COMPETITION FOR THE DESIGN, CONSTRUCTION, COMPLETION AND MAINTENANCE OF THE A9: BERRIEDALE BRAES IMPROVEMENT SCHEME

VOLUME 3 OF 5

EMPLOYER'S REQUIREMENTS

PART 1 – GENERAL REQUIREMENTS

This page is blank

COMPETITION FOR

THE DESIGN, CONSTRUCTION, COMPLETION AND MAINTENANCE OF

A9 : BERRIEDALE BRAES IMPROVEMENT SCHEME

CONTRACT NUMBER TS/MTRIPS/WKS/2017/06

INVITATION TO SUBMIT FINAL TENDER

VOLUME 3 OF 5

EMPLOYER'S REQUIREMENTS

PART 1 – GENERAL REQUIREMENTS

This page is blank

TRANSPORT SCOTLAND

COMPETITION FOR

THE DESIGN, CONSTRUCTION, COMPLETION AND MAINTENANCE OF A9 : BERRIEDALE BRAES IMPROVEMENT SCHEME

TS/MTRIPS/WKS/2017/06

INVITATION TO SUBMIT FINAL TENDER

VOLUME 3 OF 5

EMPLOYER'S REQUIREMENTS

PART 1 – GENERAL REQUIREMENTS

DOCUMENT ISSUE RECORD

I hereby confirm that this is the current version of the Employer's Requirements and supersedes all previous issues of such document by the Employer.

Signed .....

Name (Block capitals) .....

Date .....

Participant .....

Copy of signed page shall be sent to, Transport Scotland, [REDACTED].

This page is blank

COMPETITION FOR THE DESIGN, CONSTRUCTION, COMPLETION AND MAINTENANCE OF A9 : BERRIEDALE BRAES IMPROVEMENT SCHEME

VOLUME 3 OF 5

EMPLOYER'S REQUIREMENTS

PART 1 – GENERAL REQUIREMENTS

CONTENTS

1. GENERAL REQUIREMENTS

1.1 Introduction

1.1.1 Notwithstanding any other provision of the Contract, the Contractor shall be responsible for the Design, construction, completion and maintenance of the Works all in accordance with, and so as to fully comply with, all requirements and provisions of these Employer's Requirements and the Contract.

1.1.2 Notwithstanding any other provision of the Contract, Part 1, Part 2 and Part 3 of this document describe the Employer's Requirements for the Design, construction, completion and maintenance of the Works.

1.1.3 Part 1, Part 2 and Part 3 of the Employer's Requirements should be read together. Insofar as Part 2 or Part 3 may conflict or be inconsistent with Part 1, Part 2 and Part 3 shall take precedence.

1.1.4 Unless otherwise described in these Employer's Requirements, all statements refer to the whole of the Design, construction, completion and maintenance of the Works.

1.1.5 Unless otherwise described, all references to drawings identified within the Contract shall be deemed to be references to the particular revisions to such drawings identified as such in Appendix 0/4 of the Specification.

1.1.6 Within these Employer's Requirements and other parts of the Contract reference points ("**Reference Points**") are used to denote the position on the reference drawing, ("**Reference Drawings**"), as listed in Appendix 0/4 of the Specification.

1.1.7 Within these Employer's Requirements and other parts of the Contract, references to chainage are used to denote positions on the centrelines shown on the reference drawings in Appendix 0/4 of the Specification.

Reference to Left (L) and Right (R) identified within the Contract for chainage is relative to the direction of increasing chainage.

Reference to nearside identified in this Contract refers to the Left relative to the direction of increasing chainage on a single carriageway road.

Reference to offside identified in this Contract refers to the Right relative to the direction of increasing chainage on a single carriageway road.

References in these Employer's Requirements to "paragraph(s)", "Section(s)", "Item(s)", "Table(s)" and "Appendix/Appendices" shall refer to such "paragraph(s)", "Section(s)", "Item(s)", "Table(s)" and "Appendix/Appendices" of these Employer's Requirements.

References in these Employer's Requirements to "Part 1", "Part 2" and "Part 3" refer to Part 1 – General Requirements, Part 2 – Scheme Specific Requirements and Part 3 – Appendices to Employer's Requirements respectively.

1.1.8 The extent of the Land Made Available by the Employer for the Works shall be as identified on the drawings listed in Appendix 0/4 of the Specification. Any restrictions in timing of availability or other constraints shall also be identified on these drawings.

1.1.9 References to the Scottish Executive shall be deemed to mean references to the Scottish Government and shall be construed as such.

1.2 Design

1.2.1 Subject to any other provision of the Contract, the Design, construction, completion and maintenance of the Works shall comply with:

(i) The Design Manual for Roads and Bridges (DMRB) as implemented by Transport Scotland, Major Transport Infrastructure Projects acting on behalf of the Scottish Government;

(ii) the Manual of Contract Documents for Highway Works;

(iii) TS IAs;

(iv) The Traffic Signs Manual;

(v) the Specification (Vol 4);

(vi) the Certification Procedure;

(vii) Transport Scotland's 'Roads for All: Good Practice Guide for Roads';

(viii) any other specific standards and the like identified elsewhere in the Contract; and

(ix) the documents listed in Appendix M in Part 3

current at the Reference Date.

1.2.2 Subject to any other provision of the Contract the Contractor shall prepare and supervise the preparation of a Design sufficient to allow the construction, completion and maintenance of the Works, which shall:

(i) be developed from and be consistent with the Conceptual Design; and

(ii) comply with and be carried out in accordance with the requirements and provisions of these Employer's Requirements and the Contract.

1.2.3 The Contractor shall ensure that all persons identified in the Certification Procedure, as set out in Section 8 of Part 1:

(i) shall at all relevant times be appointed to carry out the procedures referred to therein; and

(ii) at all times comply with the Certification Procedure.

1.2.4 Notwithstanding any other provision of the Contract any failure by any person identified in the Certification Procedure to fulfil the requirements of such person under the Certification Procedure shall be a breach of the Contractor's obligations under the Contract.

1.2.5 The Contractor shall not commence or permit the commencement of construction of any part of the Works until the relevant pre-construction certificates (all relevant certificates necessary for the certification of the relevant part of the Design) have been submitted to the Engineer in accordance with the Certification Procedure and the Engineer has acknowledged receipt of such pre-construction certificates.

1.2.6 Notwithstanding any other provision of the Contract, where required by these Employer's Requirements the Contractor shall consult and comply without limitation with the requirements of those organisations identified in Appendix I in Part 3.

1.3 Construction

1.3.1 The Contractor shall construct, complete and maintain the Works in accordance with:

(i) the Design;

(ii) the Employer's Requirements; and

(iii) the other relevant parts of the Contract.

1.4 General Requirements

1.4.1 Subject to any other provision of the Contract, all Works, materials, workmanship and Design shall comply with:

(i) the DMRB;

(ii) the Specification (Vol 4 of 5);

(iii) the Manual of Contract Documents for Highway Works;

(iv) the Traffic Signs Manual;

(v) the Certification Procedure;

(vi) Transport Scotland's 'Roads for All: Good Practice Guide for Roads';

(vii) any other specific standards and the like identified elsewhere in the Contract; and

(viii) the documents listed in Appendix M in Part 3

current at the Reference Date.

1.4.2 Any references to The Scottish Executive or the Scottish Government, including Transport Scotland, technical memoranda shown in the appendices to these Employer's Requirements shall be read as relating to the relevant standards in the Contract.

1.4.3 Where the Contract requires a decision by the Designer which affects the standard of the Design, each decision shall be recorded and shall form part of the information accompanying the appropriate Design Certificate or Design Interim Certificate.

1.4.4 In respect of the Design, construction, completion and maintenance of the Works, any requirements that any material or article shall comply with any specified standard whether a British Standard, other named standard or otherwise, shall be satisfied by compliance with any relevant national or governmental standard of any member state of the European Union, or any relevant international standard recognised in such a member state, provided that in either case the standard in question offers guarantees of safety, suitability and fitness for purpose equivalent to those offered by the standard which is identified in the Contract.

1.4.5 In respect of the Design, construction, completion and maintenance of the Works, any requirement to use material or an article which is defined by reference to a named supplier or manufacturer or a specified Quality Assurance Scheme or Agrément Board Certificate, or which is registered with or has otherwise received the approval of the Employer shall be satisfied using material or an article which has received equivalent approval in another member state of European Union provided that the material or article in question is as safe, suitable and fit for the relevant purpose as material or an article complying with the requirement as identified in the Contract.

1.4.6 Existing materials, street furniture, or infrastructure may only be reused where such material fully satisfies the Specification and the relevant codes, schemes, and Certification Procedure and shall be clearly identifiable and accompanied by all relevant and necessary certificates before they shall be used in the Works.

1.4.7 The advice contained in the various standards and advice notes within the Contract represents best industry practice.

For the purposes of the Contract, Good Industry Practice shall be applied at all times.

In the context of any part of the Design, where any ambiguity shall be raised by either:

(i) the Contractor;

(ii) the Designer;

(iii) the Checker; or

(iv) the Engineer

as regards such advice and/or its application in terms of Good Industry Practice and where such ambiguity cannot be resolved between the Contractor and the Engineer, then the resolution shall be by written reference by the Contractor via the Engineer to the Overseeing Organisation as identified in the DMRB.

The decision of the Overseeing Organisation as identified in the DMRB shall be final.

Such decision of the Overseeing Organisation as identified in the DMRB shall be notified in writing to the Contractor by the Engineer within 7 days of such decision having been reached.

1.4.8 The Design, construction, completion and maintenance of the Works shall be in accordance with Section 7.6.1.

1.5 Provision of Records and Information

1.5.1 Notwithstanding any other provision of the Contract, in respect of the Design, construction, completion and maintenance of the Works, the Contractor shall provide the records and information identified in Section 7 of Part 1.

1.5.2 Property Schedule of Condition Surveys

1.5.2.1 The Contractor shall carry out a risk assessment of the effects the Design, construction, completion and maintenance of the Works may have on the structural integrity of adjacent roads, railways, buildings, structures and the like.

1.5.2.2 The Contractor shall arrange for Property Schedule of Condition Surveys to be undertaken in relation to those roads, railways, buildings, structures and the like that the Contractor considers appropriate relative to their proximity to the Works in advance of any Works commencing.

1.5.2.3 As a minimum requirement such roads, railways, buildings, structures and the like identified in Appendix V in Part 3 shall have a Property Schedule of Condition Survey undertaken.

1.5.2.4 Such surveys shall be carried out by a Chartered Engineer / Structural Engineer / Surveyor, as appropriate, in accordance with 'IStructE's Guide to: Surveys and Inspections of Buildings and Associated Structures' (IStructE, 2008). Prior to undertaking any such survey, the qualifications and experience of the Chartered Engineer / Structural Engineer / Surveyor, as appropriate, which the Contractor intends to use to carry out the surveys shall be submitted for the written consent of the Engineer.

Such surveys shall be carried out in two stages as follows:

(i) The first stage shall consist of pre-construction start Property Schedule of Condition Surveys including photographic records to be carried out prior to the commencement of any Works.

Two copies of the pre-construction start Property Schedule of Condition Survey records and reports shall be completed and forwarded to the Engineer in advance of any Works commencing.

(ii) The second stage shall consist of post-construction completion Property Schedule of Condition Surveys including photographic records to be carried out within 4 weeks after the issue of the Certificate of Completion for the whole of the Works, or where relevant, a Section.

Two copies of the post-construction completion Property Schedule of Condition Survey records and reports shall be completed and forwarded to the Engineer within 8 weeks of the issue of the Certificate of Completion for the whole of the Works, or where relevant, a Section.

1.5.2.5 In respect of all such Property Schedule of Condition Surveys, the Contractor shall arrange entry to the properties with the property owners.

1.5.2.6 This entry arrangement shall be in writing with a copy of this correspondence issued to the Engineer.

1.5.2.7 The Contractor shall provide the property owners with a copy of both the pre-construction and post-construction Property Schedule of Condition Surveys within 4 weeks of issue to the Engineer.

1.6 Disruption During Construction

1.6.1 The Contractor shall ensure that disruption to road users and other third parties during construction, completion and maintenance of the Works shall be kept to the minimum possible.

1.6.2 The Contractor shall ensure that there shall be adequate alternative provision of an appropriate standard for all vehicular, pedestrian, and animal traffic to all existing roads, Non-Motorised User (NMU) facilities, accesses and premises adjacent to or affected by the Works.

1.7 Temporary Traffic Management

1.7.1 Notwithstanding any other provisions of this Contract, the Contractor shall consult and comply with the requirements of the relevant roads authorities, Transport Scotland and Police Scotland on all temporary traffic management proposals including but not limited to temporary and rolling closures, diversions, and speed restrictions.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

The relevant roads authorities are outlined in Section 1.7 of Part 2.

Contact details for Police Scotland are outlined in Section 1.7 of Part 2.

1.8 Further Requirements

1.8.1 Refer to Part 2 – Scheme Specific Requirements.

1.9 Sustainability

1.9.1 General

1.9.1.1 The Contractor shall appoint a person with suitable experience in the delivery of sustainability measures on major infrastructure projects to act as the sustainability manager.

1.9.1.2 The sustainability manager shall work with the Employer to develop, manage and maximise the delivery of sustainability initiatives as part of the Works.

1.9.2 Reporting

1.9.2.1 The sustainability manager shall produce a sustainability progress report for discussion at the monthly progress meeting with the Employer. The sustainability progress report shall include but not be limited to the following:

(i) information on progress in delivering sustainability objectives and targets through the tracking of appropriate indicators; and

(ii) sustainable materials planning (to include a comparison between estimated material quantities and quantities actually used, with a monthly report on the progress in delivering targets).

1.9.3 Training, Communications and Awareness

1.9.3.1 The Contractor shall develop a training and communications programme to ensure that all operatives, staff and sub-contractors are aware of the sustainability, energy and carbon management objectives and targets

associated with the Works and their responsibilities in this regard, and of any Site-specific issues.

1.9.4 Materials and Resource Sourcing

1.9.4.1 The Contractor shall produce a "Responsible Sourcing Code of Practice" for the Works based on the BRE Sustainability Standard – BES 6001: Issue 3 Framework Standard for the Responsible Sourcing of Construction Products. This shall set out key principles and guidance in relation to supply chain management, stakeholder engagement, management systems and site stewardship relevant to the Works.

1.9.4.2 The Contractor shall ensure that the Responsible Sourcing Code of Practice is in place within one month of the Date for Commencement of the Works and continually implemented until the date of the Certificate of Completion has been issued and that it is implemented and adhered to. The code of practice shall ensure that the following objectives are met:

(i) to source all materials responsibly; and

(ii) to ensure that all timber-based products (either temporary or permanent) are sourced from Forest Stewardship Council certified (or equivalent) sustainably managed forests.

1.9.5 Transportation of Materials

1.9.5.1 The Contractor shall prepare a materials transportation strategy that shall ensure that the impacts of transport (impacts caused by the transportation of materials to and from the Works) are kept to a minimum.

1.9.6 Waste Management

1.9.6.1 The Contractor shall produce a "Waste Management Plan" as specified in Appendix 1/24 of the Specification. This shall cover all the regulatory and best practice requirements relating to the planning and delivery of Site waste management.

1.9.6.2 The Contractor shall have a specific documented approach to waste minimisation that will feature in the Waste Management Plan to ensure that no unnecessary waste arisings go to landfill. This will contain targets to reduce, re-use and / or recycle waste.

1.9.6.3 The Contractor shall, to the extent reasonable and practicable, ensure that effective waste minimisation and management shall also be delivered.

1.9.6.4 The Contractor shall not commence or permit the commencement of any aspect of the Works or any other matters for which the Contractor shall be responsible under the Contract before those parts of the Waste Management Plan which concern such parts of the Works or such other matters have been approved in writing by the Engineer.

1.9.6.5 The Contractor shall from time to time as circumstances change from that considered when the Waste Management Plan was originally produced submit to the Engineer for approval any changes to the Waste Management Plan to continue to comply with the provisions of the Contract.

1.9.6.6 The Contractor shall make a condition in each and every sub-contract and order for goods and services including Design services whereby sub-contractors and suppliers shall for the term of the Contract comply with the requirements of the Waste Management Plan for the purpose of ensuring and demonstrating the services or goods provided conform with the relevant provisions of the Contract.

1.9.6.7 Notwithstanding any other provision of the Contract the Contractor shall provide to the Engineer or the Employer such information as the Engineer or the Employer may reasonably require to demonstrate the Contractor's compliance with this Section 1.9.6.

1.9.7 Storage and Handling of Materials

1.9.7.1 The Contractor shall produce, as part of the Waste Management Plan, a soil and associated materials handling and management plan to minimise the impact of soil and materials storage and handling on the environment. This shall be based on the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites published by DEFRA in 2009.

1.9.7.2 An assessment of soils and sub-soils to be reused shall be undertaken to identify any potential risks to human health or the water environment during and after construction.

1.9.7.3 The Contractor shall:

(i) clearly identify all soil resources, grades of earthworks, fill and aggregate materials;

(ii) design appropriate storage areas for each category of soil, fill and aggregate material;

(iii) plan the location of storage areas to minimise transportation movements on the Site;

(iv) screen designed storage areas for environmental risk;

(v) ensure all stockpiles have suitably designed protection (e.g. seeding to prevent erosion); and

(vi) find a sustainable use for any surplus soils on the Site (both topsoil and subsoil).

1.9.7.4 The Contractor shall use appropriate storage methods for any construction materials.

1.9.7.5 The Contractor shall, where reasonable and practicable, select plant for use on Site which minimises the environmental impacts experienced. The impacts to be considered include, but are not limited to, material transfer, compaction and waterlogging.

1.9.7.6 The Contractor shall clearly explain and communicate the Code of Practice for the Sustainable Use of Soil and accompanying method statement to all relevant staff. Compliance with this code shall be checked and verified by the Contractor.

1.9.8 Carbon Footprint Calculations

1.9.8.1 The Contractor shall calculate an embodied carbon footprint for the Works and provide a baseline carbon footprint to the Employer within 60 days of the Date for Commencement of the Works.

1.9.8.2 The Contractor shall utilise and maintain the carbon calculator contained within the Transport Scotland Carbon Management System ("CMS") to monitor the embodied carbon footprint of the Works.

1.9.8.3 The Contractor shall consult and comply with the requirements of the parties identified in Section 1.9.1 of Part 2 in connection with the Transport Scotland Carbon Management System (CMS).

1.9.8.4 During the construction and completion of the Works, the Contractor shall track any deviations from the estimated carbon footprint calculated. Should any deviation occur which increases the carbon footprint being generated,

the Contractor shall, to a reasonable and practicable extent, take appropriate actions to generate a corresponding reduction in the footprint.

1.9.9 Energy Management

1.9.9.1 The Contractor shall formulate an "Energy Management Plan" which will consider the energy consumption of the Works. This shall demonstrate actions taken to:

(i) use energy efficient plant (after consideration of the use and maintenance of construction plant); and

(ii) run an energy efficiency programme on Site (e.g. cutting out unnecessary heating, switch-off campaigns, etc.).

1.9.9.2 The Contractor shall maintain all construction plant and ancillary equipment to maximise fuel efficiency and minimise as far as practicable carbon emissions.

1.9.9.3 The Contractor shall explore opportunities for using energy derived from renewable (i.e. low- or zero-carbon) resources during construction and where practicable implement them.

1.10 Communications

1.10.1 General

1.10.1.1 All communications relating to the Contract must be approved by the Employer prior to delivery. The Contractor shall provide all support deemed necessary to the Employer in the implementation of all project communications for the duration of the Works.

1.10.1.2 To enable the effective management and delivery of communications with external parties including:

(i) stakeholders;

(ii) communities; and

(iii) media

the Contractor shall comply with the Employer's communications protocols and shall attend regular communications meetings as defined in Section 1.10.2 of Part 2.

1.10.1.3 The Employer's communications protocols shall set out the roles, responsibilities and actions applicable to the Employer and the Contractor. The Contractor shall specify how he will fulfil the communications requirements of the Contract in a Communication Implementation Plan.

1.10.1.4 Upon the Date for Commencement of the Works the Contractor shall provide the following:

(i) a Community Liaison Officer in accordance with Section 1.10.1 of Part 2 of these Employer's Requirements;

(ii) a fully implementable enquiries and complaints procedure; and

(iii) a dedicated Freephone 24-hour contact 'hotline', as defined in Section 1.10.6.

(iv) Communication Implementation Plan

(v)

1.10.2 Communications Meetings

1.10.2.1 Communications meetings shall be held monthly, or at other intervals as required and directed by the Employer. The meetings shall be chaired by the

Employer and the Contractor shall be in attendance. In order to allow immediate consideration and potential discussion prior to and at the next communications meeting, the Contractor shall notify the Employer, as soon as practicable, of any stakeholder, community group or media issues which:

(i) are likely to be controversial;

(ii) are likely to attract national or regional interest;

(iii) are likely to affect the local community;

(iv) relate to trade press interest;

(v) relate to public or private conferences and presentations; or

(vi) request or require a meeting or briefing.

1.10.3 General Communications Requirements

Public Statements and the Like

1.10.3.1 The Contractor shall not make any public statements, public announcements, speeches or presentations in relation to the Works in whole, or in part, without prior written approval from the Employer. This includes, but is not limited to, participation at professional conferences and seminars as well as any statements to the media.

Contact Persons Database

1.10.3.2 The Contractor shall retain and update a Contact Persons Database, which lists contact details for stakeholders including any individual, household, group, business or the like, affected by the Works. The Employer shall be granted full access to the Contact Persons Database at any time.

1.10.3.3 The Contractor shall be responsible for notifying owners / occupiers of nearby properties, businesses, community councils and other relevant parties regarding any element of the Works which have a significant impact on them a minimum of 14 days before any such Works begin on Site. All notifications shall be prepared by the Contractor and submitted to the Employer for approval a minimum of 7 days prior to the intended date of issue. The distribution of all media by the Contractor shall be in accordance with data protection laws.

1.10.3.4 In exceptional circumstances, where the 7 day timescales defined in 1.10.3.3 above cannot be met, the Contractor shall ensure that the Employer is notified as soon as practicable. However, under no circumstances shall the Contractor issue correspondence without prior written approval of the Employer.

Project Website

1.10.3.5 The Contractor shall support the enhancement of the Employer's project website during Design, construction and completion of the Works, to facilitate community liaison and communicate relevant works information. This shall include, but is not limited to, the use of multimedia and social media engagement tools as appropriate. The Contractor shall also be expected to support any future advances in website related communications which may become available to the Employer during this time.

1.10.3.6 The Contractor shall not commission, host or maintain any website or other online communications channel relating to the project.

1.10.3.7 All photography, videos, webcams and the like shall be provided in accordance with Appendix 1/22 to the Specification.

1.10.3.8 The Contractor shall provide a comprehensive monthly construction progress update, written in plain English and supported with copy photographs and / or relevant information, to form the basis for project website updates, quarterly newsletters and monthly updates.

Newsletter

1.10.3.9 The Contractor shall procure and produce a regular newsletter.

1.10.3.10 The Contractor shall procure the printing of the newsletters.

1.10.3.11 The Contractor shall procure the distribution of the newsletters to identified contacts on the Contact Persons Database and to local libraries. The Contractor shall distribute the newsletter in electronic PDF format where requested.

Advertising

1.10.3.12 The Contractor shall be required to procure additional advertising this includes, but not limited to special flyers, media advertising in advance of upcoming construction events which have a significant impact on the general public as identified by the Contractor or the Employer.

1.10.3.13 The Contractor shall procure the printing and distribution of any advertising. The Contractor shall agree the quantity of advertising to be produced with the Employer.

Project Sign Board

1.10.3.14 The Contractor shall supply and install a project sign board in accordance with Appendix 1/21 to the Specification.

1.10.3.15 The Contractor shall erect the project sign board prior to the commencement of the Works.

1.10.3.16 The Contractor shall remove the project sign board upon the removal of the Contractor's Site compound.

Publicity Sign Boards

1.10.3.17 The Contractor shall provide and display information on publicity sign boards pertaining to the scope of the Works and their progress, in accordance with Appendix 1/21 of the Specification.

1.10.3.18 The Contractor shall erect the publicity sign boards prior to the ccommencement of the Works.

1.10.3.19 The publicity sign boards shall be removed by the Contractor upon the issue of the Certificate of Completion.

Material Branding

1.10.3.20 All communications materials, including Site signage, shall be produced in accordance with the corporate guidelines provided by the Employer and in accordance with Appendix 1/21 to the Specification.

1.10.3.21 Project website updates, quarterly newsletters and monthly updates issued by the Employer, shall carry Employer approved corporate branding and include a Contractor logo as agreed by the Employer.

1.10.3.22 Any Works related or Employer corporate branding produced by the Contractor shall be submitted to the Employer for agreement and approval in advance of public use to ensure consistency with the Employer's corporate guidelines.

1.10.4 Meetings, Events and Site Visits

1.10.4.1 The Contractor shall assist the Employer with the preparation of a draft invitation / notification list for any meetings and events a minimum of 14 days prior to the proposed meeting date.

1.10.4.2 The Contractor shall chair all attended meetings and briefings with community groups, affected parties and the like, unless otherwise agreed with the Employer. In addition, the Contractor shall be required to support, chair and input into meetings with stakeholders or the media where required by the Employer.

1.10.4.3 At the request of the Employer, the Contractor shall facilitate media events to the Site for Ministers and other dignitaries. The Contractor shall also facilitate other visits to the Site for stakeholders, community groups, media representatives, industry representatives and the like. The Contractor shall provide and maintain all necessary safety clothing and equipment to allow these visitors to access the site in compliance with site rules.

1.10.4.4 The Employer may require the Contractor to provide and facilitate public drop-in events at a time and venue to be agreed with the Employer, a minimum of six weeks prior to the proposed drop-in event date. These drop-in events will consist of presentations showing construction progress or informing on upcoming work as well as addressing questions posed by attendees. Protocols shall be agreed with the Employer in advance of the drop-in events.

1.10.5 Contacts Log

1.10.5.1 The Contractor shall record all communications, correspondence, enquiries, complaints, and responses with any stakeholders, community groups, media, affected parties and the like, within a contacts log, which shall be maintained throughout the Design, construction and completion of the Works.

1.10.5.2 The contacts log shall be maintained in electronic format (Microsoft Excel or other compatible software) and for all communications, correspondence, enquiries, complaints and responses, shall include as a minimum:

(i) date received / responded;

(ii) geographic area from where the communications, correspondence, enquiries or complaints originated;

(iii) nature of enquiry / complaint / response;

(iv) name of employee who received the communication;

(v) name of employee dealing with response; and

(vi) current status.

1.10.5.3 The Contractor shall update the log as necessary to include:

(i) the measures taken to investigate, deal with or address communications, correspondence, enquiries or complaints; and

(ii) the timescale taken to respond to or address communications, correspondence, enquiries or complaints.

1.10.5.4 Complaints shall be accurately noted in the contacts log as received and the Contractor shall advise the Employer as soon as practicable of all key communications received. The contacts log shall form the basis of the summary for the monthly report at the communications meetings.

1.10.5.5 Notwithstanding the requirements of Section 1.10.2 of Part 2, the Contractor shall provide to the Employer on a monthly basis detailed and summary information from the contacts log.

1.10.6 Freephone 24-hour Contact 'Hotline'

1.10.6.1 The Contractor shall establish a dedicated Freephone 24-hour telephone contact 'hotline' in addition to an email address, fax number and postal address to deal with queries or complaints from the general public. These contact details shall be exhibited on all site notice or information boards, correspondence, newsletters, flyers and the like.

1.10.6.2 The Contractor shall establish operating and management procedures for the 24-hour 'hotline' that will meet the requirements in the protocol.

1.10.6.3 In general, responses to complaints or queries shall be prepared by the Contractor, approved by the Employer and issued by the Contractor unless otherwise instructed.

1.10.7 Stakeholder and Media Communications

1.10.7.1 The Employer shall be responsible for all stakeholder communications on all aspects of the Works including, but not limited to:

(i) political (MPs, MSPs, MEPs, Ministers, local councillors, council officials);

(ii) statutory bodies (including community councils);

(iii) operational stakeholders (utilities, emergency services, etc);

(iv) environmental groups; and

(v) industry stakeholders

unless otherwise specified in Section 1.10.5, and a detailed list of the stakeholder contacts within each category shall be included as part of the Contractor's communication protocols defined in Section 1.10.1.

1.10.7.2 The Employer shall be responsible for all community, local, regional, national and international media communications on all aspects of the Contract including, but not limited to:

(i) print (newspapers);

(ii) technical (trade media including journals); and

(iii) online (online versions of above media, blogs, social media).

1.10.7.3 The Contractor shall ensure that the Employer is notified immediately of any media enquiry and the protocols for referral of media interest and publicity procedures shall be included as part of the communication protocols defined in Section 1.10.1.

1.10.7.4 The Employer shall be responsible for the co-ordination of all responses to stakeholders, media and the like unless otherwise specified in Section 1.10.7.5 and at the request of the Employer, the Contractor shall provide assistance with responses where necessary.

1.10.7.5 The Contractor shall be permitted by the Employer to communicate directly with a stakeholder (e.g. agreed local authority officials) where delegated authority is written into the communication protocols defined in Section 1.10.1. In this instance, the Employer must agree and approve any communication or response prior to issue by the Contractor.

1.10.7.6 The Employer shall authorise and undertake any meetings or briefings with stakeholders, media and the like. At the request of the Employer, senior specialist personnel shall be made available by the Contractor to attend such meetings or briefings and provide expert assistance.

1.10.8 Community Communications

1.10.8.1 The Contractor shall be responsible for all community communications relating to all aspects of the Works, including but not limited to:

(i) local (affected) residents;

(ii) residents associations;

(iii) community groups and associations;

(iv) recreational user groups;

(v) local (affected) businesses; and

(vi) wider community including non-local commuters and businesses using the existing road network through and in the vicinity of the Works.

1.10.8.2 A detailed list of the community contacts within each category shall be included as part of the communication protocols defined in Section 1.10.1.

1.10.8.3 The Contractor shall be responsible for co-ordination of all responses to community groups unless otherwise specified in Section 1.10.1.

1.10.8.4 The Contractor shall be responsible for communicating directly with a community group unless otherwise specified in the communications protocols defined in Section 1.10.1. In this instance and at the request of the Employer, the Contractor shall provide assistance with responses where necessary.

1.10.8.5 The Employer shall authorise and undertake any meetings or briefings with statutory community groups, and other pre-defined / agreed groups unless the Employer delegates authority to the Contractor to undertake these on their behalf. At the request of the Employer, senior specialist personnel shall be made available by the Contractor to attend such meetings or briefings and provide expert assistance.

2. DESCRIPTION OF THE DESIGN AND THE WORKS

2.1 General Scheme Details

2.1.1 Scheme specific details are presented in Section 2 of Part 2.

3. SITE INFORMATION

3.1 Land Made Available by the Employer for the Works

3.1.1 Details of the limitations on use of the Land Made Available by the Employer for the Works shall be as identified in Appendix 1/7 of the Specification and the remainder of the Contract.

Any other information shown on the Land Made Available by the Employer for the Works drawings, contained in Appendix 0/4 of the Specification, including survey information and the like shall be for information only.

Such other information shall be unwarranted by the Employer and does not form a part of the Contract.

3.1.2 Subject to Sections 3.1.3 and 3.1.4, where the Contractor shall consider that as a consequence of the Design that additional land shall be required to enable the Design, construction, completion and maintenance of the Works to proceed, then they shall carry out at their expense all necessary consultations or purchases for such additional land and obtain all necessary Permissions for the required use.

This shall include assessment of potential environmental impacts resulting from the Design, construction, completion and maintenance of the Works on such additional land.

3.1.3 Prior to the construction, completion and maintenance of the Works on additional land as identified in Section 3.1.2, (unless otherwise consented to in writing by the Employer) the Contractor shall convey the ownership, title or servitude and the like of any such additional areas of land to the Scottish Ministers or to a third party nominated in writing by the Employer all at no cost and without qualification, liability or obligation to the Employer such that any future maintenance obligations of the Employer and the Scottish Ministers can be fulfilled without further recourse.

3.1.4 Notwithstanding any other provision of the Contract, where any additional Permission including planning permission, approval, consent or the like shall be required as a result of the Design or any part of the Design for any part of the Works, these shall be obtained by the Contractor from the relevant authority or relevant organisation and submitted to the Engineer prior to construction or where relevant the maintenance of that affected part of the Works proceeding.

3.1.5 Notwithstanding any other provision of the Contract, the Contractor shall consult and comply with the requirements of

(i) Transport Scotland, Major Transport Infrastructure Projects

in connection with the location of the Permanent fencing and Accommodation Works fencing for:

(a) the Land Made Available by the Employer for the Works; and, if relevant;

(b) additional land as described in Section 3.1.2.

Contact details are provided in Section 3.1 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

3.2 Permissions and the Like

3.2.1 The Contractor shall not have possession or right of entry onto land owned or reputed to be owned by any other relevant third party until any necessary or required Permissions and the like shall have been granted by the relevant third party.

3.2.2 Scheme specific requirements regarding possession or right of entry onto land owned or reputed to be owned by other relevant third parties are identified in Section 3.2 of Part 2.

The Contractor shall consult and comply with the requirements of any third party to obtain the necessary Permissions and the like to enable the Design, construction, completion and maintenance of the Works.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

In this respect the Contractor shall also refer to Appendix 1/7 of the Specification.

3.2.3 The Contractor shall consult and comply with the requirements of:

(i) Scottish Environment Protection Agency (SEPA)

in connection with complying with the requirements of the Water Environment (Controlled Activities) (Scotland) Regulations 2011 ("**CAR**") and The Water Environment (Miscellaneous) (Scotland) Regulations 2017, and with respect to obtaining the necessary Permissions and the like to enable the Design, construction, completion and maintenance of the Works. Contact details are provided in Section 3.2 of Part 2.

The Contractor shall also provide a copy of the relevant Permissions and the like as required under CAR and The Water Environment (Miscellaneous) (Scotland) Regulations 2017 to the Engineer prior to commencement of the relevant Design, construction, completion and maintenance of the Works.

3.2.4 The Contractor shall consult and comply with the requirements of the relevant local authority environmental standards department in connection with working hours and the control of noise and vibration. Contact details are provided in Section 3.2 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

3.3 Access to the Site

3.3.1 Road access to the Site shall be gained solely via classified roads subject to the requirements of Appendix 1/19 of the Specification.

3.3.2 Access to the Site from public roads shall be subject to the requirements of Appendix 1/17 and 1/19 of the Specification.

3.3.3 Notwithstanding any other provision of the Contract, the Contractor may gain entry to the Site via private land only with the prior written agreement of the landowner and occupier after having obtained any necessary planning consent or otherwise.

Access to the private land from the public road shall be to the requirements of Sections 3.3.1 and 3.3.2.

3.3.4 Notwithstanding any other provision of the Contract, the Contractor shall bear full responsibility for negotiating, paying for and bearing all costs relating to these accesses and for any matters arising with any party who considers itself to be affected by any of such accesses.

The Contractor shall assess the potential environmental impacts of any such access and ensure that any adverse environmental impact shall be avoided in the Design, construction, completion and maintenance of the Works.

3.4 Maintenance of Existing Public Roads within the Site

3.4.1 Notwithstanding any other provision of the Contract, all routine, cyclic and winter maintenance of all existing roads used by public vehicles within the Site, together with undertaking emergency response procedures and actions shall be the responsibility of those authorities identified in Section 3.4 of Part 2.

3.4.2 Notwithstanding any other provision of the Contract, the Contractor shall liaise, on a monthly basis, with the relevant roads authority(s), or their representatives, regarding matters relating to the maintenance of the trunk roads and local roads. A record of this liaison shall be forwarded to the Engineer within seven days.

3.4.3 The Contractor shall consult with the parties as identified in Section 3.4 of Part 2 and provide reasonable assistance and access, including the adjustment of existing/proposed traffic management arrangements, to enable any such party to carry out its statutory and contractual obligations in relation to the maintenance Works identified in this Section.

3.5 Statutory Orders

3.5.1 The Design shall comply with the published Made Statutory Orders and the like and the Environmental Assessment Documents as identified in Appendix S and Appendix Q in Part 3 respectively.

3.5.2 Notwithstanding any other provision of the Contract, where the Contractor shall enact further Permissions, including Statutory Orders and the like or Environmental Assessment Documents in order to accommodate the Design, construction, completion and maintenance of the Works, the Contractor shall be responsible for:

(i) any additional time and cost for Design, construction, completion and maintenance of the Works, wayleaves, material procurement and the like;

(ii) any other associated work or risks; and

(iii) all other costs and profit including those required by the Undertakers in connection with Apparatus and Private Apparatus or other similar such apparatus or equipment.

3.6 Accommodation Works

3.6.1 The Contractor shall consult and comply with the requirements of relevant landowners in connection with the provision of Accommodation Works as identified in Appendix 1/15 of the Specification (the "**Accommodation Works**").

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

3.6.2 The Contractor shall be responsible for the Design, construction, completion and maintenance of the Accommodation Works which have been agreed by the Employer with various landowners and occupiers all as identified in Appendix 1/15 of the Specification.

3.7 Public and Private Roads Accesses and Public/Private Rights of Way

3.7.1 The Design shall ensure that:

(i) all public and private roads, accesses and public/private rights of way affected by the Works shall be retained and maintained throughout the period of the Contract until alternative suitable means of access shall be provided by the Contractor; and

(ii) any agreement to alter a private road or access in any way shall be confirmed in writing by the Contractor with the appropriate landowners, occupiers and other authorised users and the Contractor shall be required to have such agreement in writing prior to any alteration to the access.

The Contractor shall assess the environmental impacts of any proposed changes to the Works and ensure that all reasonable precautions are taken to avoid or mitigate adverse environmental impacts.

A copy of any agreement together with supporting drawings shall be submitted to the Engineer prior to the Contractor carrying out any such alterations.

3.7.2 The Contractor shall consult and comply with the requirements of relevant authorities in connection with the alterations to public and private roads, accesses and public/private rights of way. Contact details for the relevant authorities are as identified in Section 3.7 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

3.7.3 The Contractor shall not construct any private access to the Works before the Engineer has acknowledged receipt of a Consultation Certificate in accordance with the Certification Procedure.

3.8 Site Security

3.8.1 If security persons, firms, organisations and the like shall be employed by the Contractor such persons, firms, organisations and the like shall be accredited to, and shall undertake their duties in accordance with, BS 7499 Static Site Guarding and Mobile Patrol Services Code of Practice.

3.8.2 Where there is the requirement for the procurement of security industry services through any contract or subcontract, the Contractor shall ensure that any contractor or subcontractor be registered with the Security Industry Authority (SIA) Approved Contractors Scheme for the category of service being provided / performed under the contract or subcontract.

3.8.3 Notwithstanding any other provisions of the Contract, throughout the duration of the Design, construction, completion and maintenance of the Works the Contractor shall consult with Police Scotland on a regular and as necessary basis with regard to the security and protection of:

(i) the Works;

(ii) all persons entitled to be upon the Site; and

(iii) the Site.

Contact details for Police Scotland are provided in Section 3.8 of Part 2.

4. DESIGN CRITERIA

4.1 Standards

4.1.1 Notwithstanding any other provision of the Contract, the Design shall comply with the standards and requirements as identified in Section 1.4 of this Part 1.

4.1.2 The Design shall be subject to the written acknowledgement of receipt by the Engineer as required by the Certification Procedure.

No part of the Works shall commence until all the relevant part(s) of the Certification Procedure shall have been completed including the written acknowledgement and receipt by the Engineer.

4.1.3 Notwithstanding any other provision of these Employer's Requirements the Contractor shall consult and comply with the requirements of the parties as identified in Section 4.1 of Part 2 in connection with the Design for the side roads, as identified in Appendix A in Part 3.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2 Road Design Criteria

4.2.1 Road Design Standard

4.2.1.1 Design Speeds

The Design speeds that shall be adopted for the purpose of the alignment Design shall be as identified in Appendix A in Part 3.

4.2.1.2 Cross Section

The Design shall ensure that:

(i) carriageway dimensions, as a minimum, shall be as identified in Appendix A in Part 3;

(ii) on sections of road with radii greater than that shown in Table 3 of TD 9 of the DMRB (minimum radii without elimination of adverse camber and transitions), the crossfall or camber shall be 2.5% from the centre of single carriageways, or from the central reserve of the dual carriageways / motorways to the outer channels; and

(iii) there shall be no rolling crowns within the Design.

4.2.1.3 Horizontal Alignment

Subject to any other provision of the Contract the horizontal road geometry Design shall comply with the relevant Design speed identified in Appendix A in Part 3.

The Design shall ensure that:

(i) the horizontal alignment for all trunk roads, side roads, Accommodation Works tracks, NMU facilities and the like shall extend as a minimum to the Reference Points as relevant identified on the Reference Drawings and shall tie-in with the existing road network at or beyond such Reference Points as identified in Appendix A in Part 3.

4.2.1.4 Vertical Alignment

Subject to any other provision of the Contract the vertical road geometry Design shall comply with the relevant Design speed identified in Appendix A in Part 3.

The Design shall ensure that:

(i) the vertical alignment for all trunk roads, side roads, Accommodation Works tracks, NMU facilities and the like shall extend as a minimum to the Reference Points as relevant identified on the Reference Drawings and shall tie-in with the existing road network at or beyond these reference points as identified in Appendix A in Part 3.

4.2.1.5 Junctions

The Design shall ensure that:

(i) all junctions between roads including those identified in Appendix A in Part 3 and all accesses including agricultural accesses and other roads controlled by local authorities and the like shall be in accordance with the DMRB and the requirements of the relevant Local Authority.

4.2.1.6 Closure of Existing Roads, Junctions, Lay-bys and Accesses

The Design shall ensure that:

(i) unless otherwise stated in Appendix A in Part 3, the closure of existing roads, junctions, lay-bys and accesses shall be achieved by removal of existing hard materials followed by reinstatement in materials and to levels to match the adjacent existing verge or central reserve, with the addition of suitable drainage; and

(ii) fencing and gates associated with the closure of existing roads, junctions and accesses shall be as identified in Appendix 1/15 of the Specification.

4.2.1.7 Lay-bys and Bus Lay-bys

The Design shall ensure that:

(i) Notwithstanding any other provision of the Contract the Design for all the lay-bys listed in Appendix A in Part 3 shall be in accordance with the geometric layout of a Type A lay-by with a merge taper and the overall requirements of TD 69 of the DMRB and requirements as identified in Appendix A in Part 3.

4.2.1.8 Accesses

The Design shall ensure that a longitudinal gradient of between 2.5 percent and 5 percent shall be provided on all accesses over a minimum length of 6 metres from the adjacent carriageway edge. Unless otherwise stated in Appendix A, Table 4 in Part 3, the Design shall ensure that:

(i) all accesses, except field accesses, shall be a minimum of 3.5 metres wide and incorporate horizontal radii sufficient to accommodate any turning movement by a UK Freight Transport Association Design Articulated Vehicle (1998) (16.48 metres long) to form the junction with the adjacent carriageway, unless otherwise identified in Appendix A in Part 3;

(ii) where a new access shall be replacing an existing access, the width of new accesses and verges shall not be less than the existing width;

(iii) to aid surface water treatment, all accesses shall incorporate a one metre minimum verge width on each side of the access, unless otherwise stated in Appendix A in Part 3; and

(iv) all accesses shall extend from the edge of the reference carriageway for a minimum length of 9 metres or to the adjacent road boundary whichever shall be the greater unless identified otherwise in Appendix A in Part 3.

4.2.1.9 Carriageway Tie-ins

The Design shall ensure that:

(i) there shall be a safe transition between new and existing carriageways;

(ii) there shall be a smooth horizontal and vertical alignment for the carriageway at tie–ins to existing roads;

(iii) the tie-in Design shall be unique for each location with particular reference to road widths, Design speed, alignment curvature and sight distances together with road markings, surface texture, signing and any other relevant Design criteria;

(iv) tie-ins to existing roads shall have verge widths as identified in Appendix A in Part 3 to a point 10 metres from the limit identified on the relevant Reference Points as identified in the Reference Drawings and thereafter the width shall taper linearly to the existing verge width; and

(v) where necessary the carriageway shall incorporate a taper of 1 in 10 to tie into the existing side road at the limit of the new side road construction.

4.2.1.10 Side Roads

Notwithstanding any other provision of the Contract the Design for all the side roads listed in Appendix A in Part 3 shall be in accordance with the requirements of the relevant local authority and requirements as identified in Appendix A in Part 3.

4.2.1.11 Provision for Non-Motorised Users

The Design shall ensure that:

(i) new NMU facilities shall be incorporated as identified in Appendix A in Part 3;

(ii) all NMU facilities shall be in accordance with Transport Scotland's 'Roads For All: Good Practice Guide for Roads', and Transport Scotland's 'Cycling by Design 2010', unless identified otherwise in Appendix A in Part 3;

(iii) suitable provision for the use of existing or new roads and tracks by NMUs shall be as identified in Table 2 of Appendix A in Part 3;

(iv) refer to Section 4.2.8 of Part 1 for further Design criteria; and

(v) The Contractor shall consult and comply with the requirements of the relevant authority as is outlined in Section 4.2.1 of Part 2 in connection with NMU facilities.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.1.12 Visibility Envelopes

The Design shall ensure that:

(i) visibility envelopes have a layout and suitable surface to permit cyclic maintenance cutting of grass or other vegetation;

(ii) such envelopes shall not be obstructed by proposed or existing bridges, signing or landscape; and

(iii) visibility splays at junctions meeting the new trunk road should be in accordance with Paragraphs 7.3-7.13 and Figure 7/1 of TD 42 of the DMRB.

4.2.1.13 Maintenance Crossovers

The Design shall ensure that:

(i) all crossovers shall be in accordance with the requirements in Section 4.2.1.7 of Part 2; and

(ii) the Contractor shall provide new crossovers in accordance with TA 92 of the DMRB.

4.2.1.14 Turning Areas

The Design shall ensure that:

(i) all turning areas shall be in accordance with the requirements in Table 2 of Appendix A in Part 3; and

(ii) all turning areas shall be in accordance with SCOTS National Roads Development Guide.

4.2.1.15 Access Roads and Tracks

The Design shall ensure that:

(i) all access roads and tracks shall be in accordance with the requirements in Table 3 of Appendix A in Part 3; and

(ii) where Access Roads/Tracks shall be used by Non-Motorised Users as identified in Appendix A in Part 3, the maximum gradients identified in the document listed in Section 4.2.8.3 of this Part 1 shall be applied.

4.2.2 Site Clearance

4.2.2.1 The Design shall ensure that:

(i) any trees which shall be required to be felled to accommodate the Design shall be felled and disposed of with the exception of those required to fulfil the requirements of Sections 4.2 and 4.4 and Part 2, Section 4.2.2.3; and

(ii) those buildings and structures as identified in Appendix 2/1 of the Specification shall be removed.

The Contractor shall consult his Landscape Architect and Ecologist on all aspects of the proposed site clearance.

The Contractor's Landscape Architect and Ecologist shall validate the site clearance Design via a Consultation Certificate in accordance with the Certification Procedure prior to any such Works commencing.

4.2.2.2 The Contractor shall consult and comply with the requirements of:

(i) Transport Scotland, Trunk Road and Bus Operations (TRBO)

in connection with trunk road site clearance and whose contact details are as identified in Section 4.2.2 of Part 2; and

(ii) with the relevant local authority

in connection with side road site clearance and whose contact details are as identified in Section 4.2.2 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.3 Fencing and Environmental Barriers

4.2.3.1 General

The Design shall ensure that:

(i) watergates on fencing shall be provided at all watercourse locations where stock or wildlife proof fencing shall be provided;

(ii) all gates at accesses shall allow for the gates to open away from the carriageway only; and

(iii) notwithstanding any other provision of the Contract all defective and damaged fencing shall be immediately repaired to ensure that the Site shall be stock proof until such time as the walling, permanent fencing, and accesses shall be complete.

4.2.3.2 Temporary Fencing, Gates and the like

The Design shall ensure that:

(i) the temporary fencing shall be either type 1 or 3 as shown on drawings H1 and H2 in the Highway Construction Details, except where wildlife proof fencing is required.

4.2.3.3 The Contractor shall consult and comply with the requirements of

(i) relevant landowners

in connection with the lengths of the Site boundary which shall require to have temporary stock proof fencing erected or the permanent fencing erected if the Contractor chooses this option, and the position of all gates and animal accesses.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.3.4 Permanent Fencing, Walling, Gates and the Like

The Contractor shall satisfy himself of the adequacy of his Design and shall ensure that as a minimum his Design includes for:

(i) permanent fencing, gates, walling and other such features, as identified in Appendix 1/15 of the Specification. This fencing shall include fencing between the corners of adjacent fields/land which ties into bridges and Structures, where appropriate;

(ii) where storage, attenuation, settlement lagoons / soakaways, settlement ponds, basins or other such features shall be required to be formed as part of the drainage measures an appropriate risk assessment shall be carried out by the Contractor to determine whether fencing is required and if so an appropriate form of fence and lockable gate is to be designed, executed and completed. This fencing shall include a 300 millimetre concrete or blockwork strimming strip along the length of the fence. The Contractor shall provide a padlock and two sets of keys for each gate to the Employer;

(iii) unless otherwise identified in these Employer's Requirements, permanent fencing shall be a minimum of 3 metres from the earthworks limits other than in areas where wildlife proof fencing is specified, or otherwise agreed by the Engineer. Where no permanent fencing exists, the permanent limit of the Land Made Available by the Employer for the Works shall be a minimum of 3 metres from the earthworks limits, unless otherwise agreed with the Engineer. No subsurface elements shall extend beyond the permanent fencing limit;

(iv) the location of fencing shall follow a smooth and flowing vertical and horizontal alignment;

(v) where permanent fencing is located along the boundary of the Land Made Available by the Employer for the Works, the fence shall be set parallel to the boundary of the Works with the fence posts contiguous to the boundary and with the fence within the Land Made Available by the Employer for the Works;

(vi) notwithstanding any other provision of the Contract the line of the permanent fencing shall be set out in such locations as shall have the written consent of the Engineer prior to any fencing Works having commenced;

(vii) the location and erection of any fencing Works shall have the written consent of the Engineer before such Works have commenced; and

(viii) Notwithstanding the other provisions of this Contract, the Contractor shall undertake a risk assessment on all fencing provision to confirm that this is appropriate to the location and adjacent land use and the fencing constructed should be as a minimum dependant on the characteristics of each specific area of construction. Where any conflict is identified with the Employer's Requirements this shall be reported to the Engineer.

4.2.3.5 Fencing for Wildlife

(i) Where fencing for wildlife is required, separate fencing shall be provided in addition to the accommodation works fencing. The fenceline should be installed inside the Land Made Available by the Employer for the Works, at an offset of 1 metre from this boundary to allow the turned mesh to remain within the Land Made Available. Adjacent landowners should be informed that the fence line does not mark the extent of land ownership.

(ii) Where fencing for badgers is required it shall be designed in accordance with "Badgers and Development" (SNH, 2002).

4.2.3.6 Deer Fencing

The Contractor shall undertake a risk assessment, taking account of Transport Scotland's strategic deer management planning, the Trunk Road Operating Contractor's deer management plan and SNH's "Code of Practice on Deer Management" (SNH, 2012). The Contractor shall take appropriate measures such as erection of deer fencing so as to avoid increasing the risk of deer collisions on the road and to protect new planting areas from browsing.

4.2.3.7 The Contractor shall consult and comply with the requirements of

(i) Transport Scotland: Major Transport Infrastructure Projects

in connection with permanent fencing, gates and the like to be constructed other than that identified in Appendix 1/15 of the Specification. Contact details are as identified in Section 4.2.3 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.4 Road Restraint Systems (Vehicular and Pedestrian)

4.2.4.1 The Design shall ensure that:

(i) subject to any other provision of the Contract, road restraint systems shall be provided for all roads, including existing roads, identified in Appendix A in Part 3, in accordance with TD 19 of the DMRB;

(ii) in addition to the criteria for the provision of road restraint systems, the Contractor shall carry out a risk assessment to determine additional areas within the Design where the provision of road restraint systems shall be provided;

(iii) where road restraint systems shall be provided in the same area as sign posts, street lighting and the like then all such sign posts, street lighting and the like shall be located to the rear of the road restraint systems;

(iv) gaps of less than 100 metres in the verge road restraint systems shall be infilled with a similar type of road restraint systems to the adjacent lengths;

(v) road restraint systems shall be erected to ensure that a smooth and flowing vertical and horizontal alignment shall be achieved on the arrival to, and the departure from, any Structure;

(vi) the taper shall be no steeper than 1:50 relative to the road alignment unless otherwise agreed with the Engineer, in which case the requirements of TD19 of the DMRB shall be met as a minimum;

(vii) where reinforced soil Structures or other Structures utilising precast soil retaining panels shall be provided in the Design adjacent to the carriageway then the fixing of road restraint systems directly to these precast panels shall not be permitted in the Design;

(viii) permanent vertical concrete barrier shall not be permitted in the Design;

(ix) Safety barrier posts to be set in bound materials in excess of 40mm thick shall be installed in sockets and that the top surface of passive filler to sockets shall be finished flush with the surrounding surface. Any unused post sockets shall be fitted with caps; and

(x) On Trunk Roads, all terminals on road restraint systems shall have a minimum Performance Class of P4.

4.2.4.2 TD 19 of the DMRB requires that Working Width shall be specified by the Design Organisation.

(i) The Design Organisation in relation to such Working Widths shall be the Designer.

4.2.4.3 Notwithstanding the requirements of TD 19 of the DMRB, any road restraint systems incorporated in the Design shall have an impact severity level of either A or B as identified in Table 3 of BS EN 1317-2 together with the relevant test report results to demonstrate that the appropriate index values have been achieved.

4.2.4.4 The Contractor shall consult and comply with the requirements of

(i) Transport Scotland, Trunk Roads and Bus Operations

in connection with the location and type of anti-glare screens between the side roads and access tracks and the new trunk roads being provided. Contact details are as identified in Section 4.2.4 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.4.5 The Contractor shall consult and comply with the requirements of

(i) Transport Scotland, Trunk Roads and Bus Operations

in connection with the design of road restraint systems along the side roads, access tracks and the new trunk roads. Contact details are as identified in Section 4.2.4 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.4.6 At any new central reserve maintenance crossovers the central reserve road restraint systems shall be demountable. The removal of the road restraint systems shall not be detrimental to the effectiveness of the adjacent sections of the vehicle restraint systems.

4.2.4.7

4.2.5 Drainage and Service Ducts

4.2.5.1 The Contractor shall consult and comply with the requirements of SEPA in connection with the drainage design including but not limited to drainage outfalls, culverts and works on all inland watercourses. Contact details are as identified in Section 4.2.5 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.5.2 The Contractor shall consult and comply with the requirements of the relevant local authority and Transport Scotland, Trunk Road and Bus Operations, as appropriate, regarding the connection of the proposed drainage to the existing road drainage network. Contact details are as identified in Section 4.2.5 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.5.3 The Contractor shall consult and comply with the requirements of the relevant local authority with respect to the design of drainage to the side roads.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

The Contractor shall not discharge water from the Site on either a temporary or permanent basis until he has consulted and complied with the requirements of all interested parties including:

(i) Scottish Environment Protection Agency (SEPA);

(ii) Scottish Water;

(iii) the relevant local authority; and

(iv) the relevant trunk road operating company.

Contact details for each party are provided in Section 4.2.5 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.5.4 Notwithstanding any other provision of the Contract, the Contractor shall, prior to the Date for Commencement of the Works, give written notification to SEPA of the intended Date for Commencement of the Works.

4.2.5.5 General Drainage

The Design shall ensure that:

(i) account shall be taken of CIRIA Report C753 "The SuDS Manual" and all surface water runoff from the new trunk road shall pass through Sustainable Drainage Systems, as defined in CIRIA Report C753, prior to outfalling into any watercourse, unless otherwise consented in writing by SEPA. The number of levels of treatment shall be as identified in Section 4.2.5 of Part 2;

(ii) unless identified otherwise all kerbed new trunk roads and side roads shall have a positive drainage system such as gullies and all unkerbed new trunk roads and side roads shall drain to filter drains;

(iii) the minimum pipe diameter for all drainage systems shall be 150 millimetres except for cross carriageway drainage where the minimum diameter shall be 225 millimetres;

(iv) access for drainage inspection and maintenance is provided. All drainage systems shall have adequate facilities for rodding or jetting;

(v) rodding eyes shall not be used on pipes larger than 150 millimetres diameter;

(vi) the maximum distance between access points on lengths of drainage pipe shall be 90 metres;

(vii) access chambers shall have a diameter not less than 1050 millimetres. Chamber diameters and depths and the use of step irons, rungs and ladders shall conform to those given in Table NA.23 of BS EN 752, if not identified within the Highway Construction Details;

(viii) pipe flow velocities shall not be less than 0.75 metres per second at any point nor greater than 2.5 metres per second at pipe discharge points;

(ix) all pipes under carriageways less than 1.2 metres below the finished road level (measured from the finished road level to the soffit of the pipe) shall be encased in concrete of minimum thickness 150 millimetres, except for pipes intended to drain the pavement foundation;

(x) drainage shall be provided to intercept water, field drains and slope drains and the like at the top of cuttings where the adjacent land falls towards the cutting, and at the bottom of embankments and in the verges;

(xi) where the road shall be in cutting less than 2 metres below original ground level, drainage at the top of a cutting may be omitted;

(xii) where the road shall be on embankment less than 2 metres above original ground level, drainage at the bottom of the embankment may be omitted and drainage provided in the road verge so that the drainage pipe shall be a minimum of 300 millimetres below the original ground level;

(xiii) subsurface drainage shall be provided within the verges of all new trunk roads and side roads wherever the road shall be lower than the adjacent ground;

(xiv) the new trunk road shall be drained to ensure that the water table does not encroach within 600 millimetres of the road formation level;

(xv) drainage shall be provided in areas where there shall be potential for erosion or ponding which would be detrimental to the safe operation of the carriageway or long term stability of the Works;

(xvi) there shall be no increase in flood risk in the vicinity of the site and inconvenience to adjacent landowners should be avoided;

(xvii) there shall be filter drains in the road verge of unkerbed roads to intercept surface run-off;

(xviii) the top surface of the filter material shall be between 25 millimetres and 50 millimetres below the adjacent finished verge or carriageway level;

(xix) exposed stone shall be 'Type B' crushed rock (gravel shall not be permitted) for a depth of 300 millimetres. This filter material shall extend to the carriageway edge;

(xx) where filter drains shall be remote from the carriageway edge the top surface of the filter material shall extend to finished ground level;

(xxi) subject to any other provision of the Contract all surface water drainage in the Design shall be designed in accordance with the Modified Rational Method;

(xxii) carrier drains and filter drains shall accommodate a storm event identified in Section 4.2.5 of Part 2;

(xxiii) carrier drains and filter drain Design shall be checked against a storm intensity, identified in Section 4.2.5 of Part 2, to ensure that chamber surcharge levels do not exceed formation level or sub-formation level where a capping layer shall be present;

(xxiv) the soffit of the subsurface drain shall be located at a minimum depth of 300 millimetres below formation, or where a capping layer is to be adopted in the works, at a minimum depth of 300 mm below sub formation;

(xxv) where a filter drain shall be installed within an embankment, that there shall be no risk of earthworks instability or slope failure of the embankment or loss of water from the filter drains;

(xxvi) filter drains shall conform to Highway Construction Details Drawing Number F2 as amended by the Employer's Requirements;

(xxvii) any new manhole or catchpit cover which shall be required in the Design shall not be permitted within the road pavement of all roads identified in Appendix A in Part 3;

(xxviii) any gully, linear drainage channel, catchpit and manhole grates, covers and frames shall comply with BS EN 124:2015 along with the following provisos:

(a) Class A 15 shall not be permitted;

(b) Class D 400 shall be used as a minimum standard for ironwork located within the carriageway or areas accessible to vehicular loading; and

(c) gullies shall be of the trapped type, in-situ cast to Highway Construction Details number reference F13, and shall have a non-rock grating and frame, double triangular gully with a minimum waterway area of 1870cm^2, or a single piece hinged gully with a minimum waterway area of 1240cm^2, bedded in mortar.

(xxix) where gullies shall be used, double gullies shall be provided at sag points;

(xxx) for plastic pipes, the ultimate pipe stiffness shall be 1400 Newtons per square metre when tested in accordance with BS 4962 and the resistance to impact shall comply with BS 4962 with a striker of 1 kilogram mass and a 25 millimetres spherical radius;

(xxxi) NMU facilities, access tracks and accommodation tracks shall shed water to prevent ponding;

(xxxii) where drains shall be encountered in the construction and/or the maintenance of the Works such drains shall be intercepted and connected to an outfall via a drainage system;

(xxxiii) the Contractor shall record and photograph the position of each land drain when intercepted, provide this information to the Engineer, add it to the As Constructed Requirements and agree this with the relevant landowners as a true representation;

(xxxiv) side slopes shall be drained where egress of groundwater shall be encountered, or shall be likely to be encountered;

(xxxv) the Contractor shall monitor ground conditions throughout the construction period and up to the end of the maintenance period to ensure effective functioning of all field drainage;

(xxxvi) the use of surface water concrete open channels, fin drains and narrow filter drains shall not be permitted in the Design;

(xxxvii) pumped drainage and pumped drainage systems shall not be permitted in the Design; and

(xxxviii) pipes within filter drains placed in embankments shall have a diameter of no greater than 500mm.

4.2.5.6 Existing Drainage

The Design shall ensure that:

(i) all existing drainage, including road, foul and surface water drains and associated structures, which shall become redundant, shall be treated as follows:

(a) drainage within 1 metre of finished ground levels shall be excavated and disposed of as appropriate; and

(b) drainage exceeding 1 metre below finished ground levels shall be either excavated and disposed of as appropriate or infilled with Pulverised Fuel Ash (PFA) cement grout or equivalent.

(ii) where the Design requires the replacement of foul or surface water sewers, the Contractor shall maintain all existing foul and surface water drainage affected by the Works until permanent replacement drainage has been provided;

(iii) Ground profiles shall at all times be maintained to shed surface water efficiently and directly to the nearest drain and to prevent penetration of water into or below existing pavements;

(iv) The Contractor shall consult and comply with the requirements of all landowners in respect of land drain connections; and

(v) Landowners shall be permitted to inspect severed land drains and their connections prior to backfilling and shall be notified of this work seven days in advance of works being undertaken and shall have 24 hours to inspect the work.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.5.7 Drainage Outfalls

The Design shall ensure that:

(i) discharge of the drainage system shall be controlled or attenuated to ensure no change to the run off shall adversely affect downstream pipes, culverts, watercourses, fish farms, static water bodies, reed beds and the like;

(ii) access to all new outfalls requiring maintenance shall be made available from side roads for Constructional Plant and equipment for future

maintenance purposes within the limits of the Land Made Available by the Employer for the Works as identified in Section 3.1 of this Part 1;

(iii) new outfalls to watercourses shall be designed in accordance with CIRIA Report C689 "Culvert design and operation guide" and CIRIA Report C742 "Manual on scour at bridges and other hydraulic structures" and shall incorporate measures between the end of the pipe and the watercourse to dissipate and reduce the velocity of the discharge; and that the Design for such measures shall prevent erosion and scour and shall sustain grass or aquatic vegetation;

(iv) where the Design shall incorporate connection to the existing drainage systems it shall be controlled or attenuated to ensure that there shall be no adverse effect on downstream pipes, culverts, watercourses, fish farms, static water bodies, reed beds and the like;

(v) where the design shall incorporate connection to and use of the existing drainage systems the Design shall allow for the upgrading of existing drainage systems in accordance with all other requirements of the Contract; and

(vi) direct access to all new outfalls from the trunk road shall not be permitted.

4.2.5.8 Culverts

A culvert shall mean a cross carriageway drain servicing an open drainage system.

4.2.5.9 The Design shall ensure that:

(i) culverts shall have a minimum internal diameter of 600 millimetres;

(ii) other than those watercourses identified in Appendix X in Part 3, existing watercourses, whether flowing or dry, shall remain on their existing alignment;

(iii) all watercourses shall be taken under the new roads in culverts;

(iv) all aspects of culvert Design shall take account of Report Number C689 published by the Construction Industry Research and Information Association (CIRIA), entitled "Culvert Design and Operation Guide" except that all culverts Design shall be for the 1 in 200 years flood peak discharge flow of the watercourse and that the Design for the culvert shall accommodate this flow in free flow conditions;

(v) the Design for all culverts shall, in addition, be in conformance with the Design Guidance Booklet: "River Crossings and Migratory Fish: Design Guidance" produced by the Scottish Executive (February 2012) and shall take account of the SEPA's "Engineering in the water environment: good practice guide - River crossings", 2nd Edition (November 2010);

(vi) culverts shall be designed to operate under sub-critical, free flow conditions;

(vii) where an existing culvert shall be replaced or extended, the Design for the new culvert shall be no less in dimensions and capacity than the existing culvert;

(viii) all culverts shall encourage use by wildlife such that all fish species associated with and mammals identified in the vicinity of the watercourse may pass freely through the culvert;

(ix) all culverts shall have a headwall at both the inlet and outlet:

(a) where practical, all such headwalls shall be located a minimum of 2 metres beyond the back of the verge; and

(b) all such headwalls in the Design shall be designed as Structures.

(x) measures shall be taken at watercourses to prevent livestock and children entering all culverts;

(xi) risk assessments shall be undertaken by the Contractor to determine whether trash screens and security screens are required at culverts;

(xii) inverts and sides of all watercourses at the inlets and outlets of culverts shall be protected from scour and erosion where required in accordance with CIRIA Report C689 "Culvert design and operation guide" and CIRIA Report C742 "Manual on scour at bridges and other hydraulic structures";

(xiii) all cascades and erosion protection on all watercourses shall be constructed in natural local stone matching the colour, finish and features of watercourses within and adjacent to the Site;

(xiv) scour protection measures where required shall be formed of loose rock of appropriate size and shape determined in accordance with CIRIA Report C742 "Manual on scour at bridges and other hydraulic structures" and CIRIA Report C683 "The Rock Manual";

(xv) culverts shall be buried below the natural bed level, allowing the natural bed level, slope and bed material to be maintained but without compromising the culverts hydraulic performance, in accordance with "Engineering in the water environment: a good practice guide - River Crossings" (SEPA, 2010);

(xvi) culverts shall be single pipe and multi-pipe systems shall not be permitted in the culvert Design;

(xvii) provision shall be made to facilitate safe access to each culvert inlet and outlet for inspection and maintenance purposes;

(xviii) culverts shall exhibit a freeboard in accordance with C689 "Culvert design and operation guide"; and

(xix) bends, steps, changes in culvert slope or cross section shall not be permitted in the culvert Design.

4.2.5.10 Watercourse Diversions

The Design shall include for the diversion of all watercourses as identified in Appendix X in Part 3.

4.2.5.11 The Contractor shall consult and comply with the requirements of

(i) SEPA

in connection with the Design for watercourse diversions. Contact details are as identified in Section 4.2.5 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.5.12 Ducts

The Design shall ensure that:

(i) ducting for Traffic Scotland Equipment (TSE) and spare duct and chamber infrastructure to facilitate future use by third party providers of

broadband services shall be provided in accordance with Section 4.8.11; and

(ii) the provision of service ducts for the use of or the future use of any Undertakers and any other companies shall be as identified in Appendix 1/16 of the Specification and as follows:

(a) all service ducts have a metal foil strip laid above them to aid their future location and shall be provided with 45 degree radius bends and extensions at each end to provide entry at a depth of 0.5 metres below finished ground level terminating, with a duct marker or chamber, a minimum of 0.5 metres outwith the edge of the carriageway;

(b) empty ducts shall include draw wires or cords and plugs;

(c) ducts which do not terminate in a draw chamber shall have a 0.3 metre by 0.3 metre referenced concrete marker slab placed directly above the duct ends;

(d) service ducts shall be 100/150 millimetres internal diameter smooth bore rigid style ducts or as otherwise identified in Appendix 1/16 of the Specification; and

(e) chambers shall be clearly marked to highlight to maintenance personnel the use of the chamber.

4.2.5.13 Pollution Control and Flood Prevention

The Design shall ensure that:

(i) all storage and attenuation facilities shall be designed in accordance with CIRIA Report C753 "The SuDS Manual" in order to allow settlement for pollution removal purposes;

(ii) all settlement, attenuation and storage ponds/basins and the like shall take into account ground water levels, and shall be designed in accordance with Section 4.2.5 of Part 2;

(iii) all drainage networks shall include provision to prevent accidental release of hydrocarbons into the receiving watercourse including a baffle or similar to facilitate retention;

(iv) all outfalls from settlement, attenuation and storage ponds/basins and otherwise shall include a shutdown facility at the inlet and outlet of the new pond/basin which can be operated safely when the pond/basin is in operation;

(v) access to all settlement, attenuation and storage ponds/basins and the like shall be provided for maintenance purposes from a new / existing side road either on access tracks constructed specifically for this purpose or through use of other tracks or Non-Motorised User facilities;

(vi) vehicular access to all settlement, attenuation and storage ponds/basins and the like shall extend to both the inlet and outlet and to the base of the pond for maintenance access with appropriate plant;

(vii) where access tracks are being constructed specifically to give access to all settlement, attenuation and storage ponds/basins and the like, these shall be constructed to the same standard as unsurfaced access construction in accordance with Section 4.2.7 of Part 2;

(viii) where it is proposed to make use of NMU facilities or Access Roads/Tracks as identified in Appendix A in Part 3 for the purpose of access to all settlement, attenuation and storage ponds/basins, the

relevant sections of track shall be constructed to the standard for bituminous surfaced access construction in accordance with Section 4.2.7 of Part 2 as a minimum;

(ix) the use of Accommodation Works Tracks as part of the access provision for settlement, attenuation and storage ponds/basins shall not be permitted unless otherwise stated in Appendix A in Part 3;

(x) measures shall be incorporated, including gates with locks, fences and the like to deter use of maintenance access routes by unauthorised vehicles and pedestrians;

(xi) The Contractor shall prepare a Pollution Prevention Plan ("PPP") and Drainage Management Plan ("DMP"), which shall include details of how the risk of pollution to surface waters and groundwater will be minimised, and management of surface water runoff will be undertaken, to demonstrate adherence to best practice and CAR;

(xii) Flood protection and compensatory storage and otherwise shall be provided where the Works encroach on the functional flood plain of main rivers. The functional floodplain is as defined in Scottish Planning Policy;

(xiii) Flood defences shall include appropriate freeboard including allowance for climate change, modelling inaccuracies, settlement, and erosion; and

(xiv) Maintenance access shall be provided to flood defences and compensatory storage areas.

4.2.5.14 The Contractor shall consult and comply with the requirements of:

(i) SEPA; and

(ii) the relevant local authority

in connection with flood prevention and pollution control measures. Contact details are as identified in Section 4.2.5 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.5.15 The Contractor shall consult and comply with the requirements of

(i) Transport Scotland, Trunk Roads and Bus Operations

in connection with measures to prevent unauthorised use of maintenance access routes. Contact details are as identified in Section 4.2.5 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.5.16 Particular Requirements for Underpasses

The Design shall ensure that:

(i) surface water drainage shall be provided at each end of all underpasses to intercept run-off from the adjacent areas to prevent water ingress into the underpass.

4.2.6 Earthworks

4.2.6.1 General

The Design shall ensure that:

(i) the geotechnical design for earthworks shall comply with:

(a) the principles and application rules of BS EN 1997-1 + A1 and the accompanying UK National Annex, as modified and supplemented by these Employer's Requirements;

(b) the requirements of the DMRB, where they do not conflict with the above; and

(c) relevant Non-Contradictory Complementary Information.

(ii) the Contractor shall carry out a risk assessment as part of the earthworks design in order to minimise any risk to the general public, pedestrians, cyclists and any other road users resulting from the Design, construction, completion and maintenance of the Works;

(iii) the Contractor shall take all necessary measures to prevent rock or other debris from falling onto the carriageway;

(iv) the Contractor shall take all necessary measures to obviate any adverse effects on the surrounding area and to prevent flooding and/or pollution;

(v) the Contractor shall develop an earthworks strategy to demonstrate the effective management of the earthworks balance;

(vi) any ground improvement methods and systems that shall be provided by the Contractor in the Design, construction, completion and maintenance of the Works shall be provided in accordance with the manufacturer's written guidance, where appropriate. The Contractor shall undertake in-situ trials and testing to demonstrate to the Engineer that the desired performance can be achieved. The type, extent and frequency of in-situ testing shall be specified by the Designer. The in-situ trials shall be undertaken in advance of the Works;

(vii) the Contractor shall grub up, re-profile and plant to restore the rural landscape, and where possible recycle into the Works, all redundant areas of existing road pavement from within the Site;

(viii) all earthworks shall be subject to landform design as specified in Section 4.4.8 of this Part 1 except that any design necessary to ensure short-term and long-term stability shall take precedence;

(ix) in areas where topsoil depths greater than 150 millimetres are proposed, the Contractor shall carry out stability assessments and take all necessary measures to ensure topsoil stability;

(x) the Contractor shall design earthworks slopes including strengthened earthworks to avoid the need for hard facings;

(xi) gabions and crib walling shall not be permitted in any part of the design of the Works. The Contractor shall consult and comply with the requirements of Transport Scotland regarding proposals for necessary works to existing gabions, provision of new gabions or crib walling;

(xii) subject to the requirements of Section 4.2.5.5 (x), the Contractor shall provide cut-off drainage lined as required in order to prevent water from undermining cuttings and embankments, or as otherwise required by the Contract or as specified by the Designer;

(xiii) the Contractor shall keep excavations for earthworks and structures free from groundwater and surface water and undertake every reasonable means to ensure that formation is protected from inclement weather. The Contractor shall remove and replace all materials damaged by water or trafficking at formation level with well compacted suitable granular fill prior to upfilling or before foundation construction;

(xiv) certificates shall be provided by the Contractor to confirm that any geosynthetics / geotextiles used in the Works shall have a minimum operational life span of 120 years;

(xv) all organic material shall be removed from below earthwork footprints;

(xvi) excavated materials shall be assessed by the Contractor for suitability for re-use as Acceptable Earthworks Materials as defined in the MCHW. The use of lime or cement treatments shall be considered where possible to render excavated materials suitable for reuse in the Works;

(xvii) prior to commencement of any earthworks in the vicinity of any railway, the Contractor shall consult and comply with the requirements of Network Rail and / or any other relevant railway undertaker. The Contractor shall provide Consultation Certificates in accordance with the Certification Procedure in respect of this requirement;

(xviii) the Contractor shall prepare an Earthworks Design Statement in the format given in Appendix Z in Part 3, covering the basis of the design of each earthworks element, including stability analysis and designs of cuttings in soil, rock and made ground, highway loadings, groundwater assessments and slope drainage design, (including the use of in-slope raking drains as well as slope surface drainage, crest, berm and toe drainage), any slope reinforcement design, embankment stability assessments, construction over soft ground and peat, earthworks suitability for re-use assessments and the like. The design statements shall be provided to accompany each Certificate for the relevant earthworks element issued in accordance with the Certification Procedure. The Contractor shall not reduce the Geotechnical Category of any Earthworks or Structure without approval of the Employer;

(xix) the use of blasting shall not be permitted unless the prior written approval of the Employer has been obtained; and

(xx) the use of Spent Oil Shale as backfill to structures is not permissible.

4.2.6.2 Ground Investigation Report

The Contractor shall ensure that the Designer prepares a Ground Investigation Report ("GIR") as defined in the DMRB for the scheme in accordance with BS EN 1997-2, which may be subdivided and arranged as appropriate. The first GIRs shall be submitted to the Engineer with accompanying documentation within two months of the Date for Commencement of the Works. Further revised GIRs, updated to take account of any supplementary ground investigations or other relevant additional information, shall be issued at appropriate intervals as the construction of the Works proceeds. The final GIRs shall be submitted prior to submittal of the relevant Final Construction Certificate(s).

4.2.6.3 Geotechnical Design Report

The Contractor shall ensure that the Designer shall prepare a Geotechnical Design Report as defined in the DMRB for all earthworks, foundations or other geotechnical design elements of the scheme in accordance with BS EN 1997-1 + A1, which may be subdivided and arranged as appropriate. The report(s) shall be updated to take account of any supplementary ground investigations or other relevant additional information as the Works proceed.

The Geotechnical Design Report(s) shall be submitted in accordance with the Certification Procedure and 28 days in advance of the construction of the Works element.

In addition to the requirements of BS EN 1997-1 + A1, under "a description of the proposed construction, including actions", the Contractor shall also provide;

(i) characteristic values of pile resistances, including justification, as appropriate;

(ii) design values of pile resistances, including justification, as appropriate; and

(iii) characteristic values of soil and rock properties, including justification, as appropriate.

The clause 2.8(3) of BS EN 1997-1 + A1 shall be considered to be a principal in the context of the Eurocodes, i.e. 2.8(3) P.

The relevant part(s) of the Geotechnical Design Report(s) shall be submitted to accompany each Structures Design Statement and each Earthworks and Structures Design Certificate. The final report(s) shall be submitted prior to submittal of the relevant Construction Certificate(s).

4.2.6.4 Geotechnical Feedback Report

Within three months of the completion of construction, the Contractor shall submit to the Engineer a Geotechnical Feedback Report as defined in the DMRB in the format given in Appendix F of HD 22 of the DMRB. The contents of the report shall include, but not be limited to, the following:

(i) geotechnical records for foundations;

(ii) geological records;

(iii) ground investigation and inspection records obtained during the construction phase and summary of any divergences from the assumed ground conditions as presented in Structures Design Statements and Geotechnical Design Reports;

(iv) groundwater level monitoring and quality records;

(v) ground movement monitoring records;

(vi) piling and embedded retaining wall construction records;

(vii) soil nail, rock bolt and ground anchorage construction records;

(viii) as-built location and geometry of all completed works including any temporary works left in-situ with permission of the Employer;

(ix) construction records for all Structures, Earthworks and ground improvement techniques;

(x) all integrity test results;

(xi) all strength measurement test results on materials (concrete cylinder / cube, etc.) for Permanent Works and Temporary Works left in-situ with permission of the Employer; and

(xii) all non-conformance reports and completed close out documentation.

(xiii) All material compliance test results

4.2.6.5 Cuttings

The Design shall ensure that:

(i) the tops and bottoms of all road cuttings shall be rounded to a minimum radius of 2 metres over a length of 1 metre; where space does not permit, to the maximum radius possible, proposals for which shall be submitted to the Employer for agreement;

(ii) permanent drainage channels shall be constructed at the crest of all cuttings, subject to the provisions of Section 4.2.5 of Part 1 with the exception of areas where the existing ground profile ensures that water, which would otherwise be intercepted by a drainage channel, is directed away from the crest of the cutting and the slope forming materials. All drainage channels constructed at the crest shall be designed and constructed so as not to allow water into the slope forming materials thereby reducing the stability of the cut slope. Crest channels shall be lined where required by the design. Paving slabs shall not be permitted as a lining for erosion control;

(iii) the design of all soil cuttings shall incorporate appropriate in-slope drainage;

(iv) the Contractor shall demonstrate consideration of adequate slope drainage in his design in the Geotechnical Design Report referred to above;

(v) slope drainage shall not be used to ensure long term stability of soil cut slopes. Slope drainage shall be used as an additional measure to improve long term stability. Long term stability shall be ensured by other design considerations;

(vi) where soil cuttings require a mid-slope berm for stability and drainage control purposes, the berm shall be a minimum of three metres wide and be accessible for maintenance;

(vii) where environmental bunds are constructed on the top of cutting slopes, the toe of the environmental bund shall be offset from the crest of the slope by a minimum of three metres;

(viii) all cuttings shall be constructed within the Land Made Available by the Employer for the Works. Where space does not permit a slope angle with adequate stability, alternative stabilisation measures shall be considered; and

(ix) all cuttings shall be profiled to reflect local landform characteristics and to avoid long, consistent earthworks profiles.

(x) Where soil nails are proposed, they shall be designed using BS 8006-2:2011 Code of Practise for Strengthened / Reinforced Soils, Part 2 : Soil Nail Design and CIRIA C637: Soil Nailing – Best Practice Guidance (design approach 1-2). Soil nail head design shall take account of Geoguide 7 (GEO Civil Engineering and Development Department, Hong Kong Government) for recessed soil nail head details. The following requirements apply to soil nail design and execution:

(a) the presence of deep-seated failure surfaces in the control of overall soil nail length shall be considered;

(b) in determining critical design surfaces and bond lengths, unfactored parameters with a minimum existing factor of safety = 1.0 shall be used;

(c) the soil nail head assembly head size requirements shall be determined using BS 8006-2:2011 Code of Practise for Strengthened / Reinforced Soils, Part 2 : Soil Nail Design. If

used concrete head pads shall be used in line with Figure A3.3 of CIRIA C637 with recessed soil nail heads as shown in Figure 5.11 of Geoguide 7. All soil nailed slopes shall be finished so that they are capable of supporting vegetation. Erosion control netting shall be used connected to the soil nail heads on the surface to prevent erosion between the soil nail heads prior to vegetation establishment;

(d) flexible facings (without a properly designed and dimensioned soil nail head) shall not be allowed; and (e) durability of soil nail bars and soil corrosivity shall be assessed in line with guidance included within CIRIA C637.

4.2.6.6 Rock Cuttings

(i) Rock cuttings shall be designed and constructed to provide safe and sustainable rock slopes, minimising instability and the requirement for future maintenance and minimising environmental impact.

(ii) Design and construction of rock cuttings shall be in accordance with Wyllie and Mah, Rock Slope Engineering as well as details and advice given in Rock Engineering Guides to Good Practice: Road Rock Slope Excavation (TRL Report 2011).

(iii) The design and construction of rock excavation works shall minimise the requirement for the provision of any permanent means of rock control or containment, such as rockfall netting, rock catch fences and barriers either on the rock face or verge, and the use of strengthening or support (rock dowels or bolts), concrete buttresses, shotcrete and the like. However, ongoing stability and protection of the public shall take precedence for temporary control and permanent long term performance. The design and construction of the Works shall include all rock slope stabilisation measures required to ensure that the rock slope is stable and remains stable for its full design life, taking into account weathering and degradation.

(iv) Any excavation techniques adopted shall not compromise the stability of the rock slopes, or lead to increased risk to the road infrastructure or to the general public for the design life of the road. Excavation techniques shall allow for the formation of the appropriately designed drainage ditches and rock trap ditches.

(v) The design shall include rockhead berms formed at the contact between sound rock and overlying materials. This is defined as the boundary between material that can be directly excavated using standard machines (such as back-actors) and material that needs to be broken before excavation.

(vi) The design of rockhead berms shall take into account all geological factors which could lead to instability in the rock at the edge of the bench and / or in the overlying material. All rockhead benches shall have a minimum effective bench width of 3.0 metres, after excavation.

(vii) Rockhead berms shall include for berm drainage channels to collect and control any seepage from the cut face.

(viii) The design shall include intermediate berms to provide access for maintenance and to break up the appearance of extensive rock slopes exceeding 10 metres in height.

All intermediate berms shall have a minimum effective bench width of 3.0 metres. The intermediate berms shall have a transverse profile (cross fall) which shall dip towards the upper rock slope, and shall incorporate drainage measures to discharge the surface water runoff from the cutting slope above the bench and an appropriately sized rock trap designed to accommodate rockfall material from the upper slope(s).

(ix) In-slope raking drains in the excavated rock slope face shall be used in areas of seepage or high groundwater as required.

(x) The Contractor shall have an engineering geologist on site to record rock faces exposed during construction and to assess the requirement for any rock stabilisation measures to address specific conditions encountered that differ to those assumed at the design stage. Full details of these elements of the works shall be included within the Geotechnical Feedback Report described in Section 4.2.6.4.

(xi) The use of chemical non-explosive rock splitting agents or rapid expansion techniques shall be permitted to break out massive and competent rock horizons, combined with mechanical excavation as required, subject to the implementation of an adequate risk management system.

4.2.6.7 Existing Natural and Constructed Slopes (including Rock Cuttings)

(i) The Contractor shall ensure that the stability of any existing natural or constructed slope (including rock cutting) impacted by or impacting on the Works shall not:

(a) adversely affect the long-term stability or safety of the Works; and / or

(b) be adversely affected by the Design, construction, completion and maintenance of the Works.

(ii) The Design, construction, completion and maintenance of the Works shall be undertaken to ensure that the existing slopes are at least as stable in the long term as the current conditions at any given location.

(iii) Where the design of the Works incorporates, impinges upon, modifies or extends any such slope, or part of any such slope, the requirements for that slope shall be as for new slopes or cuttings.

4.2.6.8 Temporary Works Adjacent to Sections of Live Carriageway

(i) The Contractor shall ensure the stability of sections of live carriageway, footpath, service, structures, buildings and the like adjacent to any temporary works slopes. The Contractor shall demonstrate stability of live sections of carriageway, footpath, railway line, pipeline, structures, buildings and the like for the duration of any adjacent temporary works slopes by means of appropriate surface movement monitoring.

4.2.6.9 Embankments

The Design shall ensure that:

(i) the tops and bottoms of embankments in the Design shall be rounded to a minimum radius of 2 metres over a length of 1 metre or, where space does not permit, to the maximum radius possible, proposals for which shall be submitted to the Employer for agreement;

(ii) topsoil and pockets of soft-soil and loose rock shall be removed from beneath embankments, except where alternative measures in accordance with the Employer's Requirements and Specification are proposed in the design of the Works;

(iii) where an embankment is constructed on any existing slope, the existing surface shall be benched. The maximum height of the bench shall be 500 millimetres;

(iv) where any areas of old watercourses (infilled or otherwise) occur under a section of new embankment they shall be excavated and replaced with a well compacted suitable granular fill; and

(v) all embankments shall be profiled to reflect local landform characteristics and to avoid long, consistent earthworks profiles.

4.2.6.10 The Design shall pay due regard to the effects of settlement.

The Contractor shall take measures to ensure that the settlement of embankments shall be prevented or shall be substantially complete before the road pavement Works shall be constructed.

4.2.6.11 Topsoil

The Design shall ensure that:

(i) topsoil handling and storage shall be undertaken in accordance with the Specification and the following:

(a) where the Contractor identifies topsoil from a particular source that shall be intended to be re-spread in a specified location within the Works, the Contractor shall stockpile the topsoil separately and mark the storage location on a plan;

(b) stockpiled vegetation and upper soil horizons shall be stored separately from lower soil horizons;

(c) soil stockpiles shall not be placed over the rooting zone of mature trees, in areas where existing trees / habitats may be damaged or where surface run-off may cause pollution; and

(d) soil stockpiles shall be located away from any watercourses – the site to be agreed with the Engineer.

4.2.6.12 Notwithstanding any other provision of the Contract, the Design shall ensure that the topsoil depths shall be as follows:

(i) where sowing grass seed the depth shall be a minimum of 150 millimetres;

(ii) in areas to be planted with transplanted trees and shrubs, with the exception of rock cuts, the depth shall be a minimum of 300 millimetres. In areas to be planted with specimen trees, the depth shall be a minimum of 400 millimetres; and

(iii) in areas of land potentially to be returned to agriculture, topsoil depth shall be a minimum of 400 millimetres.

4.2.6.13 In areas to be seeded with a combined mix of grass and wildflowers existing topsoil shall be removed prior to seeding. No topsoil shall be spread in areas to be seeded with a combined mix of grass and wildflowers except in areas of proprietary soil retention matting.

4.2.7 Road Pavements

4.2.7.1 Road pavement Design shall be in accordance with the requirements of the DMRB and Interim Advice Note (IAN) 73 - Design Guidance for Road Pavement Foundations.

4.2.7.2 The terminology used in Section 4.2.7 of Part 1 shall be as used in DMRB HD 26 Pavement Design and IAN 73.

4.2.7.3 The road pavement Design for roads as described in Appendix A in Part 3 shall be as identified in Table 4.2.7.2 of Part 2.

4.2.7.4 Notwithstanding any other provision of the Contract, the Design shall ensure that:

(i) pavement foundations shall be designed in accordance with IAN 73, as included in Appendix M in Part 3;

(ii) the requirements of the IAN 73 to maintain continuity of drainage of the pavement foundation and to provide a down-slope route from the sub-base to the subsurface drain shall apply. The Contractor shall ensure compliance;

(iii) where the pavement incorporates any existing pavement, concrete overlays shall not be permitted;

(iv) at junctions the pavement Design for the major road shall extend into the minor road up to the corner radii tangent points on the minor road;

(v) in respect of Figure 2.1 of HD 26 of the DMRB the Design thickness of flexible pavements shall include the full thickness of the chosen surface course material;

(vi) the surface course shall be:

(a) Transport Scotland approved thin surface course to specification TS2010 as introduced by Transport Scotland Interim Amendment Number 35.; or

(b) hot rolled asphalt with coated chippings to SHW clause 911.

(vii) The Contractor shall consult and comply with the requirements of

(a) Transport Scotland, Trunk Road and Bus Operations (TRBO)

in connection with the application of approved thin surface courses to specification TS2010. Contact details are as identified in Section 4.2.7 of Part 2.

(viii) All TS2010 mixtures shall either have a Stage 3 TAIT approval Certificate for the site class or the supplier shall be required to undergo the TAIT process detailed in the TS2010 specification. Where the stage 3 TAIT process is to be completed during the contract the mixture must have reached stage 2 of the approval process and have been given Approval to Proceed with the stage 3 trial by Transport Scotland using the Approval to Proceed form contained in Volume 3 Part 3 Appendix BB. The Contractor shall provide the Engineer with the completed Approval Certificate(s) and Consultation Certificate(s) in accordance with the Certification Procedure. All flexible pavements shall incorporate a binder course which shall be at least 60 millimetres thick;

(ix) In all cases where asphaltic material shall be used in the Design it shall be to:

(a) BS EN 13108 (Bituminous mixtures – Materials specification);

(b) BS EN 12697 (Bituminous mixtures – Testing methods for hot mix asphalt);

(c) BS 594987 (asphalt for roads and other paved areas – Specification for transport, laying, compaction and type testing protocols); and

(d) Where TS2010 is used, the material shall comply with Transport Scotland Interim Amendment 35.

(x) where the pavement incorporates an asphaltic overlay such Design shall allow for the removal of the existing thickness of surface course and all such existing surface course shall be removed;

(xi) at all lanes of the carriageway(s) and, where applicable, hard strips, hard shoulders, lay-bys, bus lay-bys, turning areas, maintenance crossing points and tapers to the back of the nose for all roads detailed in Appendix A in Part 3, shall be sufficient to carry the Design traffic appropriate to most heavily trafficked lane, which is typically the left hand lane of the relevant carriageway;

(xii) where full depth pavement construction shall be provided in the Design it shall have a minimum thickness of 450 millimetres inclusive of the sub-base;

(xiii) between each asphaltic pavement layer, a polymer modified bond coat to Clause 920 of the specification, shall be applied in accordance with BS594987 and the manufacturers' recommendations;

(xiv) the central reserve shall be finished with 20mm single size stone chippings, grey in colour, to a minimum depth of 100mm, on permeable vegetation repressing membrane.

4.2.7.5 Notwithstanding any other provision of the Contract, the Contractor shall consult and comply with the requirements of

(i) the relevant local authority

in connection with the pavement Design for all side roads and all carriageway tie-ins to side roads. Contact details are as identified in Section 4.2.7 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.7.6 The use of the Analytical Approach Design Method as outlined in HD 26 of the DMRB shall not be permitted in the Design when standard Designs and materials as defined in HD 26 of the DMRB are used in the Design unless otherwise identified in Section 4.2.7 of Part 2.

4.2.7.7 The use of rigid, rigid composite or Continuously Reinforced Concrete Pavement (CRCP) construction shall not be permitted in the Design.

4.2.7.8 The upstand face of all joints, including between existing and new construction shall be painted with a polymer modified bond coat to Clause 920 of the Specification. The position of these joints shall not fall within the wheel track zones.

4.2.7.9 The new surface course on all sections of the trunk road carriageways shall be constructed using echelon paving where possible. Where this is not possible the joins shall be chamfered at 60 to 70 degrees.

4.2.7.10 Not Used.

4.2.7.11 Bridge surfacing shall comply with the requirements on TS IA 24.

4.2.7.12 Polished Stone Value (PSV)

The design shall ensure that:

(i) the minimum Polished Stone Value of coated chippings in HRA shall be established from Interim Advice Note IAN 156/, using the traffic data contained in Appendix U in Part 3.

(ii) PSV will not be specified for TS2010 mixes that already hold a Stage 3 TAIT approval Certificate. Where TS2010 is undergoing stage 3 trials within the contract the minimum PSV of coarse aggregate shall be established from Interim Advice Note IAN 156, Table 3.1b using the traffic data contained in Appendix U in Part 3 .

4.2.7.13 Site class

The design shall ensure that:

(i) the required site class of surface course TS2010 shall be established from TSIA35.

4.2.7.14 Road pavement for Accesses, Access Roads / Tracks and Accommodation Works Tracks

The Design shall ensure that:

(i) unless otherwise identified in Section 4.2.7 of Part 2, bituminous surfaced access construction shall comprise:

(a) 300 millimetres thick type 1 sub-base to Clause 803 of the Specification;

(b) 100 millimetres thick Dense Base and Binder Course Asphalt Concrete to Clause 906 of the Specification; and

(c) 50 millimetres thick Close Graded Asphalt Concrete Surface Course to Clause 912 of the Specification.

(ii) unless otherwise identified in Section 4.2.7 of Part 2, concrete access construction shall comprise:

(a) 300 millimetres thick type 1 sub-base to Clause 803 of the Specification; and

(b) 150 millimetres thick C40 concrete to BS 8500 and BS EN 206 + A1 with expansion joints at 40 metres centres and contraction joints at 4 metres centres (see HCD Drawing Number C1, C2 and C3). The surface finish shall be tamped or brushed.

(iii) unless otherwise identified in Section 4.2.7 of Part 2, unsurfaced access construction shall comprise:

(a) 300 millimetres minimum thick capping material class 6F1, 6F2 or 6F3 to Clause 613 of the Specification; and

(b) 150 millimetres thick type 1 sub-base to Clause 803 of the Specification, sealed with rolled/vibrated crushed rock fines.

(iv) Accommodation Works tracks shall be in accordance with the requirements of Appendix 1/15 of the Specification.

4.2.7.15 Existing pavement may be retained in the design as foundation layers only, where suitability of existing materials can be verified in accordance with IAN 73. Where existing pavement does not meet the criteria of IAN 73 pavement shall be made redundant and treated in accordance with Section 4.2.6.1 (vii) of Part 1.

4.2.7.16 Where carriageway widening is required, pavement materials adjoining existing retained pavement layers shall be constructed of material of equal Layer Stiffness such that the risk of longitudinal cracking is minimised.

4.2.7.17 Notwithstanding the other requirements of the contract, where existing pavement is being retained in the design as a foundation layer testing will be undertaken in accordance with Appendix 1/5 of the Specification to confirm that the existing pavement meets the appropriate class foundation requirements with 95% confidence. Any area of obvious structural distress shall be individually identified and tested.

(v)

4.2.8 Kerbs, Footways and Paved Areas

4.2.8.1 Kerbing

The Design shall ensure that:

(i) kerbing shall be provided for the roads as identified in Appendix A in Part 3, together with the following:

a) all lay-bys; and

b) all pedestrian and cycle crossings.

(ii) kerbing shall be half battered where there shall be an adjacent footway and shall be splay kerbing elsewhere; and

(iii) dropped kerbs shall be provided at all pedestrian and combined footway/cycleway crossings and shall be suitable for pedestrians with prams and the disabled using a wheelchair.

4.2.8.2 The Contractor shall consult and comply with the requirements of the relevant roads authority in connection with the Design for all kerbing on Roads. Contact details are as identified in Section 4.2.8 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.8.3 Non-Motorised User Facilities

The Design shall ensure that:

(i) the width of all NMU facilities shall be as indicated in Appendix A in Part 3. Allowance shall be made to accommodate widths and tie-ins and any other features affecting the width of the NMU facility;

(ii) NMU facilities shall have a maximum crossfall of 2.5 percent;

(iii) longitudinal gradients for footways and combined footways/cycleways shall make due allowance for their intended use and shall not exceed 5 percent without the written consent of the Engineer;

(iv) NMU facilities shall tie in to existing NMU facilities at all interfaces and extremities of existing NMU facilities;

(v) the asphaltic layers of NMU facilities shall be machine laid;

(vi) all NMU facilities shall incorporate sufficient drainage to ensure that they shall be kept free from standing water;

(vii) immediately prior to the laying of type 1 sub-base the formation shall be treated with an application of weedkiller; and

(viii) where NMU facilities shall be used by maintenance vehicles and/or emergency vehicles, they shall comprise a bituminous surfaced construction in accordance with Section 4.2.7 of this Part 1.

4.2.8.4 Notwithstanding the requirements of Section 4.2.8.3 of this Part 1, combined footways/cycleways shall be designed in accordance with the DMRB, IHT Cycle Audit and Cycle Review, Transport Scotland's 'Cycling by Design 2010' and with Transport Scotland's 'Roads for All: Good Practice Guide for Roads', unless identified otherwise in Section 4.2.1 of Part 2.

4.2.8.5 The Contractor shall consult and comply with the requirements of the relevant roads authority in connection with the Design for all NMU facilities. Contact details are as identified in Section 4.2.8 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.8.6 Paved Areas

The Design shall ensure that:

(i) pedestrian centre of carriageway crossings shall be surfaced as footways; and

(ii) deflection islands less than 20 square metres in area shall be surfaced as NMU facilities.

4.2.9 Traffic Signs, Road Markings and Studs

4.2.9.1 General

The Design, construction, completion and maintenance of traffic signs, road markings and studs shall be in accordance with:

(i) the Traffic Signs Regulations and General Directions 2016;

(ii) the Traffic Signs Manual;

(iii) the DMRB; and

(iv) Local Transport Note 1/94.

4.2.9.2 The Design shall ensure that tourist facilities shall be signed from the Trunk Road in accordance with the Scottish Office Development Department Circular 27/1995 and the Trunk Road and Motorway Tourist Signposting Policy and Guidance 2006 published by Scottish Office Development Department.

4.2.9.3 The Design shall ensure that:

(i) new traffic sign faces, poles and foundations, road markings and studs shall be provided in the Design for all roads, including existing roads, identified in Appendix A in Part 3;

(ii) all permanent traffic sign faces shall be designed in accordance with BS EN 12899-1 and shall be constructed from microprismatic retroreflective material, in accordance with the requirements of BS 8408, with dew resistant coatings;

(iii) where traffic signs require to be illuminated as specified in Part 1 Section 8 of the Traffic Signs Regulations and General Directions 2016 they shall be either externally or internally illuminated, with the exception of traffic bollards which shall be internally illuminated; and

(iv) "New Road Layout Ahead" signs shall be provided on all approaches to the Works immediately prior to opening the new roads to traffic. At the end of the first Relevant Fifty Two Week Period the signs and associated posts shall be removed by the Contractor.

4.2.9.4 The Contractor shall consult and comply with the requirements of:

(i) Transport Scotland;

(ii) Transport Scotland Trunk Road and Bus Operations;

(iii) the relevant operating company; and

(iv) the relevant local authority

in connection with maintaining existing sign information during construction of the Works. Contact details are as identified in Section 4.2.9 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.9.5 Scheme Information Boards

(i) The Contractor shall provide and erect scheme information boards to the detail in Appendix 1/21 of the Specification.

(ii) The Contractor shall erect the scheme information boards prior to the commencement of the Works.

(iii) The Contractor shall remove the scheme information boards at the end of the first Relevant Fifty Two Week Period.

4.2.9.6 Traffic signs manufactured using a proprietary planking system shall not be permitted in the Design.

4.2.9.7 Traffic Sign Posts

The Design shall ensure that:

(i) all posts hot-dip galvanised to Annex A of BS EN 40-5 or shall be passively safe as defined in TD 89 of the DMRB; and

(ii) Lattice style posts shall not be permitted.

4.2.9.8 Road Markings

The Design shall ensure that:

(i) all road markings shall be 'extruded' thermoplastic material;

(ii) notwithstanding any other requirement of the Contract, where kerbs shall be provided, and on slip roads, continuous white edge lines shall also be provided;

(iii) any transitions in the offsets of white lines to be provided on the roads identified in Appendix A in Part 3 and existing carriageways shall be applied at a rate of 1:100;

(iv) all continuous white edge lines shall have a 100 millimetres gap every 10 metres to permit the discharge of surface water onto the verge in areas of shallow gradient;

(v) all road markings are replaced or remarked as appropriate throughout the relevant Period of Maintenance when less than 70 per cent remains due to wear, or when the luminance factor shall be less than 45 per cent, as estimated by visual inspection or measurement;

(vi) all road markings shall be renewed during the fifth Relevant Fifty Two Week Period by remarking with sprayed thermoplastic material. However, lengths of raised rib markings which shall be damaged or excessively worn shall be replaced; and

(vii) roadmarkings shall be included within all lay-bys in accordance with Transport Scotland's 'Roads For All: Good Practice Guide for Roads'.

Road Studs

4.2.9.9 The Design shall ensure that:

(i) all permanent road studs situated within the running carriageway of the trunk road shall be designed and constructed such that they are robust and durable during normal winter maintenance operations. Evidence of this will be presented as part of the consult and comply requirements of this Clause; and

(ii) all permanent road studs comply with BS EN 1463 Part 1 and Part 2 and are contained in the Lists of Compliant/Approved/Registered Products (MCHW SA1/08).

4.2.9.10 The Contractor shall consult and comply with the requirements of

(i) Transport Scotland Trunk Roads: Network Management

in connection with all permanent road studs. Contact details are as identified in Section 4.2.9 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.9.11 The Contractor shall provide the necessary CHART link and section node markers within the Works to enable suitably co-ordinated Transport Scotland's Integrated Roads Information System (IRIS or equivalent) survey information to be recorded.

The CHART link and section node markers shall be in accordance with Clause 1270AR of the Specification.

4.2.9.12 The Contractor shall consult and comply with the requirements of

(i) Transport Scotland

in connection with the locations for the CHART link and section node markers. Contact details are as identified in Section 4.2.9 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.2.9.13 Traffic Bollards

The Design shall ensure that:

(i) bollards shall be provided on the approaching corners of splitter and deflection islands to highlight their presence for traffic entering and leaving junctions; and

(ii) pairs of non-illuminated junction identification bollards shall be provided at all private accesses.

4.2.9.14 Marker Posts

The Design shall ensure that marker posts shall:

(i) be provided in accordance with TD 69 of the DMRB;

(ii) be placed in the splitter islands of lay-bys at 4.5 metre centres such that the top of the sign to diagram 560 included within the marker post shall be positioned 600 millimetres above the adjacent carriageway (i.e. 600 millimetres above the level of the adjacent edge of the carriageway line);

(iii) be aligned to ensure that visibility to/from vehicles at the lay-by exit shall not be impeded; and

(iv) have a cylindrical cross section.

4.2.10 Road Lighting

4.2.10.1 Not used.

4.3 Structures General Requirements

4.3.1 General

4.3.1.1 The design of Structures shall, as a minimum, be in accordance with the requirements of the Eurocodes, the DMRB and Transport Scotland Interim Amendments.

4.3.1.2 All structures shall undergo a Category 3 design check as defined by BD 2 of the DMRB - Technical Approval of Highway Structures. The design checking of all Structures shall be in accordance with the requirements of the Eurocodes, the DMRB and Transport Scotland Interim Amendments.

4.3.1.3 For the purposes of these Employer's Requirements, in addition to Structures listed in Appendix B in Part 3, Gantries, culvert headwalls, pier protection, closed circuit television ("CCTV") supports, high mast lighting supports and variable message sign ("VMS") substructures and superstructures shall be regarded as Structures. The design of CCTV supports shall be to the same parameters as high mast lighting supports.

4.3.1.4 The Contractor shall consult and comply with the requirements of the parties identified in Section 4.3.1 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.3.1.5 The Contractor shall consult and comply with the requirements of SEPA with regard to the Design, construction, completion and maintenance of all Structures adjacent to watercourses. Contact details are as identified in Section 4.3.1 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.3.1.6 The Contractor shall consult and comply with the requirements of Statutory Undertakers and owners of Private Apparatus, as identified in Section 4.3.1 of Part 2, in relation to the design for the layout and location of apparatus, over, through and adjacent to Structures and the method of access to such apparatus.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.3.2 Location and Description of Structures

4.3.2.1 The approximate locations and brief descriptions of the principal Structures in the design of the Works shall be as described in Appendix B in Part 3.

4.3.3 Design Loading

4.3.3.1 The design loading for all Structures shall be as described in Appendix B in Part 3.

4.3.4 Design Headroom

4.3.4.1 The minimum headroom requirements for each Structure shall be as described in Appendix B of Part 3.

4.3.5 Road Cross Section at Structures

4.3.5.1 Carriageway and verge widths at Structures shall be as described in Appendix B in Part 3.

4.3.6 Parapets and Wind Barriers

4.3.6.1 Unless otherwise stated in Appendix B in Part 3, all parapets and other road restraint systems on Structures including vehicle parapets, pedestrian parapets and pedestrian protection at headwalls, wingwalls and retaining walls shall be in accordance with Series 400 of the Specification, BS EN 1317 and TD 19 of the DMRB as described by Transport Scotland Interim Amendment No. 39 (TS IA 39 Annex C).

4.3.6.2 Vehicle parapets shall be compatible with the vehicle restraint systems to which they are, or shall be, connected in accordance with Section 4.2.4 of this Part 1.

4.3.6.3 New vehicle parapets shall extend at least two panels or six metres, whichever is the greater, beyond the top of the slope intersecting line.

4.3.6.4 Steel parapets shall be unpainted and galvanised with a minimum coating finish of 100 microns. If painting of steel parapets is required, prior to painting they shall receive appropriate treatment to aid paint adhesion as stated in Table 19/1 of the Specification. The colour of the paint protection system shall be submitted to the Employer for approval.

4.3.6.5 Unless otherwise stated, vehicle containment parapets of aluminium, concrete construction or combined metal and concrete construction shall not be permitted on Structures.

4.3.6.6 Where stainless steel parapets or handrails are required, these should be designed to be anti-vandal and anti-theft to the satisfaction of the Engineer.

4.3.7 Structural Form

4.3.7.1 The form of new Structures shall be such that where practicable, consistency of material, form and finish shall be achieved throughout the Works giving the appearance of a "family" of Structures.

4.3.7.2 Unless otherwise stated in Appendix B in Part 3, bridges shall have an open aspect, having a constant superstructure thickness (unless otherwise specified) and bankseat end supports with an exposed height below deck soffit level not greater than 1.8 metres.

4.3.7.3 The inclined surfaces in front of the superstructure end supports shall maintain continuity of the gradient of adjacent earthworks slopes.

4.3.7.4 Straight triangular haunches to bridge deck soffits shall not be permitted.

4.3.7.5 Unless otherwise specified, for new Structures the design of the Works shall provide deck edges with suitable cantilevers as follows:

(i) all cantilevers shall be a constant dimension over the length of the superstructure;

(ii) the minimum width of cantilever shall be equal to or greater than 0.7 times the depth of deck subject to a minimum cantilever of 500 millimetres and a maximum cantilever of 2500 millimetres;

(iii) the cantilever width shall be measured from the outside edge of the parapet edge beam to the outermost edge of the deck soffit below;

(iv) the depth of deck shall be measured from the underside of the beam / slab soffit to the top of the top slab; and

(v) where deck edges and cantilevers of existing Structures shall be reconstructed, the existing cantilever width shall not be reduced.

4.3.7.6 The use of leaf piers shall not be permitted unless otherwise specified.

4.3.7.7 The locating of piers in the central reservation of a carriageway shall not be permitted.

4.3.7.8 Where the design of the Works includes prefabricated elements including, but not limited to, precast concrete beams or steel girders as main members in deck construction, the deck shall be made structurally continuous under live load over intermediate piers.

4.3.7.9 Where the design of the Works includes a transverse diaphragm over intermediate piers, it shall be formed within the depth of the deck with no extension below the deck soffit or outwith the external beam envelope.

4.3.7.10 The use of a pier crosshead beam in the design shall not be permitted.

4.3.7.11 All wingwalls, retaining walls and bridge decks shall have copes with a constant 2.5 per cent crossfall.

4.3.7.12 The use of gabions shall not be permitted in any part of the Design and the Permanent Works unless otherwise specified in Part 2.

4.3.7.13 Structures over waterways

(i) The design for all burn, stream and river Structures and the like shall include for ledges as required in Volume 10 of the DMRB and as defined elsewhere in these Employer's Requirements, to ensure safe passage of mammals when the watercourse is in spate.

(ii) For the purposes of the design of the Works, spate shall be assumed to be the flood flow for a storm with a return period of 25 years.

(iii) Where the burn, stream or river or otherwise is subject to tidal influence, spate flow levels shall be the peak flow levels which would occur during a storm with a return period of 25 years simultaneous with a tidal event with a high water level of mean high water spring.

(iv) Manholes shall be provided to culverts at locations along the length of the culvert at spacings not more than 50 times the diameter / clear span of such culvert subject to a maximum spacing of 90 metres.

(v) The design of the burn, stream and river Structures and the like shall be designed to allow safe inspection and maintenance.

(vi) The design and selection of clear span for waterway Structures shall be such that flood risk is not increased in accordance with the Environmental Statement.

(vii) The waterway for all burn, stream and river Structures shall be designed to freely pass the flood flow for a storm with a return period of 200 years with a 20% allowance for climate change.

(viii) The design for all burn, stream and river Structures shall in addition be in conformance with the "River Crossings and Migratory Fish: Design Guidance" produced by the Scottish Executive (February 2012).

(ix) Where it is proposed to modify existing waterway Structures, including extending waterway Structures, the Design shall ensure that the existing cross-section, gradient and alignment of the watercourse are maintained.

(x) The minimum span of each new Structure shall not be less than any existing Structure it is replacing.

(xi) Where an Underpass is combined with a watercourse crossing, the Underpass shall be separated from the watercourse using a 1.5m high parapet.

4.3.7.14 Segmental Construction

(i) Not used.

4.3.8 Structural Finish

4.3.8.1 Finishes to new Structures shall be such that a consistency is achieved throughout the Works.

4.3.8.2 All exposed in situ structural concrete constituents shall be supplied from a single source and shall ensure a consistency of colour and exposure.

4.3.8.3 Plain concrete finishes shall not be permitted for large areas of exposed vertical surfaces except for the interior and wing walls of drainage culverts.

4.3.8.4 All exposed vertical concrete surfaces on reinforced concrete bankseats, wingwalls, abutment walls, leaf type piers, retaining walls and interior surfaces of box underpasses, shall have a patterned profile type finish which shall be consistent throughout the scheme.

4.3.8.5 Unless otherwise stated in Section 4.3 of Part 2, the patterned profile shall comprise 40 millimetres deep vertical rebates, 200 millimetres wide at the inner most face of the rebate tapering to 250 millimetres wide at the outermost face of the rebate. Rebates shall be symmetrical and be spaced at 500 millimetre centres.

4.3.8.6 Unless otherwise stated, in all cases where a patterned profile finish shall be provided for vertical elements, a plain concrete border 500 millimetres wide shall be provided.

4.3.8.7 Concrete finish class F1 and F2 as defined in the Specification shall not be permitted on any exposed concrete surface.

4.3.8.8 Exposed concrete arises shall be finished with a 25 millimetre by 25 millimetre chamfer unless otherwise specified.

4.3.8.9 Where steel universal beam, plate girder or box construction is adopted:

(i) splices, where provided in internal spans, shall be positioned symmetrically about the centre line of the span;

(ii) splices, where provided in end spans, shall be positioned a distance from the adjacent pier proportional to the distance from the pier to a splice, if provided in the adjacent span, in the ratio of the end span to adjacent span. Where no splice is provided in the adjacent internal span, the splice in the end span shall be positioned to suit the design of the end span;

(iii) with the exception of bearing stiffeners, intermediate stiffeners shall not be permitted on the outer face of steel universal beam and plate girders at the edge of the deck;

(iv) where steel box construction is adopted the external surfaces of the boxes shall be free of both intermediate stiffeners and / or bearing stiffeners; and

(v) the use of bolted splices on external members shall not be permitted. Only full strength butt welds shall be allowed.

4.3.8.10 The interior surfaces of accessible steel box sections shall be painted. The paint colour code shall be 10C33 to BS 4800 Yellow.

4.3.9 Service Ducts

4.3.9.1 The design of the Works shall include the services and service duct requirements specified in Appendix B in Part 3.

4.3.9.2 The design of all service ducts shall make due allowance for anticipated settlement of embankments and structural elements.

4.3.9.3 Service ducts, pipes and the like shall not be exposed in the finished Structure.

4.3.9.4 Wherever possible, service ducts shall be accommodated within the raised verges across the bridge superstructure and shall be surrounded with Class C28/35 fibre reinforced air entrained concrete as defined in Section 4.3.12 of this Part 1.

4.3.9.5 Where service ducts are accommodated in raised verges across the bridge superstructure, the minimum depth of concrete cover over the duct shall be 75 millimetres and the minimum width of concrete between ducts shall be 50 millimetres.

4.3.9.6 Where the design of the Works requires the use of service troughs, the troughs shall be fully waterproofed, inspectable and positively drained. In addition, sufficient space around services shall be agreed with the service authority to enable future inspection, maintenance and replacement of the service.

4.3.9.7 Ducts shall be suitably sleeved at any expansion joints to prevent the ingress of water.

4.3.9.8 The sleeves shall be capable of carrying accidental actions from vehicles on the bridge in accordance with BS EN 1991-2 (Eurocode 1 - Actions on Structures - Traffic Loads on Bridges).

4.3.9.9 Ducts, whether empty or containing services, shall be sealed to prevent the ingress of water.

4.3.9.10 All apparatus carried by bridge decks shall be replaceable without disruption to, or removal of the structural concrete or the waterproofing system.

4.3.9.11 Notwithstanding any other provisions of the Contract, ducts within bridge decks shall be of a minimum 100 millimetres diameter.

4.3.9.12 The location of apparatus through or adjacent to Structures shall meet the requirements of the Statutory Undertakers and any other companies.

4.3.9.13 Access chambers shall be provided at each end of each Structure carrying apparatus and shall be so designed to curtail passage of water along ducts.

4.3.9.14 Each service duct chamber shall be suitably drained. Covers and frames for service duct access chambers shall conform with Class D400 and Class B125 to BS EN 124:2015, be watertight and have a strength class appropriate to their location.

4.3.10 Structural Drainage

4.3.10.1 The design of all drainage shall make due allowance for anticipated settlement of embankments and structural elements.

4.3.10.2 Road drainage shall not be continuous across bridge superstructures.

4.3.10.3 Systems for the drainage of surface water from the superstructure shall be so designed that water shall not be allowed to fall freely from the superstructure.

4.3.10.4 Drainage pipes shall not be exposed in the finished Structure.

4.3.10.5 Drainage systems shall not contain details which shall be integral with either the superstructure or sub-structure of any Structure, such as downpipes cast into abutments.

4.3.10.6 Bridge decks shall be provided with an adequate surface water drainage system, minimum diameter 100 millimetres, which shall be capable of being rodded from both ends. The maximum distance between rodding points shall be 40 metres.

4.3.10.7 Drainage pipes shall be suitably sleeved at any expansion joints to prevent the ingress of water.

4.3.10.8 Holes shall be provided to drain the voids of superstructures. The holes shall be formed such as to prevent passage of water along the underside of the superstructure and shall discharge to an area remote from the carriageway.

4.3.10.9 A positive drainage system shall be provided to drain any water which may reach the deck waterproofing.

4.3.10.10 The top surfaces of bridge superstructures shall have adequate falls to prevent ponding thereon.

4.3.10.11 Bridge superstructures shall where possible project beyond the substructure such as to prevent water from running down piers and abutments.

4.3.10.12 Manholes shall be provided at each end of each Structure. Covers and frames shall conform with Class D400 of BS EN 124:2015 and be watertight.

4.3.10.13 Drainage water from the superstructure of any Structure shall not be discharged into the drainage layer behind the sub-structure. Openings through the superstructure to allow the passage of surface water drainage shall not be permitted.

4.3.10.14 All earth retaining Structures shall incorporate a positive drainage system to earth faces which shall be connected to the road drainage system via a manhole or catchpit.

4.3.10.15 Positive drainage shall be provided to all underpasses in accordance with TD 36 of the DMRB.

4.3.10.16 Drainage systems shall be sufficiently robust to withstand damage during cleaning and shall be resistant to all commonly occurring chemical spillages.

4.3.10.17 Suitable drip checks shall be provided at all copings, parapet cantilevers, soffit edges, edge beams, superstructure ends over abutments and elsewhere to prevent runoff to the underside of Structures and adjacent vertical faces.

4.3.10.18 Groove type checks at the edge of bridge decks shall not be permitted unless otherwise specified in Part 2.

4.3.10.19 For concrete parapet copes, drip checks shall take the form of 100 to 150 millimetres wide by 75 millimetres deep projections below the adjacent soffit unless otherwise specified in Part 2.

4.3.11 Verges, Side Slopes and Paved Areas

4.3.11.1 Raised verge construction across bridge superstructures shall continue to the end of any wing walls, return walls, parapet extensions or retaining walls which are returned parallel to the carriageway related to the verge under consideration.

4.3.11.2 Verges abutting the bridge parapets shall be so designed as to provide a smooth transition between the Structures and embankments and between the parapets and adjoining vehicle restraint systems.

4.3.11.3 Raised verge construction across bridge decks shall consist of Class C28/35 fibre reinforced air entrained concrete as defined in Section 4.3.12 of this Part 1. The surface finish shall be hot rolled asphalt, subject to compliance

with Section 4.2.7 of this Part 1, or have a brushed concrete surface finish to give a non-slip surface.

4.3.11.4 The minimum verge crossfall towards the carriageway shall be 2.5 per cent and any widened verges shall be adequately drained.

4.3.11.5 Kerb upstands across bridge decks shall be in accordance with TD 27 of the DMRB.

4.3.11.6 Side slopes, verges and central reserve (excluding hard strips) below the plan area of all bridges, shall be surfaced with pattern imprinted concrete which shall provide a random stone pattern with a 200 millimetre wide flush finished concrete kerb all round. Construction joints shall be formed in straight lines at centres not greater than four metres throughout the pattern imprinted concrete area. Joints shall be parallel and at right angles to kerb lines with each panel having an aspect ratio not exceeding 1.5.

4.3.11.7 Carriageway surfacing over Structures shall be a minimum thickness of 120 millimetres including any additional protective layer to the waterproofing system in accordance with Transport Scotland Interim Amendment Number 24. An additional protective layer of sand asphalt shall only be provided when required by the individual waterproofing system.

4.3.12 Durability

4.3.12.1 General

(i) Annex C1 of Transport Scotland Interim Amendment Number 39 in reference to BD 57, Design for Durability, and Transport Scotland Interim Amendment Number 23 shall be taken to be requirements for the design, construction, completion and maintenance of all Structures.

(ii) Bridges with lengths not exceeding 60 metres and skews not exceeding 30 degrees shall be of integral construction and earth pressures shall be determined in accordance with PD 6694 - 1. All bridges shall be designed with a continuous superstructure.

(iii) Semi-integral abutments shall only be incorporated into the works upon agreement with the Employer.

(iv) In-span discontinuities, generally referred to as half joints, shall not be permitted in bridge superstructures.

(v) The use of concrete hinges shall not be permitted unless otherwise specified in Appendix B in Part 3.

4.3.12.2 Concrete

(i) All structural concrete shall be designed concrete in accordance with BS EN 206+ A1 and BS 8500 + A1, subject to the requirements of these Employer's Requirements and Transport Scotland Interim Amendment Number 23.

(ii) All exposed concrete surfaces in the Works except internal faces of culverts carrying watercourses and drainage and all exposed concrete surfaces to new works to existing structures except internal faces of culverts carrying watercourses and drainage shall be impregnated in accordance with the requirements of BD 43 of the DMRB. This shall include all surfaces of reinforced or prestressed concrete which shall be exposed to the atmosphere in the completed Works. Exposed concrete surfaces of existing structures shall be impregnated, as stipulated in the specification.

(iii) Any curing agents used shall be compatible with the surface impregnant.

(iv) All structural concrete shall have a minimum cement / combination content of 360 kilograms per cubic metre.

(v) All structural concrete shall have a maximum water / cement ratio of 0.45.

(vi) All structural concrete above ground level, other than concrete class C40/50 and above, shall be air entrained as follows:

Maximum aggregate size	Minimum air content
20 millimetres	3.5 per cent
14 millimetres	4.5 per cent
10 millimetres	5.5 per cent

(vii) Other than where it is required for factory precast prestressed concrete bridge beams, structural concrete strength class C50/60 shall be permitted above ground level only if it is required for structural purposes. In this circumstance, concrete strength class C50/60 or above shall only be permitted subject to the prior approval of Transport Scotland (Bridges Branch).

(viii) The design of all structural concrete for buried components, and any additional protective measures that may be required, shall ensure durability taking into account the design chemical class appropriate to the chemical composition of the soil and groundwater in addition to the stated strength requirements. Sulphate-resisting Portland cement may be required for the most aggressive design chemical classes.

(ix) Footway / verge infill concrete shall be placed such that shrinkage cracking is minimised. This shall require either restricting the length of pours or the introduction of crack inducers at discrete intervals for longer pours.

(x) The following strength classes and cement / combinations shall apply to structural concrete for the locations indicated in Table 4.3.12.2.1 of this Part 1.

Table 4.3.12.2.1 Permissible Cement Combinations and Minimum Strength Requirements

TS Application	Minimum Strength Class	TS Permitted Cement Combinations (refer to Table A.6 of BS 8500-1)						
		CEM I	II A	IIB-S	IIB-V IIB +	IIIA IIIA + SR	IIIB IIIB +SR	IVB-V
Footway/Verge Infill Concrete	C28/35AF		√	√	√	√	†	√
In situ reinforced concrete above ground	C32/40 a.e. or C40/50		√	√	√	√	†	√
Site cast precast reinforced concrete above ground	C32/40 a.e. or C40/50		√	√	√	√	†	√
Factory cast precast rc elements, e.g. box culverts, reinforced soil retaining wall panels etc.	C32/40 a.e. or C40/50	√ (C40/50 only)	√	√	√	√	†	√
In situ pre-stressed post tensioned concrete above ground	C40/50		√	√	√	√	†	√
Factory cast pre-stressed concrete bridge beams	C40/50 or C50/60	√	√	√	√	√	†	√
Reinforced concrete below ground	C32/40	Depends on DC class. Refer to TS IA 23 and BS8500-1.						

Notes
† IIIB cement combination may be considered through Application for Departure from Standard
AF Air Entrained, Fibre Reinforced
a.e. Air Entrained

(xi) Minimum concrete cover to reinforcement shall be appropriate to the most onerous exposure class at any particular location within a Structure for an intended working life of at least 100 years. Tolerance Δc between the minimum cover and the nominal cover to allow for fixing precision shall be in accordance with Transport Scotland Interim Amendment Number 23.

(xii) To ensure that the designed minimum cover to reinforcement shall be achieved, the Contractor shall carry out a cover meter survey to finished concrete sections in accordance with Clause 1714 of the Specification within one day of removal of formwork, and shall submit the results to the Employer within one further day.

(xiii) The use of paint systems or the equivalent to reduce the minimum cover shall not be permitted.

(xiv) The Contractor shall put in place curing procedures which shall include effective methods of monitoring the temperature differences within the concrete members.

(xv) The methods of curing and their duration shall be such that the concrete shall have satisfactory durability and strength and the member shall suffer a minimum of distortion, be free of excessive efflorescence and shall not cause, by its shrinkage, undue cracking in the Structure in excess of the acceptable flexural and early thermal cracking limits.

(xvi) Reinforced concrete sections shall be designed such that they comply with the flexural and early thermal crack limits required by BS EN 1992-2 (Eurocode 1 – Design of Concrete Structures – Concrete Bridges – Design and Detailing Rules) for the relevant exposure conditions.

(xvii) Exposed or debonded tendons at the ends of precast prestressed beams shall be protected against corrosion.

(xviii) If voided concrete slab construction is adopted, then during the placement of concrete, the difference in level of the placed concrete on either side of the void formers shall be controlled to avoid movement of the formers and shall not exceed 150 millimetres.

(xix) Provision shall be made for compacting the concrete below void formers and for drainage of the formed voids. The drainage shall be formed in such a manner as to prevent passage of water along the underside of the deck and shall discharge to an area remote from the carriageway.

(xx) All buried concrete surfaces shall be treated with two coats of bitumen paint as specified in Clause 2004 of the Specification.

(xxi) Accommodation / farm underpasses shall incorporate sacrificial concrete protection against diesel spillage, abrasion and animal fouling in accordance with the following:

(a) sacrificial concrete invert which is separate from the structural base slab of the underpass shall be provided across the full width of the floor to the following criteria:

(i) surface finish and grade shall comprise of:

- 300 millimetres thick Type 1 sub-base to Clause 803 of the Specification; and
- 150 millimetres thick concrete to BS 8500-1 & BS EN 206+ A1 surfacing with expansion joints at 40 metre centres and contraction joints at four metre centres (see Drawings C1, C2 and C3 in Volume 3 of the MCHW). The surface finish shall be tamped or brushed.

(ii) sufficient crossfall and longitudinal gradient shall be provided to minimise the risk of icing during winter.

(b) sacrificial concrete shall be provided on the internal walls of underpasses extending from the structural base slab of the underpass to one third of the height of the underpass above the sacrificial concrete invert. In the case of reinforced concrete underpasses this may be provided as an additional 50 millimetres cover to the reinforcement and may be provided as part of a profiled patterned finish. A stepped profile will not be acceptable at a third height. In this case an additional 50mm cover shall be provided over the full height; and

(c) the requirement for sacrificial concrete protection in a(i) and a(ii) above shall be taken into account in the design of the Works for the span and height of the underpass.

4.3.12.3 Steelwork

(i) Structural steelwork shall be protected using a paint system appropriate to the environment in which the Works are located as outlined in Section 4.3.3 of Part 2 and 'Difficult' access in accordance with Series 1900 of the Specification and shall meet the following minimum durability requirements:

(a) no maintenance up to 12 years;

(b) minor maintenance from 12 years; and

(c) major maintenance after 20 years.

(ii) The Contractor's proposed paint systems, including completed Specification Appendices shall be submitted to Transport Scotland (Bridges Branch) prior to construction of any relevant part of the Works. Contact details are as identified in Section 4.3.3 of Part 2. The Contractor shall not commence any painting works before such consultation has taken place and the paint system and colour is approved by Transport Scotland (Bridges Branch). The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

(iii) Aluminium metal spray shall not be permitted.

(iv) All paint systems shall comply with the requirements of current Environmental and Health & Safety regulations and legislation.

(v) The use of weathering steel shall be permitted.

(vi) Intermittent fillet welds shall not be permitted outwith areas that are completely protected from the adverse effects of weather.

(vii) The design of steelwork shall ensure the prevention of the accumulation of water, dirt and debris.

(viii) Exposed structural steelwork shall not be used in the substructures of Structures.

(ix) Where the design of the Works includes transition slabs, stainless steel reinforcement, grade 1.4436 or 1.4462 to BS EN 10088 shall be used in connecting a transition slab to an abutment.

(x) Reinforcement bridging joints, or items penetrating the concrete surface, and also subject to chloride contamination (e.g. dowel bars) shall be stainless steel Grade 1.4436 or 1.4462.

(xi) Any mechanical bearings, where permitted, shall be either steel with protection of steelwork against corrosion, or stainless steel, with the following minimum grades:

(a) plates and flats shall be 1.4436 or 1.4462;

(b) sliding surfaces shall be 1.4436 or 1.4462; and

(c) fasteners shall have mechanical properties and dimensions that comply with grade A4-70 or A5-80. Chemical composition shall comply with grade 1.4436 or 1.4462.

(xii) Anchorages, including threaded anchorages, cast into concrete for attachments to Structures shall be stainless steel grade 1.4362, 1.4436 or 1.4462.

(xiii) Fasteners for parapet anchorages shall be stainless steel with the following minimum grades:

(a) holding down bolts, studs and nuts shall have mechanical properties and dimensions that comply with grade A4-80. Chemical composition shall comply with grade 1.4436 or 1.4462; and

(b) washers shall be 1.4436 or 1.4462.

(xiv) Provision shall be made to prevent electrolytic corrosion of dissimilar metals.

(xv) Temporary works shall not be attached to any part of the permanent Structure.

4.3.12.4 Waterproofing

(i) Bridge deck waterproofing systems shall be in accordance with Transport Scotland Interim Amendment Number 24, shall have a current BBA Roads and Bridges Agrément Certificate and shall be capable of being non-destructively tested.

(ii) Waterproofing systems shall be independently tested in accordance with the Specification.

(iii) The independent testing organisation shall have current third party quality assurance certification.

(iv) The whole width of the bridge deck slab between parapet upstands to a height of 100 millimetres minimum above the adjacent deck slab shall be waterproofed.

(v) In addition to those surfaces specified in the DMRB and elsewhere, the following concrete surfaces shall be waterproofed:

(a) pier and abutment bearing shelves;

(b) inaccessible areas which may be subject to leakage;

(c) all internal faces of abutment galleries;

(d) vertical faces at deck ends to a distance of 200 millimetre below the level of either the underside of the deck beams at the abutment or of any associated construction joint in the abutment, whichever is the lower; and

(e) where buried box sections are proposed in the design including accommodation underpasses, the bottom slab.

(vi) Further to the testing requirements of the Specification, Holiday testing as defined in the DMRB shall be carried out on the completed waterproofing to check for any discontinuity in the coating and for any thickness less than that specified by the manufacturer.

(vii) The Contractor shall consult and comply with the requirements of

(a) Transport Scotland (Bridges Branch)

in connection with the proprietary waterproofing system. Contact details are as identified in Section 4.3.3 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.3.13 Maintenance and Inspection

4.3.13.1 Provision shall be made for future inspection and maintenance of all Structures throughout the design life of the Structures. All requirements of Health and Safety Legislation and other relevant requirements shall be observed in such provisions. Standards in excess of the minimum requirements shall be provided where possible.

4.3.13.2 Where bridge bearings shall be used they shall be replaceable without requiring the removal of any structural concrete or welding of structural steelwork.

4.3.13.3 Provisions shall be made to allow for jacking from the substructure during bearing replacement.

4.3.13.4 Replacement of bearings shall be possible whilst maintaining traffic flows over the Structure in accordance with the requirements of 2171AR of the Specification.

4.3.13.5 Provision for access at Structures shall be made for the following purposes:

(i) cleaning and painting;

(ii) maintenance and inspection;

(iii) jacking, removal / replacement of bearings;

(iv) removal / replacement of movement joints; and

(v) inspection of closed cell and box members.

4.3.13.6 The design for all steel and concrete interfaces on a Structure shall permit ease of access for inspection and maintenance.

4.3.13.7 Where voided elements of bridge Structures, e.g. box girder decks, voided piers, voided abutment stems, inspection galleries and the like are provided, they shall be of sufficient size to allow internal inspection. Access shall be provided in accordance with the following:

(i) access to the voids shall, where practicable, be from the underside of the bridge;

(ii) access points shall be placed in such positions as to give convenient access, and where their use would not cause interference to traffic;

(iii) all access points and access ways within the voids shall be suitably sized and designed to allow for the evacuation of a casualty on a stretcher and the like if necessary;

(iv) specific emergency routes and exits shall be identified clearly by signs and shall be provided with lighting;

(v) access points to the voids, where provided, shall be carefully located and detailed so as to minimise their visibility to passing traffic;

(vi) access points to the voids shall not be permitted on surfaces visible on the main bridge elevation, with the exception of access doors and ancillary arrangements for accessing abutment inspection galleries;

(vii) all permanent services, equipment and the like shall be capable of withstanding the prevailing environmental conditions including ingress of dust and water and the natural movement of the Structure;

(viii) permanent access ladders or steps, as appropriate, shall be provided at changes in level within the voids;

(ix) access ladders and steps shall be provided with guardrails;

(x) all walking surfaces shall be provided with a non-slip surface coating compatible with the waterproofing system and shall avoid details which create a risk of tripping and shall be self-draining;

(xi) permanent lighting with permanent power supply shall be provided for access routes and access chambers;

(xii) lighting levels shall be a minimum of 30 lux. Additional emergency lighting shall be provided in the Structure along emergency routes having a minimum intensity of 0.2 lux and having a separate battery operated power supply and warning notices and signs shall be provided to all mains power boards, valves and the like where the operation may affect the safety of persons using the voids of any such Structure;

(xiii) all access points to galleries and voids and the like shall be capable of being secured from unauthorized access by means of lockable steel doors or grills;

(xiv) public access to any facilities provided for bridge inspection or maintenance shall be prevented by means of suitable barriers, covers and the like and colonisation of accessible areas by plants, animals or birds shall be prevented by the application of suitable measures to be agreed with the Employer; and

(xv) inspection platforms shall be provided in front of abutments to overbridges for both integral and non-integral Structures in accordance with the requirements of, CIRIA C543 "Bridge Detailing Guide" or similar detail, proposals for which shall be submitted to the Employer in accordance with the Certification Procedure.

4.3.13.8 The Design shall ensure that:

(i) the layout of and access to publicly and privately owned services and supplies shall meet the requirements of the relevant statutory bodies, Undertakers and any other companies as well as the requirements of these Employer's Requirements.

4.3.14 Reinforced Soil

4.3.14.1 The Contractor shall consult and comply with the requirements of the Employer with respect to the design of reinforced soil Structures (i.e. having a face greater than 70 degrees to the horizontal).

Precast concrete facing panels associated with reinforced soil Structures in the Works shall be replaceable in the event of damage and shall have a patterned profile finish. The Contractor shall consult and comply with the requirements of the Transport Scotland (Bridges Branch) with respect to such works. Contact details are provided in Section 4.3.5 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.3.14.2 Precast concrete facing panels shall comprise square or rectangular panels; cruciform units shall not be permitted.

4.3.14.3 The top edge of precast concrete facing units shall be finished with a continuous cope.

4.3.14.4 In the design of reinforced soil Structures, the Contractor shall take due cognisance of factors including, but not limited to:

(i) durability;

(ii) vibration from road traffic;

(iii) floods;

(iv) water flows;

(v) replacement of facing panels; and

(vi) stability following a vehicular fire and the like.

4.3.14.5 Where used in conjunction with a parapet the precast concrete facing panels shall extend to the underside of the parapet cope.

4.3.14.6 Reinforced soil abutments shall not be permitted.

4.3.14.7 The dimensional tolerances on completion of erection of reinforced soil Structures shall comply with the limitations given in Appendix J in Part 3. The design tolerances used shall be stated in the Structures Design Statement for each reinforced earth Structure.

4.3.14.8 Permanent reference points shall be provided on reinforced soil Structures to enable the extent of deformations which occur following completion of the Works to be monitored.

4.3.14.9 Reinforced soil slopes (i.e. having a face not exceeding 70 degrees to the horizontal) shall be so finished that they are capable of supporting vegetation.

4.3.15 Corrugated Steel Buried Structures

4.3.15.1 The use of corrugated steel buried Structures to provide access for vehicular traffic through the Structure shall not be permitted.

4.3.15.2 The minimum durability requirement for corrugated steel buried Structures shall be for an aggressive environment.

4.3.15.3 All corrugated steel buried Structures shall have a sacrificial concrete invert protection. The invert shall extend across the full width of the floor and a third of the way up the sides of the Underpasses. This requirement shall be taken into account in the Design of the span and height of the Structure.

4.3.15.4 The ends of all corrugated steel buried Structure type culverts shall be provided with a structural headwall or a concrete ring beam of 300 millimetres minimum thickness. The concrete ring beam shall follow and finish flush with the slope of the adjacent earthworks.

4.3.15.5 Corrugated steel buried Structures shall be designed in accordance with BD 12 of the DMRB.

4.3.15.6 Corrugated steel buried Structures shall have a secondary protective coating system applied to permanently accessible surfaces, with a life to first maintenance of six years.

4.3.15.7 The secondary protective system shall not be taken into account in determining the sacrificial steel thickness, it shall be certified in accordance with BD 12 of the DMRB and shall have a life to major maintenance of 20 years.

4.3.16 Existing Structures

4.3.16.1 Where it shall be proposed by the Contractor to incorporate any part of an existing Structure into the design of the Works, it shall be the Contractor's responsibility to ensure the adequacy of such Structure within the design of the Works and carry out all remedial works and strengthening required such

that it meets all the necessary standards and certification requirements as set out in the Contract.

4.3.16.2 The durability and serviceability limit state criteria defined within the DMRB and Eurocodes for new Structures shall not apply to existing structures or parts of existing Structures incorporated within the design of the Works.

4.3.16.3 All existing Structures to be retained shall be assessed and, if required, strengthened in accordance with the assessment procedure detailed in Appendix W in Part 3. In respect of bridge bearings, provided there is no evidence of cracking, structural failure or other instability, a qualitative assessment shall be acceptable. In respect of free-standing piers, a quantitative assessment shall be required. The contents of the assessment reports required in accordance with Appendix W in Part 3 shall be based on the requirements of BD 79 of the DMRB (Appendices E and F for bridges and retaining walls respectively).

4.3.16.4 Defects, as noted as Maintenance Priority Ranking 2 or above in the Principal and General Inspection reports, in retained existing Structures shall be repaired by the Contractor in accordance with the Specification unless otherwise agreed.

4.3.16.5 Where the parapets of existing Structures are to be replaced, the replacement parapets shall extend at least two panels or six metres, whichever is the greater, beyond the top of the slope intersecting line.

4.3.16.6 Where an existing Structure is to be extended or amended, the extended or amended Structure form and finishes shall match the existing Structure. All other requirements for the extended or amended portions of the existing Structures shall be as for new Structures unless otherwise stated in Part 2 or Part 3. Extensions to existing crib walling shall not be permitted; any extension of such structures shall be designed as a new Structure in accordance with these Employer's Requirements.

4.3.16.7 Existing Structures that are to be abandoned or made redundant within the Site shall be kept in place but assumed to be redundant for design purposes

4.3.16.8 Where an existing Structure shall be demolished, it shall be demolished to a minimum of one metre below finished ground level.

4.3.16.9 If an existing Structure shall be modified, the modifications shall be designed in accordance with these Employer's Requirements.

4.3.16.10 The existing elements of an existing Structure to be retained shall comply with Section 4 to Volume 3 of the DMRB with the exception of loading requirements which shall be as described in Appendix B in Part 3.

4.3.16.11 Modifications to existing Structures shall not replicate detailing that is not compliant with the DMRB.

4.3.16.12 Where existing Structures are to be modified the interaction between the modified section and the existing Structure shall not adversely affect the short and long term integrity of both elements. Items to be considered shall include, but not be limited to:

(i) differential settlement;

(ii) creep;

(iii) shrinkage;

(iv) differential deflection;

(v) early thermal cracking; and

(vi) traffic induced vibrations, deflection and stresses.

4.3.16.13 Where maintenance painting of existing Structural steelwork shall be carried out, Structural steelwork shall be protected using a paint system appropriate to the environment in which the Works are located and 'Difficult' access in accordance with Series 5000 of the Specification and shall meet the following minimum durability requirements:

(i) no maintenance up to 15 years;

(ii) minor maintenance from 15 years; and

(iii) no major maintenance up to 20 years.

4.3.16.14 Maintenance painting of existing Structures shall be carried out in accordance with the requirements of BD 87 of the DMRB. As a minimum, existing structures which undergo Maintenance Painting shall receive a finishing (top) coat in accordance with Table 50/2 of Series 5000 of the Specification for Highway Works to all exposed surfaces of existing steelwork to ensure a consistent appearance over the structure.

4.3.16.15 The colour of the final paint coat on existing structures on which maintenance painting is carried out shall be as identified in Section 4.3 of Part 2.

4.3.16.16 The Contractor's proposed paint systems, including completed Specification Appendices shall be submitted to the Employer for review prior to the construction of any relevant part of the Works.

4.3.16.17 Where bearings and movement joints are to be replaced in a Structure the design of such replacement items shall be in accordance with the Eurocodes. In the design of such replacement items, an additional allowance of +2 degrees Celsius shall be made for climate change.

4.3.16.18 Where bearings are to be replaced in a Structure the Contractor shall propose and confirm with the Employer the live load regime during the replacement of bearings when the Structure is supported on temporary jacks taking account of the Contractor's specific traffic management proposals during bearing replacement.

4.3.17 Removal and Replacement of Existing Waterproofing

4.3.17.1 Surfaces exposed after the removal of existing waterproofing shall be inspected for either spalling or reinforcement corrosion and repaired in accordance with the Specification.

4.3.17.2 Areas contaminated with oil or grease or residue from the removed waterproofing system shall be cleaned with a suitable detergent.

4.3.18 Construction Tolerances in Structural Concrete

4.3.18.1 The tolerances stated in Clause 1728 AR of Appendix 0/1 to the Specification shall be adopted in the Design, construction, completion and maintenance of the Works.

4.3.19 Road Lighting

4.3.19.1 Not used.

4.3.20 Structures Design Statement

4.3.20.1 Prior to the commencement of the design, the Contractor shall submit a completed Structures Design Statement, including the information required by Annex C of BD 100/16, , fully defining the design assumptions and parameters to be used in the design of each Structure.

4.3.20.2 Sample Structures Design Statements for Structures are provided in Appendix P in Part 3.

4.3.20.3 Following completion of the design a final version of the Structures Design Statement (for Construction) shall be submitted with the Design Certificate and Design Check Certificate, which shall be updated to record, all decisions made by the Designer that affect the standard of the design of the Works.

4.3.21 Particular Requirements for Structures

4.3.21.1 Particular requirements for the Structures included as part of the Works are as outlined in Section 4.3 of Part 2.

4.3.22 Resin Anchors

4.3.22.1 Chemical Anchorages, including threaded anchorages, dowels and reinforcement bars secured into concrete, rock, stone, masonry or brickwork shall be secured using proprietary resins. The choice of resin shall be appropriate for the substrate material and its preparation, hole orientation, load type(s) and installation and exposure conditions. Polyester resins shall not be used on Permanent Works and in situations where holes contain or are under water without the written permission of the Employer.

4.4 Environmental Criteria

4.4.1 General Requirements

4.4.1.1 The Design shall include environmental criteria identified in these Employer's Requirements, the Environmental Assessment Documents and the Contract.

4.4.1.2 The Contractor shall submit to the Engineer monthly reports from the Date for Commencement of the Works to cover landscape, ecology and Environmental Criteria prior to the monthly site contract meetings.

4.4.1.3 The Contractor shall arrange monthly environment meetings from the start of the contract one week prior to the main progress meetings. Records of this meeting shall be forwarded to the Engineer within seven days.

4.4.1.4 The Design shall ensure that Design, construction, completion and maintenance of the Works mitigates and/or minimises any adverse environmental impacts.

4.4.2 Indicative Landscape and Planting Works Drawings

4.4.2.1 The Indicative Landscape and Planting Works drawings, listed in Appendix 0/4 of the Specification identify the minimum requirements of the Employer for the planting works. The type, size, species and densities of plants and the like identified in the Indicative Landscape and Planting Works drawings shall be adopted by the Contractor in the Design.

4.4.2.2 Where the landform Design differs from that identified on the Indicative Landscape and Planting Works Drawings the total number of plants and the like or areas of plants and the like may be varied to suit the change in the landform only but type, size, species and densities of plants and the like shall be as identified in the Indicative Landscape and Planting Works Drawings.

4.4.2.3 Where the Design differs from the landform identified on the Indicative Landscape and Planting Works Drawings the Design shall follow the requirements of Section 4.4 of this Part 1 with respect to any change to the landform.

4.4.2.4 The engineering design and all other requirements to ensure the competence of such measures that may be required for the Design shall be in accordance with the relevant sections of the DMRB and these Employer's Requirements.

4.4.3 Qualified Professional Assistance

4.4.3.1 The landscape Design shall be prepared and carried out by a suitably experienced chartered Landscape Architect registered with the Landscape Institute or equivalent and supported during the construction of the landscape Works by a suitably experienced Landscape Architect and Landscape Clerk of Works.

The Contractor shall consult and comply with the requirements of

(i) Transport Scotland

in connection with the appointment of the Landscape Architect and Landscape Clerk of Works. Contact details are as identified in Section 4.4.3 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.4.3.2 The Contractor shall appoint a suitably experienced and qualified archaeologist to undertake archaeological evaluation, archaeological mitigation works and other archaeological issues as required.

The Contractor shall consult and comply with the requirements of:

(i) Transport Scotland's Historic Environment Advisor; and

(ii) any other relevant authority

in connection with the appointment of the archaeologist. Contact details are as identified in Section 4.4.3 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.4.3.3 The Contractor shall employ a suitably experienced and qualified Ecological Clerk of Works. The Ecological Clerk of Works shall be a member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and a Chartered Environmentalist/Ecologist and/or a holder of Protected Species licences.

The Contractor shall consult and comply with the requirements of

(i) SNH

in connection with the appointment of the Ecological Clerk of Works. Contact details are as identified in Section 4.4.3 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.4.3.4 Other specialist environmental professional(s) may be required to address ecology, wildlife, acoustics, materials management, water quality and drainage, as required.

4.4.3.5 The Contractor shall ensure that the appropriate qualified professionals shall be appointed prior to the Date for the Commencement of the Works and be sufficiently involved throughout the duration of the Contract to ensure:

(i) the Design, construction, completion and maintenance of the Works complies with the requirements of the Contract;

(ii) professional review of the method statements and programmes for the Works;

(iii) professional completion of all procedural audits and preparation of all other reports;

(iv) regular supervision and inspection of site preparation Works, including but not limited to, existing vegetation surveys, installation of measures to protect vegetation to be retained, tree felling and other vegetation clearance, topsoil stripping and storage;

(v) professional plant inspections;

(vi) regular supervision and inspection of the landscape Works including, but not limited to, landscape earthworks, subsoil ripping, topsoiling, cultivation, planting, seeding and landscape maintenance takes place during the construction, completion and maintenance of the Works in accordance with but not limited to Sections 6.1 and 6.2 of this Part 1.

4.4.4 Environmental Design and Mitigation

General

4.4.4.1 The Design shall ensure that:

(i) all measures be taken to protect the environment and control pollution in accordance with statutory requirements and the Contract; and

(ii) the environmental Design shall avoid or reduce and mitigate adverse environmental effects.

Design Standards

4.4.4.2 Environmental mitigation measures and the Design shall be implemented under the recommendations of the environmental professionals identified in Section 4.4 of Part 2 in accordance with current best practice guidelines including, but not limited to, the following:

(i) DMRB Volume 4, Geotechnics and Drainage;

(ii) DMRB Volume 10, Environmental Design;

(iii) DMRB Volume 11, Environmental Assessment;

(iv) Watercourses in the Community, A Guide to Sustainable Watercourse Management in the Urban Environment, SEPA, June 2000;

(v) Ponds, Pools and Lochans, Guidance on Good Practice in the Management and Creation of Small Water Bodies in Scotland, SEPA, June 2000;

(vi) British Standard Institute (BSI) Code of Practice for General Landscape Operations (excluding hard surfaces) (BS 4428);

(vii) BSI Code of Practice for Earthworks (BS 6031);

(viii) BSI Trees in relation to design, demolition and construction - Recommendations (BS 5837);

(ix) BSI Biodiversity – Code of Practice for Planning and Development (BS 42020);

(x) Pollution Prevention Guidelines (PPGs), SEPA, various dates;

(xi) Guidance for Pollution Prevention (GPPs), SEPA, various dates;

(xii) Assigning Groundwater Assessment Criteria for Pollutant Inputs, Position Statement WAT-PS-10, August 2014;

(xiii) Engineering in the Water Environment Good Practice Guide, Temporary Construction Methods, SEPA, March 2009;

(xiv) Guidelines for Landscape and Visual Impact Assessment published by the Landscape Institute and the Institute of Environmental Management and Assessment (Third Edition, 2013);

(xv) Fitting Landscapes: Securing more Sustainable Landscapes, published by Transport Scotland, March 2014;

(xvi) River Crossings and Migratory Fish: Design Guidance published by the Scottish Executive, February 2012;

(xvii) Scotland's Biodiversity: It's in Your Hands - A strategy for the conservation and enhancement of biodiversity in Scotland published by the Scottish Executive, 2004;

(xviii) 2020 Challenge for Scotland's Biodiversity - A Strategy for the conservation and enhancement of biodiversity in Scotland published by the Scottish Executive, 2013;

(xix) Scotland's Native Trees and Shrubs – A Designer's Guide to their Selection, Procurement and Use in Road Landscape, published by Scottish Executive, June 2002.

(xx) Construction Industry Research and Information Association (CIRIA) Report C753 "The SUDS Manual"

(xxi) CIRIA Control of Water Pollution from Linear Construction projects (Murnane et al., 2006)

(xxii) CIRIA Environmental Good Practice Site Guide (Charles & Edwards, 2015)

(xxiii) Otters and Development (SNH, 2008)

(xxiv) Reptile Habitat Management Handbook (Edgar et al., 2010)

Fitting Landscapes: Securing more Sustainable Landscapes

4.4.4.3 The Contractor shall ensure that:

(i) the design, construction and establishment maintenance of the Works comply with the Transport Scotland landscape policy – "Fitting Landscapes: Securing more Sustainable Landscapes".

Landscape Design integrated with Structural Design and Environmental Barriers

4.4.4.4 The Design shall ensure that:

(i) all Structures shall be constructed in such a way as to minimise adverse visual impact and to integrate harmoniously with the surrounding landscape; and

(ii) careful consideration shall be given to the location, orientation, scale, structural form, materials, finishes and colours in the Design for Structures and environmental barriers.

Landscape Design for Temporary Works Areas

4.4.4.5 The Design shall ensure that:

(i) all Temporary Works and construction areas (compounds/ haul routes/ accesses/ material stockpiles) and the like, outwith the area of the Permanent Works, shall be restored to their original condition, particularly in relation to soil cover, vegetation cover and hydrological condition.

Air Quality and Dust

4.4.4.6 The Contractor shall consult and comply with the requirements of the environmental department of the relevant local authority in connection with air quality and the reduction of dust nuisance. Contact details are as identified in Section 4.4.4 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

All necessary measures shall be implemented to reduce airborne dust levels as far as is possible and to prevent damage, loss, injury or nuisance caused by dust at all times during the construction and maintenance of the Works.

Such measures may include but shall not be restricted to:

(i) avoiding dust generating activities in conditions likely to cause nuisance;

(ii) minimising the handling of materials such as soil;

(iii) minimising drop heights;

(iv) immediate clearance of spillages of dusty material;

(v) use of water sprays during dry and/or windy conditions to damp down material stockpiles and unsurfaced areas e.g. haul roads;

(vi) sheeting of stockpiles if required;

(vii) sheeting of vehicles carrying material which may give rise to wind-blown dust;

(viii) seeding over stored topsoil where appropriate – where seeding is proposed it shall be a local provenance mix approved by the Engineer;

(ix) avoid overfilling of lorries;

(x) no burning of materials on site;

(xi) locate construction compound and material stockpiles away from sensitive receptors;

(xii) restricting vehicle speeds on unsurfaced haul routes and all unsurfaced areas to 10 miles per hour;

(xiii) regular use of road sweepers on local off-site roads, to remove any material tracked out of the site;

(xiv) regular cleaning of paved areas on-site;

(xv) use of a jet-spray vehicle and wheel wash for all vehicles leaving the site that have passed over unpaved ground;

(xvi) careful location of haul routes to keep vehicles as far as possible from sensitive locations;

(xvii) provision of windbreaks where appropriate; and

(xviii) switching off machinery not in use.

Notwithstanding any other provision of the Contract the Contractor shall produce Method Statements for handling dust and preventing dust spreading to adjacent communities during the construction and maintenance of the Works.

At least seven days in advance of such, the Contractor shall advise, in writing, all local residents likely to be affected by dust generating activities. The Contractor shall maintain records of any air quality and dust issues raised during the construction and maintenance Works including any subsequent action taken.

Re-Use of Materials and Waste Management

4.4.4.7 The Contractor shall endeavour to re-use and recycle materials including soils, vegetation, rock and otherwise within the Site. Stripped and excavated topsoil shall be reused as a plant-growing medium. Topsoil shall be stored and follow the re-use criteria set out within BS 3882, specification for topsoil and requirements for use.

The Contractor shall undertake appropriate testing of all soils before stripping. Any varying soil material is to be recorded and stored independently on site in accordance with best practice, with the location and composition of all stock piles recorded. The original location of the stripped

material is also to be recorded on a suitable plan. All relevant records and plans to be submitted to the Engineer.

The Contractor shall ensure that any waste material exported from the Site is transported by a registered waste carrier to an appropriately licenced site. Should any waste material be imported to the Site, the Contractor shall apply for the necessary licence or exemption.

The Contractor shall consult and comply with the requirements of

(i) SEPA

in connection with waste management and the disposal of waste materials that cannot be recycled. Contact details are as identified in Section 4.4.4 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

The Contractor shall follow the "Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste" (Scottish Renewables and SEPA, 2012) and "Developments on Peat and Off-Site Uses of Waste Peat" (SEPA, 2017).

Water Quality and Drainage

4.4.4.8 The Design shall ensure that:

(i) subject to any other provision of the Contract, surface water runoff from the trunk roads and side roads, including associated cuttings and embankments, shall be carried to storage, attenuation and settlement ponds/basins and otherwise wherever possible;

(ii) water tables shall be maintained, as far as possible, and not artificially lowered, to ensure that the flora, fauna, buildings and features adjacent to the Site shall not be adversely affected;

(iii) changes to the existing drainage patterns within the topography of the Site are minimised. The Contractor shall meet the requirements of SEPA and apply for a Controlled Activities Regulations (CAR) licence, where required, with detailed drainage proposals for the completed scheme. The Contractor shall provide the Engineer with evidence of this CAR licence prior to the commencement of works at any watercourse that requires a CAR licence;

(iv) The Contractor may make use of a CAR licence which has been transferred by the Employer to the Contractor;

(v) all controlled waters and watercourses within and adjacent to the Site are identified and monitored for quality of water, prior to any Works and during construction, completion and maintenance of the Works;

(vi) Controlled waters have the same meaning as in section 30A of the Control of Pollution Act 1974 (COPA) and include:

(a) inland waters, including the waters of any relevant loch or pond and rivers and other watercourses above the fresh-water limit; and

(b) groundwaters contained in underground strata, wells, boreholes, excavation into underground strata or similar.

(vii) the containment, treatment and disposal of surface water run-off from all trunk roads and side roads or groundwater produced by the Works prevents any contaminates entering and polluting controlled waters and the drainage system and adheres to the requirements of Section

4.2.5 of Part 1 in the vicinity of watercourses throughout the duration of the contract, including the period of maintenance;

(viii) reasonable care shall be taken in the use and storage of potentially polluting chemicals and materials to minimise the risk of spillage or release into watercourses, ditches or surface drains; and

(ix) service diversions (such as sewerage) if required, shall be undertaken prior to construction to minimise the risk of spillage or release into watercourses, ditches or surface drains.

4.4.4.9 Particular care shall be taken during the construction of the Works to minimise disturbance to the banks and beds of watercourses and existing land drainage systems during, but not limited to, the construction of culverts, watercourse crossings or diversions.

4.4.4.10 The Contractor shall consult and comply with the requirements of

(i) SEPA; and

in connection with water quality and drainage and the use of approved herbicides on embankments, cuttings and verges in proximity to watercourses. Contact details are as identified in Section 4.4.4 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.4.4.11 The Contractor shall consult and comply with the requirements of

(i) SEPA

in connection with monitoring water quality during construction, completion and maintenance of the Works. Contact details are as identified in Section 4.4.4 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

Planning and Land Use

4.4.4.12 Access shall be provided during the construction, completion and maintenance of the Works and also during the Period of Establishment Maintenance to meet the requirements of adjacent landowners and the relevant local authority.

4.4.4.13 Such requirements shall serve to avoid severance of land.

4.4.4.14 The Contractor shall consult and comply with the requirements of the relevant local authority planning department as identified in Section 4.4.4 of Part 2 in connection with planning policies and any statutory planning consents required in respect of the Design, construction, completion and maintenance of the Works. All other statutory or other approvals required in respect of the Design shall be complied with and obtained by the Contractor.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

Ecology and Nature Conservation

4.4.4.15 The Contractor shall ensure:

(i) the Design and Works provide protection of specific birds, fish and other animals, which are protected by the Conservation (Natural Habitats, &c.) Regulations 1994, as amended in Scotland, the Conservation (Natural Habitats, &c.) Amendment Scotland) Regulations 2007, the Wildlife and Countryside Act 1981 . The Contractor shall programme his Works so that disturbance to the habitat of such animals is minimised;

(ii) consideration is given to the relevant SNH guidance including, but not limited to, SNH's "Protected Species Advice for Developers" for bats,, otters, pine martens and squirrels;

(iii) the Works, including but not limited to site clearance and tree felling, shall not cause disturbance to roosting bats;

(iv) any Works which may cause disturbance to bats may require a European Protected Species licence from SNH;

(v) the Works, including but not limited to site clearance and tree felling, shall not cause disturbance to badgers, otters or beavers;

(vi) any Works which may cause disturbance to badgers may require a disturbance licence from SNH, and in principle shall not be carried out during the badger breeding and winter season, defined as December to June inclusive, unless otherwise agreed in writing with SNH, such as with a badger disturbance licence in place;

(vii) any Works which may cause disturbance to otters or beavers and their places of shelter may require a disturbance licence from SNH, and SNH shall be consulted to determine appropriate mitigation, including the requirement for such a licence;

(viii) any Works in the vicinity of any landscape features which may contain bird nests, including but not limited to trees and hedgerows, shall not be undertaken during the terrestrial bird nesting season, normally defined as mid-March to August inclusive unless agreed otherwise in consultations with SNH;

(ix) protection of existing areas of semi-natural vegetation including woodlands, scrublands, grasslands, riparian corridor and wetland;

(x) creation of new wildlife habitats throughout the Works; and

(xi) storage, attenuation and settlement ponds/basins and otherwise, for treating surface run-off in accordance with Section 4.2.5 of Part 1 are included in the Works.

4.4.4.16 The Contractor's construction programme as required by Clause 14 of the Conditions of Contract shall clearly indicate areas of existing vegetation to be removed and their programmed time for removal. Additional requirements for the surveying of existing vegetation are identified in Section 4.4.9 of this Part 1.

4.4.4.17 The Contractor shall take due cognisance in the Design, construction, completion and maintenance of the Works with respect to minimising disturbance to and avoiding significant negative impacts on wildlife and wildlife habitat.

4.4.4.18 Seasonal use of affected habitats by bats, the use of wetland habitat by otters and other mammals shall also be taken into account in the Design, construction, completion and maintenance of the Works.

4.4.4.19 Before the commencement of any Works the Contractor shall undertake additional detailed surveys of plants or animals protected by legislation and invasive plants which may be directly or indirectly affected by the Works, or, (as agreed in accordance with Part 2, Clause 4.4.4.5) utilise any existing surveys which may be available.

4.4.4.20 The Contractor shall undertake such surveys by employing specialists and these shall be approved in writing by the Engineer.

4.4.4.21 The Design shall incorporate all additional mitigation measures identified by the detailed surveys.

4.4.4.22 The Contractor shall obtain all necessary licences required in relation to species protected by legislation and comply with their conditions and requirements.

Cultural Heritage Interests

4.4.4.23 The Contractor shall take due cognisance in the Design, construction, completion and maintenance of the Works with respect to minimising disturbance to cultural heritage interests.

4.4.4.24 The Contractor shall consult and comply with the requirements of:

(i) Transport Scotland's Historic Environment Advisor;

(ii) Historic Environment Scotland (for matters relating to Scheduled Monuments, Category A Listed Buildings, Gardens and Designed Landscapes); and

(iii) any other relevant authority

in connection with any cultural heritage interests which shall be likely to be affected by the Design, construction, completion and maintenance of the Works including the landscape Design. Contact details are as identified in Section 4.4.4 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

Traffic Noise and Vibration

4.4.4.25 The Design shall ensure that traffic noise levels emanating from all roads identified in Appendix A in Part 3 shall be minimised and shall meet the following criteria:

(i) traffic noise levels at all properties shall be comparable to the 'do-something' levels at year of opening stated in the Stage 3 Environmental Report, as listed in Appendix Q in Part 3, unless otherwise agreed with the Engineer;

(ii) the Contractor shall complete pre construction noise surveys at representative properties in the Stage 3 Environmental Report Study Area, to be agreed with the Engineer, over at least a one week period. The measurement procedure should be compliant with CRTN measurement methodology;

(iii) the Contractor shall, within three months of issue of the Completion Certificate for the Works, complete compliance noise measurements at representative properties in the Stage 3 Environmental Report Study Area, to be agreed with the Engineer. The measurement procedure should be compliant with CRTN measurement methodology;

(iv) the Contractor shall avoid undertaking noise surveys during local and public holidays; and

(v) should an exceedance of the traffic noise levels stated in the Stage 3 Environmental Report be identified through measurements after opening, the Contractor shall design and construct suitable mitigation measures to reduce the noise levels to those specified in (i) above having due regard for the requirements of the Contract.

4.4.4.26 The Contractor shall produce noise models to a specification agreed with the Engineer. The Contractor shall provide the Engineer with the noise models upon completion of both the pre and post construction noise surveys.

Disruption During Construction

Notwithstanding any other provision of the Contract and unless otherwise agreed with the Engineer, fencing shall be erected as soon as practicable after the Date for Commencement of the Works both to delineate the limits of the Site and also to prevent livestock from gaining access to the Site.

4.4.4.27 The fencing may be either temporary or the permanent fencing as referred to in Section 4.2.3 of Part 1 and/or as identified in Appendix 1/15 of the Specification.

4.4.4.28 Temporary fencing along with any necessary gates and accesses shall be stock proof to the satisfaction of adjacent landowners.

4.4.4.29 Any temporary fencing shall not be removed until the relevant permanent fencing shall be in place or until Completion of the Works.

4.4.4.30 The Contractor shall notify in writing all local residents likely to be affected by noise generating activities prior to undertaking such activities and shall provide a named contact to respond to noise or vibration concerns. The Contractor shall record all concerns notified and any remedial actions taken in response.

Visual Impact

4.4.4.31 The Design shall ensure that the adverse visual impact of:

(i) Roads identified in Appendix A in Part 3;

(ii) any new Structures, and

(iii) vehicles using such roads and Structures

shall be mitigated for those visual receptors identified in Section 4.4.4 of Part 2.

4.4.4.32 Reinstatement of Redundant Areas of Road

The Design shall ensure that:

(i) all redundant areas of;

(a) road,

(b) footways,

(c) kerbs,

(d) gullies,

(e) barriers,

(f) signage,

(g) and the like

shall be removed completely (unless noted otherwise) and that these areas shall be reinstated in accordance with the road and landscape Design.

4.4.5 Scheme Specific Landscape Design Requirements

4.4.5.1 The Contractor shall consult and comply with the requirements of:

(i) Transport Scotland;

(ii) any other relevant authority

in connection with scheme specific landscape design requirements. Contact details are as identified in Section 4.4.5 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.4.6 Protection Measures for Existing Vegetation

4.4.6.1 The Contractor shall erect a temporary fence, in accordance with Clause 303 of the Specification, around all areas of existing vegetation within the Works that require to be protected. Before the fencing is erected, these areas shall be agreed by the Engineer in writing prior to any Works taking place. Additional requirements for the surveying of existing vegetation are identified in Section 4.4.9 of this Part 1.

4.4.6.2 The Contractor shall not be permitted to enter the protected fenced areas during the course of the Works other than to erect and remove the temporary fencing unless the prior written consent of the Engineer has been granted.

4.4.6.3 Notwithstanding any other provision of the Contract, the Contractor shall ensure that no damage to existing vegetation, ground conditions, soils or soil structures occurs in such protected areas during the construction, completion and maintenance of the Works.

4.4.6.4 Should damage occur, the Contractor shall undertake at his own cost all necessary remedial works.

Such remedial works for trees, shrubs and other vegetation shall include but not be limited to:

(i) replacement planting at a ratio of 3:1, area of new vegetation to area of damage, location and form to be agreed with the Employer.

Such remedial Works for damage to the ground conditions shall include removal and reinstatement of the ground plus the replacement, as above, of any vegetation that may be affected.

4.4.6.5 Immediately before the issue of the Certificate of Completion for the whole of the Works the temporary fence shall be removed.

4.4.6.6 Existing Vegetation - Protection from Wind and Windthrow

The Design shall ensure that:

(i) mitigation measures for the potential effect of windthrow on any existing planting are provided.

4.4.6.7 Existing Vegetation - General Protection Requirements

The Design shall ensure incorporation of the following general protection requirements with respect to existing vegetation and shall be in accordance with BS 5837:

(i) to protect and retain the maximum possible amount of existing woodland, hedgerows, scrub and grassland vegetation as a potentially valuable landscape and ecological resource;

(ii) to avoid damage to the roots of existing trees and shrubs, including trees and shrubs of which the stems are located outside but adjacent to the Site;

(iii) to reuse/recycle existing cleared vegetation and soils and seed bank in the Works; and

(iv) to protect and maintain the maximum number of existing trees and shrubs, including but not limited to, isolated trees and scrub.

4.4.7 Landscape and Earthworks Design Requirements

4.4.7.1 The Contractor shall consult his Landscape Architect on the finished shape, soil types and methods of working for all earthworks, including but not limited to, side slopes.

4.4.7.2 The Contractor's Landscape Architect shall validate the earthworks Design via a Consultation Certificate in accordance with the Certification Procedure prior to any such Works commencing.

4.4.7.3 The Contractor shall provide sufficient notice immediately prior to topsoiling and immediately following topsoiling, to allow inspection of the constructed earthworks by his Landscape Architect and the Engineer.

4.4.8 General Earthworks/Landform Design Requirements

4.4.8.1 The Design shall ensure that:

the planting Design shall be integrated with the landform Design and meet with the other landscape Design requirements contained in these Employer's Requirements.

4.4.8.2 The requirements for landform Design shall include, but not be limited to:

(i) creation of smooth flowing contours with varying slope profiles which reflect and shall be in character with the existing naturally occurring topography, and shall be approved by the Engineer. All opportunities shall be taken to grade out embankment and cutting slopes to more closely resemble the surrounding landscape character;

(ii) integration with existing ground levels, Structures and planting;

(iii) formation of the tops and bottoms of embankments and cuttings shall be rounded as identified in Section 4.2.6 of Part 1; and

(iv) creation of slope gradients which shall allow for re-establishment of suitable ground conditions where establishment of semi-natural vegetation shall be required by the Design.

4.4.8.3 Topsoil Depths, Storage and Handling

Topsoil depths, storage and handling shall be in accordance with Section 1.9.7 and Section 4.2.6 of Part 1.

4.4.8.4 Grass Seeding

Grass seeding shall be in accordance with Appendix 30/5 of the Specification.

4.4.9 Planting Design

General

4.4.9.1 The planting Design shall take due recognition of the relevant procedure in:

(i) Fitting Landscapes: Securing more Sustainable Landscapes;

(ii) the Specification; and

(iii) the Environmental Assessment Documents.

4.4.9.2 The Contractor shall consult and comply with the requirements of

(i) Transport Scotland

in connection with the planting design.

Contact details are as identified in Section 4.4.8 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

Plant Selection and Proof of Provenance

4.4.9.3 All UK native species plants and seed mixes shall be of the nearest available local provenance. The Contractor shall state in the Provenance Certificate issued with each batch of plants the zone of provenance of the trees to be supplied and the location where seeds and cuttings were obtained.

4.4.9.4 Each batch of plants shall have been individually labelled prior to delivery. The labels shall be retained by the Contractor and the eventual destination on Site of the plants contained within that batch, identified on a marked-up planting drawing which shall be returned to the Employer on completion of planting.

4.4.9.5 The Contractor shall order all plants and seed mixes in sufficient time to ensure that the provenance requirements of the Contract are met and to ensure that they are available for planting / seeding within the appropriate season.

Planting Densities

4.4.9.6 The Design shall ensure that:

(i) the various species and sizes of trees shall wherever possible resemble the local landscape characteristics typical in the locality.

4.4.9.7 Natural planting shall be carried out in single species or multi- species clumps to obtain a natural effect.

Extent of Planting

4.4.9.8 All planting distance requirements of statutory bodies, Undertakers and other companies shall be met.

4.4.9.9 The extent and type of planting in the Design shall be based on the mitigation proposals of the Environmental Statement and as identified on the Indicative Landscape and Planting Works Drawings as listed in Appendix 0/4 of the Specification.

General Design Requirements for Planting

4.4.9.10 Notwithstanding any other provision of the Contract the Design shall ensure that general planting Design requirements shall include, but not be limited to:

(i) retention of existing trees and hedgerows wherever possible, and integrate with new planting proposals;

(ii) avoidance of planting where the Works cross naturally open tracts of land, unless such planting shall be required for essential screening;

(iii) compensation for vegetation removed/destroyed by the Works;

(iv) reinforcement and linkage with existing hedgerows and trees for visual and ecological continuity;

(v) provision of mass planting to new embankments and structures to help assimilate the new arrangements in to the surrounding landscape;

(vi) provision of ecological diversity and interest wherever possible;

(vii) selection of plants shall be native species of local provenance, unless otherwise indicated on the Indicative Landscape and Planting Works Drawings as listed in Appendix 0/4 of the Specification, and in keeping with the naturally occurring and existing vegetation;

(viii) woodland planting shall not be permitted adjacent to the carriageway and verges;

(ix) make use of redundant field corners and landlocked areas as appropriate;

(x) provide visual interest throughout the Design; and

(xi) ensure any new planting areas reflect the varying density found in naturally occurring vegetation blocks, including glades/open areas as appropriate.

The planting species in the Design shall be appropriate to the physical conditions of the locality.

Planting Mixes

4.4.9.11 Planting mixes in the Design shall be as identified in the Indicative Landscape Design drawings as listed in Appendix 0/4 of the Specification.

Grass and Herbaceous Vegetation General Design Requirements

4.4.9.12 All seeding Design and seeding works shall be undertaken in accordance with Clause 3005 of the Specification, the Indicative Landscape and Planting Works Drawings as listed in Appendix 0/4 of the Specification and scheme specific requirements identified in Section 4.4 of Part 2.

Management of Existing Vegetation General Design Requirements

4.4.9.13 The Contractor shall survey the existing vegetation and submit accurate plan information to the Engineer accompanied by tabulated survey data including, but not limited to, species type, dimensions, condition and recommendations.

4.4.9.14 The Contractor shall employ a suitably qualified arborist to undertake the existing vegetation surveys.

4.4.9.15 Notwithstanding any other provision of the Contract, including but not limited to Section 4.4.6, the Contractor shall submit a written action report of remedial management measures for the consent of the Engineer (who will be advised by the appropriate professionals), prior to commencement of site clearance and excavation/construction works.

4.4.9.16 The Contractor shall undertake all the measures which have been agreed by the Engineer, in accordance with Clauses 3006 and 3010 of the Specification.

4.4.9.17 The report shall include those items identified in Section 4.4.8 of Part 2.

4.4.10 Landscape Design Implementation

4.4.10.1 The Contractor shall supervise the Works in accordance with Section 6 of this Part 1.

4.4.11 Landscape Maintenance

4.4.11.1 All references in the Contract to "Period of Establishment Maintenance" shall be taken to have the same meaning as "Period of Maintenance", the duration(s) of which shall be stated in Form of Final Tender.

Landscape Establishment Maintenance Manual

4.4.11.2 The Contractor shall prepare a Landscape Maintenance Manual, for approval by the Engineer, a minimum of 12 weeks prior to the commencement of the landscape maintenance period, detailing Period of Establishment Maintenance Works for planting, seeding and other landscape or ecological Works for such Works as referred to in Clauses 3003, 3007, 3009, 3010, 3011 and 3012 of the Specification.

Nuisance

4.4.11.3 Where any vegetation beyond the Site poses an actual or potential hazard, nuisance and or obstruction to the operation of the roads as identified in Appendix A in Part 3, these shall be reported in writing to the Engineer without delay.

Replacement Planting

4.4.11.4 Replacement planting in the Design shall be in accordance with sub-Clauses 3006.87 to 92 in Appendix 30/6 of the Specification.

4.4.12 Scheme Specific Environmental Requirements

4.4.12.1 Scheme specific requirements are identified in Section 4.4.9 of Part 2.

4.5 Settlement

4.5.1 The Design shall pay due regard to the effects of settlement or heave.

Measures shall require to be taken by the Contractor to ensure that settlement or heave of embankments shall be prevented or shall be substantially complete before the road pavement shall have been constructed.

4.5.2 The following criteria shall apply:

Within 10 metres of the interface between Structures and adjacent embankments, the differential settlement or heave between any two points at any time up to the end of the Defects Notification Period, shall not exceed:

(i) for any two points less than 1 metre apart, 5mm;

(ii) for any two points greater than 1 metre but less than 3 metres apart, 10mm;

(iii) for any two points greater than 3 metres but less than 6 metres apart, 15mm;

(iv) for any two points greater than 6 metres but less than 8m apart, 20mm; and

(v) for any two points greater than 8 metres apart, 25mm.

4.5.3 Over a distance of 50 metres back from any structure the maximum permitted change in gradient, from the design gradient monitored in accordance with Section 4.6 of Part 1 shall be 0.1 per cent.

4.5.4 Where new construction imposes loads on existing embankments, pavements or Structures, appropriate measures shall be taken by the Contractor to prevent differential settlement or damage.

4.5.5 Differential settlement which adversely affects the carriageway drainage shall not be acceptable in the Works.

4.5.6 At any time up to the end of the Defects Notification Period for each Section, the maximum permitted change in gradient from the design gradient shall be 0.5 per cent except for Accommodation Works Access Tracks where the maximum permitted change in gradient from the design gradient shall be 1.0 per cent. For the purposes of analysis the gradient shall be calculated using surveyed levels of the adjacent equally spaced control points.

4.6 Instrumentation

4.6.1 To monitor settlement, control points shall be attached to the pavement by the Contractor and levelled by the Contractor immediately after construction of the pavement and thereafter monthly for an initial period of six months.

The Contractor shall continue to monitor settlement on a monthly basis until such time as settlement trends have been established and significant movements have ceased.

4.6.2 The control points shall be installed at the following locations, referenced to Ordnance Survey datum, and be co-incident with Design chainages:

(i) where embankments are of greater than 3 metres in height, control points shall be installed in the pavement at 10 metre intervals on both edges of the carriageway and on the centreline;

(ii) within 10 metres of the interface between Structures and approach embankments control points shall be installed in the pavement at 10 metre intervals on both edges of the carriageway and on the centreline;

(iii) behind Structures, control points shall be installed in the pavement at 5 metre intervals on both edges of carriageway and on the centreline, over a distance of 50 metres;

(iv) where new construction crosses areas where ground improvement has been undertaken, control points shall be installed in the pavement at 5 metre intervals on both edges of the carriageway and on the centre line, over a distance of the ground improvement works plus 50 metres; and

(v) where new construction incorporates soil reinforcement (including geogrid), control points shall be installed in the pavement at 5 metre intervals on both edges of the carriageway and on the centre line, over a distance of the soil reinforcement works plus 50 metres.

4.6.3 The centreline control points shall be levelled by the Contractor until the carriageway is opened, and thereafter only when the edge control points indicate significant level changes, or as otherwise directed by the Engineer.

4.6.4 The Contractor shall submit to the Engineer the results of the monitoring within seven days of the measurements having been taken.

4.6.5 Notwithstanding the requirements of Section 4.6 of Part 1, the Contractor shall take all measures to identify the area over which any remedial measures are required due to unacceptable differential settlements.

4.7 Contaminated Land

4.7.1 The Contractor shall consult and comply with the requirements of:

(i) SEPA; and

(ii) the relevant local authority

regarding treatment and disposal of all contaminated materials. Contact details are provided in Section 4.7 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.7.2 The Contractor shall be responsible for the implementation of any ground investigation required to provide information for the design of the Works and monitoring purposes to deal with known or suspected contamination and to support reuse and management of waste materials.

4.7.3 The Contractor shall ensure that any contaminated materials which shall be removed from the Site shall be transported to an appropriately licensed waste management or disposal site.

4.7.4 The Contractor shall select materials suitable for the environment in which they shall be placed taking into account the presence of known or suspected contaminants and shall refer to appropriate guidance in the selection of materials.

4.7.5 The Design, execution and completion of the Works shall take into account the presence of known and potential land contamination. It shall achieve the objective of protection of all environmental receptors (including humans, water environment, ecology, and built structures from land contamination) through design and implementation of appropriate mitigation design and monitoring procedures.

4.7.6 Stockpiling of contaminated material shall be avoided wherever possible, although where stockpiles are deemed to be necessary short-term prior to disposal or treatment of material, the Contractor shall take precautions to prevent the generation of contaminated leachate by preventing infiltration of precipitation, generation of potentially contaminated run-off and dust blow. Earthworks should be undertaken in accordance with SEPA documentation WAT-SG-29, Engineering in the Water Environment.

4.7.7 The Contractor shall employ source – pathway – receptor assessments to assess the risks to human health and the environment for all phases and activities to be undertaken during the Works, including, but not limited to ground improvement works, piling works, grouting works, service ducts, existing and new drainage, and use of SuDS. Such risk assessments shall be undertaken in accordance with published guidelines included in Appendix O.

4.7.8 The Contractor shall ensure that the Site shall not be capable of being determined as Contaminated Land under and as defined by Part IIA of the Environmental Protection Act 1990 as a result of the Works. The Contractor shall ensure that existing linkages are minimised as far as reasonably practicable and new pollutant linkages are not created.

4.7.9 Mitigation works shall be designed and implemented for all areas of potential contamination identified as presenting a risk to an environmental receptor. These shall address the following:

(i) removal of pathways to isolate contamination sources from receptors;

(ii) protection of receptors;

(iii) source removal; and

(iv) verification to demonstrate that the mitigation objectives have been addressed.

4.7.10 The Contractor shall undertake a watching brief for potential land contamination during the Works. In the event of suspected land contamination being discovered / encountered at any time during the Works, the Contractor shall notify the Engineer immediately.

4.7.11 The Contractor shall submit to the Engineer, for review and comment, the output of all risk assessments and mitigation Designs and method statements detailing his proposed monitoring and on-site controls for mitigating the risks associated with contaminated soil, groundwater, dust and gases including reference to the safety and welfare of the general public, no later than 21 days prior to the Date for Commencement of the Works.

4.8 Requirements for Intelligent Transport Systems

4.8.1 General

4.8.1.1 All consultation with Transport Scotland shall be as per the contact details provided in Section 4.8.1 of Part 2.

4.8.1.2 Transport Scotland shall arrange for the provision of the technology components and software systems for the Intelligent Transport Systems (ITS) facilities, known as the Active Equipment, for installation and commissioning by the Contractor. The Contractor shall be required to provide the infrastructure necessary to support the Active Equipment, known as the Passive Network.

4.8.1.3 The Contractor shall design, install and commission the following equipment:

(i) Variable Message Signs ("VMS") to display tactical text messages and/or multi-coloured pictograms to drivers. These shall be positioned in advance of major junctions along the route;

(ii) Closed Circuit Television ("CCTV") monitoring to provide visual coverage of major junctions and all associated slip roads. Additionally, cameras to be mounted on VMS signs to monitor main carriageway sections; and

(iii) Data Service Equipment for gathering traffic count data, via sub-surface technologies such as loop detectors, or alternative compatible technologies as agreed with Transport Scotland.

4.8.1.4 The Passive ITS Infrastructure to be provided by the Contractor shall include:

(i) Infrastructure to support VMS to provide Transport Scotland's Traffic Scotland Service (TSS) operators the ability to display driver messages;

(ii) Infrastructure to support CCTV to provide visual monitoring by TSS operators and other parties that the CCTV images are shared with;

(iii) Infrastructure to support Data Service vehicle detection facilities to gather traffic data used by Transport Scotland TRBO;

(iv) Infrastructure to support communications between the Traffic Scotland Equipment (TSE) and the Traffic Scotland National Control Centre (TSNCC);

(v) Communication network to provide the backbone for all ITS implementations, whether for local connection between roadside equipment and cabinets, or long-distance connection between the TSNCC and the roadside. The communications backbone shall be installed in a duct system, based on a fibre cable network; and

(vi) An Electrical power network to provide dedicated power supplies at each TSE site.

4.8.2 Provision of ITS Works

4.8.2.1 The Contractor shall prepare a '"Strategy for Delivery of the ITS works for Traffic Scotland Equipment" that identifies and captures all obligations within the Contract.

The Contractor shall consult and comply with the requirements of Transport Scotland when developing this document.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

The Contractor shall not commence any works until Transport Scotland has given written approval of the document. The Contractor shall incorporate any comments made by Transport Scotland in to the document. The strategy is a live document that shall be updated by the Contractor and re-approved by Transport Scotland as the work progresses.

4.8.2.2 The Contractor shall provide a communication network that is fully compatible with Transport Scotland's existing communication network to accommodate TSE provided under this Contract. The Contractor shall consult and comply with the requirements of Transport Scotland regarding the communications network design.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.8.2.3 The Traffic Scotland NDX series of drawings listed in Specification Appendix 0/4 comprise of standard details of non-site specific installations of standard equipment and site layouts. The Contractor shall use both the specific requirements and these standard details to prepare site specific layouts to meet the Employer's Requirements and Specification. Where these standard details cannot be achieved the Contractor shall consult and comply with the requirements of Transport Scotland.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.8.2.4 The Contractor shall test and commission all Works for TSE in accordance with the Specification.

4.8.2.5 Transport Scotland shall provide as Transport Scotland Issued Equipment (TSIE) only the Active Equipment and Passive Network components as detailed in Section 4.8.4 of this Part 1 required to complete the Works. Unless otherwise specified, the Contractor shall provide all other TSE necessary to complete the Works.

4.8.3 Transport Scotland Equipment

4.8.3.1 Transport Scotland will be responsible for managing the modifications and configuration changes to the Traffic Scotland in-station to accommodate the Transport Scotland provided TSE. In addition, Transport Scotland will develop the data interface and make the changes to the Internet Protocol (IP) wide area network outwith the Site as required to provide communications with the TSE.

4.8.3.2 To allow Transport Scotland to make the necessary modifications and configuration changes to existing TSIE the Contractor shall provide to Transport Scotland the following information, including but not limited to:

(i) Ordnance Survey grid reference coordinates and details of changes in lane configuration and lane relationships along the length of the road;

(ii) Ordnance Survey grid reference coordinates and details of changes in the default speed limit of traffic along the length of the road;

(iii) Ordnance Survey grid reference coordinates and dimensions, where applicable, of maintenance access, maintenance access slips and maintenance hardstandings;

(iv) Ordnance Survey grid reference coordinates and road alignment details to allow the new road to be overlaid on the Traffic Scotland operational in-station geographical mapping;

(v) Ordnance Survey grid reference coordinates of all TSIE and its cross sectional position; and

(vi) A table of all TSIE with chainage and equipment reference names. The format of the TSIE chainage and reference names will be provided prior to the Date for Commencement of the Works.

4.8.3.3 To allow Transport Scotland to order TSIE and prepare all modifications and configurations described in Section 4.8.3.2, the Contractor shall notify Transport Scotland of the TSIE requirements and in-station and TSE modifications and configuration in accordance with the following lead-in time requirements:

(i) Design and development of the in-station – six months;

(ii) Configuration of in-station / software systems to accommodate TSIE that requires to be relocated – three months;

(iii) Setting TSIE out of service to allow removal – 14 days;

(iv) Delivery of TSIE – twelve months written notice and confirmation one month prior to actual delivery requirement;

(v) Service diversion documents – six months prior to any diversion taking place;

(vi) Notification to Transport Scotland of any works affecting the existing TSE and Traffic Scotland Service – six months;

(vii) Transport Scotland's attendance to witness works – 21 days;

(viii) Notice to uplift TSIE from the nominated TSIE store – 7 days; and

(ix) Configuration of an item of TSIE for the IP communications network – three months from notification regarding configuration requirements.

4.8.3.4 Transport Scotland will plan, undertake and release the configuration works input to match the Contractor's construction programme. The Contractor shall be responsible for any additional modification, configuration and data input effort by Transport Scotland as a result of changes to the construction programme.

4.8.3.5 The Contractor shall give not less than three months written notice of the proposed date of each TSE installation. This notice shall be reconfirmed at two months and 21 days prior to installation and again at the time of installation.

4.8.3.6 The Contractor shall at any time allow access by Transport Scotland's Traffic Scotland Operations and Infrastructure Services Contact (TSOIS) contractor to undertake a maintainability audit of the TSE implementation. The Contractor shall take cognisance of the output of such a maintainability audit and make reasonable adjustments to their implementation to facilitate Transport Scotland's handover of the scheme into maintenance and operation.

4.8.4 Transport Scotland Issued Equipment

4.8.4.1 Transport Scotland will issue to the Contractor TSE as detailed in Table 4.8.4.1.1 required to complete the Works, for installation, testing and commissioning by the Contractor. This TSE is referred to as TSIE.

Table 4.8.4.1.1 Traffic Scotland Issued Equipment

	Item	Contractor to collect from Transport Scotland's TSIE Nominated Stores	Issued from Transport Scotland's Supplier
VMS	MS4VMS (Offset-T) including vertical post, support frame, RSC, ladder, CCTV bracket and ALM as required	No	Yes
	Bolt group fixing and template	No	Yes
Data Service	TMUs complete with detector cards	Yes	No
CCTV	CCTV mast	Yes	No
	Bolt group fixing and template	Yes	No
	CCTV camera – Monitoring only	Yes	No
	Pan, tilt and zoom unit	Yes	No
	CCTV base station	Yes	No
	CCTV prefabricated composite interconnecting cable	Yes	No

4.8.4.2 Table 4.8.4.1.1 identifies those large items of TSIE that shall be dispatched direct to the Contractor from Traffic Scotland Service suppliers. All other TSIE shall be uplifted and transported by the Contractor from the Traffic Scotland Service Nominated TSIE Store to Site or the Contractor's TSE Assembly Point.

4.8.4.3 The Traffic Scotland Service Nominated TSIE Store is located within 250 kilometres of the Site.

4.8.4.4 Where the Contractor disassembles TSIE to ease transportation to Site the Contractor shall be responsible for reassembly and testing to ensure that the equipment is operational and has not been damaged during disassembly, transportation, reassembly or installation. Any damage incurred shall be treated in the same way as the Contractor's damage to TSE and shall be rectified at the Contractor's expense.

4.8.4.5 The Contractor shall develop, populate and maintain a TSE Schedule to manage the planning, ordering, dispatch and installation of TSIE such that the status of each and every item of TSIE can be readily determined by both the Contractor and Transport Scotland. This TSE Schedule and associated records shall be in an electronic format and identify for each item of TSIE the following:

(i) Transport Scotland's TSE equipment number of the TSIE;

(ii) Serial Number of the TSIE;

(iii) Date ordered;

(iv) Date required by Contractor taking cognisance of the lead time detailed in Section 4.8.3.3;

(v) Date uplifted by the Contractor;

(vi) Nominated TSIE Store equipment release note reference number;

(vii) Date delivered to the Contractor by the supplier, the supplier's name and goods delivered reference number, for TSIE dispatched direct from Transport Scotland's supplier;

(viii) Date the TSIE was installed on site;

(ix) Site Acceptance Test ('SAT') dates for each TSIE and successful Pre-commissioning SAT certificate reference number; and

(x) Successful Commissioning SAT certificate reference number.

4.8.4.6 The TSE Schedule and associated records shall be version controlled and backed up by the Contractor;

4.8.4.7 Where activity is taking place that requires the TSE Schedule to be modified the Contractor shall issue the modified schedule to Transport Scotland on a weekly basis or as instructed by Transport Scotland.

4.8.4.8 The Contractor shall ensure that the request for the delivery of TSIE matches the Construction programme. The Contractor shall comply with the following constraints:

(i) TSIE supplied directly to the Contractor shall be subject to a minimum delivery order so that efficient use of the supplier's transport is made. The minimum delivery order shall be 75 percent of the capacity of the Transport Scotland's TSIE delivery vehicle. The Contractor shall be responsible for the additional transport costs associated with inefficient supplier transport use;

(ii) The Nominated TSIE Store operates between 08:30 hours and 16:30 hours Monday to Friday excluding statutory holidays. The Contractor shall provide written notice, in compliance with the lead in times detailed in Section 4.8.3.3, of the Contractor's intention to uplift TSIE. The written notice shall include a list of TSIE to be uplifted;

(iii) TSIE equipment waiting to be installed within a cabinet shall be stored by the Contractor in a safe, secure and heated environment to avoid potential damage prior to installation by the Contractor. All VMS must be electrically energised upon delivery to avoid potential damage prior to installation by the Contractor;

(iv) The Contractor shall advise Transport Scotland of the location and description of the store that the Contractor shall use, at least 28 days prior to the TSIE being uplifted by the Contractor from the Nominated TSIE Store; and

(v) The Contractor shall complete and submit to Transport Scotland in compliance with the lead in times detailed in Section 4.8.3.3 the TSIE Requisition forms for all items of TSIE. A separate form shall be provided for each TSE site, or for each different requirement date.

4.8.4.9 The Contractor shall appoint a Transport Scotland Issued Equipment Controller ("TSIE Controller") whose duties shall be to liaise with Transport Scotland on all matters relating to TSIE.

4.8.4.10 Transport Scotland shall not accept any request from the Contractor for the release of TSIE unless it is included with an agreed delivery programme.

4.8.4.11 Written notification shall be provided to Transport Scotland, in compliance with the lead-in times detailed in Section 4.8.3.3 by the Contractor's TSIE Controller, of the planned requirement to release TSIE from the Nominated TSIE Store. The request for TSIE shall be on a just-in-time basis and take cognisance of minimum order requirements to avoid inefficiency of transportation.

4.8.4.12 Faulty or non-operational TSIE, identified during testing in accordance with the Specification, shall be replaced or repaired within 14 days of notification to Transport Scotland. Subject to the nature of the fault Transport Scotland may arrange repair of the equipment at the Contractor's TSE Assembly Point, and the Contractor shall facilitate access for the Traffic Scotland Service supplier's to undertake repairs to rectify such faulty or non-operational TSIE. Faulty or non-operational TSIE not being repaired on Site shall be returned to Traffic Scotland Service Nominated TSIE Stores or shall be uplifted by the provider of the TSIE. Replacement / repaired TSIE shall be subject to testing in accordance with the Specification.

4.8.5 Existing Traffic Scotland Equipment

4.8.5.1 The Contractor shall remove and dispose of the existing active and passive equipment elements of the existing TSE that are determined to be no longer required through consultation with Transport Scotland. The Contractor shall undertake investigations as necessary to confirm the location and quantity of all existing TSE and associated communications and power networks installed within the Site.

4.8.5.2 Transport Scotland wish the TSE to operate for as long as possible. The Contractor shall consult and comply with Transport Scotland to confirm the date when the existing TSE requires to be removed. Transport Scotland requires four weeks notice of the need for Transport Scotland to remove the active equipment of the TSE.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.8.6 Connection of New and Existing Traffic Scotland Equipment

4.8.6.1 Each new item of TSE which connects to the existing TSE shall be subject to testing and commissioning in accordance with the Specification.

4.8.6.2 The Contractor shall complete the installation and testing of TSE at the roadside a minimum period of 56 days prior to requesting the Certificate of Completion. Within this 56 day period, the Contractor shall allow access to Transport Scotland to undertake additional testing and fine tuning as required.

4.8.7 Active Equipment

4.8.7.1 Active Equipment is segregated into the following communications traffic types:

(i) Video (from roadside CCTV cameras); and

(ii) Data (for example to / from Multi-Purpose Controller (MPC), VMS, Journey Time (JT) Cameras, CCTV controllers, networked computers etc).

4.8.7.2 The Active Equipment communications traffic shall be connected to the IP network at transmission stations, Traffic Scotland 600(S) cabinets ('600(S)'), Combined Equipment Cabinets (CEC) where environmental control is required, and at remote equipment sites (using Ethernet over the fibre optic cable network and Digital Subscriber Line (DSL) technology over the copper cable network). Active Equipment communications traffic shall be capable of being recovered at transmission stations and at the TSNCC.

4.8.7.3 The Active Equipment includes a communications system of switches/routers, connecting devices and transmission equipment.

4.8.7.4 The communications system shall comply with the following requirements:

(i) A core / distribution network, consisting of Ethernet multi-layer switches connected to provide resilience through redundancy using the longitudinal fibre optic network;

(ii) A local access network for connecting roadside TSE to the core / distribution network, consisting of Ethernet switches connected to provide resilience through redundancy using the longitudinal and local fibre optic network;

(iii) Multi-layer switches located in transmission stations shall be connected to other transmission station multi-layer switches and to roadside cabinet switches and DSL equipment;

(iv) Roadside switches shall be connected to local DSL equipment, adjacent roadside switches or to an adjacent transmission station switch. No copper link from a roadside equipment cabinet to its corresponding upstream switch shall be greater than 7 kilometres in length;

(v) Switches and DSL equipment shall be supplied with all necessary fibre optic interface equipment, and shall require patch leads with Fixed Connectors ('FC');

(vi) DSL equipment shall be supplied with all necessary copper interface equipment, and shall require patch leads with RJ45 connectors; and

(vii) Switches and DSL equipment shall require local copper Ethernet connection using Category 5e ('CAT5e') cables.

4.8.7.5 Prior to commencing the communications network design the Contractor shall request from Transport Scotland confirmation of the IP communication equipment that is available as TSIE and Transport Scotland will confirm that information within 21 days. The Contractor shall consult and comply with Transport Scotland and liaise with their nominated providers prior to the commencement of any design work to ensure that the communications network design philosophy will yield a design which will interface with the existing Traffic Scotland network.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.8.7.6 The Contractor shall provide the communications network design to Transport Scotland to allow them to undertake the IP design in accordance with Section 4.8.3.3. The communications network design shall clearly identify the locations of all the TSE.

4.8.7.7 Transport Scotland shall provide all pre-configured IP related Active Equipment required to provide the necessary communication path rules, prior to uplift by the Contractor from TSS Nominated TSIE Store.

4.8.7.8 The Contractor shall assemble, install, connect, test and commission the Active Equipment complete with internal and, where appropriate, external communications cabling and terminations onto the Passive Network.

4.8.7.9 The Contractor shall liaise with Transport Scotland regarding the commissioning requirements of the TSE and the involvement of the TSS providers during the commissioning process. The Contractor shall integrate such requirements in their commissioning programme.

4.8.7.10 To prevent potential damage to environmentally sensitive components, Active Equipment shall not be installed on Site unless it can be connected to an electrical power supply, in accordance with the Specification.

4.8.7.11 The Contractor shall undertake testing of Active Equipment in accordance with the Specification.

4.8.8 Passive Network (Roadside Infrastructure)

4.8.8.1 Passive Network components to be provided by the Contractor shall include, but shall not be limited to all supporting infrastructure associated with:

(i) Road restraint systems associated with TSE as detailed in Section 4.2.4 of this Part 1;

(ii) TSE as detailed in Section 4.8.4 of Part 1;

(iii) Cabinets and foundations;

(iv) Longitudinal, transverse and local fibre optic communications cables, cable fittings and terminations and cable network stage 1 and stage 2 testing;

(v) Longitudinal, transverse and local cable duct systems between cabinets and equipment including ducting, draw cords, draw chambers, platforms, cable tray and fixings;

(vi) Data Service vehicle detection facility inductive loops and associated feeder cable in both carriageways;

(vii) Incoming power supply and all associated power distribution cabling and infrastructure;

(viii) Mechanical interface components and brackets to enable the Active Equipment to be fixed, aligned and adjusted during its operational life to the Passive Network; and

(ix) Hard landscaping, safe hard landscaping access paths, stairs and pedestrian guardrails as required at each TSE site.

4.8.9 Cabinets

4.8.9.1 Cabinets and ancillary items required for the ITS works shall be provided in accordance with this Part 1 and the Specification.

4.8.9.2 The Contractor shall provide and install all foundations including 610 plinth and skirts and other fixing arrangements for all cabinets and verge mounted TSE in accordance with the NDX1002 series of drawings as listed in Appendix 0/4 of the Specification.

4.8.9.3 Cabinet types to be issued as TSIE are:

(i) Electricity Supplier Termination Pillar ("TP") for the incoming local electricity supplier's cable head and outgoing circuits to TSE;

(ii) Traffic Equipment Distribution Pillar ("TEDP") for local power supply termination at each TSE site requiring power, local switchgear and outgoing circuits for each item of TSE; and

(iii) Combined Electricity Supplier Termination and Traffic Equipment Distribution Pillar ("TP/TEDP") for termination of the incoming cable from the Electricity Supply Contractor and distribution to TSE in accordance with the NDX1011 series of drawings as listed in Appendix 0/4 of the Specification.

4.8.9.4 Cabinet types to be supplied by the Contractor are:

(i) 600(S) cabinet for housing Active Equipment;

(ii) Above ground fibre optic cable termination pillar (FOTP), a Highways Agency Type 609 cabinet for termination of fibre optic cable at TSE sites; and

(iii) Below ground fibre optic cable termination pillar (UFOTP), a subterranean version of the FOTP to be deployed to minimise the environmental impact of the multiple longitudinal FOTPs required throughout the scheme. The Contractor shall consult and comply with Transport Scotland to agree a specification for this cabinet type.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.8.9.5 Cabinets shall be placed such that doors open freely and there is sufficient space between and around cabinets for safe working. The Contractor shall design the site layout of the Passive Network to achieve a consistent approach throughout the Site in compliance with this Part 1, the Specification and Part 2.

4.8.9.6 Cabinets shall be colocated at TSE sites to minimise visual and environmental impact.

4.8.10 Cable Routing Systems

4.8.10.1 Cable routing systems for TSE shall be installed in a cable management system at all locations in a duct management system as described in Section 4.8.11.

4.8.10.2 Cable routing systems shall comply with the following:

(i) TSE power and fibre optic cables shall be installed within a duct management system to form the cable routing system;

(ii) The cable routing system, detailed in (a) above, shall be physically separated from other power supply systems with a minimum separation of 500 millimetres throughout where the voltage of other power system is up to 415 volts and where the other power supply systems are greater than 415 volts, the minimum separation from the copper communications cables shall be a minimum of 2 metres. Where local conditions dictate, the longitudinal ducts may be placed closer for a maximum of 50 metres, but this shall be minimised as far as practical, and each occurrence shall only be allowed with the agreement of Transport Scotland;

(iii) If routes are enclosed, whether utilised or not, they shall be provided with continuous draw cords secured between the chambers;

(iv) Cable routing systems shall be installed so as to run parallel to the relevant adjacent road, at a distance of not greater than 2 metres from the edge of the carriageway;

(v) Transverse cable routing shall be perpendicular to the relevant road; and

(vi) Cable routing systems shall be continuous in both verges of the A9 mainline carriageway between the duct interface locations as agreed with Transport Scotland.

4.8.10.3 The Contractor shall ensure the continuity of the cable routing systems at their interface with Structures are not compromised during the construction of roads and Structures. The Contractor shall ensure:

(i) Correct alignment of the cable routing systems within the Structure foundation;

(ii) Installation of required draw cords within the cable routing systems within the Structure and its associated chambers;

(iii) Provision of a smooth cable routing systems with an appropriate bending radius to avoid damage to cables within the Structure foundation;

(iv) Continuity of cable routing systems through Structure components such as abutments, expansion joints and interfaces; and

(v) Provision of leak proof joints such that spoil (e.g. from resin, grouting, mortar, silt and the like) shall not migrate into the duct to create any blockage (permanent or otherwise) of the duct route.

4.8.10.4 Cable restraint and support systems shall be provided for above ground cable management systems in accordance with the Specification. Where cable management systems span mechanical or expansion joints the cable management system and cables shall be designed and installed to prevent additional strain to the cable restraint mechanism or damage to the integrity of the cable.

4.8.11 Ducting and Chambers for Roads

4.8.11.1 The Contractor shall provide underground ducting and chambers for TSE cable networks in accordance with the Employer's Requirements and the Specification to provide an integrated duct network.

4.8.11.2 The Contractor shall provide, install and test ducts, duct network and duct chambers for TSE in accordance with the Employer's Requirements and the Specification.

4.8.11.3 The Contractor shall provide all necessary ducts, chambers and draw cords to complete the works which link TSE on all relevant roads and in accordance with the following minimum criteria;

(i) Two, 100 millimetre internal diameter, longitudinal communication ducts within both verges of the A9 mainline carriageway throughout the site, and slip road verges, terminating at tie-in locations at the scheme extents to be agreed with Transport Scotland;

(ii) Two, 100 millimetre internal diameter, transverse communication ducts across Slip Roads;

(iii) One, 150 millimetre internal diameter power duct to distribute power supply cables between the TSE and between TSE and the incoming power supply point;

(iv) Two, 100 millimetre, internal diameter, transverse communication ducts shall be provided at a maximum of 1000m spacings to cross the carriageway, or taking cognisance of TSE locations, forming a connected network of transverse ducts throughout the Site;

(v) Ducts shall not be installed where existing trees, shrubs and the like may have an impact on the future integrity of the ducting;

(vi) Type A chambers in both verges of the A9 mainline carriageway at each transverse duct location and each TSE site;

(vii) Additional Type C chambers at each 600(S) cabinet;

(viii) Additional intermediate Type A chambers equidistant between each transverse duct in both verges of the A9 mainline carriageway at a maximum distance of 500 metres between transverse ducts;

(ix) Additional Type A chambers at locations where any changes of direction, road crossings or level changes of the duct installation occur including entry to and egress from any Structures;

(x) Type D loop detector chambers at each Data Service vehicle detection facility site where vehicle inductive loops are installed and jointed to loop feeder cables;

(xi) Additional chambers and local 100 millimetre diameter ducts at each TSE site to interconnect all TSE chambers and ducts to provide a cable route between all TSE at each site; and

(xii) Chambers shall not be installed on the slope of embankments unless an appropriate level area of hard landscaping is provided for cable installation and future maintenance.

4.8.11.4 Further to the requirements of Section 4.8.11.3, the Contractor shall install further duct and chamber infrastructure to facilitate future use by third party providers of broadband services:

(i) two, 100 millimetre internal diameter, longitudinal communication ducts within both verges of the A9 mainline carriageway throughout the site, and slip road verges, terminating at tie-in locations at the scheme extents to be agreed with Transport Scotland;

(ii) two, 100 millimetre internal diameter, transverse communication ducts across Slip Roads;

(iii) two, 100 millimetre, internal diameter, transverse communication ducts shall be provided at a maximum of 1000 metre spacings to cross the carriageway, or taking cognisance of Traffic Scotland Equipment (TSE) locations, forming a connected network of transverse ducts throughout the Site;

(iv) ducts shall not be installed where existing trees, shrubs and the like may have an impact on the future integrity of the ducting;

(v) ducts shall run in parallel with the Traffic Scotland ducting and share common chamber types as defined in the Traffic Scotland NDX series of drawings. An extra type A chamber shall be provided at every 500 metre interval, providing one for Traffic Scotland use, and the other for third party use;

(vi) ducts which pass through any additional Traffic Scotland chambers shall do so without being broken;

(vii) the Contractors design shall ensure that ducts which pass through a chamber without being broken do not inhibit access to the ducts and cables which are broken out into this chamber for use by the designated stakeholder;

(viii) the Contractors design shall ensure that ducts which pass through a chamber without being broken do not inhibit use of or access to any drainage or other service facilities provided for in the chamber; and

(ix) chambers shall be clearly marked to highlight to maintenance personnel the use of the chamber.

4.8.11.5 The Contractor shall provide marker tape for the cable routing systems in accordance with the Specification.

4.8.11.6 The Contractor shall terminate the duct network at the scheme extents at a UFOTP to allow future connection to the network at such time as adjoining schemes are complete. The chamber installations at these locations shall provide suitable duct stubs to readily allow for connection of the duct network from the adjoining schemes.

4.8.11.7 The ducting and chambers shall provide an integrated network of routes that efficiently inter-connect Traffic Scotland equipment and required services, which shall accommodate for the future expansion by Traffic Scotland.

4.8.11.8 In exceptional circumstances where local constraints would prevent the installation of ducts within the verge, the Contractor may propose the use of either verge located cable troughs of equivalent volumetric capacity to the ducted network, in accordance with the Specification, or the installation of ducts beneath the carriageway with access chambers provided in the verge. This shall be approved by Transport Scotland in accordance with the Certification Procedure.

4.8.12 Cable Network and Connections

4.8.12.1 The cable network and connections shall form a communications system that collects, distributes and controls the movement of all data, voice and video between the TSNCC and each item of TSE within and outwith the Site. The cable network and connections form part of the Passive Network whilst the switches and routing devices are part of the Active Network.

4.8.12.2 The Contractor shall comply with the requirements in this Part 1 and the Specification with regard to the provision, use and installation of fibre optic and loop feeder cables within the Site and communications circuits connected through the Site.

4.8.12.3 The Contractor shall comply with the requirements in this Part 1 and the Specification with regard to the termination, jointing and connection of loop and loop feeder cables within the Site.

4.8.12.4 The Contractor shall comply with the requirements in this Part 1 and the Specification with regard to the termination, jointing and connection of fibre optic cables within the Site and communications circuits connected through the Site.

4.8.12.5 The Contractor shall comply with the requirements in this Part 1 and the Specification with regard to the termination, jointing and connection of power cables within the Site and communications circuits connected through the Site. The cable types to be supplied, installed, tested and commissioned by the Contractor for use in cable routing systems shall be:

(i) armoured 24 fibre single mode to Transport Wales Specification WOEM 4421;

(ii) armoured 10 fibre single mode to Transport Wales Specification WOEM 4421;

(iii) armoured feeder cable for inductive loop detectors to Highways Agency Technical Requirement Specification TR 2031;

(iv) inductive loop detector cable to specification Highways Agency Technical Requirement Specification TR 2029;

(v) armoured power cable, three core XLPE/SWA/PVC to BS 5467; and

(vi) all specialist TSE cable types as necessary to satisfy the Employer's Requirements in relation to TSE.

4.8.12.6 Communications cables shall not be installed in longitudinal or transverse power ducts.

4.8.12.7 The Contractor shall terminate all fibre communication cables at the scheme extents within a UFOTP to allow future connection to the A9 corridor network at such time as the adjoining schemes are complete.

4.8.12.8 At joint locations where the fibre optic cable does not require termination, the joint shall be a fusion splice type.

4.8.12.9 The Contractor shall, as a minimum, install in each verge of the A9 mainline carriageway fibre optic cables supplying 24 fibre cores, through the duct network to form a longitudinal optical fibre network to support local connection to TSE in each verge. The fibre optic cable shall be terminated at a maximum interval of 2000 metres in UFOTPs located in the verge.

4.8.12.10 On both verges at TSE sites, the Contractor shall terminate the fibre optic cabling in an FOTP.

4.8.12.11 The Contractor shall provide multi-core optical fibre cabling from the FOTP to the 600(S) cabinet. The Contractor shall consult and comply with Transport Scotland to ascertain the number of cores to be provided within the 600(S) cabinet.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.8.12.12 All fibre optic terminations shall be within FOTP and UFOTP cabinet types. Chamber located underground cable joints shall only be permitted within loop chambers for connection of loop cables to loop feeder cables.

4.8.13 Power Supply Network and Connections

4.8.13.1 The Contractor shall procure and pay for the installation of power supplies to all new TSE sites. The Contractor shall upgrade existing supplies as required. The Contractor shall provide the power supply distribution network to all TSE sites.

4.8.13.2 The Contractor shall provide an independent 230 volts single phase electrical supply from the Electricity Supply Contractor (SSE Power Network Connections) to all new sites as detailed within the Design. The power supply provided will be located on the trunk road network boundary, to be terminated in a TP which should be located within 30m of the TSE site. The Contractor shall order the TP from Transport Scotland, and install it in the final location on the trunk road network limit of the Land Made Available by the Employer for the Works, in advance of the Electricity Supply Contractor installing the power cable.

4.8.13.3 The Contractor shall provide the power distribution network from the TP to the TSE site.

4.8.13.4 The Contractor shall monitor the Electricity Supply Contractor progress and work with and support them in the delivery of all required power supplies.

4.8.13.5 The Contractor shall where necessary, provide, purchase and upgrade existing power supplies required for the completion of the Works. Any diversions of existing power supplies required shall be the responsibility of the Contractor.

4.8.13.6 Transport Scotland shall supply the power supply cabinets, complete with the associated internal fittings and switchgear.

4.8.13.7 All TSE shall be earthed and bonded in accordance with the Specification.

4.8.13.8 The Contractor shall ensure the incoming Electricity Supply Contractor's cable is terminated in a TP or TP/TEDP for isolation and distribution of outgoing circuits to TSE as specified in the Specification and the NDX 1011 series of drawings, as listed in the Specification. The TP shall be located so that the Electricity Supply Contractor staff can access the equipment safely

without requiring access to the trunk road network or supervision from the trunk road maintenance organisation.

4.8.13.9 The Contractor shall provide the design, cabling, testing and Certificates of Completion associated with the new, upgraded or amended power supply network and its distribution to the TSE in accordance with BS 7671: Requirements for Electrical Installations.

4.8.13.10 Power cables shall not be installed in the longitudinal or transverse communication ducts.

4.8.13.11 The Contractor may utilise the existing power supply network to TSE within and adjacent to the Site where compliance with BS 7671 and the Electricity at Work Regulation 1989 can be achieved. The Contractor shall upgrade the existing power supply network and associated supply / distribution cabinets as required to make such existing power supply networks equivalent to the standards detailed in the Employer's Requirements.

4.8.13.12 The Contractor shall ensure that the power distribution network can accommodate the power consumption requirements for the TSIE as detailed in Table 4.8.13.12.1 and the requirements of Section 4.8.13.14 and 4.8.13.15. An additional allowance of twenty five per cent of the total supply to each TSE site shall be provided for future upgrades to the TSS.

Table 4.8.13.12.1 TSE Power Loading (Watts)

Equipment	Design Value (Watts)
CCTV Camera (Heater on and PTZ Running) (ER1009e)	460W
TMU (ER1095)	5W
MPC4 (ER1127)	70W
Ethernet Switch (ER1121)	40W
Remote Communications Equipment (ER1006)	200W
600(S) Cabinet (ER1002)	180W
Test Socket Allowance	700W
Roadside Controller ("RSC")	25W
Offset T MS4VMS (Full Display with Heaters on)	4000W

4.8.13.13 The Contractor shall provide all necessary alteration and / or modification of existing electrical circuits to complete the Works.

4.8.13.14 The Contractor shall provide two spare 6 amp circuits at TEDP cabinets and 600(S) cabinets.

4.8.13.15 The Contractor shall provide a single socket outlet for connection of portable apparatus to facilitate testing and maintenance within each 600(S) cabinet.

4.8.13.16 In the event that any new, upgraded or amended circuit fails an inspection or test, the Contractor shall carry out works necessary to achieve the requirements of BS 7671. The Contractor shall operate under a 'Permit to Work' system when implementing any such changes to circuits.

4.8.13.17 The Contractor shall ensure provision of the power supply before installation of any Active Equipment in accordance with Clause 1508 of the Specification. The Contractor shall ensure this supply will continuously power the Active Equipment from the time of installation. The Contractor shall ensure that power supplies are made permanent before commencement of any site based testing or commissioning as described in the Specification. The Contractor shall ensure that any temporary power supplies provided are suitable for use with sensitive electronic equipment and provide continuous operation of the TSS at all times. The Contractor shall monitor and record the performance of the power supply, immediately rectifying any failures and shall record attendance and repair times for each and every occurrence of power failure, submitting to Transport Scotland such time records of power failure within twenty four hours of the failure occurring.

4.8.14 Closed Circuit Television Facilities

4.8.14.1 Transport Scotland shall supply the CCTV equipment detailed in Section 4.8.4 of this Part 1 as TSIE for installation by the Contractor.

4.8.14.2 The Contractor shall install CCTV facilities and equipment in accordance with the Employer's Requirements and the Specification to provide maximum achievable coverage of the trunk roads at junctions to the TSNCC from cameras mounted a maximum of 8m above carriageway level. The required level of coverage shall be achieved through the use of Pan, Tilt and Zoom (PTZ) functionality and shall be sufficient to allow the TSNCC operators to view traffic flow conditions and incidents. The CCTV design shall assume the maximum viewing distance of cameras is 500m.

4.8.14.3 CCTV facilities shall be installed:

(i) at VMS sites; and

(ii) at standalone locations (at the junctions specified).

4.8.14.4 The Contractor shall provide the CCTV facilities as detailed in Section 4.8.2 in this Part 2.

4.8.14.5 All CCTV equipment shall be of PTZ configuration.

4.8.14.6 The Contractor shall undertake a visibility survey of the CCTV coverage provided by the facilities detailed in Table 4.8.1.3.1 of Part 2. Should the survey demonstrate the requirements of Section 4.8.14.2 are not achieved the Contractor shall consult and comply with Transport Scotland with regard to satisfying the requirements.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.8.14.7 The Contractor shall submit to Transport Scotland evidence to confirm that the requirements of Section 4.8.14.2 can be achieved and also the extent of coverage from each camera prior to undertaking any CCTV works.

4.8.14.8 The Contractor shall submit to Transport Scotland not less than three months from the date of requirement of CCTV equipment the length of prefabricated composite interconnecting cables required to allow connection between the CCTV and the TSE cabinet.

4.8.14.9 For CCTV cameras located at VMS sites, the Contractor shall:

(i) Install the camera and PTZ unit on the bracket provided on the VMS;

(ii) Install the prefabricated composite interconnecting cables between the CCTV camera and the base station unit within the TSE cabinet; and

(iii) Test and commission the installation to prove the complete CCTV installation in accordance with the Specification.

4.8.14.10 For CCTV cameras located at standalone (junction) sites, the Contractor shall:

(i) Provide the CCTV mast foundation using the TSIE supplied holding down assembly;

(ii) Provide hardstanding and TSE cabinets and associated interconnecting ducts. Requirements for hardstandings shall be as identified in Appendix A of Part 3;

(iii) Provide safe access and defined working area to allow attendance at the site by operatives;

(iv) Install the camera mast on the foundation;

(v) Provide a 6A capable 110V electrical outlet within 10m of the base of the CCTV mast to facilitate the maintenance operatives electrical means of lowering and raising the CCTV camera;

(vi) Install the camera and PTZ unit on the top of the mast;

(vii) Provide the power, communications and fibre cables from the standalone CCTV site to the power distribution and longitudinal communications cables;

(viii) Install the prefabricated composite interconnecting cables between the CCTV camera housing on the mast and the base station unit within the TSE cabinet; and

(ix) Test and commission the installation to prove the complete CCTV installation in accordance with the Specification.

4.8.14.11 The Contractor shall consult and comply with Transport Scotland to obtain details of the mast and CCTV equipment to be mounted on the foundation to allow structural calculations to be undertaken.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.8.15 Data Service Vehicle Detection Facilities

4.8.15.1 The Contractor shall install infrastructure to support the Data Service equipment. Such infrastructure shall include vehicle inductive loops, which should be not greater than 200m from the TSE cabinet.

4.8.15.2 The Contractor shall install Data Service equipment to allow monitoring of all traffic entering and leaving the trunk road network. Loop arrays shall be located within all lanes of the slip roads and A9 mainline carriageways at the junctions identified in Table 4.8.1.3.1 of Part 2.

4.8.15.3 The Contractor shall provide Data Service equipment in accordance with the Employer's Requirements and the Specification.

4.8.15.4 For each Data Service site the Contractor shall:

(i) provide the Type D loop chamber in the verge prior to installing vehicle inductive loops and loop feeder cables;

(ii) provide the vehicle inductive loops in accordance with MCH1540;

(iii) provide the loop feeder cables;

(iv) join the inductive loops onto the loop feeder cables in a Type D chamber; and

(v) terminate the loop feeder cables into the TSE cabinet.

4.8.15.5 Where vehicle inductive loop cables do not share a duct or chamber network route with other cables, it is permissible to terminate such cables directly into the TSE cabinet.

4.8.16 Variable Message Sign Facilities

4.8.16.1 Transport Scotland shall supply offset-T type VMS complete with supporting structures for installation on the scheme by the Contractor.

4.8.16.2 The Contractor shall install VMS facilities and equipment in accordance with the Employer's Requirements and the Specification. The Contractor shall consult and comply with the requirements of Transport Scotland over works planning, staff competencies, method of work, lifting plans and hold and witness points.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.8.16.3 The Contractor shall install VMS in accordance with Table 4.8.1.3.1 of Part 2 and the following criteria:

(i) Normally 800m in advance of the first advance direction sign serving the junction, although the final location shall take cognisance of land availability, other infrastructure constraints, and environmental impacts;

(ii) Integrated with the Traffic Signs and Road Marking Design to convey a clear and concise messaging / signing strategy to road users; and

(iii) The VMS shall be aligned in accordance with MCX0069, however the Contractor shall consult and comply with Transport Scotland regarding the outcome of this analysis to ensure optimum visibility to the road users. The VMS shall not be obscured by other road infrastructure, trees or shrubs.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.8.16.4 For each VMS facility the Contractor shall:

(i) Provide the VMS foundation using the TSIE supplied holding down assembly;

(ii) Provide hardstanding and TSE cabinets and associated interconnecting ducts. Requirements for hardstandings shall be as identified in Appendix A of Part 3;

(iii) Provide safe access and defined working area to allow attendance at the site by operatives;

(iv) Install the VMS onto the TSIE provided post, and install the TSIE provided ladder arrangement;

(v) Provide, install and terminate interconnecting power and communication cables between the VMS and the TSE cabinet as necessary;

(vi) Ensure that the VMS is aligned for optimum visibility by road users in accordance with MCX0069; and

(vii) Test and commission the installation to prove the complete VMS installation in accordance with the Specification.

4.8.17 Site Communications Infrastructure

4.8.17.1 The Contractor shall consult and comply with Transport Scotland regarding the site infrastructure required to support remote communications between the TSE site and the TSNCC.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

4.8.17.2 Nominally such infrastructure shall include a post mounted aerial, which will be positioned according to the outcome of signal strength tests carried out by the Traffic Scotland providers.

4.8.17.3 The Contractor shall provide and install the post on which the aerial will be mounted. The Traffic Scotland provider will install the aerial.

4.8.17.4 The Contractor shall provide one, 100mm internal diameter communications duct between the post on which the aerial will be mounted, and the TSE cabinet.

4.8.18 Hard Landscaping

4.8.18.1 The Contractor shall provide hard landscaping for TSE including vehicle, pedestrian and maintenance access as detailed in the Specification so that Transport Scotland does not require to employ traffic management to be able to gain access to maintain TSE.

4.8.18.2 All TSE sites should be accessible for maintenance personnel and maintenance vehicles without the need to access and egress from and to the main carriageway. Where this is not possible, the Contractor shall consult and comply with Transport Scotland to agree the form of the site access to be implemented.

Contact details are provided in Section 4.8.1 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

5. UNDERTAKERS WORKS AND PRIVATE APPARATUS WORKS

5.1 General

5.1.1 In respect of the Design, construction, completion and maintenance of the Works the Contractor's responsibilities relating to Undertaker's Works and Private Apparatus Works and any other companies in respect of Apparatus or Private Apparatus shall be as set out in:

(i) the Conditions of Contract;

(ii) the Specification;

(iii) these Employer's Requirements; and

(iv) any other parts of the Contract.

5.1.2 In respect of the Design, construction, completion and maintenance of the Works the Contractor shall consult and comply with the requirements of

(i) Undertakers and owners of Private Apparatus in connection with Apparatus or Private Apparatus.

Contact details are as identified in Section 5.1 of Part 2.

The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the Certification Procedure.

5.1.3 Subject to any other provision of the Contract,;

(i) The locations of:

(a) existing Apparatus;

(b) existing Private Apparatus; and

(c) any advance Undertakers Works

identified on the drawings listed in Appendix 0/4 of the Specification are approximate only and may not reflect the full extent of the actual Apparatus or Private Apparatus.

In this context the Contractor shall comply with the provisions of Appendix 1/16 of the Specification in respect of such existing Apparatus or Private Apparatus.

(ii) at the date of acceptance of the Contractor's Submission, the Contractor shall be deemed to have been given delegated authority to act as Employer's Authorised Representative in relation to all Undertaker's Works and the Contractor shall take responsibility for serving all notices on Undertakers as shall be necessary under the terms of the New Roads and Street Works Act 1991 in respect of the Indicative Schedule of Undertaker's Works referred to in Clause 31 of the Conditions of Contract and identified in Appendix 1/16 of the Specification together with any other Undertaker's Works necessary for the Design, construction, completion and maintenance of the Works.

This shall include the responsibility for certifying that all Undertaker's Works necessary for the Design, construction, completion and maintenance of the Works have been completed.

5.1.4 Notwithstanding the Indicative Schedule of Undertakers Works as contained in Appendix 1/16 to the Specification, the Contractor shall carry out all main Works by the Contractor as identified therein resulting from the requirement upon the Contractor to consult and comply with the requirements of the Undertakers and any other provision of the Contract.

5.1.5 Notwithstanding the Indicative Schedule of Undertakers Works as contained in Appendix 1/16 of the Specification, the Contractor shall arrange the procurement, construction and completion of all Undertakers' Works necessary for the Design, construction, completion and maintenance of the Works.

5.1.6 In respect of existing Apparatus or Private Apparatus the Contractor shall raise, lower or relocate the covers of existing manholes, chambers, catchpits, gullies and the like where necessary resulting from the Design, construction, completion and maintenance of the Works.

5.1.7 All Private Apparatus shall be diverted to a standard equivalent to that which would be provided by an equivalent Undertaker or to a higher standard where this existed prior to the Works commencing.

Ducting, chambers and drawpits shall be provided as required to allow the service, supply and the like to be accessed and maintained from points wholly outwith the Works wherever possible.

5.1.8 In the event that the Contractor modifies the route of any Apparatus or Private Apparatus or requires removal of existing Apparatus or Private Apparatus or Works to any Apparatus or Private Apparatus, or requires additional Apparatus or Private Apparatus Works or diversions as a consequence of modifications to the Design, the Contractor shall be responsible for any additional time and cost for Design, construction, wayleaves, material procurement and any other associated Works of whatsoever nature required by the Undertakers or owners of Private Apparatus.

Where the Undertakers or owners of Private Apparatus modify the route of any diversion, or require additional diversions or removal of any existing Apparatus or Private Apparatus or modifies the work content of any diversion, the Contractor shall be responsible for any additional time and consequential costs associated with any such diversion or removal of existing Apparatus or Private Apparatus.

5.1.9 The Contractor shall:

(i) liaise with the Undertakers identified in the Indicative Schedule of Undertakers Works as identified in Appendix 1/16 of the Specification to ensure that all Undertakers' Works shall be designed and constructed in compliance with the Undertakers' design, from the date of the Employer's acceptance of the Contractor's Submission;

(ii) liaise with the Undertakers identified in the Indicative Schedule of Undertakers Works as identified in Appendix 1/16 of the Specification to ensure that the Design, construction, completion and maintenance of the Works take due cognisance of all Undertaker's Works as identified in Appendix 1/16 of the Specification together with any other Undertakers' Works necessary for the Design, construction, completion and maintenance of the Works;

(iii) complete such setting out as may be necessary for Undertakers' Works identified in the Indicative Schedule of Undertakers Works as identified in Appendix 1/16 of the Specification together with any other Undertakers' Works necessary for the Design, construction, completion and maintenance of the Works as required by the Undertaker, from the date of the Employer's acceptance of the Contractor's Submission;

(iv) make due allowance for all Undertakers' Works as identified in Appendix 1/16 of the Specification together with any other Undertakers' Works necessary for the

Design, construction, completion and maintenance of the Works in the programme submitted in accordance with Clause 14 of the Conditions of Contract; and

(v) allow for all costs and any associated delays and disruption for Undertakers' Works as identified in Appendix 1/16 of the Specification together with any other Undertakers' Works necessary for the Design, construction, completion and maintenance of the Works which are incomplete at the Date for Commencement of the Works up until their due date for completion as referred to in Section 5.2.1 of Part 1.

5.1.10 The Contractor shall have no responsibility for making any payment(s) to Undertakers' in relation to any Undertakers' Works unless such Undertakers' Works are necessary only as a consequence of the Design.

5.1.11 No payments shall be made by the Employer to the Contractor in respect of delay of Undertakers' Works other than payments made under Section 5.2 of Part 1, if relevant, and only where the Contractor shall have demonstrated to the Engineer that he made all necessary endeavours and took all reasonable measures to mitigate the performance of any such Undertaker.

5.2 Advance Indicative Undertakers' Works

5.2.1 Where Advance Undertaker's Works are required, scheme specific requirements are identified in Section 5.2.1 of Part 2.

6. SUPERVISION, SAMPLING AND TESTING REQUIREMENTS

6.1 Supervision

6.1.1 Notwithstanding any other provision of the Contract, the Contractor shall supervise the construction, completion and maintenance of the Works.

In doing so the Contractor shall ensure that an adequate level of supervisory staff shall be present on Site at all times to carry out such supervision duties required under the Contract.

6.1.2 Notwithstanding any other provision of the Contract, the Contractor shall ensure that the Designer shall supervise the construction, completion and maintenance of the Works sufficient to permit the Designer to sign all the relevant Construction Certificates referred to in the Certification Procedure.

In doing so the Contractor shall ensure that the Designer has the minimum levels of supervisory staff referred to in Section 6.1 of Part 2.

This shall be the minimum staffing levels for the Designer's supervision of the Works and shall be in addition to the Contractor's own supervisory staff on Site.

6.1.3 The Contractor shall not be permitted to undertake any Permanent Works without adequate representation on Site by either the Designer's Site Representative, engineers or works inspector/clerk of works.

The responsibility of the Designer's Site Representative shall include, but not be limited to, supervision, witnessing and inspection of the construction, completion and maintenance of the Works and the undertaking of physical checks of the same to ensure compliance with the Design.

The responsibility of the Designer's engineer and works inspector/clerks of work shall be to solely supervise, witness and inspect the construction, completion and maintenance of the Works and undertake physical checks of the same to ensure compliance with the Design.

The Designer's Site Representative, engineers and works inspector/clerk of works shall be supplemented by additional engineer(s), inspector(s), landscape architect(s), Landscape Clerk(s) of Works, Ecological Clerk(s) of Works and the like for specialist Works during the periods when such specialist Works shall be being undertaken.

Notwithstanding the minimum staffing levels referred to earlier in this Section the total number of and the experience of the supervisory staff from both the Contractor's and the Designer's organisation(s) shall be commensurate with the level and type of Works being carried out on Site.

6.1.4 Notwithstanding any other provision of the Contract the Designer's Site Representative shall be a Chartered Civil Engineer with relevant experience of site supervision as a Designer's Site Representative within the Design, construction, completion and maintenance process.

6.1.5 Notwithstanding any other provision of the Contract the Designer's supervisory staff shall have relevant and appropriate experience of site supervision within a commensurate sized civil engineering contract.

The specialist supervisory staff shall have relevant and appropriate experience in the supervision of such related specialist Works within a commensurate sized civil engineering and/or any other relevant contract.

6.1.6 The Contractor's Chartered Landscape Architect shall attend Site to supervise the landscape Works in accordance with the provisions of the Contract at least once a fortnight or more frequently where required by the Engineer, to supervise items (i) to (vi) listed in 6.1.7 below and at least once a week to supervise items (vii) to (xi) listed in 6.1.7 below.

6.1.7 During the construction, completion and maintenance of the landscape Works the Contractor's Landscape Clerk of Works shall be based on Site full time supervising the Works, unless otherwise consented to in writing by the Engineer.

Such supervision shall include, but not limited to:

(i) identifying vegetation to be protected or removed;

(ii) stripping of topsoil;

(iii) grading earthworks and landscape;

(iv) slope formation;

(v) removing redundant surfaces;

(vi) ripping subsoil;

(vii) spreading of topsoil;

(viii) cultivating before and /or after seeding and planting;

(ix) seeding;

(x) preparing for planting;

(xi) planting; and

(xii) maintenance works.

6.1.8 Notwithstanding any other provision of the Contract the Chartered Landscape Architect shall inspect the Site at the following intervals throughout the Period of Establishment Maintenance and report in accordance with sub-Clause 3001.15 in Appendix 30/1 of the Specification.

(i) Six times per year in the first year of the Period of Establishment Maintenance;

(ii) Four times per year in the second year of the Period of Establishment Maintenance; and

(iii) Three times per year for the remainder of the Period of Establishment Maintenance.

Not more than two weeks after each visit the Contractor's Chartered Landscape Architect shall make written recommendations to the Contractor regarding deficiencies and opportunities for improving the landscape maintenance and exploiting environmental opportunities that become apparent during the Period of Establishment Maintenance to enhance biodiversity and reduce pesticide application.

A copy of the Chartered Landscape Architect's written recommendations shall be provided simultaneously to the Engineer.

The Contractor's Chartered Landscape Architect shall confirm, without limitation, the requirements for plant replacement, establishment of woodland, shrub and hedgerow planting and all seeded grassland and wildflower areas and remedial Works associated with the landscape Design.

The recommendations of the Contractor's Chartered Landscape Architect shall be carried out by the Contractor.

6.2 Sampling and Testing

6.2.1 All sampling and testing of materials carried out by the Contractor shall be undertaken by a Laboratory holding accreditation granted in respect of such sampling and testing by the United Kingdom Accreditation Service ("UKAS") or by the European Co-operation for Accreditation of Laboratories ("EAL").

All sampling and testing of materials incorporated into the Works, unless otherwise certified, shall be undertaken by a Laboratory holding accreditation granted in respect of such sampling and testing by UKAS or EAL.

6.2.2 Where the Contractor uses work, goods or materials for which a testing schedule is not identified in Appendix 1/5 of the Specification, the Contractor shall use a test and frequency of test on the work, goods or materials as recommended in writing by the manufacturer or agreed by both the Designer and Checker.

A Consultation Certificate shall be signed to this effect by the Contractor, the manufacturer, the Designer and the Checker.

The Contractor shall submit to the Engineer two copies of the certificate, with original signatures.

One copy of the certificate shall be returned within 7 days of receipt, signed in acknowledgement by the Engineer.

The Contractor shall not commence such testing until this procedure is completed.

6.2.3 The Contractor shall incorporate within the schedule of tests required under Clause 36 of the Conditions of Contract as a minimum the tests detailed in Appendix 1/5 of the Specification together with all additional tests required by the Designer and the Checker and the Contract.

6.3 Compliance Surveys

6.3.1 General

6.3.1.1 During the Period of Maintenance the Contractor shall employ firm(s), organisation(s) or person(s) of appropriate skill and acceptable to the Engineer to undertake the following surveys and tests:

(i) Surface Condition Assessment of the National Network of Roads (SCANNER) Surveys;

(ii) Visual Surveys;

(iii) Deflectograph Surveys (DS) of Flexible Pavements;

(iv) SCRIM Surveys of all Pavements; and

(v) Sign Surveys.

6.3.1.2 The surveys listed in this Section 6.3 shall be referenced to IRIS links and sections.

The Contractor shall ensure that not later than 13 weeks before the due date for completion of the Works, relevant details of the IRIS referencing system have been obtained by the Contractor from

(i) Transport Scotland, Trunk Roads & Bus Operations

Contact Details are provided in Section 6.3.1 of Part 2.

6.3.1.3 The Contractor shall provide to the Engineer within 14 days of completing each individual survey, a copy of all survey data in a computerised format acceptable to the Engineer.

6.3.1.4 The Contractor shall analyse the data to identify potential defects.

All potential defects shall be further investigated by the Contractor as described in Volume 7 of the DMRB.

Where defects shall be identified by the Contractor, resulting from such further investigation, these shall be repaired in accordance with the other requirements of the Contract.

6.3.2 Surface Condition Assessment of the National Network of Roads (SCANNER) Surveys

6.3.2.1 SCANNER surveys shall be undertaken over the length of all Lanes of the new carriageways of the new trunk road, as identified in Appendix A in Part 3, in accordance with HD 29 of the DMRB. These surveys shall be undertaken during each Relevant Fifty Two Week Period between the months of May to September inclusive.

6.3.2.2 The Contractor shall provide to the Engineer within 14 days of completing each individual survey a video record of the surface condition of the carriageways surveyed and a copy of all survey data in a computerised format.

6.3.2.3 The SCANNER data shall be analysed by the Contractor and the results displayed graphically. The data shall be sifted against the road condition criteria for:

(i) Rutting;

(ii) Macrotexture; and

(iii) Riding quality.

6.3.2.4 From the third Relevant Fifty Two Week Period, trends in structural and surface condition with time shall be analysed and assessed.

6.3.2.5 For the purposes of the Contract, the following results shall be deemed to be indicative of potential defects:

(i) Condition category greater than or equal to 2 for any of the above road condition criteria for a length of 100 metres or more; or

(ii) Condition category greater than or equal to 2 for two or more of the above road condition criteria on any section of road.

6.3.3 Visual Surveys

6.3.3.1 Visual surveys shall be undertaken over the length of all Lanes of the new carriageways of the new trunk road, as identified in Appendix A in Part 3, in accordance with HD 29.

6.3.3.2 The visual surveys shall be undertaken during each Relevant Fifty Two Week Period between the months of May to September inclusive.

6.3.3.3 The following visual defects shall be deemed to be defects for the purposes of the Contract:

(i) All wheel track rutting shall be investigated by the Contractor as potential defects;

(ii) All wheel track cracking;

(iii) All major and minor cracking (including longitudinal, transverse or area)

(iv) All major or minor fretting

(v) All joint defects

(vi) All major or minor surface defects

(vii) All carriageway edge defects;

(viii) All drainage defects;

(ix) All deviation of kerb upstand in excess of 10 millimetres; and

(x) All kerb defects.

6.3.4 Deflectograph Surveys (DS) of Flexible Pavements

6.3.4.1 DS of all flexible pavements shall be undertaken over the length of all lanes of the new carriageways of the new trunk road, as identified in Appendix A in Part 3, in accordance with HD 29 of the DMRB. These surveys shall be undertaken within the third, fourth and fifth Relevant Fifty Two Week Periods.

6.3.4.2 The category of survey shall be Category 1A.

6.3.4.3 The processing of DS data to determine the residual life of the pavement in million standard axles (msa) shall be undertaken using software approved by the Overseeing Organisation.

6.3.4.4 Abnormally high deflection readings in excess of the average readings from the DS data shall be investigated by the Contractor as potential defects. Additionally, any section of pavement which is not identified as having a residual life greater than that listed Section 6.3.2.1 of Part 2 shall be deemed to be a potential defect and shall be subject to further investigation as described in Sections 6.3.4.5 to 6.3.4.9 of this Part 1.

The readings obtained from the DS in the fifth Relevant Fifty Two Week Period shall be those used for determining potential defects under the Contract whilst those obtained within the third and fourth Relevant Fifty Two Week Periods shall be used as early indicators of a condition requiring preliminary investigation.

6.3.4.5 If a potential defect is identified as per Section 6.3.4.4 then the Contractor shall carry out a review in terms of the Certified Design for the road structure and the validation testing undertaken to support such Design (as per Appendix 1/5 of the Specification and Section 6.2.3 of Part 1). If this review does not identify a non-compliance with the Certified Design, an investigation shall be undertaken initially using Falling Weight Deflectometer (FWD) for identification purposes as an initial step followed up by more detailed investigation involving coring and other invasive and/or direct testing as appropriate. If, however, the review reveals any non-compliance in relation to the Certified Design the element(s) in question shall be deemed to be defects for the purposes of the Contract and the Contractor shall develop proposals for appropriate investigation and rectification of the defect(s).

6.3.4.6 If required by Section 6.3.4.5, the FWD testing referred to shall be performed at intervals of no more than 20 metres in each lane of the new trunk road, diverge slip road and merge slip carriageways, where applicable. In areas where other surveys have identified potential defects or where FWD identifies anomalies, tests shall be performed at closer intervals, determined by the Designer.

6.3.4.7 In conjunction with the non-invasive FWD testing sufficient cores shall be taken through the pavement in each Lane to provide representative samples of each pavement layer as well as ascertaining whether any material can be considered "unsound" for ESBM (Equivalent Thickness of Sound Bituminous Material) and TTBM (Total Thickness of Bituminous Material) purposes. Dynamic Cone Penetrometer tests shall be taken down the core holes to determine the thickness of sub base and approximate CBRs of the sub-base and subgrade. Laboratory testing on the cored materials shall be carried out to identify the stiffness, load spreading, fatigue and deformation

characteristics of each material. While the essence of the detailed investigation is a robust assessment based on physical properties, the FWD data shall be analysed in conjunction with directly obtained pavement and subgrade layer data as referenced in Section 6.3.4.4 to arrive at an assessment of the residual life of the pavement.

6.3.4.8 If the results/analysis of the invasive testing undertaken in Section 6.3.4.7 shows the construction to be in compliance with the Certified Design in all aspects then, without prejudice to the Employer's and Engineer's rights contained elsewhere within the Contract, no rectification shall be required by the Contractor. If, however, the investigation reveals non-compliance in relation to the Certified Design, the element in question shall be deemed to be a defect for the purposes of the Contract and the Contractor shall undertake rectification of such defect.

6.3.4.9 If the investigation described within Section 6.3.4.4 demonstrates that the road structure has been constructed in conformance with the Certified Design, the cost of this detailed investigation shall be borne by the Employer. If, however, the investigation shows the requirements of the Certified Design have not been carried forward in all aspects to construction then the full cost of both the detailed investigation and the rectification of the defective elements shall be borne by the Contractor.

6.3.5 Sideways Coefficient Routine Investigation Machine Surveys (SCRIM) of All Pavements

6.3.5.1 SCRIM Surveys shall be undertaken over the length of all lanes of the new and resurfaced carriageways of the trunk road, as identified in Appendix A in Part 3, in accordance with HD 28 of the DMRB. These surveys shall be undertaken during each relevantRelevant Fifty Two Week Period. The seasonally corrected Characteristic Skid Coefficient (CSC) values shall be determined as described in Annex 2 of HD28.

6.3.5.2 CSC levels which are below or equal to the IL for the applicable site category shall be deemed to be a Defect for the purposes of the Contract. The Contractor shall issue proposals for rectification of the defect to the Employer for approval.

6.3.6 Signs

6.3.6.1 The Contractor shall carry out sign surveys in accordance with TD25 during the first six months of the fifth Relevant Fifty Two Week Period on all traffic signs erected under the Contract to confirm that such signs comply with the requirements of the Contract in respect of:

(i) target distance (in daylight and dark conditions);

(ii) legibility distance (in daylight and dark conditions);

(iii) average surface luminance (in dark conditions);

(iv) degradation of surface colour (in daylight and dark conditions);

(v) retroflectivity (in dark conditions);

(vi) degradation of surface protective finish to posts and other structural condition (in daylight conditions); and

(vii) security of brackets, bolts and other fittings (in daylight conditions).

6.3.6.2 Prior to carrying out each such sign survey the Contractor shall clean all signs including but not limited to sign faces and posts.

All traffic signs faces shall achieve the minimum levels for reflectivity and surface luminance as specified in TD 25 of the DMRB.

All non-compliances in signs shall be deemed to be defects for the purposes of the Contract.

6.3.7 Principal Inspections for All Structures.

6.3.7.1 Notwithstanding any other provision of the Contract, the Engineer shall undertake a principal inspection as referred to in Paragraphs 3.25-3.38 of BD 63 of the DMRB ("**Principal Inspection**") for each Structure in the Design.

All such Principal Inspections shall be undertaken during the last Relevant Fifty Two Week Period and shall be completed six months prior to the end of the last Relevant Fifty Two Week Period.

The Contractor shall ensure that the Contractor and the Designer shall be in attendance as witnesses at all such Principal Inspections. The Principal Inspections shall also be witnessed by the Scottish Ministers' maintenance agent (Operating Company) in the role of observer.

The Engineer shall provide 14 days written notification to the Contractor, to enable the Contractor and the Designer to witness any such Principal Inspection.

The Contractor on receipt of any such notification shall notify the Designer in writing requiring the Designer to attend as a witness at any such Principal Inspection.

Notwithstanding any other provision of the Contract the Contractor shall carry out at his own expense all work of repair, amendment, reconstruction, rectification and making good of defects, imperfections, shrinkages or other faults (fair wear and tear excepted) identified by the Engineer as a result of any such Principal Inspection prior to the end of the last Relevant Fifty Two Week Period.

7. AS CONSTRUCTED REQUIREMENTS

7.1 General

7.1.1 Notwithstanding any other provisions of this Contract, the Contractor shall store all records relating to the Design, construction, completion and maintenance of the Works in good condition in hard copy format and electronically in a format to be agreed with the Engineer for a period of seven years from the end of the Period of Maintenance. Final disposal shall only be carried out after requesting and receiving approval, in writing, from the Employer.

7.1.2 At the end of such seven year period, the Contractor shall offer to supply, free of charge, a copy of these records to the Employer and after such relevant confirmation from the Employer may thereafter destroy or disperse such records.

7.2 Health and Safety File

7.2.1 The Contractor as principal contractor shall produce the Health and Safety File as required by the Construction (Design and Management) Regulations 2015. The Health and Safety File shall be provided prior to the issue of the Certificate of Completion of the Works. No part of this Contract shall be interpreted as limiting, for any reason, the information provided as part of the Health and Safety File. All information necessary to ensure the health and safety of persons and property over the lifetime of the project shall be provided.

In addition to the requirements for hard copies of submitted information, drawings and text stated in this section of these Employer's Requirements, four copies shall also be supplied in electronic format to be agreed with the Engineer.

In addition, an electronic copy of drawings shall be supplied to the Employer in AutoCAD format using the latest version of AutoCAD current at the date of completion of the Health and Safety File.

Other electronic information shall be supplied in Microsoft software or equivalent format approved by the Employer.

7.2.2 One hard copy and one electronic copy of the sections of the Health and Safety File relevant to local authority controlled roads shall also be supplied to each local authority affected.

7.3 As-Built Records

7.3.1 Notwithstanding any other requirements of this Contract (in particular the requirement to provide information to the principal designer under the Construction (Design and Management) Regulations 2015 or any statutory re-enactment or amendment thereof for the time being in force the Contractor shall supply to the Engineer (in hard copy format and electronically in a format to be agreed with the Engineer) prior to the issue of each Certificate of Completion pursuant to Clause 48 of the Conditions of Contract the As Constructed Requirements (as referred to in Clause 6 of the Conditions of Contract) as follows, but not limited to:

(i) "As-Built" Drawings as follows, to include drawings showing the defined limit of the Network boundary by applying the guidance provided in "Extent of the Trunk Road Network" (Revision 4), published by the Scottish Executive, 2002. The boundary information will also be supplied as a shape file. Residual hazards must be highlighted on the "as-built" drawings. Examples of the information to be provided are listed below. The drawings should have any non-relevant background information removed for clarity.

(a) General

General arrangement drawings referenced to the Ordnance Survey grid reference or maintenance reference system must include the following information:

(i) The horizontal alignment plan layout to a minimum scale of 1 to 2500 (1 to 1250 in urban areas);

(ii) The vertical alignment showing the final and original ground levels on the centreline of the road, or new and existing surface levels where an existing road is reconstructed; and

(iii) The trunk road boundary and other relevant land boundaries.

(b) Earthworks

Earthworks drawings are to include the following information:

(i) Plans and profiles of all earthworks, depicting new and existing ground levels, annotated with basic information on soil and rock types and earthworks materials including any capping layers, geosynthetic materials and backfill to structures;

(ii) Plans and profiles of any areas of contaminated land depicting the extent of land, details of treatment and analysis of contaminants;

(iii) Plans and details of treatment for any mine shafts, mine workings or similar voids encountered in the project;

(iv) Plans and details of treatment for any ground improvement (e.g. stone columns, trench mixing, dynamic compaction, etc.);

(v) Details of any soil retention methods (e.g. reinforcement, soil nailing);

(vi) Details of any rock treatment methods (eg. rock bolts, rock mesh); and

(vii) Reports produced as part of the geotechnical procedures identified in BS EN 1997-1, HD 22, (DMRB 4.1.2) and SH 4/89 or successor (DMRB 4.1.7), including construction-phase ground investigation factual data in AGS format.

(c) Drainage

Drainage drawings are to include the following information:

(i) Plans and sections of foul and surface water drainage networks depicting location and invert;

(ii) levels of chambers, types and sizes of pipes, bedding and backfill details and any protection;

(iii) Plans showing locations of filter drains including details of type and depth;

(iv) Plans depicting outfalls into watercourses including the provision of oil interceptors or other pollution traps;

(v) Plans depicting SuDS facilities and other drainage features;

(vi) Plans showing land drain connections;

(vii) Types and locations of manholes and catchpits including details of any proprietary systems;

(viii) Types and locations of gullies, gratings and frames;

(ix) Details of water bearing strata;

(x) Identification of locations and facilities requiring confined space procedures;

(xi) Identification of areas susceptible to flooding; and

(xii) Information relating to drainage pumps and any associated electrically activated sluices or similar including design detail, electrical schematics relating to the installation. The information shall also adequately cover the

provision of the electrical supply, feeder/control pillar, level sensors, remote monitoring and all such additional parts.

(d) Pavement

Pavement drawings are to depict the extent of pavement and include the following information:

(i) Details of materials used and mix design;

(ii) Details of pavement layer thicknesses;

(iii) Details of longitudinal and transverse tie-in details; and

(iv) Details of joints and reinforcement where appropriate (e.g. concrete pavements).

(e) Road Structures

Records (including drawings) shall be provided in accordance with BD 62 (DMRB 3.2.1), with the Health and Safety File cross-referencing. Any additional significant health and safety issues not recorded in the structural records, as-built records or maintenance manuals must be recorded within the Health and Safety File specified in Section 7.2. General arrangement drawings identifying residual health and safety risks may also be included for clarity. It should be noted in addition to Table 1 of BD 62, that the following are classified as road structures and therefore information must be recorded:

(i) Culvert headwalls;

(ii) Pier Protection;

(iii) CCTV masts;

(iv) Portal and cantilever signs and signal gantries; and

(v) High mast lights.

(f) Road markings and Traffic Signs.

Drawings are to depict the locations and details of road markings and traffic signs including materials, fabrication and foundations. Where the signs are lit information shall be provided as covered in para. (h) 'Road Lighting' clauses below. Road markings shall be considered as including 'intelligent road studs' where installed.

(g) Traffic signals.

Traffic signals drawings are to depict the locations of traffic signal apparatus and routes of cables, power supply and connections to any signal control systems (e.g. SCOOT, MOVA). They should also detail types of signal heads and detectors. A statement of the equipment's functionality must also be provided.

(h) Road Lighting.

Drawings, tables, electrical schematics and Standard Details shall be provided depicting the location of roadside lighting assets and shall include *inter* alia details of:

(i) columns, lanterns;

(ii) electrical pillars, duct and cable runs;

(iii) foundations;

(iv) method of cable termination;

(v) earth electrodes location and type; and

(vi) power supply arrangements provided by the distribution network operator (DNO).

Reference shall be made primarily to MCHW Series 1200, 1300 and 1400 together with LDS8016. Additionally, sheets covering electrical and lighting design calculations shall be provided as necessary. Furthermore, reference shall be made to all appropriate regulations and guidance, with respect to information to be provided, including that contained in other documents in the LDS Series. For the Health and Safety File Requirements relating to Road Lighting and other electrical assets reference shall be made to Transport Scotland document LDS8004_A.1_H&SFiles 'Roadside Electrical Assets and Lighting Health and Safety File Requirements with Model Forms'.

(i) Statutory Undertakers' Equipment - Drawings identifying statutory undertakers' equipment shall include the following information:

(i) Plan layouts showing the location of equipment and identifying the responsible authority;

(ii) Depth, size and type of equipment;

(iii) Methods of marking and identifying of statutory undertakers; and

(iv) A note stating that any future proposals require liaison with the relevant authority.

(j) Control and Communications Equipment.

Drawings are required to identify the location and details of equipment. The drawings must identify routes of interconnecting cables and power supply. A statement of the equipment's functionality must be included.

(k) Legal Requirements.

Plans must be included to identify the area of land available for road maintenance and possible future road improvements. Discharge rights and legal agreements for maintenance of drainage, etc. must be shown. Additionally, all Wayleave arrangements with respect to the DNO electrical supplies necessary for the works, shall be correctly and adequately addressed and appropriately agreed.

(ii) "As-Built, Operational and Maintenance Records for Trunk Road Structures" in accordance with BD 62 of the DMRB.

In the production of such "As-Built, Operation and Maintenance Records for Trunk Road Structures" the Contractor shall take account of the following documents:

(a) Transport Scotland Inspection Manual, Principal Inspections of Trunk Road Structures & Location System – March 2009;

(b) BD 63 (DMRB 3.1.4) Inspection of Highway Structures; and

(c) TS IA33 Guidance on the Use of Various Documents relating to General and Principal Inspections for Trunk Road Structures.

A Structures Management System Datasheet shall be compiled for each structure and provided to Transport Scotland (Bridges Team) at least 12 weeks prior to the issue of the Certificate of Completion (for the whole or part of the works) pursuant to Clause 48 of the Conditions of Contract.

(iii) For Design Elements, other than road Structures, one copy of each of the drawings specified in paragraph 7.3.1(i), including the landscape drawings, on A1 size paper clearly marked "As-Built Drawing" in red shall be provided.

(iv) The requirements for road Structures drawings and photographs as referred to in BD 62 of the DMRB.

(v) A completed Roads Design Criteria certificate referred to in Appendix N in Part 3 for each road forming part of the Design for the Works.

(vi) A construction report identifying the actual types of materials and construction methods that were used throughout the Works.

The construction report shall include, but not be limited to:

(a) summarising the information obtained by the laboratory or field tests on the road materials employed in the Works;

(b) commenting on the remedial and corrective actions taken;

(c) discussing points of interest or the use of "unusual" and "special" materials and methods of construction; and

(d) a statement setting out the problems and defects encountered during the construction of the Works and how such problems were overcome and/or such defects rectified.

For the purposes of these As Constructed Requirements, during the construction, completion and maintenance of the Works, a defect shall mean failure of any component in the Works including but not limited to:

(i) deterioration in the road pavement;

(ii) chip loss;

(iii) unexpected movement of earthworks slopes;

(iv) evidence of poor drainage; and

(v) subsequent identification of the use of materials within the Works that would not have met the requirements of this Contract.

(e) record material compliance, other than that provided within paragraph 7.1 such as certification, quality assurance, external testing and otherwise.

(vii) A complete record of sampling and testing data for materials incorporated in the Works in bound hard copy format and electronically in a format to be agreed with the Engineer.

Each of the individual records shall include, in addition to the sampling and testing data:

(a) the date;

(b) the supplier;

(c) the source of material; and

(d) a statement of compliance or otherwise with the Specification.

Such records shall be consistently referenced to chainage and/or specific location(s) within the Works.

(viii) As constructed physical survey results, including co-ordinates and drawings of all permanent fencelines, including Accommodation Works fence-lines.

7.4 Maintenance Manuals

7.4.1 Notwithstanding any other requirements of this Contract (in particular the requirement to provide information to the principal designer under the Construction (Design and Management) Regulations 2015 or any statutory re-enactment or amendment thereof for the time being in force) the Contractor shall supply to the Engineer (in hard copy format and electronically in a format to be agreed with the Engineer) within 7 days from the date of the end of each Relevant Fifty Two Week Period as referred to in

Clause 49 of the Conditions of Contract and the issue of the Maintenance Certificate pursuant to Clause 61 of the Conditions of Contract the As Constructed Requirements (as referred to in Clause 6 of the Conditions of Contract) as follows:

Where applicable a supplementary report setting out all the changes to the As Constructed Requirements set out in Sections 7.3(i) to (viii) inclusive.

(i) A Roadworks Maintenance Manual which shall include, inter alia, all relevant details in respect of each element of the Design, cross referencing where necessary to information compiled elsewhere as part of the As Constructed Requirements, and shall comprise the following:

(a) Design information relevant to health and safety must be provided. In providing design information the Designer must refer to the requirements of the relevant DMRB documentation and any site specific issues. The information identified in this section should not been considered an exhaustive list.

The following design information relating to road structures must be provided where relevant:

(i) Reference to the structural records prepared in accordance with BD 62 (DMRB 3.2.1);

(ii) A design summary including the height, width, design loads and load restrictions of road bridges;

(iii) Design Certificates and Design Check certificates;

(iv) Other design requirements in accordance with Volume 1 of the DMRB; and

(v) For sub-structures and special structures design information must be provided in accordance with Volume 2 of the DMRB. Design information for any tunnels to be in accordance with BD 78 (DMRB 2.2.9).

Design information relating to safety barriers must specify the classification of barrier with justification of the system(s) selected. Details of barrier length, set-back and working width in compliance with TD 19 (DMRB 2.2.8) must be included.

Design parameters used for earthworks slope calculations and drainage calculations, including storm periods, must be provided in compliance with Volume 4 of the DMRB.

Pavement design information must be in compliance with Volume 7 of the DMRB and must include traffic flow details including appropriate information on predicted and actual traffic growth. Pavement design loadings and any assumptions made in the calculations (e.g. strength of subgrade) must be identified.

The Contractor shall create and use Method Statements describing in detail work on, and associated with, the maintenance of all electrical assets and infrastructure. These Method statements shall be based on, and align with, LDS8023. Such Method Statements shall be made available to the Employer for his information.

No part of this Contract shall be construed as limiting the Contractor's obligation to correctly maintain, at all times, electrical installations in full accordance with the Electricity at Work Regulations 1989 and its Code of Practice BS7671.

Details of Roadside Electrical Assets including road lighting must include all required electrical design, inspection and test information in accordance with BS7671. Additionally, lighting design information shall be similarly held. The

bulk of this information, including location of underground ducts and cables shall be held in and/or directly linked to the Health and Safety File.

Details of Traffic Signal installations must include all required electrical design, inspection and test information in accordance with TD 24, BS7671. The bulk of this information, including location of underground ducts and cables shall be held in and/or linked to the H&S File. Traffic signal calculations, including signal timings and predicted queue lengths, must be provided in compliance with Volumes 8 and 9 of the DMRB.

Details for designed and retained maintenance crossovers, including design speed, length and pavement details must be provided.

(b) Safety data must be provided for hazardous proprietary materials (e.g. paints and protective coatings used on road structures) and existing hazardous products or materials (e.g. asbestos drainage pipes, contaminated land) used or retained in the project. Data on other materials must be included where it is anticipated that they may become difficult to obtain at a later date. Where sub-contractors were responsible for operations involving the installation or application of products or materials, their names and addresses must be given. Where this information is related to road structures it shall be contained in the structural records prepared in accordance with BD 62 (DMRB 3.2.1) and must be included in the Health and Safety File by reference.

Waste transfer notes must be held in the file to comply with legislation and provide information on any contaminants removed from Site.

Test certificates for materials must be provided where not otherwise included in operation and maintenance manuals.

(c) Full information on maintenance facilities, procedures, and manuals for road structures must be provided in the structural records prepared in accordance with BD 62 (DMRB 3.2.1) and included in the Health and Safety File by reference. Attention is additionally drawn to the provision and maintenance of escape routes in respect of entry into voids within structures. Such escape routes need to be fully documented and provided with approved notices and labelling and as appropriate, with emergency lighting.

Information on the inspection, maintenance, repair, and assessment of road structures including tunnels and buried concrete box structures must be provided in accordance with the requirements of Volume 3 of the DMRB.

A maintenance manual must be provided for any plant, machinery or equipment forming part of the permanent works for the project that is not required as part of a road structure as defined within BD 62 (DMRB 3.2.1) e.g. gantries and electrical pillars, assets and infrastructure in road lighting systems. The manual must detail the methodology for comprehensive testing, routine maintenance, fault repair and testing and incorporate all appropriate parts in LDS8023, TD 23 and all similarly applicable.

Details must be provided of any features that have been incorporated into the project in order to facilitate future maintenance operations, e.g. access and egress arrangements for structures, lane closure arrangements for maintenance work and temporary cross-over arrangements on dual carriageways in accordance with TA 92 (DMRB 8.4.6).

Where operation and maintenance manuals shall be provided, within or outside the file, they must highlight significant residual hazards.

Where it is known or anticipated that hazardous, inflammable or toxic substances are present then these must be identified. It should be noted that hazardous, inflammable or toxic substances may be present:

(i) Where used in the construction process;

(ii) Due to the use of the structure (e.g. carbon monoxide, sulphur dioxide and rat urine in sewers, bird faeces on the underside of bridge decks and mould growth in tunnels and other buried structures); and

(iii) Due to maintenance, inspection and testing procedures requiring the use of substances hazardous to health (e.g. silane used in the impregnation of concrete road structures, utilising the technique of radiography in the inspection of structures, and substances used in the waterproofing of structures).

All necessary information and instructions relating to inflammable and explosive atmospheres shall form part of this information. Significant duties to eliminate or minimise risks are contained within Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) while protective arrangements form part of the ATEX requirements. Both shall be appropriately applied.

Where substances hazardous to health are utilised in maintenance, inspection and testing procedures, information must be provided as identified in (b) above.

(d) The requirements for the provision of such a maintenance manual shall be extended to include all Design and the Works elements and shall cross reference to the Trunk Road Inventory Manual.

(i) Information on the health and safety implications of temporary or permanent decommissioning, demolition or dismantling of structures is required where this is anticipated or proposed (e.g. to renew time-expired components such as joints or bearings). Where this information is related to road structures it is contained in the structural records prepared in accordance with BD 62 (DMRB 3.2.1) and must be included in the Health and Safety File by reference.

Potential health and safety problems with the future demolition of any structure must be highlighted (e.g. post-tensioned road structures, hazardous substances such as lead that were traditionally used in the manufacture of paint, statutory undertakers' equipment).

Potential hazards to those inside and outside of the site or working area, arising from the removal of plant, machinery or equipment must be identified. LDS8013 'Guidance on the decommissioning and removal of obsolete, redundant and derelict Roadside Electrical Assets and lighting' provides guidance that shall be fully accommodated in any maintenance activity;

(ii) design risk assessments for each element of the Design highlighting any residual risk; and

(iii) a list of drawings relevant to each element of the Design cross-referenced to those provided elsewhere as part of the As Constructed Requirements.

7.5 Network Referencing & Inventory

7.5.1 Network Referencing

7.5.1.1 The Contractor shall use the network referencing information (link, section and chainage) provided by the Employer when compiling the inventory data as set out in the sections below.

7.5.1.2 The following details shall be provided by the Contractor:

(i) measured lengths for each new network section including those comprising existing or new roads;

(ii) measured chainage of the start and end of the Works related to the existing network referencing;

(iii) Ordnance Survey grid references for each installed network node point which shall be provided as 12 figure references and shall be accurate to plus or minus one metre; and

(iv) completed node marker reference replacement documents for each installed network node point.

7.5.2 Inventory Requirements

7.5.2.1 The Contractor shall use the Trunk Road Inventory Manual to prepare an inventory of all assets within the boundary of the new Trunk Road and any other assets for which the Employer will have management or maintenance responsibility following any detrunking works in accordance with the relevant Orders.

7.5.2.2 The Contractor shall contact the Asset Management Branch of Trunk Roads and Bus Operations to obtain the current version of the Trunk Road Inventory Manual. In addition to the Trunk Road Inventory Manual, the Asset Management Branch will also provide a digital pro-forma which the Contractor shall complete in line with requirements of the Trunk Road Inventory Manual and to the satisfaction of the Engineer.

7.5.2.3 The Contractor shall consult and comply with the requirements of

(i) Transport Scotland (Asset Management Branch of Trunk Roads and Bus Operations)

in connection with the Trunk Road Inventory Manual.

Contact details are as identified in Section 7.5 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the certification procedure.

7.5.2.4 The inventory shall be referenced using the IRIS Referencing System as specified in the Trunk Road Inventory Manual and shall use 12 figure Ordnance Survey grid references accurate to one metre. The Contractor shall convert any other referencing system used into the IRIS Referencing System.

7.5.2.5 The inventory shall be submitted using a spreadsheet in a format agreed with the Employer and completed by the Contractor. Shape files accompanying the spreadsheet shall prepared by the Contractor. Subject to agreement with the Engineer, alternative methods of transferring inventory data in a digital format may be proposed by the Contractor. Should the Contractor propose alternative methods of transferring inventory data the Contractor shall consult and comply with the requirements of the Asset Management Branch of Trunk Road and Bus Operations in regard to the data format and methods of transfer. For electrical roadside assets and lighting the inventory spreadsheet, supplied by the Employer is additionally covered in LDS8002.

Contact details are outlined in Section 7.5 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the certification procedure.

7.5.2.6 An inventory shall be submitted to the Engineer prior to the date of substantial completion as specified in the Contractors Programme under Clause 14 of the Contract.

7.5.2.7 If, following the issue of the inventory, any additions are made to the inventory or alterations are made to any asset attributes in the inventory, the Contractor shall submit details to the Engineer of all changes:

(i) within 14 days of the date of substantial completion;

(ii) within 14 days of completion of the Works and issue of the Certificate of Completion (for the whole or part of the works) pursuant to Clause 48 of the Conditions of Contract; and

(iii) at the end of each relevant fifty two week period.

7.5.3 Pavement Construction Data

7.5.3.1 The Contractor shall use the Employer's Pavement Construction Datasheet (PCD) to record the pavement treatment specifications and depths used in the construction of the new and existing trunk roads. This shall include any current network sections that will become de-trunked.

7.5.3.2 The contractor shall complete the PCD with the following data as a minimum:

(i) Link;
(ii) Section;
(iii) Chainage;
(iv) Cross Sectional Position;
(v) Material Removed;
(vi) Layer (base/binder/surface course);
(vii) Material Type;
(viii) Material Specification;
(ix) Percentage of Recycled Material;
(x) Mixing Temperature;
(xi) Material Thickness;
(xii) Binder Type;
(xiii) Binder Specification;
(xiv) Grading;
(xv) Aggregate Type;
(xvi) Aggregate Size;
(xvii) Design Polished Stone Value;
(xviii) Laid Polished Stone Value;
(xix) Material Source – Plant;
(xx) Material Source – Aggregate; and
(xxi) Material Source – Fine Aggregate.

7.5.3.3 The Contractor shall contact the Asset Management Branch of Trunk Roads and Bus Operations to obtain the current version of the PCD.

7.5.3.4 The Contractor shall consult and comply with the requirements of

(i) Transport Scotland (Asset Management Branch of Trunk Roads and Bus Operations)

in connection with the PCD.

Contact details are as identified in Section 7.5 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the certification procedure.

7.5.3.5 All details shall be recorded with reference to the Integrated Road Information System (IRIS) link, section and chainage system provided by the Employer under Section 7.5.2 and shall not be recorded by scheme chainage.

7.5.3.6 The Contractor shall provide the completed PCD to the Engineer in Microsoft Excel format.

7.5.4 SCRIM Site Categories

7.5.4.1 In order to assign data from the Sideways Coefficient Routine Investigation Machine (SCRIM) Surveys, specified in Section 6.3.5 into IRIS, SCRIM categories need to be assigned to each section of road on the IRIS network.

7.5.4.2 The Contractor shall complete the Employer's SCRIM Site Category and Investigatory Level Notification form to record the SCRIM categories from the design of the new and existing trunk roads. This shall include any current network sections that will become de-trunked in accordance with the relevant Orders.

7.5.4.3 The Contractor shall consult and comply with the requirements of

(i) Transport Scotland (Asset Management Branch of Trunk Roads and Bus Operations)

in connection with the SCRIM Site Category and Investigatory Level Notification form.

Contact details are as identified in Section 7.5 of Part 2. The Contractor shall provide the Engineer with the completed Consultation Certificate(s) in accordance with the certification procedure.

7.5.4.4 The Contractor will provide as a minimum:

(i) Road Name;
(ii) Cross Sectional Position;
(iii) Link;
(iv) Section;
(v) Start Chainage;
(vi) End Chainage;
(vii) Scrim Category; and
(viii) Investigatory Level.

7.5.4.5 SCRIM categories shall be recorded with reference to the IRIS link, section and chainage system provided by the Employer under Section 7.5.2 and shall not be recorded by scheme chainage.

7.5.4.6 The Contractor shall determine the appropriate SCRIM category using the 'Guidance Document for Implementing a Skid Resistance Policy for Transport Scotland' published by WDM Limited.

7.5.4.7 The Contractor shall provide the completed SCRIM categories in a digital format, using the SCRIM Site Category and Investigatory Level Notification form, to the Engineer.

7.6 Building Information Modelling (BIM)

7.6.1 The Design, construction and completion of the works shall be Building Information Modelling (BIM) Level 2 compliant in accordance with the Employer's Information Requirements included within Appendix AC in Part 3.

8. CERTIFICATION PROCEDURE

8.1 Introduction

8.1.1 The Contractor shall provide to the Engineer certification to cover the Design or Design Elements, construction, completion and maintenance of the Works.

Compliance with these procedures shall not relieve the Contractor of his responsibilities under the terms of the Contract.

8.1.2 Models of all the certificates shall be as identified in Appendix C in Part 3.

The Employer shall not accept modifications or qualifications to these certificates other than those consented to in writing by the Engineer.

8.1.3 The Certification Procedure associated with a part of the Design or Design Element shall be deemed to cover all aspects of the part of the Design or Design Element and as set out in this Section.

8.1.4 The Contractor shall maintain and provide to the Engineer a register recording the names and original signatures of individuals authorised to carry out the various functions of the Designer(s) and Checker(s) set out in this Section.

The only person authorised to delegate the various functions of the respective Designer(s) and Checker(s) shall be a Director of the respective organisation.

8.1.5 The Contractor shall maintain and provide to the Engineer a register recording the current status of all Certificates identified in this Section.

8.1.6 Subject to the requirements of this Section, construction of any part of the Works requiring certification shall not commence until the relevant certificate(s) required by the Certification Procedure shall have been completed and acknowledged by the Engineer.

8.2 Design Certificates and Design Check Certificates

8.2.1 Separate Design Certificates and Design Check Certificates shall be required where applicable for all parts of the Design or Design Elements including, but not limited to:

(i) fencing and environmental barriers;

(ii) road restraint systems;

(iii) drainage;

(iv) earthworks;

a) earthworks,

b) excavation in hard material (Rock Cutting),

c) piling, and

d) other geotechnical measures;

(v) road pavements;

(vi) road layout;

(vii) kerb, footways and paved areas;

(viii) signs and road markings;

(ix) lighting;

(x) electrical installation;

(xi) communication systems;

(xii) structures;

(xiii) environment and landscape;

(xiv) Undertakers and Private Undertakers;

(xv) Accommodation Works;

(xvi) Traffic Scotland, including Hard landscaping for Traffic Scotland;

(xvii) Site Clearance;

(xviii) and the like.

8.2.2 Notwithstanding any other requirements of the Contract, the Design check for all parts of the Design or Design Elements shall be carried out by a Checker who shall be technically independent of the Designer, the Contractor and their associated companies.

8.2.3 The independent Design check for Structures shall be carried out in accordance with the procedures identified in the DMRB.

The Design check category required for each Structure shall be as identified in Appendix B in Part 3.

8.2.4 The requirements for earthworks certification identified herein shall supersede those of the DMRB.

The Design Basis documents for the earthworks are the Earthworks Design Statement, the Ground Investigation Report and the Geotechnical Design Report.

A Geotechnical Design Report shall be prepared for all earthworks, foundations and other geotechnical design elements.

The relevant part(s) of the Geotechnical Design Report(s) shall be submitted to accompany each Structures Design Statement and each Earthworks and Structures Design Certificate. The final report(s) shall be submitted prior to submittal of the relevant Construction Certificate(s).

8.2.5 Each Design Certificate submitted by the Contractor shall be signed by the Designer and Contractor.

Each Design Check Certificate submitted by the Contractor shall be signed by the Checker and Contractor.

8.2.6 The Contractor shall submit to the Engineer two copies of each certificate with original signatures together with four copies of all relevant drawings, schedules, numbered appendices and otherwise.

One copy of each certificate only shall be returned to the Contractor within 7 days of receipt, signed in acknowledgement of receipt by the Engineer.

8.3 Design Interim Certificates and Design Check Interim Certificates: Staged Procedure

8.3.1 The parts of the Design or Design Elements identified in Section 8.2 of Part 1 requiring Design Certificates and Design Check Certificates may each be further divided into:

(i) accommodate the Contractor's phasing of the Works; and

(ii) enable construction of the further divided part of the Design or Design Elements to proceed.

8.3.2 Where this method of certification shall be adopted the following procedure shall apply:

(i) For each further divided part of the Design or Design Element, the Contractor shall submit to the Engineer two copies of a schedule of such further divided parts of the Design or Design Element which he proposes to certify.

One copy of the schedule shall be returned to the Contractor within 7 days of receipt, signed in acknowledgement by the Engineer.

This process shall be completed prior to the implementation of the staged procedure and the schedule incorporated into the Design register referred to in Section 8.2 of Part 1.

(ii) The Contractor shall submit to the Engineer two copies of each Design Interim Certificate and Design Check Interim Certificate for each further divided part of the Design or Design Element with original signatures, together with four copies of all relevant drawings, schedules, numbered appendices and otherwise.

One copy of each Interim Certificate shall be returned to the Contractor within 7 days of receipt, signed in acknowledgement of receipt by the Engineer.

(iii) Construction for any part of the Works for each of the further divided parts of the Design or Design Element requiring certification shall not commence until this procedure shall have been completed.

(iv) Once all Design Interim Certificates and Design Check Interim Certificates for a part of the Design or Design Element identified in Section 8.2 in Part 1 have been completed, the Contractor shall submit to the Engineer two copies of the Design Certificates and Design Check Certificates for each part of the Design or Design Elements with original signatures together with one copy of all relevant drawings, schedules, numbered appendices and otherwise.

One copy of each certificate shall be returned to the Contractor within 7 days of receipt, signed in acknowledgement of receipt by the Engineer.

8.3.3 Each Design Interim Certificate submitted by the Contractor shall be signed by the Designer and Contractor and each Design Check Interim Certificate submitted by the Contractor shall be signed by the Checker and Contractor.

8.4 Information to be provided with Design Certificates, Design Check Certificates, and/or Design Interim Certificates and Design Check Interim Certificates

8.4.1 Drawings, Schedules and Specification Appendices

The Contractor shall provide with each Design Certificate, Design Check Certificate, Design Interim Certificate and Design Check Interim Certificate the relevant drawings, schedules and Specification Appendices as follows, but not limited to:

(i) plans to a scale of not less than 1:500 of the road layout showing the;

(a) trunk road(s),

(b) side road(s),

(c) junctions,

(d) access(es) and access roads/tracks, and

(e) otherwise.

(ii) drawings of the road construction giving typical cross-sections;

(iii) drawings to a scale of not less than 1:500 showing all;

(a) drains,

(b) underground pipes,

(c) fences,

(d) road restraint systems,

(e) environmental barriers,

(f) kerbs,

(g) footways,

(h) footpaths,

(i) paved areas,

(j) cables,

(k) signs,

(l) road markings,

(m) environmental and landscape,

(n) Traffic Scotland, and

(o) otherwise.

(iv) drawings to a scale not less than 1:200 showing all relevant aspects of the Structures including but not limited to reinforcement details and schedules; and

(v) any other schedules or supporting information which are identified in the Numbered Appendices within the Specification.

8.5 Interim Construction Certificates

8.5.1 An Interim Construction Certificate shall be provided by the Contractor at the end of each calendar month prior to the date of substantial completion of the Works (section or whole as relevant).

The Contractor shall submit to the Engineer two copies of each certificate with original signatures.

One copy of each certificate shall be returned to the Contractor within 7 days of receipt signed in acknowledgement by the Engineer.

An Interim Construction Certificate shall be completed in respect of parts of the Works constructed during that month.

Upon substantial completion of the Works the Contractor shall supply an Interim Construction Certificate in respect of the final month of construction together with a Final Construction Certificate in respect of the whole of the Works.

8.5.2 Each Interim Construction Certificate submitted by the Contractor shall be signed by the Designer and Contractor.

8.6 Final Construction Certificates

8.6.1 A Final Construction Certificate shall be provided by the Contractor on completion of the construction of each certified part of the Design or Design Element as identified in Section 8.2 of Part 1.

The Contractor shall submit to the Engineer two copies of each certificate with original signatures.

One copy of each certificate shall be returned to the Contractor within 28 days of receipt signed in acknowledgement of receipt by the Engineer.

8.6.2 Each Final Construction Certificate submitted by the Contractor shall be signed by the Designer and Contractor.

8.7 Interim Post Construction Certificates

8.7.1 An Interim Post Construction Certificate shall be provided by the Contractor at the end of each calendar month during each Period of Maintenance.

The Contractor shall submit to the Engineer two copies of each certificate with original signatures.

One copy of each certificate shall be returned to the Contractor within 7 days of receipt signed in acknowledgement of receipt by the Engineer.

8.7.2 Each Interim Post Construction Certificate submitted by the Contractor shall be signed by the Designer and the Contractor.

8.8 Final Post Construction Certificates

8.8.1 A Final Post Construction Certificate shall be provided by the Contractor at the end of each Period of Maintenance for each part of the certified Design or Design Element as identified in Section 8.2 of Part 1.

The Contractor shall submit to the Engineer two copies of each certificate with original signatures together with four copies of the record of all work carried out by the Contractor.

One copy of each certificate shall be returned to the Contractor within 28 days of receipt signed in acknowledgement of receipt by the Engineer.

Each Final Post Construction Certificate shall be signed by the Designer and the Contractor.

8.9 Consultation Certificates

8.9.1 Where within the Contract there shall be a requirement to consult and comply with the requirements of a third party, the Contractor shall provide a completed Consultation Certificate to the Engineer.

8.9.2 Subject to any other provision of the Contract, the Contractor shall comply with the special requirements relating to the Undertakers and any other companies which are identified in Clause 77 of the Conditions of Contract.

8.9.3 The Contractor shall consult and comply with the requirements of all other third parties/interested parties concerned with the Works.

Following consultation, the Contractor shall provide Consultation Certificates signed by the Contractor, the third parties, or all other third parties/interested parties concerned with the Works to the Engineer.

The Contractor shall submit to the Engineer two copies of each Certificate, with original signatures along with four copies of all relevant documentation including drawings, other information and associated correspondence between Contractor/third party or interested party and interested party or third party/Contractor.

One copy of each Certificate shall be returned to the Contractor within 7 days of receipt, signed in acknowledgement by the Engineer.

The Contractor shall not commence any Works which affect the interests of any third party or interested party until this procedure is completed.

8.10 Temporary Works Certificates

8.10.1 Temporary Works Certificates shall be required for all Temporary Works associated with any Structure and for any other Temporary Works, which have or require to have a Design input. This shall include but not be limited to all temporary works undertaken adjacent to live sections of carriageway.

The Contractor shall submit two copies of the Temporary Works Certificate to the Engineer with original signatures along with four copies of all relevant drawings and documents.

One copy of each Certificate shall be returned to the Contractor within seven days of receipt, signed in acknowledgement by the Engineer.

8.10.2 The Contractor shall not commence construction of any relevant Temporary Works until he has made the appropriate submission.

8.10.3 Each Temporary Works Certificate submitted by the Contractor shall be signed by the Temporary Works Checker and the Contractor.

8.11 Road Safety Audits

8.11.1 General

8.11.1.1 Road Safety Audits shall be carried out in accordance with the DMRB as amended by the requirements detailed below.

8.11.1.2 Road Safety Audit Certificates (Reference RSAC) in Appendix C of Part 3 shall be provided to the Engineer for each stage of the Road Safety Audit Procedure.

8.11.1.3 For the purposes of DMRB Volume 5, Section 2, Part 2: HD 19 the "Project Sponsor" shall be construed as meaning the "Employer".

8.11.1.4 For the purposes of the Road Safety Audit procedures the "Director" shall be:

Director of Major Transport Infrastructure Projects

Transport Scotland

[REDACTED]

or other person notified in writing by the Employer, and accordingly he shall be the arbitrator with respect to issues in any Exception Reports (as defined in the DMRB).

8.11.2 Audit Team

8.11.2.1 Paragraphs 2.38, 2.71 and 2.73 of HD 19 of the DMRB.

The Audit Team shall be appointed by the Contractor who shall submit names and curriculum vitae of the proposed Audit Team members to the Engineer for approval.

Once approval of all prospective members is obtained, the Contractor shall appoint the Audit Team.

The Audit Team shall be independent of the Contractor, the Designer(s) and the Checker(s) and any of their associated companies.

The Engineer may object to such proposal only for the reason that:

(i) the proposed Audit Team is not independent of the Contractor, the Designer(s) and Checker(s) and any of their associated companies; or

(ii) the proposed Audit Team does not have in the opinion of the Employer, sufficient training or experience of road safety and accident investigation and prevention appropriate to the Road Safety Audit to be carried out.

8.11.3 Permanent Works

8.11.3.1 The Contractor shall ensure the Road Safety Audit Brief (as defined in the DMRB) is completed and submitted to the Audit Team such as to avoid causing delays to the progress of the Works.

The Contractor shall provide all relevant information requested by the Audit Team.

8.11.3.2 The Certificates shall be issued once the following procedure has been completed.

Either:

(i) The Design Team accepts all the Audit Team's recommendations; or

(ii) The Design Team submits alternative solutions/proposals to the Audit Team and these are accepted by the Audit Team; or

(iii) The Design Team submits alternative solutions/proposals to the Audit Team and because these are not accepted by the Audit Team, submits an Exception Report to the Director for arbitration (as defined in the DMRB).

In this case the decision of the Director shall be binding on the Contractor.

8.11.4 Stage 2 Road Safety Audit

8.11.4.1 The Design shall, on its completion and before commencement of construction, be subject to a Stage 2 Road Safety Audit. The Road Safety Audit may be phased using the following Zones of Interest:

(i) Road layout, earthworks, drainage, services, structures and accommodation works;

(iii) Fencing and environmental barriers;

(iv) Road pavement, kerbs, footways and paved areas;

(v) Road restraint systems;

(vi) Signs, road markings and lighting; and

(vii) Environment and landscape.

8.11.4.2 The Contractor shall, in addition to the requirements of paragraph 2.89 of HD 19 of the DMRB, submit to the Road Safety Audit Team the following information relating to parts of the Design Elements for each Zone of Interest where relevant:

(i) 1:500 scale scheme plans of the road layout showing all junctions; and

(ii) Drawings showing road restraint systems (vehicular and pedestrian), bridge parapets, walls, structures, signs (including locations and indicating faces and pole arrangements), road markings, lighting, service diversions, drainage layouts, kerbs, footways and all other roadside features.

8.11.4.3 The Contractor shall supply the Road Safety Audit Team with any further information that it may request.

8.11.4.4 The Contractor shall submit to the Engineer two copies of Stage 2 Road Safety Audit Certificate (for each Zone of Interest if appropriate) with original signatures.

8.11.4.5 One copy of the Certificate shall be returned to the Contractor within 7 days of receipt signed in acknowledgement of receipt by the Engineer.

8.11.4.6 The Contractor shall not construct the parts of the Design or Design Element (included within any Zone of Interest) subjected to Stage 2 Road Safety Audit until the recommendations of the Stage 2 Road Safety Audit report including, where appropriate:

(i) alternative solutions to the safety issues raised by the Stage 2 Road Safety Audit which have been agreed with the Audit Team; and

(ii) any decision of the 'Director' with respect to issues detailed in the Exception Report

have been incorporated in the Design or Design Element.

8.11.5 Stage 3 Road Safety Audit

8.11.5.1 A Stage 3 Road Safety Audit shall be carried out immediately prior to the Contractor giving notice to the Engineer pursuant to a Certificate of Completion and for sections of the Works to be opened to traffic without Temporary Traffic Management Schemes.

8.11.5.2 The Contractor shall be responsible for ensuring that representatives of:

(i) Police Scotland;

(ii) Transport Scotland, Major Transport Infrastructure Projects;

(iii) Transport Scotland, Trunk Roads and Bus Operations;

(iv) the Engineer; and

(v) any relevant local authority responsible for connections to the non-trunk road network.

are invited to accompany the Road Safety Audit Team to offer their specialist views for the Stage 3 Road Safety Audit.

Notwithstanding any other requirement of the DMRB any views or observations made at Stage 3 Road Safety Audit by Police Scotland, Transport Scotland Major Transport Infrastructure Projects and Network Road Management Directorate, the Engineer and/or any relevant local authority shall be recorded in the Stage 3 Road Safety Audit.

8.11.5.3 The Contractor shall submit to the Engineer two copies of the Stage 3 Road Safety Audit Certificate, with original signatures together with two copies of the Audit Report and associated relevant correspondence.

One copy of the Certificate shall be returned to the Contractor within 7 days of receipt, signed in acknowledgement of receipt by the Engineer.

8.11.5.4 Before a Certificate of Completion is issued the Contractor shall incorporate into the Works the recommendations of the Stage 3 Road Safety Audit report including:

(i) alternative solutions to the safety issues raised by the Stage 3 Road Safety Audit which have been agreed with the Audit Team; and

(ii) any decision of the 'Director' with respect to issues detailed in the Exception Report.

8.11.5.5 A Stage 3 Road Safety Audit may be carried out separately for each section of the Works.

8.11.6 Stage 4 and 5 Road Safety Audits

8.11.6.1 Following the end of the first and third Relevant Fifty Two Week Periods the Employer shall provide the Contractor with accident data relating to the scheme since issue of the Certificate of Completion pursuant to Clause 48 of the Conditions of Contract.

The traffic accident records shall be analysed in accordance with the requirements of the HD 19.

In addition to the requirements of HD 19, Road Safety Audit Reports shall also be prepared which include the following:

(i) details of any specific safety problems identified through the traffic accident record analysis; and

(ii) recommendations to address the problems highlighted.

8.11.6.2 For the purposes of paragraph 2.43 of HD 19 of the DMRB, the Audit Team appointed by the Contractor shall be responsible for the routine accident monitoring required by the Overseeing Organisation's road safety management system.

8.11.6.3 The Contractor shall submit the Audit Team's report in accordance with the DMRB to the Employer not later than 4 weeks after the receipt of the accident data from the Employer.

8.11.6.4 The Contractor shall incorporate into the Design and the Works those recommendations identified for his action in the Stage 4 and Stage 5 Road Safety Audit reports including:

(i) alternative solutions to the safety issues raised which have been agreed in writing by the Audit Team; and

(ii) any decision of the 'Director' with respect to issues detailed in any exception report.

8.11.6.5 Notwithstanding any other requirement of the Contract, additional Design and Works resulting from the recommendations of the Stage 4 and Stage 5 Road Safety Audits shall be deemed to be work of repair, amendment, reconstruction, rectification and making good of defects, imperfections, shrinkages or other faults arising during the Period of Maintenance and shall be subject to the requirements of Clause 49 of the Conditions of Contract.

Notwithstanding the provisions of Clause 49(3), all such additional Design and Works shall be carried out by the Contractor at his own expense.

8.11.6.6 The additional Design and Works shall be undertaken within the timescale detailed in Clause 49(2) of the Conditions of Contract or such earlier timescale of reasonably practicable duration recommended in the Stage 4 and Stage 5 Road Safety Audit Reports.

8.11.7 Road Safety Audit (RSA) For Temporary Traffic Management Schemes (TTMS)

8.11.7.1 Stage 2 and Stage 3 Road Safety Audits shall be carried out on Temporary Traffic Management Schemes that are judged by the Contractor, following discussions with the relevant roads authority and Police Scotland, to be sufficiently complex or major to require audit. Consultation Certificates in the form prescribed in the Contract shall be provided for the Engineer's acknowledgement.

The general procedures are as described above and modified as follows:

8.11.7.2 At Stage 2 Road Safety Audit the Contractor shall submit to the Engineer two signed copies of a Road Safety Audit Certificate for each audited TTMS not less than ten days before implementation of the TTMS.

One copy shall be returned to the Contractor signed in acknowledgement of receipt by the Engineer within seven days of receipt.

8.11.7.3 At Stage 3 Road Safety Audit: TTMS shall be implemented and audited outwith peak times as described in Appendix 1/17 of the Specification.

At the audit, the Road Safety Auditor shall advise the Contractor of any alterations required to the TTMS and these shall be implemented to the satisfaction of the Road Safety Auditor.

On completion of the TTMS to the satisfaction of the Road Safety Auditor, the Road Safety Auditor and the Contractor shall sign a Road Safety Audit Certificate.

The Contractor shall submit to the Engineer two signed copies of a Road Safety Audit Certificate for each audited TTMS not more than one day after implementation of the TTMS.

One copy shall be returned to the Contractor signed in acknowledgement of receipt by the Engineer within seven days of receipt.

8.12 Departures from Standard

8.12.1 Where the Contractor proposes to incorporate a Departure from Standard [as defined by the DMRB] within the Design, the Contractor shall seek the formal approval in writing of the Overseeing Organisation.

For this purpose the Overseeing Organisation in Scotland is TRBO Standards Branch.

The following procedure shall be followed by the Contractor in seeking formal approval to incorporate a Departure from Standard into the Design:

(i) Prior to any Stage 2 Road Safety Audit being carried out in accordance with the Certification Procedure detailed elsewhere in these Employer's Requirements the Contractor shall submit details of the proposed Departure from Standard to the Engineer.

[In this context the Contractor's attention is drawn to DMRB Volume 1, Section 0, Part 1, 'The Introduction to the Design Manual for Roads and Bridges' Paragraph 1.17]

(ii) The Engineer shall pass details of the Contractor's proposed Departure from Standard to the relevant Overseeing Organisation staff in Transport Scotland, TRBO Standards Branch.

(iii) The relevant Overseeing Organisation staff shall consider the Contractor's proposed Departure from Standard and shall determine the proposed Departure by approving or rejecting it.

Approval may be conditional or unconditional.

(iv) Such approval or rejection of a Departure from Standard submission shall be at the sole discretion of the Overseeing Organisation.

(v) The relevant Overseeing Organisation staff shall inform the Engineer of the Departure determination.

(vi) The Engineer shall inform the Contractor of the Departure from Standard determination.

Each Departure from Standard submission to the Engineer shall include as a minimum the information detailed in Section 8.12.2 of Part 1 as outlined below.

8.12.2 Information to be provided with each Departure from Standard Submission.

As a minimum, the Departure from Standard submission to the Engineer shall include the following information:

(i) Description of Departure from Standard

1:10,000 location plan; 1:500 detailed plan; Design speed of road; a statement of the strategy for the route; description of context including contiguous affected adjacent sections of routes in a 2 to 3 kilometres range; desirable minimum standard; proposed Departure from Standard including number of steps from desirable minimum standard; details of other Departures from Standard or Relaxations affecting the same or related Design elements and otherwise and reasons for the Departure from Standard.

(ii) Safety (History of feature)

Performance of Departure from Standard feature elsewhere; a risk assessment including different user category effects.

(iii) Compensatory Measures

Proposed adjustment to the Design to mitigate the effects of the Departure from Standard including use of upgraded materials such as high skid resistant surfacing; improved signing and lining such as warning signs/ladder markings and otherwise; need for further enforcement measures and need for further statutory measures including the introduction of speed restrictions.

(iv) Cost Consequences

A summary of the cost implications of applying the Departure from Standard including capital cost effects; increased maintenance costs; increases in vehicle operating costs and accident costs and other user dis-benefits.

(v) Environmental Consequences

The effects, if any which the Departure from Standard may have on the Environment in terms of human, flora, fauna, soil, water, air, climate, landscape, visual amenity, materials assets, cultural heritage issues and otherwise.

(vi) Structural Integrity

Where applicable supply details of any possible effects the Departure from Standard may have in relation to the structural integrity/stability of earthworks, Structures and road pavements.

(vii) Any other relevant information.

For Departure from Standard applications to Volume 6 of the DMRB (Road Geometry), the Contractor shall provide the information required on the 'Application for Departure from Standards Design Manual for Roads and Bridges Volume 6 (Road Geometry)' proforma contained in Appendix D in Part 3.

8.12.3 Departures from Standards DMRB Volumes 1 to 3 (Structures)

The Contractor shall provide the information required on the 'Application for Departure from Standards DMRB Volumes 1 to 3 (Structures)' proforma contained in Appendix D in Part 3.

8.12.4 The Contractor shall provide 5 hard copies and one electronic copy of each Departure submission to the Engineer.

8.13 Walking, Cycling and Horse-Riding Assessment and Review Requirements

8.13.1 The Contractor shall undertake a Walking, Cycling and Horse-Riding Review and produce a Review Report in accordance with DMRB HD 42. Once the Review Report has been signed by both the Lead Assessor and Design team leader the Contractor shall provide a copy of the Review Report to the Engineer.

8.13.2 For the avoidance of doubt the Contractor is not required to follow the audit requirements of 'Cycling by Design 2010' or Transport Scotland's 'Roads For All: Good Practice Guide for Roads'.

8.14 Provenance Certificates

8.14.1 Provenance Certificates shall be required for all native plant stock and seed mixes required by the Design.

The Contractor shall submit two copies of the Provenance Certificate to the Engineer with original signatures along with four copies of all relevant documents.

One copy of each Certificate shall be returned to the Contractor within seven days of receipt, signed in acknowledgement by the Engineer.

8.14.2 The Contractor shall not commence the landscape planting until he has made the appropriate submission.

8.14.3 The Contractor shall provide to the Engineer and maintain a register recording the current status of all Provenance Certificates.

8.14.4 Each Provenance Certificate submitted by the Contractor shall be signed by the Designer, Landscape Designer and the Contractor.