



O'CONNOR · SUTTON · CRONIN
MULTIDISCIPLINARY CONSULTING ENGINEERS

D870: DINISH BRIDGE REFURBISHMENT

VOLUME A PART A – WORKS REQUIREMENTS, APPENDICES TO THE SPECIFICATION

For
Department of Agriculture, Food and the Marine

11 August 2026

NOTICE

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Section 1:

Works Requirements Scoping Document



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VOLUME A PART A – WORKS REQUIREMENTS SCOPING DOCUMENT

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1 WORKS REQUIREMENTS

The following are listed items considered to be included in the Works Requirements.

- Volume A Part A
 - This document the Works Requirements Scoping Document
 - The Appendices to the Specification (Volume A Part A)
- Volume A Part B
 - The Contract Drawings
- TII's Specification for Roadworks
- TII's Standard Construction Details
- Uisce Éireann Specification and Standard Details
- Guidelines for Managing Openings in Public Roads – Guidelines for the Openings, Backfilling and Reinstatement of Openings in Public Roads, Second Edition (Rev 1), April 2017

2 PRELIMINARY PARTICULARS

2.1 Name, Nature And Location Of The Works

This scheme involves the refurbishment of Dinish Bridge located in Castletownbere Co. Cork connecting Dinish Island to the mainland regional road R572. Dinish Bridge is a Department of Agriculture Food and the Marine (DAFM) asset within the footprint of the Fishery Harbour Centre (FHC), which is operated and managed by the DAFM. The bridge is the only means of access by road or foot to Dinish Island for persons attending the businesses, fishing vessels and fishing industry adjacent enterprises located on Dinish Island. Typical items to be addressed at this structure include Waterproofing and resurfacing of the existing bridge deck, expansion joint and seal replacement, parapet replacement, concrete repairs, render repairs and lighting column replacement.

2.2 A GENERAL DESCRIPTION OF THE WORKS – DINISH BRIDGE

The bridge connects Dinish Island to the mainland R572 regional road and was constructed in the 1970s as part of the Castletownbere FHC. Dinish Bridge consists of 12 simply supported spans comprised of 19 No. prestressed precast beams and in-situ RC concrete over slab. The overall length of the structure is 191m, the max clear span is 12.2m and the out-to-out width of the deck is 10m. The sub-structure comprises reinforced concrete abutments and intermediate trestle piers comprised of 8 No. columns on precast concrete piled foundations. The structure carries two lanes of traffic and has a footway on one side of the structure. A metal parapet is provided along the structure.

Refurbishment of the bridge will include but is not limited to the following:

- The road and footway surfacing are to be removed, a new waterproofing membrane installed, and the surfacing, kerbs and footpaths replaced.
- The expansion joints are to be replaced at all locations.
- Reseal all joints in parapet edge panels.
- New road markings to be provided for the entirety of the resurfacing works.
- Concrete spalling to be repaired to the abutments and elevation of the bridge deck.
- Render spalling to be repaired to the trestle piers.
- Installation of Parapet Railing and safety barriers
- Installation of corbels to support lighting columns
- Installation of lighting columns.
- All existing services to be protected and wrapped prior to footpath reinstatement.
- Cleaning and painting of the deck fascia

2.3 NAME AND ADDRESSES OF THE EMPLOYER AND CONSULTANT

Below is the name and address of both the Employer and the Consultant

Client Name: Department of Agriculture, Food and the Marine
Address: National Seafood Centre, Clonakilty, Cork, P85 TX47
Contact: Jerome McCarthy
Email: Jerome.McCarthy@agriculture.gov.ie

Consultant Name: O'Connor Sutton Cronin & Associates Ltd
Address: 9 Prussia Street, Dublin 7
Contact: Brian Heron
Email: brian.heron@ocsc.ie

Employer's Rep: O'Connor Sutton Cronin & Associates Ltd
Address: 9 Prussia Street, Dublin 7
Contact: Brian Heron
Email: brian.heron@ocsc.ie

2.4 CONSENTS, PLANNING AND OTHER CONSENTS OBTAINED OR TO BE OBTAINED BY THE CONTRACTOR

Below is a list of the consents, planning and other consents obtained or to be obtained by the Contractor in order to execute the works:

- Third Party Access Agreements
- Road Opening Licences
- Site / Compound Set-Up
- Lane closures/traffic restrictions. Lane restrictions may not be put in place until a minimum of 2 working days following issue of Harbour Notice notifying harbour users of same. Contractor to have established point of contact to handle queries from stakeholders and harbour users to be included on Harbour Notices. Contractor to liaise with Cork County Council for restrictions affecting R572

3 THE SITE

3.1 SITE LOCATION

The bridge structure included in this Contract is located as shown on the drawing in Volume A Part B. The structure is located in Castletownbere Co. Cork between Dinish Island and the mainland R572 regional road.

3.2 MEANS OF ACCESS

The Contractor is to ensure that site restrictions and restrictions on access to bridge are taken into account when carrying out the work. Where traffic management is required to be put in place to facilitate the works at the bridge, please refer to Appendices 1/17, 1/18 and 1/19 for the constraints on access requirements and the parties that approvals are to be obtained from prior to putting in place traffic management impacting upon the existing access to the structure.

3.3 RESTRICTION ON ACCESS

The site is accessible from the roadside. The contractor is to provide traffic management in accordance with Appendix 1/17 and 1/18 Traffic Safety and Management of the Specification.

Access to third party land will be by agreement with Landowners, Employer, and the Employers Representative. The Contractor must liaise with all parties and reach agreement on conditions of entry prior to commencing any works.

Works are to be undertaken over / adjacent to tidal water and that access is restricted. Prior to commencement, the Contractor shall submit method statements, risk assessments, temporary works proposals, rescue arrangements, and a pollution prevention plan for acceptance. The Contractor shall take all necessary precautions to prevent silt, debris, fuel, concrete washout, grout, or other contaminants entering the water and shall provide containment measures where required. The Contractor shall suspend the Works immediately if water levels, weather, bank stability, or other conditions render access unsafe. The Contractor shall comply with all relevant statutory requirements and with any instructions or restrictions issued by the Employer's Representative.

The Contractor shall ensure that safe access to and egress from all business premises on Dinish Island is maintained at all times during the works and shall take all reasonable measures as may be necessary to plan and execute the works in such manner that minimises any disruption to businesses. It will be the responsibility of the contractor to liaise with all business owners in advance and during the works in this regard.

3.4 INFORMATION ON ADJACENT / ABUTTING STRUCTURES

The Contractor shall ensure that the works do not have a global detrimental impact on the public road or any nearby or adjacent structures.

3.5 LIMITATIONS (IF ANY) ON USE OF THE SITE

Access to third party land will be by agreement with Landowners, Employer, and the Employer's Representative. The Contractor must liaise with all parties and reach agreement on conditions of entry prior to commencing any works.

All access routes and proposed temporary lane closures must be agreed in advance with DAFM and Cork County Council and/or the Employer's Representative. The Contractor will be responsible for the provision, erection and maintenance of all traffic management equipment required to facilitate the works.

The Contractor must, during the course of the Works, liaise with the businesses and premises along the Works. The Contractor must ensure that the deliveries to/from each business is not affected and must, through liaison, ensure that undue disruption is not caused to the businesses.

The Contractor is to allow for all measures required to maintain the safety of all people engaged in the Works, and of the public throughout the contract. The Contractor must prevent all debris and materials from falling into the water and onto adjoining lands. Full details of protective measures to address the escape of debris from the works area are to be submitted to the Employers Representative for Acceptance.

The Contractor may not use the roads or footpaths open to the public for the parking of vehicles, storage of materials or location of plant and temporary buildings; these areas shall be maintained in a clean condition with unrestricted access for the Public at all times.

Access to the site is limited to the scope of the Contract; no other works are to be carried out unless instructed by the Employers Representative.

3.6 OTHER WORK ON SITE TO BE CARRIED OUT CONCURRENT WITH THE WORKS BY THE EMPLOYER'S PERSONNEL OR OTHER

The following relate to Works by Statutory Undertakers and / or Utility Providers

The Contractor shall be deemed to have within his tender price have provided for:

- a) Consultation and liaison with the DAFM, Public or Private Utility Undertakers, Service Provider, or Private Owners and other Contractors as necessary, particularly in respect of the timings or phasing of the Works and furnishing such details as the Works may require.
- b) Restrictions of and hindrances to the Works arising from the requirements and activities of DAFM, Local Authority, Public or Private Utility Undertakers, Service Provider, or Private Owners and other Contractors.
- c) Restrictions of and hindrance to the Works arising from the activities of other Contractors who are engaged in alteration, renewals, provisions for future requirements or other Works authorized by the Clients Representatives in respect of the Services or Undertakings belonging to DAFM, the Local Authority, Public or Private Utility Undertakers, Service Provider, or Private Owner either on or in the vicinity of the site.
- d) Ascertainment of the location of existing utility services and compliance with all requirements of DAFM, the Local Authority, Public or Private Utility Undertakers or Private Owners, Service Provider in respect of Accommodation Works involving or affecting their services or Undertakings.
- e) All losses arising from the activities of DAFM, Local Authority, Public or Private Utility Undertakers or Private Owners, Service Provider, and other Contractors.
- f) Excavations to ascertain the locations of existing underground utility services including excavations by hand and provision of working space.
- g) Completing required excavations by hand digging around existing services and protection of same.
- h) Compliance with the relevant Clauses of the Conditions of Contract.
- i) Attendance including working outside of normal working hours, lighting, traffic control, signing and backfilling with approved materials for DAFM, Local Authority, Public or Private Utility Undertakers or Private Owners, Service Provider, and other Contractors.
- j) Support and protection of existing utility pipes, ducts, cables and other apparatus during the progress of the Works.
- k) Taking measures to ensure that no existing services are interrupted without the written consent of DAFM, Local Authority, Public or Private Utility Undertakers, Service Provider, or Private Owners.
- l) Awaiting the Employers Representatives consent to proposals.
- m) Restrictions and hindrances to the Works from the activities of other Contractors of the Employer including the activities for water connections, traffic and public light installation, plantings and other landscape works to be carried out by DAFM, Local Authority and their agents.
- n) Keeping the Employers Representatives informed of arrangements made with the owners of public and privately owned services.

3.7 FACILITIES OF THE EMPLOYER TO BE OPERATED AND MAINTAINED BY THE CONTRACTOR.

The following elements are to be maintained live throughout the works:

- Access and Egress to all adjacent lands/ properties
- Surface Water Drainage

- Existing watermain
- Existing telecoms services
- Existing utilities

4 SECTIONS

4.1 DEFINITION OF SECTIONS INTO WHICH THE WORKS ARE DIVIDED FOR PURPOSES OF SECTIONAL COMPLETION

The works must be programmed and executed in accordance with the timeframe set out in the Form of Tender and Schedules and the limitations as set out in the contract documents and the Works Requirements as a whole.

5 DRAWINGS, SPECIFICATIONS, SCHEDULES, REPORTS, GENERAL ARRANGEMENTS, WORKING AND CONSTRUCTION DRAWINGS

5.1 PROJECT DRAWINGS

Refer to Volume A Part B for the Contract Drawings.

NOTE: Additional information drawings are supplied for information only and do not form part of the contract. No reference to them shall include them as a contract document.

5.2 MATERIALS AND WORKMANSHIP SPECIFICATIONS

- Transport Infrastructure Ireland (TII) Specification for Roadworks,
- Transport Infrastructure Ireland (TII) Standard Construction Details,
- Uisce Éireann Code of Practice and Standard Details,
- Guidelines for Managing Openings in Public Roads – Guidelines for the Openings, Backfilling and Reinstatement of Openings in Public Roads, Second Edition (Rev 1), April 2017 Works Requirements Volume A, Part A,
- Works Requirements Volume A, Part B.

6 PERFORMANCE SPECIFICATIONS APPLICABLE TO CONTRACTOR DESIGNED OR SPECIALIST DESIGNED ELEMENTS OF THE WORKS

6.1 TRAFFIC MANAGEMENT

All traffic management works shall be in accordance with the current published version of the Traffic Signs Manual, Chapter 8 “Temporary Traffic Measures and Signs for Road Works” and shall be submitted to the Employer’s Representatives for agreement prior to commencement of any works. Any Traffic Management that affects the public roads must be issued to the Employer’s Representatives, DAFM and the Local Authority for agreement prior to commencement of any works.

The Contractor shall consult with DAFM, Cork County Council, the relevant Local Authority/Road Authority/TII in relation to requirements for works in roads and public areas. The Contractor shall employ either directly or through a sub-contractor a suitably qualified Temporary Traffic Management (TTM) designer to design and/ or implement the Construction Stage Traffic Management Plan, which will fulfil these requirements, particularly in relation to road opening licenses, consultation with Cork County Council, DAFM, Gardaí, private Bus operators, public relations and notifications, general traffic management, and provisions for pedestrians.

The plan shall be prepared (and reviewed as required) by a competent Designer (TTM) with experience in traffic management and road construction or civil engineering works and having regard to the nature and complexity of the Works. As a minimum, the Designer (TTM) shall hold an accredited Level 7 Engineering Qualification, shall have a minimum of 5 years post graduate experience in an engineering role and shall have a Certified qualification in Temporary Traffic Management Design i.e. have successfully completed the LASNTG Temporary Traffic Management Design Course (Levels 1 – 4) or an approved equivalent.

The Construction Stage Traffic Management Plan shall be developed in accordance with the current published version of the following documents:

- Temporary Traffic Management Design Guidance (Department of Transport, Tourism and Sport 2019),
- Temporary Traffic Management Operations Guidance (Department of Transport, Tourism and Sport 2019),
- Traffic Signs Manual, Chapter 8 – Temporary Traffic Measures and Signs for Road Works (Department of Transport, Tourism and Sport 2019),
- Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads (Department of Transport, Tourism and Sport, Second Edition (Rev 1) April 2017)
- Specification for the Reinstatement of Openings in National Roads (TII, Issue 2 2013)
- Guidelines for Working on Roads (HSA, 2008).

A Temporary Traffic Operations Supervisor (TTOS) appointed by the Contractor shall be responsible for the implementation of the plan. The TTOS shall carry out site inductions and routine inspection of traffic arrangements and assess whether or not the Site is operating within the traffic management parameters

specified in the plan. Inspections shall be documented. Completed inspection sheets (including providing details of traffic accidents, dangerous occurrences, and corrective actions) shall be submitted to the PSCS and Employer's personnel on site at the end of each working day. No work shall take place without the presence of a suitably qualified TTOS.

In addition, the Contractor shall maintain the requisite number of accredited personnel within his workforce with their site activities related to their relevant accreditation. The Contractor must nominate an appropriately trained and accredited (CSCS, or equivalent) Signing, Lighting and Guarding gang member, where required, to be responsible for the installation, modification, maintenance, and removal of appropriate traffic management arrangements at all times. STOP/GO arrangements require that operatives have a CSCS Card for Signing, Lighting and Guarding.

A communications plan is to be agreed in advance by the Contractor with the Employer's Representative, DAFM and Cork County Council. The Contractor shall make allowance for providing ongoing information on traffic management arrangements were required to AA Road Watch, through public notices in local papers, website updates, local radio notices etc.

The Contractor shall also note the requirements of the Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads in respect of notifications to businesses where works are due to continue outside the normal working hours.

The Contractor shall, after consultation with Cork County Council, DAFM, and any other statutory or other authorities concerned Submit in writing to the Employer's Representative for his approval a programme showing the scheme of traffic management he proposes before commencing any work which affects the use of a public road and thereafter furnish such further details as the Employer's Representative may require. Particular details shall be given to lane closures, road closures and associated diversions that may be required.

Where works are proposed on public roads, Temporary Traffic Management Plans will have to be submitted with all Road Opening Licence applications and will be subject to approval by Cork County Council. Road Opening Licence applications will be through the MapRoad Licencing (MRL) System. The Contractor will be required to apply for multiple T2 and T5 Licences in accordance with the requirements of the Guidelines for Managing Openings in Public Roads: Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads (DTTAS, Second Edition (Rev 1) April 2017).

Road closures will not be permitted for Dinish Bridge. One lane of traffic must be maintained at all times. Pedestrian access must be maintained at all times.

The Contractor shall ensure minimum disruption to vehicular and pedestrian traffic, in accordance with Local Authority Road opening/road closure licences.

The Contractor shall not commence any work, which affects a public road until all necessary traffic safety measures are fully operational.

6.2 UTILITIES AND 3RD PARTY PROVIDERS

The Contractor must comply with any requirements and / or specification related to each individual utility provider and 3rd Party providers.

6.3 PUBLIC LIGHTING DESIGN

The Contractor shall make provision for the removal of existing lighting columns over Dinish Bridge and for the design, supply and installation of all public lighting as described in Appendix 13/1.

The designer and manufacturer of lighting columns and brackets proposed by the Contractor shall demonstrate adequate quality procedures and controls.

The Contractor shall where required provide designs for:

- anchorages and attachment systems for columns with flange plates to foundation or bridge deck;
- foundations for columns with flange plates as described in Appendix 13/1.

Temporary lighting shall be provided in accordance with Clause 1405 where required by Appendix 1/17, or by the Contractor in the execution of the Works.

6.4 TEMPORARY WORKS DESIGN

The Contractor is to allow for all measures required to maintain the safety of all people engaged in the Works, and of the public throughout the contract. The Traffic Management must protect and prevent vehicles and pedestrians from falling into the water and onto adjoining lands. The encapsulation system must protect and prevent all debris and materials from falling into the water and onto adjoining lands. Full details of protective measures to address the escape of debris from the works area are to be submitted to the Employers Representative for Acceptance.

The Contractor is to allow for all measures required where works are to be undertaken over / adjacent to tidal water where access is restricted. Prior to commencement, the Contractor shall submit method statements, risk assessments, temporary works proposals, rescue arrangements, and a pollution prevention plan for acceptance.

7 SPECIALISTS

7.1 DESIGNS TO BE PREPARED AND / OR WORKS TO BE UNDERTAKEN BY SPECIALISTS

The following are deemed to be elements of works for which the Contractor must propose a Specialist Designer:

- Traffic Management.
- All Site Hoarding.
- All Temporary Works
- Parapet Railing and safety barriers
- Public Lighting

7.2 NOVATED SPECIALISTS INCLUDING DETAILS OF THE ORIGINAL APPOINTMENT AND FORM OF NOVATION AGREEMENT

None known at time of tender.

8 RESTRICTIONS & OBLIGATIONS

8.1 LIMITATION ON WORKING HOURS

The normal working hours within the site shall be Monday to Friday between 08.00 hours and 18.00 hours.

Mon to Friday	08:00 to 18:00
Saturday	08:00 to 16:00
Sunday	Restricted Working

- Works outside of normal hours or during restricted period are subject to prior notice and agreement by the Employer and Stakeholders.
- No working permitted on Sundays or Bank Holidays no working unless with the prior agreement of DAFM and Employer's Representative
- Access and Egress must be maintained to all businesses throughout the duration of the works. The Contractor must obtain written agreement from each owner/occupier prior to restricting access to that premises.
- Agreement required from Employer's Representative, DAFM, Local Authority and An Garda Síochána where relevant prior to any relaxation of working hours.
- All Traffic Management to be in accordance with "Chapter 8 of the Traffic Signals Manual 2019, or current version at execution of the Contract.
- The restrictions on the timing of roadworks on the bridge will be subject to agreement of DAFM.
- The Contractor may be required to carry out traffic management works outside the site boundary in order to comply with the requirements of DAFM, Local Authority and the Employers Representative.
- The Contractor may be required to cease work in the event that the security level within the harbour is raised in accordance with International Ship and Port Facility Security Code.

8.2 HOARDINGS, FENCES, SCREENS, TEMPORARY ROOFS, ADVERTISING RIGHTS.

The Contractor is to allow for all measures required to maintain the safety of all people engaged in the Works, and of the public throughout the contract. The Traffic Management must protect and prevent vehicles and pedestrians from falling into the water and onto adjoining lands. The encapsulation system must protect and prevent all debris and materials from falling into the water and onto adjoining lands. Full details of protective measures to address the escape of debris from the works area are to be submitted to the Employers Representative for Acceptance.

8.3 MAINTENANCE AND PROTECTION OF EXISTING SERVICES ON, UNDER OR OVER THE SITE

The Contractor is required and deemed to have accepted responsibility for the maintenance and protection of existing utility services.

The Contractor will not damage or cause any interference including but without limitation, gas, drainage, electronic, electromagnetic or otherwise with or to any telecommunications services or signals that may be transmitted by or through the cabling or any services passing through the Utilities.

The Contractor shall at all times comply with the requirements of the owners of the Utilities ("the Service Providers") in the carrying out of the Works insofar as the same shall or may affect the Utility Services. The Contractor shall inform the Employer Representative of any conditions imposed by the Service Providers relating to the Utilities affected by the Works. For the avoidance of doubt the Contractor shall be responsible for the establishment and maintenance of appropriate communication with appropriate personnel of the Service Providers.

The Contractor is to take into account the risks posed by the existence of the Utility Services in establishing the Contract Sum.

The Contractor shall comply at all times with the provisions of all statutory enactments, rules, orders and regulations for the time being in force relating to or affecting the Cabling and/ the Utilities and with the requirements of any statutory, local or other relevant authority and with any notice, order or proceedings that may be issued or served by any such authority and/or the Service Providers in relation to the Cabling and/or the Utilities.

The Contractor shall as part of the Works Requirements provide for Service Providers their workmen, contractors, sub-contractors and agent's access to the Site for the purposes of installation, inspection, maintenance, repair, upgrading and renewal as the case may be of the Cabling and/or the Utilities.

The Contractor shall as part of the Works Requirements Consult and liaison with DAFM, the relevant Local Authority, Public or Private Utility Undertakers, Service Provider, or Private Owners and other Contractors as necessary, particularly in respect of the timings or phasing of the Works and furnishing such details as the Works may require.

The Contractor shall as part of the Works Requirements provide for restrictions of and hindrances to the Works arising from the requirements and activities of DAFM, Local Authority, Public or Private Utility Undertakers, Service Provider, or Private Owners and other Contractors.

The Contractor shall as part of the Works Requirements provide for restrictions of and hindrance to the Works arising from the activities of other Contractors who are engaged in alteration, renewals, provisions for future requirements or other Works authorized by the Clients Representatives in respect of the Services or

Undertakings belonging to DAFM, Local Authority, Public or Private Utility Undertakers, Service Provider, or Private Owner either on or in the vicinity of the site.

The Contractor shall as part of the Works Requirements provide for ascertainment of and compliance with all requirements of DAFM, Local Authority, Public or Private Utility Undertakers or Private Owners, Service Provider in respect of Accommodation Works involving or affecting their services or Undertakings.

The Contractor shall as part of the Works Requirements provide for all losses arising from the activities of DAFM, Local Authority, Public or Private Utility Undertakers or Private Owners, Service Provider, and other Contractors.

The Contractor shall as part of the Works Requirements provide for excavations to ascertain the locations of underground services including excavations by hand and provision of working space.

The Contractor shall as part of the Works Requirements provide for compliance with the relevant Clauses of the Conditions of Contract.

The Contractor shall as part of the Works Requirements provide for attendance including working outside of normal working hours, lighting, traffic control, signing and backfilling with approved materials for DAFM, Local Authority, Public or Private Utility Undertakers or Private Owners, Service Provider, and other Contractors.

The Contractor shall as part of the Works Requirements provide for support and protection of ducts, pipes, cables, and other apparatus during the progress of the Works.

The Contractor shall as part of the Works Requirements provide for taking measures to ensure that no existing services are interrupted without the written consent of DAFM, Local Authority, Public or Private Utility Undertakers, Service Provider, or Private Owners.

The Contractor shall as part of the Works Requirements provide for awaiting the Employers Representatives consent to proposals.

The Contractor shall as part of the Works Requirements provide for restrictions and hindrances to the Works from the activities of other Contractors of the Employer including the activities for water connections, traffic and public light installation, plantings and other landscape works to be carried out by DAFM, Local Authority and their agents.

The Contractor shall as part of the Works Requirements provide for keeping the Employers Representatives informed of arrangements made with the owners of public and privately owned services.

The Contractor shall as part of the Works Requirements provide for the provision of reinforced concrete protection to all exposed service utility duct or pipe in accordance with CC-SCD-02751.

8.4 EXECUTION OF WORKS IN A SPECIFIC ORDER

The works must be programmed and executed in accordance with the timeframe set out in the Form of Tender and Schedules and the limitations as set out in the contract documents and the Works Requirements as a whole.

8.5 ROAD CLOSURE RESTRICTIONS, ALTERNATIVE ROUTE RESTRICTIONS

The Contractor is advised that Road Closures are not permitted for this project. One lane of traffic must be maintained at all times. Pedestrian access must be maintained at all times. All Temporary Traffic management shall be in accordance with "Chapter 8 of the Traffic Signs Manual 2019, or current version at execution of the Contract, as produced by the Department of Transport and shall be subject to agreement with DAFM and the local Authority. The Contractor's will be required to provide for Stage II and Stage III Road Safety Audits for all Temporary Traffic Management Schemes proposed by the Contractor.

The Contractor must provide and maintain a means of access across the structure for both pedestrian and vehicular movements and 24-hour Emergency through access is required through the works during the contract period.

Notwithstanding any restriction on working hours the contract shall maintain one lane of traffic through all sections of work, unless expressly agreed by the Statutory Authority and the Employers Representative.

8.6 ANY OTHER OBLIGATIONS OR RESTRICTIONS

- The contractor is responsible for providing adequate resource to safely execute and secure the Works.
- A 24-hour emergency contact number must be provided and maintained by the Contractor.
- The Contractor must provide and maintain a means of access for both pedestrian and cyclists where access to the road bridge is impacted by the works.
- Where access/egress is restricted, suitable signage is to be provided by the Contractor. Signage should indicate alternative routes, Working Hours, and Contact details. Sign to be a minimum of 1.5m high by 1.5m deep with 150 mm high lettering.
- 24-hour Emergency through access is required through the works during the contract period.
- The contractor shall limit all non-necessary site activities such as contractor's vehicles and equipment to that specifically required to execute the works.
- Contractor to take sufficient measures to eliminate or minimize the risk of rodent infestation within the site boundary.
- Cleanliness of roads/ footpaths – All approach roads/ footpaths (including any temporary access roads) to the site must be kept clear at all times of all dirt and debris accruing from vehicles coming to or returning from the site or originating in any other way from the site. Make provisions for wheel and undercarriage washing adjacent to site exits and approach roads. The contractor must maintain and make good damage

to any roads, footpaths, services etc. caused by or attributable in any way to the delivery or removal of personnel, plant, materials or the like to the site or as a result of the execution of the works.

- No debris from any part of the works can enter the water.
- Drilling or dowelling into the precast beams into the precast beams of the deck is not permitted.

9 HEALTH AND SAFETY

9.1 APPOINTMENT OF PROJECT SUPERVISOR FOR THE CONSTRUCTION STAGE

As part of the works the Contractor is deemed to have accepted the appointment of the role of Project Supervisor for the Construction Stage and that the cost of this role is included within the tender value of the works.

Prior to the issue of substantial completion, the Contractor must provide all information required for a completed Safety File incorporating a full set of as built drawings (both pdf and AutoCAD Civil 3d) to the approval of the Employers Representative.

10 CONTRACT

Note: All Model Forms are deemed to be included in the Contract

10.1 FORM OF PERFORMANCE BOND

Not applicable for this scheme.

10.2 FORM OF PARENT COMPANY GUARANTEE

To be provided where applicable.

10.3 FORM OF APPOINTMENT OF CONTRACTOR AS PROJECT SUPERVISOR CONSTRUCTION STAGE (PSCS)

To be completed by the successful tenderer prior to commencement of Works.

10.4 CERTIFICATE IN RESPECT OF PROFESSIONAL INDEMNITY INSURANCE

To be provided where applicable and in accordance with the Conditions of Contract.

10.5 OWNER CONTROLLED INSURANCE

To be provided where applicable and in accordance with the Conditions of Contract.

10.6 CERTIFICATE IN RESPECT OF PAY AND CONDITIONS OF EMPLOYMENT

To be completed by successful Tender prior to commencement of works in accordance with Conditions of Contract and submitted with each valuation.

10.7 FORM OF COLLATERAL WARRANTY

To be provided where applicable and in accordance with the Conditions of Contract.

10.8 FORM OF BOND FOR PAYMENT IN RESPECT OF MATERIALS OFF-SITE

To be provided where applicable and in accordance with the Conditions of Contract.

10.9 TERMS OF APPOINTMENT OF CONCILIATOR

In accordance with the Conditions of Contract.

10.10 FORM OF CONCILIATION PAYMENT BOND

In accordance with the Conditions of Contract.

10.11 ARBITRATION RULES

In accordance with the Conditions of Contract.

11 CONTRACTORS DOCUMENTS TO BE PROVIDED

The following documents need to be provided by the Contractor during the Construction Period:

- Project Programme indicating phasing, critical path and key delivery dates.
- Traffic Management Plan(s).
- Stakeholder Liaison and Communication Plan.
- Methodology & Method Statements for carrying out the works.
- Methodology & Method Statements for maintenance of existing services, traffic signals and public lighting during the course of the works.
- Health & Safety Management Procedures.
- Key Personnel & Contact Details.
- Quality Management Procedures.
- Proposed Specialist/Subcontractors.
- Construction and Demolition Waste Management Plan.
- Construction Safety & Health Plan.
- Temporary Works Designs.

12REPORTING

The following documents need to be provided by the Contractor during the Construction Period:

- The Contractor's Public Liaison Officer must liaise with all relevant businesses and premises and provide regular updates to both businesses and Employer's Representative.
- Contractors Liaison Officer to attend progress meetings for review progress of project and upcoming works.
- All correspondence to be provided in both written and digital format.
- Contractor to provide on a weekly basis to the Employers Representative a 2 week look ahead program which should indicate main areas of works, specialist activities and works required outside of normal working hours.
- Bi-weekly site meetings and minutes.
- Monthly progress meetings including report from Contractor including progress to date, monthly programme, resources on site, payments & valuations, change orders, health & safety etc.
- Information supplied digitally to be Windows based and compatible with Office 2010, Acrobat Adobe 8.0, and or Microsoft Project 2013.
- As built drawings to be provided on AutoCAD 2018 or later format.
- As built to include x,y,z coordinates of all buried services, intersections, manholes kerb lines, road surface and sub surface features, major and minor features, connection and or termination points, road markings, fixtures and fitting, street furniture or any other element as directed by the Employer's Representative.
- The Contractor is to provide safety statistics in the following format within the monthly progress report:
 - Name of Project:
 - Date:
 - Date of Commencement of Project:

	Month	Total
No. of Reportable Accidents to HSA		
No. of 1st Aid Incidents		
No. Lost Time Incidents		
No. of Dangerous Occurrences		
No. of Environmental Incidents		
Accident Frequency Rate		

13QA AND TESTING (NOT ALREADY IN SPECIFICATION APPENDICES APPENDIX 1/5)

- Testing should be carried out in accordance with the manufacturer's minimum requirements and Appendix 1/5 of the Specification of Works Requirement Volume A Part A.
- Samples should be provided in accordance with Appendix 1/6 of the Specification of Works Requirement Volume A Part A.
- Additional testing and sampling in respects of cleaning and painting is outlined in Appendices 19/1 to 19/8 inclusive of the Specification of Works Requirement Volume A Part A.



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Section 2:

Appendices to the Specification

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PREAMBLE TO THE SPECIFICATION

1. The Specification referred to in the Contract shall be the TII 'Specification for Works', published by Transport Infrastructure Ireland on the TII Publications website (<http://tiipublications.ie/>) on the date 10 working days prior to the tender returns date or, if applicable, the extended tender returns date and incorporating all amendments current on that date and as extended by the following:-
 - (i) Appendix 0/1: Contract-specific Additional, Substitute and Cancelled Clauses, Tables and Figures;
 - (ii) Appendix 0/2: Contract-specific minor alterations to existing Clauses, Tables and Figures;
 - (iii) The Numbered Appendices listed in Appendix 0/3;
 - (iv) Appendix 0/4 containing a list of the drawings referred to in the Specification.
2. An Additional Clause as indicated by a suffix 'AR' in Appendix 0/1 is a Contract-specific alteration.
3. A Substitute Clause as indicated by a suffix 'SR' in Appendix 0/1 is a Contract-specific alteration.
4. A Cancelled Clause indicated by a suffix 'CR' in Appendix 0/1 is a Contract-specific alteration.
5. Insofar as any of the Numbered Appendices may conflict or be inconsistent with any provision of the Specification for Works the Numbered Appendices shall always prevail.
6. Any reference in the Contract to a Clause number or Appendix shall be deemed to refer to the corresponding Substitute Clause number or Appendix listed in Appendix 0/1 or 0/2.
7. Where a Clause is altered, any original Table/Figure referred to in the Clause shall apply unless the Table/Figure is also altered. Where a Table/Figure is altered, any reference in a Clause to the original Table/Figure shall apply to the altered Table/Figure.
8. Where a Clause in the Specification relates to work goods or materials that are not required for the Works it shall be deemed not to apply.
9. Any Appendix referred to in the Specification that is not used shall be deemed not to apply.
10. References in the Specification to "TII Standard Construction Details" shall be taken to refer to "Standard Construction Details" as published by Transport Infrastructure Ireland on the TII Publications website (<http://Tiiipublications.ie/>) current on the date 10 working days prior to the tender returns date or, if applicable, the extended tender returns date.
11. Throughout the Specification and Appendices to the Specification, the following interpretations shall apply:

- i. “Base Course” shall mean “Binder Course”
- ii. “Roadbase” shall mean “Base”
- iii. “Wearing Course” shall mean “Surface Course”
- iv. “UK Department of Transport” shall mean the UK’s “National Highways”.

12. Any reference to the “Engineer” within the Works Requirements or any of the other Contractor Documents or Drawings shall mean “Employer’s Representative.”

APPENDIX 0/1: Contract-Specific Additional, Substitute and Cancelled Clauses, Tables and Figures Included in Contract

(i) List of Additional Clauses, Tables and Figures

Clause No.	Title
112.4 AR	Setting Out
115.2AR	Accommodation Works
115.4AR	Accommodation Works
116.6 AR	Privately and Publicly Owned Services or Supplies
116.7 AR	Privately and Publicly Owned Services or Supplies
116.8 AR	Privately and Publicly Owned Services or Supplies
116.9 AR	Privately and Publicly Owned Services or Supplies
116.10 AR	Privately and Publicly Owner Services or Supplies - Support of Existing Structures and Services
117.20AR	Traffic Safety and Management
117.21AR	Traffic Safety and Management
117.22AR	Traffic Safety and Management
117.23AR	Traffic Safety and Management
117.24AR	Traffic Safety and Management
117.25AR	Traffic Safety and Management
117.26AR	Traffic Safety and Management
117.27AR	Traffic Safety and Management
117.28AR	Traffic Safety and Management
126.4 AR	Damage to Roadways
137 AR	Supply of Information for the Safety File
142.1 AR	Materials and Quality
142.2 AR	Materials and Quality
142.3 AR	Materials and Quality
143 AR	Disposal of Surplus Material and Demolition Rubble
144AR	Wheel Washing Facilities
145AR	Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction
170AR	Control of Dust

170.1AR	Control of Dust
170.2AR	Control of Dust
171AR	Protection of Watercourses from Pollution
171.1AR	Protection of Watercourses from Pollution
171.2AR	Protection of Watercourses from Pollution
172AR	Protection of Existing Works and Amenities
172.1AR	Protection of Existing Works and Amenities
173AR	Cleanliness on Completion
173.1AR	Cleanliness on Completion
173.2AR	Cleanliness on Completion
175 AR	Records
175.1 AR	Records – Record as Built Drawings
175.2 AR	Records – Manufacturer's Instructions, Catalogues
571 AR	Lowering of Existing Service Ducts or Cables
571.1 AR	Lowering of Existing Service Ducts or Cables
1202.10AR	General Requirements for Permanent Traffic Signs
1470AR	Inspection and Testing to be carried out by the Contractor – Photometric Testing
1470.1AR	Inspection and Testing to be carried out by the Contractor – Photometric Testing

(ii) Additional Clauses, Tables and Figures

Clause No.	Title and Written Text
112.4 AR	Setting Out Notwithstanding the requirements of clause 7.7 of the Conditions, the Contractor shall survey all tie-in sections of existing roads and drainage systems and submit the levels to the Employer's Representative prior to construction. The Contractor shall also survey and record existing details of items which he is required to remove and subsequently replace. The level of survey information to be recorded is described in Appendix 1/12.
115.2AR	Accommodation Works All agreements made by the Contractor with landowners or occupiers shall be confirmed to the Employers Representative in writing.
115.4AR	Accommodation Works The Contractor shall be aware that all landowner Accommodation Works are identified in this Contract as specified in Appendix 1/15 of the Specification. The Contract shall be deemed to include for putting all instructed Accommodation Works arrangements in place. The Contractor shall confirm pre-entry requirements with each individual landowner in writing and inform the Employers Representative.
116.6 AR	Privately and Publicly Owner Services or Supplies Before commencing any excavation, the Contractor shall notify all relevant authorities including, DAFM, Local Authority, ESB, Telephone Utility Companies, Gas Company, etc. so that all available information regarding the location of underground services and working restrictions imposed by same is ascertained prior to such excavation.
116.7 AR	Privately and Publicly Owner Services or Supplies No interference with the services of DAFM, the Local Authority or any other utility bodies shall be carried out without the prior notification and approval of these bodies.
116.8 AR	Privately and Publicly Owner Services or Supplies The Contractor shall consult the responsible authorities before commencing excavation about the position and type of underground service, including all drainage and water mains likely to be encountered. It remains the Contractors responsibility to accurately locate all services on site by means of tracing equipment and trial holes. For the purposes of this Clause the Contractor shall provide in his initial Contract Sum for pipe and cable detection equipment for his own use on site. Electricity cables must be located using cable detection equipment and the Contractor shall not assume cables are located at a minimum depth.

116.9 AR	Privately and Publicly Owner Services or Supplies Overhead services are present within the site of the Works. It shall be deemed that the Contractor has made note of these overhead services during his inspection of the site and made due allowance for all temporary diversions necessary for construction of the Works.
116.10 AR	<i>Privately and Publicly Owner Services or Supplies</i> Support of Existing Structures and Services The Contractor shall be responsible for maintaining all sewers, drains, pipes, cables, other services and structures encountered in excavations. All services shall be temporarily supported or diverted during the construction of the Works and subsequently shall be amended, altered or remade to the reasonable satisfaction of the Employer's Representative and the person, company or authority in whom they are vested.
116.11 AR	<i>Privately and Publicly Owner Services or Supplies</i> Gas Networks Ireland Pipelines Where excavation or construction work is to be carried out in the vicinity of Gas Networks Ireland Pipelines, the Contractor shall apply, at least two weeks in advance of the works, for a Permit under the Gas Networks Ireland Permit to Work/Excavation Permit system. All works in the vicinity of Gas Networks Ireland Transmission Pipelines are to be carried out in accordance with the following document 'Code of Practice for Working in the Vicinity of Transmission Pipelines' which is available from Gas Networks Ireland.
117.20AR	Traffic Safety and Management Where required in Appendix 1/17, the Contractor shall provide, erect, maintain and remove Driver Information Signs and temporary variable message signs in accordance with sub-clauses 21 to 26 of this clause.
117.21AR	Traffic Safety and Management Sign face layouts shall be in accordance with Chapter 8 of the Department of the Transport Traffic Signs Manual (2019). Variable message sign messages shall be provided at locations agreed by the roads authority and the Employers Representative.
117.22AR	Traffic Safety and Management The Driver Information Signs shall be located within road works when part of the road is coned off, for any length of time.
117.23AR	Traffic Safety and Management Signs located within road works shall only be used where they can be located in advance of a taper and in a position which does not prejudice traffic safety.
117.24AR	Traffic Safety and Management

	Driver information signs shall be sited at the beginning and end of the works. They shall not be placed where they may distract drivers negotiating traffic management provisions.
117.25AR	Traffic Safety and Management The Contractor shall provide adequate storage facilities clear of any safety zone.
117.26AR	Traffic Safety and Management Information signs shall only be displayed within road works where they accurately reflect the reason for the traffic restrictions.
117.27AR	Traffic Safety and Management All necessary traffic safety precautions shall be taken by the Contractor to ensure the safety of all traffic and pedestrians using the existing roads adjacent to the Site and connecting minor roads during the execution and completion of the Works, and all precautions shall be taken to minimise disruption to the local residents.
117.28AR	Traffic Safety and Management The Contractor shall ensure that no item of plant, goods or equipment (including stores or offices) shall be placed or parked on the public roadway or its verges in a manner which shall / may result in danger to the personnel on the Site or members of the public, or which shall / may restrict sight distances on all accesses to the Site or on public roads.
126.4 AR	Damage to Roadways All roads, accesses, drains, ditches and grips shall be kept clear of all dirt, mud and material arising from the execution and completion of the Works and suitable clearing equipment and labour shall be provided by the Contractor for this purpose. Particular attention shall be paid to the loading of lorries carrying bulk materials into the Site and spoil from the Site to ensure that these shall not be overloaded or loaded in such a way that spillage shall be unavoidable. Any dirt or mud adhering to the tyres or chassis of any vehicles shall be thoroughly cleaned off before the vehicle shall be permitted to leave the Site. In the case of delivery to the Site, vehicles shall be thoroughly cleaned before they leave the point of collection. The Contractor shall be equally responsible for the vehicles of his sub-contractors and suppliers and the like.
137AR	Supply of Information for the Safety File The Contractor shall maintain throughout the duration of the contract composite record drawings to show details of all structural and civil works constructed including but not limited to Earthworks, Structures, Structural Elements, Other Features Designed by the Contractor and As-Built Utility Information. Prior to the proposed Date of Substantial Completion of the Whole of the Works, the Contractor shall prepare and submit to the Employer, a Safety File including a

	complete set of As-Built Drawings in both hard and soft-copy formats in accordance with Appendix 1/31. Similar provision applies to Substantial Completion for Part of the Works, or equivalent, where such applies.
142.2 AR	Materials and Quality All works and materials required under the Contract shall be in compliance with the requirements of this Specification and the Standards referred to therein. Any material or product used in the work for which compliance with a Standard is specified shall be certified as complying with that Standard by the National Standards Authority of Ireland. Any material or product for which compliance with an Irish Standard Specification is specified shall be certified as complying with that Irish Standard Specification and shall bear the Irish Standard Mark. Nothing in this Clause prevents the use of a material or product that is certified to an International Standard of a National Standard of another member State of the European Community which provides an equivalent guarantee of safety and suitability to that required in this Specification and the Standards referred to therein - certification to be by the National Standards Authority of Ireland. Manufacturers or suppliers' certificates of compliance with the Standard shall be provided when requested by the Employer's representative. With regard to the list of suppliers required under Clause 105 the Contractor shall obtain and submit to the Employer all those certificates specified in the relevant Standards and satisfy the Employer that they relate to the materials being delivered to the works. Compliance with this Clause does not relieve the Contractor from any of his obligations under the Contract.
142.3 AR	Materials and Quality In every case where, in the Specification, materials of special design or manufacture, patented or otherwise, are described, or the names of manufacturers or agents are given, it is to be clearly understood that such references are only inserted for the guidance of Tenderers with regard to the nature and quality of the articles and services required, which must, in all cases, be subject to the approval of the Engineer.
143AR	Disposal of Surplus Soil and Demolition Rubble The materials to be disposed off site are classified as "wastes" and are subject to the provisions of the "Waste Management Act" 1996. The facilities at which such materials are discarded must have a waste licence from the EPA or where the EPA decides, must have a waste permit from the Local Authority.
144AR	Wheel Washing Facilities The Contractor shall allow for the installation and maintenance of an automatic wheel- washing unit on the entrance to the site, this must be available for use at all

	times. Maintenance will include for cleaning out of the equipment and disposal of any material gathered within. The Contractor must ensure that the required equipment for supplying water and power to the wheel washing facility are available and in good working order. At the end of the Contract, the Contractor must remove the wheel washing facilities in total from site.
145AR	Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction All aggregates proposed for use on this scheme shall meet fully the requirements of the Contract Specification and in addition the requirements of Standard Recommendation S.R. 21:2014 Guidance on the use of I.S. EN 13242:2002 +A1:2007 – Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction. The Contractor shall provide certification from the supply quarry in the first instance and provide follow up test samples of all materials placed within the works.
170AR	Control of Dust
170.1AR	Control of Dust The Contractor shall take all necessary steps to control dust caused by construction traffic to the satisfaction of the Employers Representative.
170.2AR	Control of Dust This shall include measures such as: Wetting of haul road and storage areas; Covering or dousing of any dry, imported or excavated material; Reducing the duration for stockpiling in fill materials; Introduction of a wheel wash for construction traffic. Work methods during the cutting of granite and concrete paving
171AR	Protection of Watercourses from Pollution
171.1AR	Protection of Watercourses from Pollution The Contractor shall ensure that waste products of whatever description associated with the execution and completion of the Works shall not enter watercourses, whether dry or not, which are adjacent to the execution and completion of the Works.
171.2AR	Protection of Watercourses from Pollution The Contractor shall consult and comply with the requirements of relevant authorities in relation to measures to be implemented for the protection of watercourses from pollution in the execution and completion of the Works.
172AR	Protection of Existing Works and Amenities
172.1AR	Protection of Existing Works and Amenities

	Prior to the commencement of the execution of the Works, the Contractor shall provide to the Employers Representative complete records (photographic or otherwise) of existing structures and other properties that shall or may be affected by the execution and completion of the Works.
173AR	Cleanliness on Completion
173.1AR	Cleanliness on Completion On completion of the Works, the Contractor shall leave the Site and any adjoining property affected by his activities, in a neat and tidy condition to the satisfaction of the Employers Representative. Carriageway and footway surfaces shall be thoroughly swept and freed from mud and loose chippings. Boundary walls, fences and adjacent properties shall be cleaned of any splashing or dirt which may be attributed to the execution and completion of the Works, and paintwork shall be repaired to the satisfaction of the Employers Representative where it has been damaged due to the Contractor's activities.
173.2AR	Cleanliness on Completion Notwithstanding any other provisions of the Contract, any of the Contractor's rubbish, debris, litter, equipment, tools and implements and the like deposited on adjoining property during this Contract shall be removed and the property reinstated as necessary.
175	Records
175.1AR	<i>Records</i> Record As Built Drawings The Contractor shall be required to provide as-built records drawings for the project upon completion of the Works as detailed in Appendix 1/31.
175.2 AR	<i>Records</i> Manufacturer's Instructions, Catalogues The Contractor shall supply to the Employer's Representative the following items, prior to incorporation into the works; Details of all proprietary current manufacturer's instructions and explanatory brochures to be used on the project. Test results and certificates for all items and investigations whether the tests or investigations are carried out on Site or off Site. Operating instruction for items. References for all materials and processes used in the works. References shall include origin, comprehensive description, manufacturer, supplier, copies of relevant parts of standards and specification and any other information necessary to reproduce the item.

(iii) List of Substitute Clauses

Clause / Table / Figure No.	Title
101.1 SR	Accommodation and Equipment for the Employers Representative
101.2 SR	Accommodation and Equipment for the Employers Representative
101.4 SR	Accommodation and Equipment for the Employers Representative
101.6 SR	Accommodation and Equipment for the Employers Representative
102.1 SR	Vehicles for the Employer's Personnel
103.1 SR	Communication System for the Employers Representative
104.3 SR	Standards, Quality Assurance Schemes, Agrément Certificates and Other Approvals Quality Assurance Schemes
104.5 SR	Irish Agrément Board Roads and Bridges Certificates
104.8 SR	Provision of Information
104.9 SR	Provision of Information
104.10 SR	Provision of Information
105.1 SR	Goods, Materials, Sampling and Testing Goods and Materials
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105.6 SR	Sampling and Testing
105.7 SR	Sampling and Testing
106.2 SR	Design of Permanent Works by the Contractor Structures
106.3 SR	Structures
106.4 SR	Structural Elements and Other Features
108.1 SR	Operatives for the Employers Representative
108.3 SR	Operatives for the Employers Representative
110.1 SR	Information Boards
111.1 SR	Existing Ground Levels
112.1 SR	Setting Out
112.2 SR	Setting Out
113.1 SR	Programme of Works
114.1 SR	Payment Statements
115.1 SR	Accommodation Works
116.2 SR	Public and Privately Owned Services or Supplies
116.3 SR	Public and Privately Owned Services or Supplies
116.4 SR	Public and Privately Owned Services or Supplies

Clause / Table / Figure No.	Title
116.5 SR	Public and Privately Owned Services or Supplies
117.3 SR	Traffic Safety and Management
117.5 SR	Traffic Safety and Management
117.6 SR	Traffic Safety and Management
117.7 SR	Traffic Safety and Management
117.8SR	Traffic Safety and Management
117.9 SR	Traffic Safety and Management
117.10 SR	Traffic Safety and Management
117.11 SR	Traffic Safety and Management
117.12 SR	Traffic Safety and Management
117.13 SR	Traffic Safety and Management
117.15 SR	Traffic Safety and Management
117.16 SR	Traffic Safety and Management
117.18 SR	Traffic Safety and Management
117.19 SR	Traffic Safety and Management
118.2SR	Temporary Diversions for Traffic
118.3 SR	Temporary Diversions for Traffic Specified by the Employers Representative
118.4 SR	Temporary Diversions for Traffic Proposed by the Contractor
118.5 SR	Temporary Diversions for Traffic Proposed by the Contractor
118.6 SR	Temporary Diversions for Traffic Proposed by the Contractor
118.7 SR	Temporary Diversions for Traffic Proposed by the Contractor
118.8SR	Temporary Diversions for Traffic Proposed by the Contractor
122.1 SR	Progress Photographs
122.3 SR	Progress Photographs
123.1 SR	Ionising Radiations
123.2 SR	Ionising Radiations
123.3 SR	Ionising Radiations
123.5 SR	Ionising Radiations
124.2 SR	Substances Hazardous to Health
124.3 SR	Substances Hazardous to Health
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124.6 SR	Substances Hazardous to Health
124.7 SR	Substances Hazardous to Health
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126.1 SR	Damage to Roadways

Clause / Table / Figure No.	Title
126.2 SR	Damage to Roadways
126.3 SR	Damage to Roadways
127.1 SR	Safety
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128.1 SR	Liaison Officer
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601.1 SR	Classification, Definitions and Uses of Earthworks Materials - General Classification
601.4 SR	General Classification
601.5 SR	Definitions
601.6 SR	Definitions
601.9 SR	Use of Fill Materials
601.10 SR	Use of Fill Materials
602.3 SR	General Requirements
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602.5 SR	General Requirements
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603.2 SR	Forming of Cuttings and Cutting Slopes
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609.2 SR	Geotextiles Used to Separate Earthworks Materials
609.3 SR	Geotextiles Used to Separate Earthworks Materials
609.4 SR	Geotextiles Used to Separate Earthworks Materials
609.7 SR	Geotextiles Used to Separate Earthworks Materials
610.4 SR	Fill to Structures
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611.1 SR	Fill Above Structural Concrete Foundations
612.1 SR	Compaction of Fills - General
612.6 SR	Method Compaction
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612.14 SR	End-product Compaction
612.15 SR	End-product Compaction
613.6 SR	Sub-formation and Capping
616.4 SR	Preparation and Surface Treatment of Formation
616.5 SR	Preparation and Surface Treatment of Formation
617.3 SR	Use of Sub-formation or Formation by Construction Plant
618.2 SR	Topsoiling, Grass Seeding and Turfing
618.3 SR	Topsoiling, Grass Seeding and Turfing
618.4 SR	Topsoiling, Grass Seeding and Turfing
618.5 SR	Topsoiling, Grass Seeding and Turfing
618.6 SR	Topsoiling, Grass Seeding and Turfing
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618.8 SR	Topsoiling, Grass Seeding and Turfing
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620.4 SR	Landscape Areas and Screening Methods
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623.10 SR	Earthworks for Corrugated Steel Buried Structures
624.1 SR	Ground Anchorages
624.2 SR	Ground Anchorages
626.4 SR	Gabions
627.1 SR	Swallow Holes and Other Naturally Occurring Cavities
627.2 SR	Swallow Holes and Other Naturally Occurring Cavities
628.1 SR	Disused Mine Workings
629.2 SR	Instrumentation and Monitoring
630.2 SR	Ground Improvement - Dynamic Compaction
630.3 SR	Dynamic Compaction
632.3 SR	Determination of Moisture Condition Value (MCV) of Earthworks Materials
633.4 SR	Determination of Undrained Shear Strength of Remoulded Cohesive Material
637.1 SR	Determination of Resistivity (rs) to Assess Corrosivity of Soil, Rock or Earthworks Materials - Method of Test
637.3 SR	In Situ Resistivity Tests
637.6 SR	In Situ Resistivity Tests
638.1 SR	Determination of Redox Potential (Eh) to Assess Corrosivity of Earthworks Materials for Reinforced Earth and Anchored Earth Structures - Method of Test
638.3 SR	In Situ Redox Potential Tests
638.4 SR	In Situ Redox Potential Tests
638.5 SR	In Situ Redox Potential Tests
639.2 SR	Determination of Coefficient of Friction and Adhesion Between Fill and Reinforcing Elements or Anchor Elements for Reinforced Earth and Anchored Earth Structures - Reinforcing Elements
642.1 SR	Determination of the Constrained Soil Modulus (M^*) of Earthworks Materials for Corrugated Steel Buried Structures - General
642.4 SR	Procedure
1201.1 SR	Definitions, Sign Classification and Regulations
1201.2 SR	Sign Classification
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1202.2 SR	General Requirements for Permanent and Traffic Signs
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1211.6 SR	Road Markings - Temporary Road Markings
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1212.3 SR	Road Studs – Reflective Road Studs
1212.7 SR	Removal and Replacement of Existing Road Studs
1212.8 SR	Removal and Replacement of Existing Road Studs
1213.4 SR	Traffic Cones, Traffic Cylinders, Flat Traffic Delineators and Other Traffic Delineators – General
1213.19 SR	General
1213.20 SR	Permanent Cones, Cylinders, FTDs and Other Delineators
1213.21 SR	Temporary Cones, Cylinders, FTDs and Other Delineators
1215.2 SR	Temporary Signs, Signals, Road Markings and Other Delineators
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1215.9 SR	Temporary Signs, Signals, Road Markings and Other Delineators
1216.3 SR	Traffic Signals – General
1217.1 SR	Detector Loops
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1218.2 SR	Pedestrian Crossings
1301.2 SR	Road Lighting Columns and Brackets – General

Clause / Table / Figure No.	Title
1301.5 SR	General
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1302.3 SR	Design of Lighting Columns, Brackets, Foundation, Anchorages and Attachment Systems
1302.4 SR	Design of Lighting Columns, Brackets, Foundation, Anchorages and Attachment Systems
1302.5 SR	Design of Lighting Columns, Brackets, Foundation, Anchorages and Attachment Systems
1302.6 SR	Aesthetic Requirements
1302.7 SR	Foundations for Planted Columns
1303.1 SR	Data Sheets
1303.2 SR	Data Sheets
1305.3 SR	Installation of Foundations, Anchorages and Attachment Systems - Planted Columns
1305.10 SR	Columns with Flange Plates
1306.3 SR	Site Tests on Anchorages in Drilled Holes
1308.1 SR	Handling, Transport and Erection
1308.4 SR	Handling, Transport and Erection
1310 SR	Amendments and Additions to BS 5649: Part 3: 1982
1313.1 SR	Laminated Glass Fibre Reinforced Plastic (GFRP) Columns - Manufacture of GFRP Laminates
1313.7 SR	Materials for GFRP Laminates
1313.8 SR	Materials for GFRP Laminates
1313.13 SR	Testing of GFRP Laminates
1314.10 SR	Brackets for Laminated GFRP Lighting Columns - Testing of Polyurethane Foam
1315.1(i) SR	Specification for Design Loads to BS 5649: Part 6 : 1982
1401.4 SR	Electrical Works for Road Lighting and Traffic Signs - General
1402.1 SR	Site Records
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1403.1 SR	Location of Lighting Units and Feeder Pillars
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1404.1 SR	Change of Lighting Arrangements
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1420.1 SR	Earthing
1420.5 SR	Earthing
1421.1 SR	Underground and Ducted Cable
1421.5 SR	Underground and Ducted Cable
1421.9 SR	Underground and Ducted Cable
1421.13 SR	Underground and Ducted Cable
1421.14 SR	Underground and Ducted Cable
1422.2 SR	Cable Joints
1422.3 SR	Cable Joints
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1424.2 SR	Inspection and Testing to be Carried Out by the Contractor
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1424.4 SR	Inspection and Testing to be Carried Out by the Contractor
1502.2 SR	Motorway Communications - General Requirements
1502.3 SR	General Requirements
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1504.1 SR	Site Records
1504.2 SR	Site Records
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1505.2 SR	Cabinets and Ancillary Items
1506.3 SR	Cables
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1506.5 SR	Cables
1507.4 SR	Cable Laying
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1507.12 SR	Cable Laying
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1507.17 SR	Cable Laying
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1508.1 SR	Installation of Cabinets and Signal Posts

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1514.1 SR	Terminal Block Connectors
1518.2 SR	Cable Testing
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1519.6 SR	Labelling and Numbering
1521.1 SR	Removal and Resiting of Existing Equipment
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1521.6 SR	Removal and Resiting of Existing Equipment
1801.1 SR	Structural Steelwork - General
2203.3 SR	Anchorage and Attachment Systems for Metal Parapets for Vehicle Containment
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2207.1 SR	Inspection and Testing of Parapet Posts
2207.2 SR	Inspection and Testing of Parapet Posts

(iv) List of Substitute Clauses

Clause / Table / Figure No.	Title
101.1 SR	Accommodation and Equipment for the Employers Representative The Contractor shall provide, maintain, service and unless otherwise described in Appendix 1/1, remove on issue of the Defects Certificate, all accommodation including contents, access roads and hard standing thereto, as described in that Appendix, for the use of the Employers Representative.
101.2 SR	Equipment, furnishings, fittings and supplies shall be located as described in Appendix 1/1. All temporary initial accommodation shall be ready for occupation on the Starting Date

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	and all other accommodation complete with contents, access roads and hard standing shall be ready for occupation and use by the Employers Representative within four weeks of the Starting Date unless otherwise stated in Appendix 1/1.
101.6 SR	All equipment supplied by the Contractor shall be of a quality and precision appropriate to its proposed use and shall be delivered in a serviceable condition. The Contractor shall maintain all such equipment in serviceable condition and replace, if necessary, any that becomes unserviceable. The Contractor shall ensure that any equipment needing periodic calibration is calibrated on delivery, annually and at other times as and when required by the Employers Representative.
103.1 SR	Communication System for the Employers Representative When required in Appendix 1/3 the Contractor shall provide a communication system for the Employers Representative as described therein, within 4 weeks of the Starting Date unless a different date for provision is required in Appendix 1/3.
104.3 SR	Standards, Quality Assurance Schemes, Agrément Certificates and Other Approvals Quality Assurance Schemes Where any work, goods or materials to be used in the Works are the subject of a quality management scheme or product certification scheme listed in Appendix 1/24 or 1/25 respectively only work, goods or materials conforming with such a scheme shall be used and the Contractor shall in each case provide to the Employers Representative a copy of the certificate of conformity affirming compliance with the scheme, unless the goods or materials bear a prescribed certification mark.
104.5 SR	Irish Agrément Board Roads and Bridges Certificates Where any work, goods or materials are required to have an Irish (or British) Agrément Board Roads and Bridges Certificate only work, goods or materials so certificated shall be used and the Contractor shall in each case provide to the Employers Representative a copy of the certificate. Types of work, goods and materials subject to such requirements are listed in Appendix 1/26.
104.8 SR	Provision of Information Unless otherwise specified, two copies of all information, including valid certificates, in respect of work, goods or materials proposed by the Contractor shall be supplied to the Employers Representative. Where the original documentation is in a language other than English, it shall be accompanied by an English translation. Information and certificates shall be supplied at least four weeks prior to the use of the work, goods or materials in the Works.
104.9 SR	When required in Appendix 1/4, three copies of detailed working and fabrication drawings,

Clause / Table / Figure No.	Title
	prepared by or on behalf of the Contractor shall be submitted to the Employers Representative.
104.10 SR	When the Contractor proposes to use a different standard, quality management scheme, product certification scheme or Agrément Certificate from that specified the Contractor shall provide all the relevant information to enable the Employers Representative to ascertain whether or not the proposal is equivalent to the specified requirement. The information shall be supplied at least 4 weeks prior to commencing the related works, to enable the evaluation of equivalence to be made, taking into account the programme for the Works.
105.1 SR	Goods, Materials, Sampling and Testing Goods and Materials The Contractor shall submit a list to the Employers Representative of the suppliers from whom he proposes to purchase the goods and materials necessary for the execution of the Works. Where a choice of goods or materials is listed in the Contract, the Contractor shall inform the Employers Representative of the goods or materials he proposes to use. No change in the list of suppliers and the Contractor's proposals shall be made without the consent of the Employers Representative.
105.2 SR	Sampling and Testing The testing scheduled in Appendix 1/5, including provision of the associated samples, shall be undertaken by the Contractor who shall supply to the Employer's Representative, within 24 hours of the completion of each test, a copy of the results. Where ILAB accreditation is required the results shall be reported on an official ILAB test report or certificate. The following operations are not included in Appendix 1/5: (i) checking, inspecting, examining, measuring (except in connection with testing); (ii) trials and demonstrations; (iii) routine testing carried out by manufacturers and suppliers in compliance with a specified standard or specification; (iv) testing of plant. Where required in Appendix 1/5 a test certificate, complying with the provisions of the relevant standard or specification where applicable and certifying that the goods or materials have been tested and meet the specified requirements, shall be supplied to the Employer's Representative by the Contractor at least four weeks prior to the incorporation of the goods or materials in the Works.
105.6 SR	The Contractor shall provide samples of goods and materials and deliver these to the

Clause / Table / Figure No.	Title
	Employers Representative as described in Appendix 1/6. Where required in Appendix 1/6, the Contractor shall arrange for the sampling of such goods and materials to be undertaken by testing laboratories holding ILAB accreditation to EN 45001 for such sampling. These samples shall be supplied in sufficient time for them to be tested and approved by the Employers Representative, taking into account the programme for the Works.
105.7 SR	Where testing is undertaken by a supplier or manufacturer in accordance with the Contract the Contractor shall ensure that each supplier and manufacturer will admit the Employers Representative, or his representative, to his premises at all reasonable times for the purposes of inspecting, selecting the samples and witnessing the testing.
106.2 SR	Design of permanent Works by the Contractor Structures Where the Contractor is required to complete TII BD2 Procedure, the Contractor shall forward two copies of the completed report to the Employers Representative for acceptance.
106.3 SR	The Contractor shall submit two copies of the completed design and check certificates and drawings for each structure listed in Appendix 1/10 to the Employers Representative.
106.4 SR	Structural Elements and Other Features The Contractor shall design the structural elements and other features listed in Appendix 1/11 to comply with the design specifications therein. Alternatively, the Contractor may propose an element or feature designed by the manufacturer. In either case, the Contractor shall submit his proposals to the Employers Representative.
108.1 SR	Operatives for the Employers Representative The Contractor shall provide the Employers Representative with, and maintain continuity of, operatives equal to the tasks, and capable of performing the functions, described in Appendix 1/8.
108.3 SR	For laboratory-related duties, operatives shall be capable of assisting laboratory staff in routine tasks.
110.1 SR	Information Boards The Contractor shall, within four weeks of the Starting Date, provide and erect information boards at the locations and to the specification given in Appendix 1/21. The Contractor shall ensure that they are kept clean and maintained in a safe and legible condition and remove them on completion of the Works. The Contractor or any sub-Contractor employed by him shall not erect any advertising sign on the site without the written permission of the Employers Representative.

Clause / Table / Figure No.	Title
111.1 SR	Existing Ground Levels The Contractor shall satisfy himself that the existing ground levels as described in Appendix 1/12 are correct. Work shall not proceed until the existing ground levels are agreed. Disturbance of the existing ground shall be deemed to indicate that the Contractor is in agreement with the levels contained in the Contract. Should the Contractor wish to dispute any levels he shall submit to the Employers Representative a schedule of the position of the levels considered to be in error and a set of revised levels. The existing ground relevant to the disputed levels shall not be disturbed before the correct levels are determined.
112.1 SR	Setting Out The Contractor shall, unless otherwise stated in Appendix 1/12, within 3 weeks of the Starting Date, carry out a check of the co-ordinates and levels of all permanent ground markers and permanent bench marks described in Appendix 1/12 and shall supply the Employers Representative with their position and level in order that they may be checked and revised if necessary. The Contractor shall identify and bring to the attention of the Employers Representative any markers that are missing. The Contractor shall comply with any specific requirements for setting out described in Appendix 1/12.
112.2 SR	The Contractor shall keep updated schedules and drawings of all bench marks (which shall be based on Ordnance Datum at Malin Head) used in the setting out and shall make these available to the Employers Representative when required.
113.1 SR	Programme of Works Subject and without prejudice to the Clause 4.9 of the Conditions, the programme which the Contractor submits to the Employers Representative shall comply with the specific requirements stated in Appendix 1/13.
114.1 SR	Payment Statements Subject and without prejudice to the Conditions, the Contractor shall comply with any requirements described in Appendix 1/14 concerning payment statements.
115.1 SR	Accommodation Works The Contractor shall undertake and complete the accommodation works as described in Appendix 1/15 or shown in the Accommodation Works drawings listed in Appendix 0/4 of the Specification. The Contractor shall give the Employers Representative at least ten days' notice of the date he intends to start work on individual plots, for the benefit of each owner, lessee or occupier.
116.2 SR	Public and Privately Owned Services or Supplies The Contractor shall, during the progress of the Works liaise with and take all measures

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	required by any Statutory Undertaker or the management of other publicly or privately owned services or supplies, for the support and full protection of all such services or supplies but subject to any instructions or contrary directions by the Employers Representative. He shall keep the Employers Representative informed of such liaison and measures. No such services or supplies shall be interrupted without the written consent of the appropriate authority or owner. Where any service or supply is affected by the Works the Contractor shall provide a satisfactory alternative before interrupting the existing service or supply unless otherwise stated in Appendix 1/16.
116.3 SR	The Contractor shall include for the programming consequences of all temporary and permanent diversions in his construction programme to the satisfaction of the Employers Representative and the Statutory Undertakers.
116.4 SR	Where privately or publicly owned services or supplies affected by the Works are subject to alteration, removal or addition, the Contractor shall be responsible for all arrangements with the owners and/or their agents for the execution and phasing of such works in accordance with his programme. Details of such work, preliminary arrangements made by the Employers Representative, and any orders already placed are given in Appendix 1/16.
116.5 SR	Where work is being undertaken on a motorway the Contractor shall take all measures required by the Road Authority for the location and protection of all cabling, ducts and other devices which form part of the motorway communications system or other systems of the road authority. Where the motorway communications system or other systems will be affected by the Works the Contractor shall ensure that an alternative system as described in Appendix 1/16 is fully operational prior to interrupting the existing systems. Any connections or disconnections to the existing systems may only be undertaken by the maintenance authority concerned. The Contractor shall be responsible for liaising, through the Employers Representative, with the maintenance authority.
117.3 SR	Traffic Safety and Management The Contractor shall, unless otherwise stated in Appendix 1/17, after consultation with the appropriate road authority and subsequently with any statutory authority concerned and An Garda Síochana, prepare and submit traffic safety and management proposals within the timescale described in Appendix 1/17 to the Employers Representative. These shall show the proposed traffic safety and management measures including provision of safety zones which he proposes for carrying out the Works. If stated in Appendix 1/17, the proposals shall include the provision of running lanes for the use of emergency vehicles within the Site. If required the Contractor shall make such changes to his proposals as may be necessary to meet the requirements of the Contract. Thereafter the Contractor

Clause / Table / Figure No.	Title
	shall furnish such details and information as may be necessitated by the Works or as the Employers Representative may direct.
117.5 SR	If the Contractor intends to construct central reserve crossovers as part of his traffic safety and management proposals he shall submit an outline of the proposals to the Employers Representative in advance, in accordance with the requirements of sub-Clause 3 of this Clause.
117.6 SR	The Contractor shall submit a formal application through the Employers Representative, as described in Appendix 1/17, to the appropriate authority for any statutory orders required to be made or notices required to be published in connection with his traffic safety and management proposals. The Contractor shall inform the Employers Representative of details the Contractor has agreed with the road authority for traffic signs, lighting, construction, maintenance and removal of any central reserve crossovers
117.7 SR	If stated in Appendix 1/17, the Contractor shall undertake the maintenance functions described therein and to the extent there described, on the lengths of road there specified, until the issue of the relevant certificate of Substantial Completion.
117.8 SR	Nothing in this Clause 117 shall relieve the Contractor of his obligations under sub-Clause 3.6.1 of the Conditions.
117.9 SR	The Contractor shall, unless otherwise stated in Appendix 1/17, provide, erect, maintain, reposition, cover and uncover and finally remove traffic signs as necessary for the execution of the Works. In so doing, such other measures shall be taken by the Contractor as may be necessitated by the Works in accordance with any special requirements in Appendix 1/17, recommendations in the Department of the Environment Traffic Signs Manual, or other instructions of the road authority listed in Appendix 1/17. Where the circumstances of any particular situation are not covered by the recommendations or described in Appendices 1/17 or 1/18, the Contractor shall submit proposals for dealing with that situation to the Employers Representative.
117.10 SR	Traffic signs shall comply with the Department of the Environmental Traffic Signs Manual and the appropriate Clauses in Series 1200 of this Specification. The Contractor shall unless otherwise stated in Appendix 1/17 keep traffic signs clean, secure and legible and ensure that all signs required to be lit, whether by external or internal lighting, are so lit during periods when road vehicles are required to display lights.
117.11 SR	Where the Contract provides that the Contractor shall not erect, maintain or reposition traffic signs, the Contractor shall not change in any manner the permanent or temporary traffic signs without instruction from the Employers Representative and shall give such notice as is stated in Appendix 1/17 to indicate when signs should be moved compatible

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	with the progress of the Works.
117.12 SR	All traffic safety and management measures shall be fully operational and shall have been submitted to the Employers Representative before the Contractor commences any associated work which affects the public road or the use of it.
117.13 SR	Any area of road which has been closed because of the Works shall not be re-opened until all appropriate traffic safety and management measures have been completed and the road is in a suitable condition for public use.
117.15 SR	Temporary lighting shall be provided in accordance with Clause 1405 where required by Appendix 1/17, or by the Contractor in the execution of the Works.
117.16 SR	The Contractor shall provide and suitably sign points of entry to and exit from the Site, for vehicles and plant engaged on the Works. Such provision shall be subject to the agreement of the Employers Representative. The Contractor shall ensure that when any vehicle or item of plant is reversing within the Site on or adjacent to a road open to traffic, it does so only under the supervision of a person designated for the purpose of regulating traffic within the Site who shall be readily distinguishable from the remainder of the workforce.
117.18 SR	Where required in Appendix 1/17, the Contractor shall appoint a Traffic Safety and Control Officer who shall make all arrangements necessary for traffic safety and control, including the provision and operation of breakdown recovery vehicles where required in Appendix 1/20. The Traffic Safety and Control Officer shall have one or more nominated deputies. The Contractor shall provide the Employers Representative with the names of this Officer and his nominated deputies and with telephone numbers or details of other means by which they or one of them can be contacted at any time. Unless otherwise described in Appendix 1/17 the Traffic Safety and Control Officer or a nominated deputy shall be on the Site at all times when traffic management is in operation and shall be readily available to deal with matters related to traffic safety and control, including breakdown recovery vehicles where required in Appendix 1/20.
117.19 SR	If an accident or breakdown occurs on a carriageway or hard shoulder open to traffic within or in the vicinity of the Site, the Contractor and operators of recovery vehicles provided in accordance with Clause 120 shall act as requested by An Garda Síochána acting under their statutory powers.
118.2 SR	Temporary Diversions for Traffic Each temporary diversion of traffic shall be made operative in advance of any interference with the existing arrangements and shall be maintained to the standard stated in Appendix 1/18 or if no standard is so stated, in accordance with Sub-Clause 6 of this Clause.

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	During the execution and completion of the Works, the Contractor shall provide appropriate diversion or reasonable and suitable access for each owner/ occupier of adjacent lands to enable him/her to continue operations where it is severed or flanked by the Works.
118.3 SR	Temporary Diversions for Traffic Specified by the Employers Representative The Contractor shall construct, maintain, remove and reinstate each temporary diversion for traffic specified in Appendix 1/18 in accordance with the details stated therein. Where stated in Appendix 1/18, the Contractor shall design each temporary diversion for traffic, including any temporary structures, in accordance with the details stated therein. Unless otherwise described in Appendix 1/18, the Contractor shall remove each temporary diversion for traffic as soon as it is no longer required.
118.4 SR	Temporary Diversions for Traffic Proposed by the Contractor If the Contractor proposes to construct a temporary diversion for traffic as part of his intended traffic safety and management measures, he shall submit an outline of his proposals to the road authority and An Garda Síochana for their agreement.
118.5 SR	The Contractor shall submit a formal application to the appropriate authority for any statutory orders required to be made or notices required to be published through the Employers Representative, allowing such time as is stated in Appendix 1/18 for the orders to be made and notices to be published.
118.6 SR	The standard and siting of every temporary diversion for traffic shall be suitable in all respects for the class or classes of traffic using it, and its width shall be not less than that of the existing way except where indicated in Appendix 1/18.
118.7 SR	The Contractor shall inform the Employers Representative of any details agreed with the road authority for traffic signs, lighting, construction, maintenance, removal and reinstatement of any temporary diversion for traffic proposed by the Contractor.
118.8 SR	Nothing in this Clause 118 shall relieve the Contractor of his obligations under sub-Clause 3.6.1 of the Conditions.
122.1 SR	Progress Photographs The Contractor shall arrange, as described in Appendix 1/22, to have record photographs of the Works taken by a professional photographer.
122.3 SR	The copyright of all photographs shall be vested in the Employer and the negatives and prints shall be delivered to the Employers Representative within 4 weeks of exposure. The photographs shall not be used for any purpose whatsoever without the Employers Representative's approval.
123.1 SR	Ionising Radiations

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	Nuclear gauges or other sources of ionising radiations shall be used only where permitted or required by the Employers Representative.
123.2 SR	The Contractor shall provide, on request, to the Employers Representative a copy of the Contractor's current valid licence issued by the Radiological Protection Institute of Ireland under SI 166 of the Nuclear Energy (General Control of Fissile Fuels, Radioactive Substances and Irradiating Apparatus) Order, 1977.
123.3 SR	The Contractor shall provide, on request, to the Employers Representative a copy of the Contractor's "Radiation Safety Procedures", specified in Condition 2 of the RPII Licence.
123.5 SR	The Contractor shall notify the Employers Representative in writing of any changes to : the Contractor's RPII Licence conditions; the Contractor's Radiation Safety Procedures; the Radiological Protection Officers designated in the RPII Licence and in the Radiation Safety Procedures.
124.2 SR	Substances Hazardous to Health Hazardous substances shall only be used or generated in or about the Works where specified in the Contract or with the consent of the Employers Representative.
124.3 SR	Where any hazardous substance is so used or generated the Contractor shall: (i) identify the hazardous substance; and (ii) assess the risks created by its use; and (iii) specify the arrangements made and the resources provided to safeguard the safety and health of persons employed at the work place against the risk posed; in his Safety Statement and bring the terms of the Safety Statement to the attention of persons employed by him and to other persons at the place of work who may be effected by the Safety Statement. The Contractor shall also provide the Employers Representative with a copy of his Safety Statement before the Starting Date.
124.4 SR	It shall be the duty of the Contractor involved in sharing a place of work with another Contractor to co-operate in implementing any safety, health, welfare and occupational hygiene provisions considered necessary and taking into account the nature of the work activities, to co-ordinate their work areas in relation to the protection from and prevention of occupational risks, and to inform each other and their respective employees or safety representatives (or both) of any risks involved in such activities. The Contractor shall provide the Employers Representative with written details of any such co-operation and/or co-ordination in relation to hazardous substances.
124.6 SR	If the Contractor proposes to use or generate any hazardous substance which has not been identified in the Safety Statement he shall:

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	revise his Safety Statement accordingly; and put into effect any additional arrangements required to deal with the new hazardous substance as per the previous sub-Clauses; and advise the Employers Representative accordingly.
124.7 SR	The Contractor shall advise the Employers Representative of the information, instruction, training, equipment and supervision to be provided for the persons described in sub-Clause 5 of this Clause and for the Contractor's employees and any other persons with reason to enter the area in which the hazards exist, and of the provisions to be made in monitoring their health. The Contractor shall provide the Employers Representative with written details of his proposals to prevent, control or monitor the exposure of members of the public to any substance hazardous to health used or generated in or about the Works.
124.8 SR	Where the measures referred to in this Clause necessitate the use of protective clothing or other safety apparatus by the Employer's Personnel, the Contractor shall: (i) provide the Employer's Personnel with sufficient suitable items of such protective clothing and other safety apparatus, so far as they are not otherwise supplied under Appendix 1/1; and (ii) arrange for the proper storage, maintenance and, if necessary, regular testing and replacement of the items provided to the Employer's Personnel; and (iii) arrange for appropriate training or instruction for the Employer's Personnel in the use of such items.
126.1 SR	Damage to Roadways The Contractor shall take every reasonable precaution to prevent dirt, mud or other deleterious material being dropped or spread by traffic or equipment associated with the Works on public roads or roadways which are made available for public use by the Contractor, whether such traffic or equipment is the Contractors own, his sub-Contractors or his suppliers or hired by any of them. The Contractor shall clean roadways of any such dirt, mud or other deleterious materials which may be spilt or spread by traffic or equipment travelling to or from the site in connection with the Works, whether such traffic belongs to the Contractor, his subContractors or his suppliers. On each working day the Contractor shall employ a road suction sweeper to clean all public roads and entrances to public or private property within a distance of 500m of the site. This shall include washing. Such cleaning operations shall be carried out notwithstanding road cleaning work being carried out by the Employer or Employer's Personnel.
126.2 SR	The Contractor shall take particular care to avoid damage to roads, footpaths, grass margins and other surfaces outside of the authorised site and shall be liable for the cost of

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	repairing, to the satisfaction of the Employers Representative, DAFM, the Local Authority or the owner, all such damage caused by his operations. He shall take precautions to prevent spillage of diesel fuel or solvents.
126.3 SR 126.3 SR Cont'd	The Contractor shall have regard to the maximum legal permissible loads for public roads in Ireland and where requested by the Employers Representative shall provide evidence of compliance with regard to delivery of material to site. He shall also prohibit the use of tracked plant on road surfaces outside of the site unless suitably approved protective measures are taken to safeguard the integrity of the road surfaces. Pumping of water onto a public road or private property shall not be permitted. Heavy discharges to gullies and storm drains shall have silt traps incorporated in the temporary discharge arrangement. Any damage so caused shall be made good by the Contractor at his own expense.
127.1 SR	Safety Unless otherwise stated in Appendix 1/27, the Contractor shall be appointed PSCS in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 for the Works and any amendments thereof.
127.2 SR	Where stated in Appendix 1/27, the Contractor shall be appointed as PSDP in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 for the Works and any amendments thereof.
127.3 SR	All accidents reported under The Safety, Health and Welfare at Work (Construction) Regulations 2013 shall be reported immediately to the PSCS, PSDP and the Employers Representative. A copy of the subsequent written report to the Health and Safety Authority shall also be provided.
128.1 SR	Liaison Officer The Contractor shall designate one of his qualified engineering staff as a liaison officer to deal with landowners and utilities. The Liaison Officer shall attend all pre-entry meetings with landowners or occupiers together with the Employers Representatives. These meetings with individual landowners or occupiers are intended to confirm the arrangements already agreed for temporary and permanent accommodation works.
129.1 SR	Emergency Services The Contractor shall include for the provision of a 24-hour, 7-day week emergency service from the start of construction work until Substantial Completion of the Works. This service shall in particular ensure immediate action on the following : (i) Replacement or relocation of warning signs, lights and safety items on public roads; (ii) Repair of damaged or inadequate stockproof fencing;

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	(iii) Restoration of water supplies or other services where interrupted or rendered inadequate; (iv) Repair work on any damaged or inadequate temporary works; (v) All repair work associated with working in public thoroughfares.
601.1 SR	Classification, Definitions and Uses of Earthworks Materials General Classification Earthworks materials shall fall into one or other of the following general classifications: acceptable material: material excavated from within the Site or imported on to the Site which meets the requirements of Table 6/1 and Appendix 6/1 for acceptability for use in the Works; unacceptable material Class U1 see sub-Clause 2 of this Clause: material excavated from within the Site which, unless processed so that it meets the requirements of Table 6/1 and Appendix 6/1, shall not be used in the Works; unacceptable material Class U2 as defined in sub-Clause 3 of this Clause: material excavated from within the Site which shall not be used in the Works.
601.4 SR	Where required in Appendix 6/1 unacceptable material shall be processed by mechanical, chemical or other means to render the material acceptable for use in the Works in accordance with the requirements of Table 6/1 and Appendix 6/1.
601.5 SR	Definitions Argillaceous rock shall mean shales mudstones siltstones slates and micaceous schists composed of particles of clay and silt and mica.
601.6 SR	Formation shall be the top surface of capping. Where no capping is required formation shall be the top surface of earthworks at the underside of sub-base, unless otherwise shown on the drawings in the Contract.
601.9 SR	Use of Fill Materials Materials with a soluble sulphate content exceeding 1.9g of sulphate (expressed as SO₃) per litre when tested in accordance with BS 1377: Part 3 shall not be deposited within 500mm, or as described in Appendix 6/3, of concrete, cement bound materials or other cementitious materials forming part of the Works.
601.10 SR	Materials with a water soluble sulphate content exceeding 0.25 grams of sulphate (expressed as SO ₃) per litre when tested in accordance with BS 1377 : Part 3 shall not be deposited within 500mm, or other distances described in Appendix 6/3, of metallic items forming part of the Works.
602.3 SR	General Requirements No excavated acceptable material or unacceptable material required to be processed,

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	other than surplus to the requirements of the Contract, shall be removed from the Site unless indicated otherwise in Appendix 6/1. Material which is unacceptable only by reason of being frozen shall be retained on Site when in that condition. Where the Contractor is permitted to remove acceptable material, or unacceptable material required to be processed, from the site to suit his operational procedure, then he shall make good any consequent deficit of material arising therefrom.
602.4 SR	If any acceptable material or unacceptable material required to be processed is, where permitted by Appendix 6/1, used by the Contractor for purposes other than for general fill, sufficient acceptable fill material to occupy, after full compaction, a volume corresponding to that which the excavated material occupied shall be provided by the Contractor.
602.5 SR	Acceptable material (other than Class 5A or any Class 5B material replacing Class 5A material in accordance with sub-Clause 3 of this Clause) surplus to the total requirements of the Works and all unacceptable material Class U2, and Class U1 not required to be processed or used in the Works, shall, unless indicated otherwise in Appendix 6/1, be run to spoil in tips provided by the Contractor. In the case of unacceptable material Class U2 the Contractor shall comply with any specific requirements for disposal described in Appendix 6/2.
602.6 SR	Where the excavation reveals a combination of acceptable and unacceptable materials the Contractor shall, unless indicated otherwise in Appendix 6/3, carry out the excavation in such a manner that the acceptable materials are excavated separately for use in the Works without contamination by the unacceptable materials. Unless otherwise described in the Contract Classes of fill material required to be deposited separately shall be excavated separately without contamination by other Classes of material.
602.12 SR	Excavations for foundations and trenches shall be adequately supported at all times, and except where otherwise described in Appendix 6/3, shall not be battered. Where excavations are permitted to be battered they shall be benched as described in Appendix 6/3 prior to backfilling and compaction. The additional work and materials shall be provided by the Contractor. Sheet piling and other excavation supports shall be removed as filling proceeds except where they are required in Appendix 6/3 to be left in position.
602.15 SR	The Contractor shall keep earthworks free of water including: arranging for the rapid removal of water; shed on to the earthworks; entering the earthworks from any source; lowering and maintaining by appropriate measures, the water level in excavations, sufficiently to enable the Works to be constructed.

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602.18 SR	Where materials are designated in the Contract as Class U2 hazardous material, the Contractor shall carry out any special requirements for their handling described in Appendix 6/2. Where hazardous materials are encountered during the progress of the Works, the Contractor shall make all necessary arrangements for their safe handling and disposal as Class U2 material after consultation with the Employers Representative and the appropriate statutory bodies.
603.2 SR	Forming of Cuttings and Cutting Slopes Cutting slopes or toes of cuttings shall only be undercut when required in the Contract for trench or other excavations. Such excavations shall be restricted in extent as described in Appendix 6/3 and where they require backfilling shall remain open only for the minimum period necessary, so as to prevent risk to the Works.
602.18 SR	Where materials are designated in the Contract as Class U2 hazardous material, the Contractor shall carry out any special requirements for their handling described in Appendix 6/2. Where hazardous materials are encountered during the progress of the Works, the Contractor shall make all necessary arrangements for their safe handling and disposal as Class U2 material after consultation with the Employers Representative and the appropriate statutory bodies.
603.3 SR	Except where otherwise described in Appendix 6/3, the excavation of cuttings may be halted at any stage providing at least 300 mm of material as a weather protection is left in place above the formation or above the sub-formation, subject to the requirements of Clauses 613 and 616. The Contractor shall install the permanent drainage before the bulk excavation reaches a level 300mm above formation or sub-formation. The cuttings shall be kept well drained at all times. The Contractor shall ensure that plant utilised in the earthworks operation does not damage or alter the location of drainage works already constructed.
603.4 SR	Where pre-split blasting is required or permitted in Appendix 6/3, it shall comply with Clause 607 and any other requirements in Appendix 6/3. Full details of the methods and arrangements to be adopted shall be made available to the Employers Representative before commencement of drilling operations.
603.5 SR	Final faces of cuttings which are not to receive topsoil shall: be left without scars or damage from construction plant; and to achieve a natural appearance, when the stratum permits and when pre-split blasting is not adopted, have the face left irregular within tolerances given in Appendix 6/3; and have boulders or other rock fragments that can be moved by hand without tools, removed; and

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	where required in Appendix 6/3 have material that can be blown away by airline or water hose, having pressures no greater than those stated therein, so removed; and have adequate access to enable inspection to be carried out to determine the extent of work required by this sub-Clause.
603.6 SR	Where required in Appendix 6/3, faces of cuttings which are not required to receive topsoil shall have one or more of the following measures carried out as appropriate: Isolated patches of soft, fragmented and insecure material shall each be excavated to a depth of at least 200 mm unless other depths are stated in Appendix 6/3 and replaced as soon as practicable with concrete mix ST2 well rammed into the cleaned out void; Areas of cutting face requiring their surface to be made stable shall be trimmed back by a nominal 50 mm or other amount required in Appendix 6/3 and the resulting surface together with an area of any surrounding intact material as detailed in Appendix 6/3, shall have a suitable cement based grout or sprayed concrete, applied by pressure to form a total nominal thickness of 40 mm unless the required thickness is stated in Appendix 6/3. Where required in Appendix 6/3, reinforcement shall be fixed to the surface before application of the concrete or grout. Weep holes using approved permanent formers shall be constructed in the locations described in Appendix 6/3 ; Soft or insecure material, interlayered with rock shall be excavated to the depth behind the face described in Appendix 6/3. The resulting cavity shall be filled with concrete mix ST2 or with masonry infill complying with the 2400 Series and provided with weep holes all in accordance with requirements in Appendix 6/3; Netting or other sheet covering as described in Appendix 6/3 or rock bolts as described in Appendix 6/10.
603.7 SR	Where required in Appendix 6/3, faces of cuttings which are to receive topsoil shall have one or more of the following measures carried out as appropriate: Isolated patches of soft, fragmented or insecure material shall be excavated and either: filled by well ramming in a Class of fill with similar characteristics as the surrounding intact material; or excavated and dealt with as described in sub-Clause 6(i) of this Clause; Other areas required to be made stable shall be dealt with as stated in Appendix 6/3.
603.8 SR	The concrete, referred to in sub-Clauses 6(i) and 6(iii) of this Clause, permanently exposed on the face of the cutting shall have surface features as nearly as possible matching those of the adjacent intact face. Such concrete and the grout referred to in sub-Clause 6(ii) of this Clause shall have a consistent colour as nearly as possible matching that of the adjacent intact face.

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604.1 SR	Excavation for Foundations The bottom of all foundation excavations shall be formed to the lines and levels shown on the drawings in the Contract. Pockets of soft soil or loose rock shall be removed and the resulting voids and any natural voids shall be filled with mix ST1 concrete (or other material as required by Appendix 6/3) except in excavations for corrugated steel buried structures when Class 6K lower bedding fill material complying with Table 6/1 shall be used. After placing of any blinding concrete shown on the drawings in the Contract, no trimming of the side faces of the excavation shall be carried out for 24 hours.
604.2 SR	The Contractor shall make good: any lateral overbreak of the excavation above the bottom of the foundation greater than the net volume required for the permanent Works with material of the same Class as used for fill above structural concrete foundations to comply with Clause 611 (except that for corrugated steel buried structures Class 6K lower bedding material shall be used) or, where the excavation is too narrow to allow the compaction of earthworks materials, with mix ST1 concrete; any additional excavation at or below the bottom of foundations, including that resulting from removal of material which the Contractor has allowed to deteriorate, with mix ST1 concrete (or other material required by Appendix 6/3) except that under corrugated steel buried structures Class 6K material shall be used.
606.4 SR	Watercourses Redundant watercourses shall, where required in Appendix 6/3, be drained and cleared in accordance with sub-Clause 2 of this Clause and material outside the existing watercourse profile excavated and dealt with as unacceptable material. The excavations shall be to the dimensions stated in the Contract and the hole filled with general or selected fills of the Class described in Appendix 6/3 complying with Table 6/1 deposited and compacted in compliance with Clause 608 and 612. Where the surface is to remain exposed it shall receive treatment, all as described in Appendix 6/3.
607.2 SR	Explosives and Blasting for Excavation Explosives shall be used in the quantities and in the manner recommended by the manufacturers. The written permission of the Employers Representative must be obtained for each location where the Contractor wishes to use explosives together with the written permission for the quantity and type of explosive to be used. The conditions attaching to any such permission shall be strictly adhered to. Permission will only be granted if the Contractor has satisfied the Employers Representative that all other methods for excavation are unsuitable. Such permission shall not in any relieve the Contractor of his liabilities or obligations under Clause 3.6 of the Conditions

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608.2 SR	Construction of Fills Starter layers of Classes 6B or 6C materials as described in Appendix 6/3 shall be deposited as the first layer or layers of fill above existing ground level or, if appropriate, above any ground improvement required by Appendix 6/13. Plant movement across starter layer material shall be restricted to that plant which is necessary for its deposition, spreading and compaction in compliance with this Clause and Clause 612 and any plant required to carry out any ground improvement beneath it if required by Clause 630. The Contractor shall take all reasonable measures to prevent damage to the underlying strata, which may include use of lighter spreading plant or the reduction of the number of passes of the compaction plant.
608.4 SR	Embankments and other areas of fill shall, unless otherwise required in the Contract, be constructed evenly over their full width and their fullest possible extent and the Contractor shall control and direct constructional plant and other vehicular traffic uniformly over them. Damage by constructional plant and other vehicular traffic shall be made good by the Contractor with material having the same characteristics and strength as the material had before it was damaged.
608.5 SR	Embankments and other areas of unsupported fills shall not be constructed with steeper side slopes, or to greater widths than those described in Appendix 6/3, except to permit adequate compaction at the edges before trimming back, or to obtain the final profile following any settlement of the fill and the underlying material. However any over steepening or increase in width shall not exceed limits described in Appendix 6/3 and shall remain only for the minimum time necessary consistent with safety of the Works.
608.9 SR	The last 600mm depth of fill to sub-formation level, or formation level shall, unless otherwise required in the Contract, be carried out for the full width of embankments, or between the outer extremities of the verges in other areas of fill, in a continuous operation. The Contractor shall then continue without delay to carry out either (i) or (ii): form the sub-formation or formation, all in accordance with Clauses 613 and 616, followed immediately by: the construction of the full thickness of capping or sub-base as appropriate; or if permitted in Appendix 6/3, the construction of a lesser thickness of capping or sub-base as described therein laid as a weather protection layer; place an additional 300 mm minimum compacted thickness of material above sub-formation level or formation level as appropriate for the full width of the filling to form a weather protection. This weather protection shall be composed of the same material as the sub-formation or formation and compacted in compliance with Table 6/1. The material shall be provided from the Contractor's own resources and the protection layer shall be

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	constructed in a continuous operation.
608.11 SR	All permanent faces of side slopes of embankments and other areas of fill formed in Classes 2 or 7 cohesive materials shall, subsequent to any trimming operations, be re-worked and sealed by tracking a tracked vehicle suitable for the purpose, on the slope, or by other suitable methods.
609.1 SR	Geotextiles Used to Separate Earthworks Materials Geotextiles required as part of the Works to separate materials at locations described in Appendix 6/5 shall be manufactured from synthetic or other fibres as required therein and be in the form of thin permeable membranes.
609.2 SR	The Contractor shall provide evidence to the Employers Representative, before the geotextile is incorporated in the Works, that the geotextile will be sufficiently durable, when installed in contact with the materials to be separated, to maintain its integrity for at least the life period required in Appendix 6/5.
609.3 SR	Geotextiles shall be protected at all times against mechanical or chemical damage. Those susceptible to damage by light shall not be uncovered between manufacture and incorporation in the Works. Temporary exposure shall not exceed 5 hours.
609.4 SR	The method of selection and the required number of samples are as described in Appendix 6/5. Samples shall be taken from the consignment of geotextile to be used in the Works. Samples and test pieces cut from them shall comply with sub-Clause 7 of this Clause and test pieces shall be tested at a laboratory to prove that the geotextile meets the following criteria or other criteria described in Appendix 6/5: The geotextile shall sustain a tensile load of not less than 13kN/m, when tested in any direction, determined in a wide strip tensile test carried out in accordance with BS 6906: Part 1. The characteristic strength shall be taken as the value of the strength of the material below which not more than 5% of the test results may be expected to fall. This represents the strength at 1.64 standard deviations below the mean strength; The geotextile shall have a CBR Puncture Resistance of not less than 2kN, determined in accordance with BS 6906: Part 4. The characteristic CBR puncture strength shall be taken as the value of the strength of the materials below which not more than 5% of the test results may be expected to fall. This represents the strength at 1.64 standard deviations below the mean strength; The geotextile shall allow water to flow through it, at right angles to its principal plane, in either direction, at a rate of not less than 10 litres/m²/s under a constant head of water of 100 mm, determined in accordance with BS 6906 : Part 3. The flow rate determined in the test shall be corrected to that applicable to a temperature of 15°C using published data on

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	variation in viscosity of water with temperature; The geotextile shall have a size distribution of pore openings such that the mean 090, determined in accordance with BS 6906: Part 2, is between 50 microns and 350 microns.
609.7 SR	All samples and test pieces cut from them shall be maintained in a clean and dry condition, except for normal contamination and wetting during testing, and shall be retained by the Contractor in accordance with Appendix 6/5. Prior to determination of pore size and tensile strength, test pieces shall be conditioned and brought into equilibrium at a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$, and a relative humidity of $65 \pm 5\%$. The dry weight of the geotextile tested shall be quoted in g/m ² .
610.4 SR	Fill to Structures Where fill to structures is required to the same level on more than one side of a structural element or buried structure (except where Clause 623 applies) it shall be maintained at heights not differing by more than 250mm after compaction on opposing sides of the structural element as filling proceeds.
610.6 SR	Where required in Appendix 6/6, Class 6N and 6P material shall be shown, by means of a trial utilising not less than 20m ³ of the material, deposited and compacted in accordance with this Clause, to be stable when it is trimmed to a slope of 1 vertical to 1½ horizontal, or other slope described in Appendix 6/6.
611.1 SR	Fill Above Structural Concrete Foundations Fill deposited above structural concrete foundations shall be, as shown on the drawings in the Contract: Class 6N or 6P selected fill material complying with Clause 610 including compaction requirements; another class of selected fill or general fill complying with Table 6/1 deposited and compacted in compliance with Clauses 608 and 612 and in addition be subject to sub-Clauses 610.4 and 5.
612.1 SR	Compaction of Fills General Except for dynamic compaction, which shall comply with Clause 630, and unless otherwise described in Appendix 6/3, the Contractor shall carry out compaction in compliance with this Clause, as soon as practicable after deposition, on all those Classes of fill in Table 6/1 which require to be compacted.
612.6 SR	Method Compaction Plant and methods not included in Table 6/4 shall only be used providing the Contractor demonstrates at site trials that a state of compaction is achieved by the alternative method

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	equivalent to that obtained using the specified method.
612.9 SR	The Contractor or the Employers Representative may carry out field dry density tests as described in sub-Clause 15 of this Clause on material compacted to method requirements at a frequency defined in Appendix 6/3, or when required by the Contractor or the Employers Representative. If the results of field tests show densities which indicate (when compared with the results of similar tests made on approved work in similar materials carried out in accordance with this Clause and Table 6/4), the state of compaction to be inadequate, then if this is due to failure of the Contractor to comply with the requirements of the Contract, the Contractor shall carry out such further work as is required to comply with the Contract.
612.12 SR	End-product Compaction The Contractor shall at least 14 working days before commencement of end-product compaction submit the following to the Employers Representative: the values of maximum dry density and the optimum moisture content obtained in accordance with BS 1377: Part 4 using the 2.5 kg rammer method or vibrating hammer method as appropriate for each of the fills he intends to use which meet the requirements of the permitted Class or Classes (where within any Class of material the fill contains material having different maximum dry densities and optimum moisture contents the Class shall be further sub-divided, by extending the identification system, in order to monitor the compacted density); a graph of density plotted against moisture content from which each of the values in (i) above of maximum dry density and optimum moisture content were determined.
612.13 SR	Once the information contained in sub-Clause 12 of this Clause has been reviewed without objection by the Employers Representative it shall form the basis for compaction.
612.14 SR	Fill compacted to end-product requirements shall have a field dry density, measured in accordance with sub-Clause 15 of this Clause, equal to or greater than the percentage given in Table 6/1 of the maximum dry density for the relevant Class of fill previously reviewed without objection by Employers Representative.
612.15 SR	The field dry density referred to in sub-Clause 14 of this Clause shall be measured in accordance with BS 1377: Part 9, except that nuclear methods shall only be used where required in Appendix 6/3. Where nuclear methods are used, the gauge shall be calibrated in accordance with BS 1377: Part 9. Use of nuclear gauges shall comply with Clause 123.
613.6 SR	Sub-formation and Capping No unprotected sub-formation which is to receive capping shall remain continuously exposed to rain causing degradation, nor be left uncovered overnight.

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616.4 SR	Preparation and Surface Treatment of Formation Where required in Appendix 6/7 or where the tolerances in sub-Clause 1 of this Clause cannot be achieved in the preparation of formation in rock then one of the following shall be carried out so as to achieve the above tolerances: the material shall be excavated below formation to the depth described in Appendix 6/7. The excavated material shall be processed as described in Appendix 6/7 and re-deposited and compacted in compliance with Clauses 608 and 612 and Table 6/4 Method 6 in compacted layers not greater than 250 mm thick; or where the rock surface is tabular it shall be regulated by depositing and compacting cement bound material as described in Appendix 6/7, complying with the 1000 Series, or mix ST1 concrete.
616.5 SR	The Contractor shall limit any areas of completed formation to suit the output of plant in use and the rate of deposition of sub-base. No formation of cohesive material Classes 2 and 7 shall remain continuously exposed to rain causing degradation or be left uncovered overnight.
617.3 SR	Use of Sub-formation or Formation by Construction Plant In addition to the requirements of sub-Clauses 1 and 2 of this Clause, the Contractor shall submit to the Employers Representative his proposals for the protection of the sub-formation or formation in areas where they are within 300 mm of the existing ground level, after topsoil has been stripped, before using construction plant or other vehicular traffic at or above sub-formation or formation.
618.2 SR	Topsoiling, Grass Seeding and Turfing Imported topsoil, Class 5B material, shall only be imported when required in Appendix 6/8.
618.3 SR	When required in Appendix 6/8 topsoil shall not be excavated from stockpiles: which have been exposed to a cumulative rainfall exceeding 100mm, or other figure stated in Appendix 6/8, over the preceding 28 days; or when heavy rain is falling; or with a tracked vehicle.
618.4 SR	The areas to be grassed shall be prepared as described in Appendix 6/8 and receive one of the following treatments as described in Appendix 6/8: Treatment I: topsoiled, fertilised and seeded. Fertiliser and seed may, unless otherwise stated in Appendix 6/8 be applied by Hydraulic Mulch; Treatment II: topsoiled, fertilised and turfed; Treatment III: left untoptoiled but fertilised and seeded by hydraulic mulch; Treatment IV: topsoiled and seeded, but not fertilised.

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618.5 SR	Cutting slopes which are to receive Treatments I or II shall: be benched where required in Appendix 6/3 to retain topsoil; unless otherwise stated in Appendix 6/8, be harrowed to a depth of 50 mm. Such harrowing shall be carried out, immediately prior to topsoiling, diagonally, at an angle between 5° to 45° to the line of the toe, measured on the plane of the slope.
618.6 SR	Topsoil in Treatment I, II and IV shall: be deposited and spread to the thicknesses described in Appendix 6/8, which thickness shall be reduced where necessary to allow for any subsequent turfing required in Appendix 6/8 (it shall not be spread using a tracked vehicle, when so stipulated in Appendix 6/8); have stones and other debris removed and disposed of off Site which have: dimensions greater than 100 mm equivalent diameter, unless stated otherwise in Appendix 6/8; and dimensions greater than 50 mm equivalent diameter which lie within 50 mm of the surface; not have stones or other debris protruding above the surface by more than 30 mm; and immediately prior to sowing of seed, including that applied by hydraulic mulch, and before laying of turf, have: its upper 50 mm thickness reduced to a fine till by use of a chain harrow or other plant producing a similar fine till; and in the case of Treatments I and II only. unless otherwise required in Appendix 6/8, fertiliser complying with sub-Clause 12 of this Clause evenly distributed and raked in, at a rate not less than 75 g per m² or other rate required in Appendix 6/8. If hydraulic mulch seeding is used such fertiliser may be incorporated in the mulch and no raking in is necessary.
618.7 SR	Seeding in Treatment I and IV shall: employ a mixture of seed complying with sub-Clause 13 of this Clause; and be carried out by evenly distributing such seed at a rate of not less than 20 g/m² for side slopes of both embankments and cuttings and not less than 10 g/m² elsewhere or other rates required in Appendix 6/8; and be immediately followed by lightly raking, by use of a chain harrow or other suitable plant, the surface of the topsoil to cover the seeds, except that no raking is required following hydraulic mulch seeding.
618.8 SR	Turf in Treatment II shall: be laid in the areas described in Appendix 6/8; and consist of Class 5C imported turf complying with Table 6/1 or, when permitted by Appendix 6/8, turf arising on Site and required to be excavated as Class 5A material; and be laid well bonded and lightly tamped and, when on slopes, be laid diagonally; and

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	where required in Appendix 6/8 be retained in position by methods described therein; and be regularly watered as necessary during prolonged dry weather.
618.9 SR	Hydraulic mulch seeding shall: be applied by a process and consist of a mulch detailed in Appendix 6/8; and where required in Appendix 6/8 have, as part of the mulch, glass fibre or other material, to form a retaining agent during establishment of sward growth; and for Treatment III, have as part of the mulch, additional additives for promotion of grass growth on the material to be grassed.
618.10 SR	Except on areas not required to be mown, or to be mown three times, all as described in Appendix 6/8, areas of grass resulting from Treatments I to III and IV shall be mown twice to leave a nominal 75 mm height. The first mowing shall be carried out once the grass has reached a height of between 150mm and 200mm, the second when it has regrown to between 150 mm and 200 mm. The plant used for mowing shall comply with any requirements in Appendix 6/8. All areas shall, unless stated otherwise in Appendix 6/8, be left clear of grass cuttings following each mowing, by raking or other suitable method and arisings disposed of off Site.
618.11 SR	A selective herbicide especially formulated for the eradication of docks, thistles, ragwort and other pernicious agricultural weeds shall be applied by spot treatment spray or other efficacious method to such plants individually; the use of a spray boom will not be permitted.
618.12 SR	Fertiliser, including where permitted in Appendix 6/8 that are incorporated in hydraulic mulch, shall consist of a compound containing not less than 10% Nitrogen, 15% Phosphoric Acid and 10% Potash and samples shall be submitted to the Employers Representative prior to its use in the Works.
618.13 SR	Grass seed, including where permitted in Appendix 6/8 that incorporated in a hydraulic mulch shall be a tested mixture and certificates of germination and purity shall be provided before sowing, together with the names of the varieties used in the mixture. Unless otherwise required in Appendix 6/8 this shall contain the seeds listed in Table 6/5 to the proportions therein.
620.3 SR	Landscape Areas and Screening Methods Following completion of filling of landscape areas and screening mounds, Class 4 material shall where required in Appendix 6/9, be shaped as described therein.
620.4 SR	Class 4 material shall be deposited in landscape areas or screening mounds after any adjoining embankment or other area of fill has been completed. Where permitted in Appendix 6/9 and provided the embankment or other area of fill is always kept at least 1m

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	higher than the landscape area fill, construction of such landscape area may proceed in parallel.
623.6 SR	Earthworks for Corrugated Steel Buried Structures Class 6M surround material shall be deposited and compacted uniformly on either side of the structure. The maximum difference in fill level on opposite sides of the structure shall be no more than 250 mm at all times unless otherwise permitted in Appendix 6/3.
623.7 SR	Class 6M surround material under the structure shall be well compacted by hand using a suitably sized pole or length of rectangular timber between the corrugations, or by another suitable method.
623.10 SR	Only that compaction plant described in sub-Clause 8 of this Clause, shall be used in the vicinity of the structure unless the depth of compacted Class 6M surround material placed above the crown of the structure is more than 1m, or one fifth of the span, whichever is the greater. The structure shall not be subjected to a surcharge greater than the depth of fill required in the Contract and permitted depth of any protection layer given in Appendix 6/3.
624.1 SR	Ground Anchorages The Contractor shall design the ground anchorages required as part of Works and listed in Appendix 1/11, in accordance with the design requirements described in Appendix 6/10. The ground anchorages shall be installed and where required in Appendix 6/10 proof loaded, in accordance with the requirements therein.
624.2 SR	Ground anchorages not forming part of the Works will only be permitted where such anchorage will not affect the Works.
626.4 SR	Gabions All wire shall be galvanised in compliance with BS 443 and be coated with a minimum thickness of 0.55mm of PVC for extruded coatings and 0.25mm of PVC for bonded coatings. The PVC shall be capable of resisting the effects of immersion in sea water, exposure to ultra violet lights and abrasion, when tested for a period not less than 3000 hours in accordance with BS 2782: Part 5 Method 54OB (ISO 4892).
627.1 SR	Swallow Holes and Other Naturally Occurring Cavities Infilled swallow holes and other naturally occurring cavities shall where required in Appendix 6/11 be excavated, filled and capped as described in Appendix 6/11.
627.2 SR	Open swallow holes and other shallow cavities shall where required in Appendix 6/11 be flushed, cleared of rubbish where to do so would not endanger operatives, and filled and capped as described in Appendix 6/11.
628.1 SR	Disused Mine Workings Disused mine workings shall, where required in Appendix 6/11, be investigated, inspected,

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	monitored, cleared, flushed, filled, capped or have any other treatment carried out, all as described in Appendix 6/11.
629.2 SR	Instrumentation and Monitoring Monitoring of instrumentation shall be carried out as required in Appendix 6/12 and the results supplied to the Employers Representative.
630.2 SR	Ground Improvement Dynamic Compaction Dynamic compaction shall be completed before the commencement of construction of any permanent works, or work on the placement or diversion of Statutory Undertakers equipment, within that part of the Site defined in Appendix 6/13 which contains the area to be dynamically compacted.
630.3 SR	The Contractor shall ensure that no damage or injury is caused to persons or property on or off the Site as a result of the dynamic compaction.
632.3 SR	Determination of Moisture Condition Value (MCV) of Earthworks Materials Where permitted in Appendix 6/1 the rapid assessment procedure for material acceptability also given in BS 1377 : Part 4 may be used.
633.4 SR	Determination of Undrained Shear Strength of Remoulded Cohesive Material Where stated and described in Appendix 6/1, other tests may be used during construction to supplement the test described above, provided the results have been correlated to ensure compatibility.
637.1 SR	Determination of Resistivity (rs) to Assess Corrosivity of Soil, Rock or Earthworks Materials Method of Test Where the resistivity of the ground or of material to be used in the Works is required to be determined, this shall be obtained by in situ tests as described in sub-Clause 2 of this Clause or, when required in Appendix 6/1, by laboratory tests on samples in accordance with BS 1377: Part 3.
637.3 SR	In Situ Resistivity Tests Details of the area and volume of material to be tested shall be submitted to the Employers Representative together with the arrangement of electrodes in each test. The Employers Representative shall be given notice of the date, time and location of each test so that he can arrange for attendance at each test.
637.6 SR	Where the depth of material to be tested is too great to be tested from the surface within the confines of the site, the Contractor shall undertake all necessary arrangements for testing such material, including subsequent tests which may be required at a lower level

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	following excavation. Details of his arrangements shall be submitted to the Employers Representative.
638.1 SR	Determination of Redox Potential (Eh) to Assess Corrosivity of Earthworks Materials for Reinforced Earth and Anchored Earth Structures Method of Test Where the redox potential of material to be incorporated into reinforced earth or anchored earth structures is required to be determined, this shall be obtained by in situ tests as described in sub-Clauses 2 to 6 of this Clause or, when required in Appendix 6/1, by laboratory tests on samples in accordance with BS 1377: Part 3.
638.3 SR	In Situ Redox Potential Tests Details of the area and volume of material to be tested shall be submitted to the Employers Representative together with the locations of the test pits.
638.4 SR	The Employers Representative shall be given notice of the date, time and location of each test so that he can arrange for attendance at each test.
638.5 SR	At each test location the tests shall be carried out in a test pit not less than 600 mm square in plan excavated to a depth given in Appendix 6/1.
639.2 SR	Determination of Coefficient of Friction and Adhesion Between Fill and Reinforcing Elements or Anchor Elements for Reinforced Earth and Anchored Earth Structures Reinforcing Elements The test shall be carried out following the procedure given in Clause 636 for the determination of the effective angle of internal friction and effective cohesion of earthworks materials except that: The apparatus shall in addition include a steel block fitting closely inside the lower half of the shear box and equal in height to it less the thickness of the reinforcing element material. (The flat toothed grid fitting the bottom of the shear box is not required); The preparation of test specimens shall be as follows: Element material shall be cut to fit the interior plan shape of the shear box using a sufficient number of strips of such material abutting to completely fill the interior plan area without overlap. They shall be firmly fixed to the top of the steel block so that the top face of the material is flush with the top edge of the lower half of the box and aligned so that shearing occurs in a direction parallel to the longitudinal axis of a reinforcing element. A sample of the fill material to be used in the Works, of sufficient size to carry out the tests, and within the range of moisture contents permitted in Table 6/1 for such material, shall be sieved to obtain a test sample passing the 20mm BS sieve, of sufficient quantity after compaction to fill the top half of the shear box. The top and bottom of the shear box

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	shall be fixed together and the test sample of the sieved fill materials immediately placed and compacted in the top half of the box as described in Clause 636
642.1 SR	Determination of the Constrained Soil Modulus (M^*) of Earthworks Materials for Corrugated Steel Buried Structures General When required in Appendix 6/1, the constrained soil modulus M^* shall be determined from a plate loading test in accordance with BS 1377: Part 9. Three tests for M^* shall be carried out on each side of the structure, one of which is to be at the level of the maximum span unless otherwise described in Appendix 6/1.
642.4 SR	Procedure The loading test shall be carried out under a series of maintained loads. The maximum load should be such that the average pressure applied to the plate is in excess of 350 kN/m². The elastic modulus E_s shall be determined as the secant modulus between average pressures applied to the plate of 150 and 350 kN/m² in the first load cycle. A value of Poisson ratio of 0.3 shall be assumed. A second load cycle testing shall also be conducted and the results of this test compared with the first load cycle to check that the plate was seated satisfactorily during the first load cycle. If the results of the first load cycle suggest that the plate was not seated satisfactorily, then the procedure shall be repeated at a new location. Second load cycle results shall not be used to demonstrate the adequacy of the material being tested.
1201.1 SR	Definitions, Sign Classification and Regulations For the purposes of this Specification the following definitions shall apply: (i) Prescribed Signs – Signs which are in accordance with: (a) The “Traffic Signs Manual” published by the Department of the Environment in 1996; and/or (b) The “Road Traffic (Signs) Regulations, 1997”; and any subsequent amendments of these documents (including any sign specially authorised by the Minister for the Environment & Local Government). (ii) Non Prescribed Signs – Signs, other than the above, which are: Required by the Contract; or Designed by the Contractor and approved by the Employer.
1201.2 SR	Sign Classification For the purposes of the Contract the following classifications apply: (i) Permanent Traffic Signs – Any of the traffic signs complying with sub-Clause 1201.1 part (i) or part (ii)(a), which will remain in position at the completion of the Works;

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	or a traffic sign, traffic cone, cylinder or other traffic delineator to be retained by the Employer; (ii) Employer's Temporary Traffic Signs – Any of the traffic signs specified in the Contract and complying with sub-Clause 1201.1 part (i) or part (ii)(a), which will not remain in position at the completion of the Works; (iii) Temporary Traffic Signs – Any of the traffic signs proposed by the Contractor and complying with sub-Clause 1201.1 part (i) or part (ii)(b), which will not remain in position at the completion of the Works.
1201.3 SR	Regulations Where the Contractor proposes to use Temporary Traffic Signs which are prescribed signs, he shall obtain the approval of the Employers Representative for their intended use and location.
1201.4 SR	Where the Contractor proposes to use Temporary Traffic Signs which are not prescribed signs, he shall obtain the approval of the Employers Representative for their intended design, use and location.
1202.2 SR	General Requirements for Permanent Traffic Signs Signs shall be in accordance with the requirements of the Contract.
1203.2 SR	Foundations for Permanent Traffic Signs and Signals All excavations for foundations shall be carried out in compliance with Clause 604 of this Specification.
1203.4 SR	Posts shall be supported for a minimum of 3 days after placing the concrete. Backfilling shall not take place until at least 48 hours after placing.
1205.1 SR	Location and Erection of Permanent Traffic Signs The approximate locations of Traffic Signs are described in the Contract. The exact location of each traffic sign shall be determined on site and recorded by the Employer's Personnel.
1205.3 SR	Signs erected on two or more posts shall have each post positioned so that the post centres are not more than 1525mm apart and no part of a sign shall be cantilevered by more than 610mm from a vertical post support (except on a special frame assembly e.g. H frame) unless otherwise approved by the Employers Representative.
1205.5 SR	No traffic sign shall be dismantled, resited or removed without the prior approval of the Employers Representative.
1206.1 SR	Covering of Permanent Traffic Signs Where it is required in Appendix 12/1 that permanent traffic signs be blanked-out or have an alternative message, the method to be adopted shall comply with the following, unless

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	otherwise described in Appendix 12/1: (i) for plate signs: A cover plate made from 1.5 mm sheet, compatible with the underlying material, or a loose covering of a material approved by the Employers Representative, or, for covering periods of up to one year, a self-adhesive plastic film to support the temporary sign face sheeting; (ii) for other traffic signs: A loose covering of a material approved by the Employers Representative.
1206.2 SR	Cover plates shall be fixed by means of 5 mm diameter stainless steel bolts, washers and nuts complying with BS 6105 or non-ferrous rivets not more than 600 mm apart, the bolt passing through 5 mm thick and 12 mm diameter plastic distance pieces between the sign face and cover plate. Any holes remaining in the finished sign face shall be filled with rivets covered by a material approved by the Employers Representative, of a colour to match that part of the face.
1206.6 SR	Removal of any covering shall be carried out with the minimum disturbance to traffic and only after the Employers Representative has given his approval.
1206.7 SR	Irrespective of any requirement in Appendix 12/1 to cover signs, any traffic sign erected at such a time that its legend does not relate either wholly or in part to the traffic movement and route in operation, shall have its sign face securely covered with one of the materials in 1206.1 until such time as the Employers Representative authorises its removal.
1207.1 SR	Employer's Temporary Traffic Signs Each Employer's Temporary Traffic Sign may be designated in the Contract as a Category A or a Category B type sign: (i) Category A signs shall comply with all the requirements for Permanent Traffic Signs as set out in Clauses 1202, 1203, 1204, 1205 and 1206; (ii) Category B sign face material shall, unless otherwise specified, be Class II retro reflective sign face sheet material as set out in the "Certification Scheme, Specification, and Guidance for the Construction of Traffic Signs – TS4" and shall satisfy the requirements set out in Appendix 12/1.
1207.2 SR	Employer's Temporary Traffic Signs shall also comply with the requirements of Clause 1215.
1208.2 SR	Temporary Traffic Signs The layout, size and use of these signs shall be in accordance with the Traffic Signs Manual or as otherwise approved by the Employers Representative. These signs shall be mounted and supported in a manner approved by the Employers Representative and that satisfies any specific requirements set out in Appendix 12/1.

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1210.8 SR	Reflective Markers - Foundations for Posts The type and size of foundations for marker posts shall be as described in Appendix 12/2 and unless stated therein shall comply with this clause. All excavations for foundations shall be carried out in compliance with Clause 604. Unless otherwise described in Appendix 12/2 the post shall be installed centrally in 300mm diameter augured holes filled in compliance with Clause 2602 with mix ST2 concrete to within 75mm of the ground surface.
1211.6 SR	Road Markings - Temporary Road Markings Temporary road markings shall only be adopted with the prior approval of the Employers Representative and shall comply with the requirements of Appendix 12/3.
1211.7 SR	When temporary road markings are used on surfaces that will continue to be used by public traffic after its removal, any shadow trace remaining after its removal shall be permanently obliterated to the Employers Representative's satisfaction. Prefabricated materials will not be permitted to be used for this obliteration.
1211.8 SR	Temporary road markings constructed from a proprietary prefabricated road marking material shall only be adopted in locations and on types of road surface as approved by the Employers Representative and shall comply with any other requirement therein. The marking material shall be new and together with any primer shall be stored and installed in accordance with the manufacturer's instructions and within the recommended shelf life. Prefabricated road markings shall only be applied to surfaces that are clean and dry. Upon removal they shall be disposed of off-site and if any making good is necessary to the road surface it shall be carried out to the Employers Representative's satisfaction before the road is opened to traffic.
1212.3 SR	Road Studs – Reflective Road Studs The Contractor shall submit details of the reflecting road studs he proposes to use in the works to the Employers Representative.
1212.7 SR	Removal and Replacement of Existing Road Studs Following heating drying and removal of loose material, the base of the cavity shall be lined with 12 mm of A2 grade bitumen or otherwise as approved by the Employers Representative. The cavity shall then be filled to the level of the existing road surface with 14 mm chippings. The voids in the chippings shall then be filled with A2 grade bitumen or otherwise as approved by the Employers Representative to a level 5mm below the finished surface. The Contractor shall provide traffic safety and control measures, at sections of the roadway where cavities are not filled immediately following removal of road studs. Details of the traffic safety and control measures shall be submitted to the

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	Employers Representative in advance. Filling of the cavity resulting from removal of the road stud shall be completed within three hours of removal of existing road studs and in no case shall cavities remain unfilled overnight.
1212.8 SR	Road studs, intended for reuse, shall be cleaned in a manner approved by the Employers Representative. Such studs shall have new inserts installed prior to installation in the road surface.
1213.4 SR	Traffic Cones, Traffic Cylinders, Flat Traffic Delineators and Other Traffic Delineators General FTD's shall be constructed of rubber or plastic materials. It shall be possible to insert and remove blades without requiring a special tool. The height of the FTD shall be 750mm or 1000mm as approved by the Employers Representative. The sides of the blade shall make an angle of $10 \pm 2.5^\circ$ with its vertical axis; the width of the top of the blade shall be 45 ± 10mm. The base shall have a maximum width measured parallel to the face of the blade of $0.75H$ where H is the height of the FTD and a minimum length measured at right angles to the face of the blade of $0.75H$. The height of its outermost edge shall not exceed 70mm.
1213.19 SR	The Contractor shall submit to the Employers Representative a copy of a test certificate confirming that samples of the identical type of cone, cylinder, FTD or delineator as those to be used in the Works and supplied as permanent cones, cylinders, FTDs or delineators under the Contract, have been tested and found to comply with sub-Clauses 1 to 18 of this Clause.
1213.20 SR	Permanent Cones, Cylinders, FTDs and Other Delineators Where required in Appendix 1/5 the Contractor shall arrange for the tests described in sub-Clauses 22 to 56, for cones, cylinders, FTDs and other delineators, to be carried out at an approved testing laboratory. The numbers to be tested, as given in Appendix 1/5, will be selected at random by the Employers Representative from the batch to be supplied under the Contract. Failure of any test will result in rejection of the batch unless the Employers Representative directs otherwise.
1213.21 SR	Temporary Cones, Cylinders, FTDs and Other Delineators The Contractor shall submit to the Employers Representative certification substantiating that at least 1 in every 500 of any batch of cones, cylinders, FTDs and delineators to be used in temporary Works have passed the tests described in sub-Clauses 22 to 56 of this Clause as appropriate.
1215.2 SR	Temporary Signs, Signals, Road Markings and Other Delineators

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	Employer's temporary traffic signs shall comply with this Clause in addition to the requirements of Clause 1207.
1215.3 SR	Temporary reflecting road studs shall comply with the following: (i) Clause 1212 and only be installed for periods of up to 3 months and thereupon be replaced unless otherwise agreed by the Employers Representative; or (ii) permanent reflecting road studs complying with Clause 1212 used for temporary purposes and having the Employers Representative's prior approval.
1215.6 SR	Any other signal, lamp, barrier or device shall be suitable for its intended purpose and where relevant shall comply with appropriate British Standards and shall be approved by the Employers Representative.
1215.8 SR	Any temporary covering of temporary signs shall comply with Clause 1206. Any temporary covering of road studs and road markings shall be to the approval of the Employers Representative and comply with any requirements described in Appendix 12/3.
1215.9 SR	Removal of temporary signs shall be carried out as soon as they become superfluous or a hazard to traffic. Methods of removal and making good shall be submitted to the Employers Representative. Making good shall be carried out immediately after removal of the traffic sign, to the satisfaction of the Employers Representative.
1216.3 SR	Traffic Signals – General Traffic signal equipment shall comply with the requirements and specification described in Appendix 12/5 including any amendments therein. It shall consist of control equipment including detector loops of a type which has received approval by the Minister for the Environment. They shall be maintained and serviced as described in Appendix 12/5.
1217.1 SR	Detector Loops The layout of the detector loops is described in Appendix 12/5. The exact position of detector loops shall be determined by the Employers Representative before the commencement of any associated work.
1217.13 SR	Before and after backfilling the slots, the Contractor shall measure the series resistance, the insulation resistance and the inductance of each loop circuit. In addition, the Contractor shall record on a suitable test certificate the site reference, the loop reference, the length of feeder cable on each loop circuit, the date of test, the prevailing weather conditions and ambient temperature. The results shall be submitted to the Employers Representative. (i) Series Resistance The series resistance shall be measured between the two conductors of a feeder cable comprising a loop circuit at the equipment housing. The resistance shall, unless otherwise

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	stated in Appendix 12/5, when corrected to 20°C, be 13.7 ohms per kilometre of conductor. The measurement shall remain stable for a period of one minute with normal traffic flow over the loop in question. (ii) Insulation Resistance With the two conductors of a feeder cable comprising a loop circuit connected together, the insulation resistance between the feeder cable conductors and a good earth point shall, unless otherwise stated in Appendix 12/5, be 10 mega ohms or greater measured at a test voltage of 500 V d.c. applied for at least one minute. (iii) Inductance The inductance shall be measured at a frequency of 70 kHz $\pm$ 10% between the two conductors of a feeder cable comprising a loop circuit with no vehicles over or traversing the loop and with no other adjacent loop circuit energised. The inductance of the loop circuit shall, unless otherwise stated in Appendix 12/5, not vary by more than 20% from the theoretical value for the loop circuit.
1217.15 SR	Each feeder cable shall be labelled at its point of entry to the equipment housing, the system of identification to be agreed with the Employers Representative. The cable marker reference, each detector function and the physical position of each detector module inside the housing shall be shown on a drawing to be fixed to the inside of the equipment housing. The drawing shall be in the form of a self-adhesive label and comply with BS 4781.
1217.17 SR	A plan to a scale of 1:500 with detailed insets at 1:200 of each as-built loop installation shall be submitted by the Contractor to the Employers Representative. These shall be delivered within one calendar month of the issue of the relevant certificate of Substantial Completion. The drawings shall show: (i) street layout and names where applicable; (ii) cable runs and type of cable in each run; (iii) position of all joints; (iv) dimensions of loops and number of turns in each loop.
1217.24 SR	Detector Feeders - Motorways All loop cables shall be terminated in a roadside chamber using insulated crimp connectors and a ratchet type crimping tool. The whole joint shall then be encapsulated in a polymer acrylic or epoxy resin jointing system comprising a plastic joint surround. All cable ends which are left temporarily unterminated shall be sealed to prevent the ingress of water.
1218.2 SR	Pedestrian Crossings

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	Surfacing of pedestrian crossing areas, where required, shall be laid with materials and to methods detailed in a document submitted to the Employers Representative and comply with Appendix 12/5. The finished surfacing shall have a minimum skid resistance value of 55 when tested in compliance with: (i) BS 3262 : Part 1 for thermoplastic material and prefabricated tiles; or (ii) BS 6044 for paint.
1301.2 SR	Road Lighting Columns and Brackets – General The designer and manufacturer of lighting columns and brackets proposed by the Contractor shall demonstrate adequate quality procedures and controls. The Contractor shall make provision for the design, supply and installation of all public lighting as described in Appendix 13/1. The Contractor shall where required provide designs for: (i) anchorages and attachment systems for columns with flange plates to foundation or bridge deck; (ii) foundations for columns with flange plates as described in Appendix 13/1.
1301.5 SR	Temporary lighting on Contractor's and Employers Representative's temporary diversions for traffic, and crossovers, shall comply with this Series.
1302.2 SR	Design of Lighting Columns, Brackets, Foundation, Anchorages and Attachment Systems Lighting columns and column systems shall be certified as complying with these specifications in accordance with the design and check certificate shown in Appendix 13/4 and as follows: (i) The design certificate for lighting columns (for planting or with flange plates), brackets, anchorage and attachment systems shall be completed by the manufacturer and the check certificate by an independent Checking Consultant accepted by the Employers Representative and the manufacturer. The design and check certification shall specify the range of combinations of column heights and length of brackets (taking account of orientation of bracket relative to door opening and orientation of sign) together with the weights and windage areas of lanterns for which the column has been designed and confirm that the design has been accurately transferred to the working drawings. (ii) Where lighting column designs are verified by testing as permitted in BS 5649: Part 8, a combination of calculations and testing shall be carried out as follows: (a) Fatigue life shall be verified by calculation; (b) Testing shall be in accordance with BS 5649 : Part 8 with the following modifications and instructions: Add to the end of the last sentence of Clause 4: "and UK DOT Standard BD 94".

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	In Clause 5 substitute: “the site value for k” in place of “a k factor of 1”. Add a new paragraph “The effect of the required 0.3m² sign shall be allowed for by applying a load equal to the calculated wind load of the sign oriented in accordance with Chapter 7, UK DOT Standard BD 94”. Modify Clause 7(b) to read: “The temporary horizontal deflection of the lantern connection caused during the load test by the incremental load due to the horizontal forces corresponding to the value of k appropriate to the site, shall not exceed 0.06 (h+w). (See BS 5649: Part 2 as modified by UK DOT Standard BD 94 Clauses incorporated into the Specification for Road Works)”. When applying Clause 7(e) the value of γ_t from Annex A shall be that of the country of origin of the column material. Delete the following text from the 4th line of Clause 8: “for k = 1.0 and”. (c) The Checking Consultant shall witness the test and countersign the Annex C report unless the test is carried out by a testing laboratory acceptable to the Employers Representative. (iii) Any modification to a certificated design shall be subject to recertification by the manufacturer and the Checking Consultant.
1302.3 SR	Where the design of anchorages and attachment systems is provided by the Contractor the design may be required to be certified by a Checking Consultant accepted by the Employers Representative and the Contractor.
1302.4 SR	Where the design of foundations for columns with flange plates is provided by the Contractor the design may be required to be certified by a Checking Consultant accepted by the Employers Representative and the Contractor.
1302.5 SR	The Contractor shall submit to the Employers Representative evidence of certification in respect of the above as follows: (i) For sub-Clause 2: A copy of the design and check certificate as in Appendix 13/4 and the Annex C report (if appropriate) inclusive of the information required under sub-Clause 2 and signed by the manufacturer and Checking Consultant; (ii) For sub-Clause 3: A copy of the design and check certificate signed by the Checking Consultant in compliance with the requirements described in Appendix 13/1; (iii) For sub-Clause 4: A copy of the design and check certificate signed by the Checking Consultant in compliance with the requirements described in Appendix 13/1.
1302.6 SR	Aesthetic Requirements The design of lighting columns and lanterns including those with bracket arms shall be

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	submitted to the Employers Representative for aesthetic approval.
1302.7 SR	Foundations for Planted Columns The Contractor shall where required submit designs appropriate to the soil types encountered on Site, as identified in Appendix 13/1, to the Employers Representative for his acceptance.
1303.1 SR	Data Sheets The Contractor shall complete the details in Appendix 13/2 Sheet 1 and Sheet 2 in accordance with the Instructions given in Appendix 13/3. He shall provide the Employers Representative with triplicate copies of the completed Data Sheets for each type of column and bracket not later than the date stated in Appendix 13/1.
1303.2 SR	The columns and brackets shall not be erected until the Employers Representative has notified his acceptance of the completed Data Sheet in writing to the Contractor.
1305.3 SR	Installation of Foundations, Anchorages and Attachment Systems Planted Columns The hole into which the column is placed shall be backfilled as follows: (i) in the case of metal and glass fibre reinforced plastic columns with concrete or other material described in Appendix 13/1; (ii) in the case of concrete columns with concrete or earth fill complying with sub-Clause 5 of this Clause or other material described in Appendix 13/1.
1305.10 SR	Columns with Flange Plates Where anchorages in drilled holes are to be used, the Contractor shall, unless otherwise described in Appendix 13/1, submit to the Employers Representative at least 4 weeks before installation well attested and documented evidence that the proposed anchorage is: (i) capable of complying with the test requirements specified in Clause 1306; and (ii) capable of resisting pulsating loading. Anchorages in drilled holes of an expanding type shall not be used.
1306.3 SR	Site Tests on Anchorages in Drilled Holes The Contractor shall test the anchorages selected by the Employers Representative and the testing frequency shall be in accordance with Appendix 1/5.
1308.1 SR	Handling, Transport and Erection Lighting columns and brackets shall be handled, transported and stored in such a way as to avoid any structural damage or damage to the surface protection system. Any damage shall be made good in such a way that the structural performance and durability of the item shall be in no way reduced.

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1308.4 SR	Columns shall be installed in accordance with the manufacturer's recommendations. The door shall face the direction described in Appendix 13/1.
1310 SR	Amendments and Additions to BS 5649: Part 3: 1982 Page 2 – Clause 7 Delete sub-clause 7.1 and insert the following: “7.1 Steel and Aluminium Lighting Columns 7.1.1 General. Arc welding of carbon manganese steels shall comply with BS 5135. Arc welding of stainless steels shall comply with BS 4677. Arc welding of aluminium alloys shall comply with BS 3019 or BS 3571 as appropriate. 7.1.2 Procedures. Written welding procedures shall be used with testing to IS EN 288 : Part 3 for Steel and Part 4 for aluminium alloys and shall apply to all production and repair procedures. These shall be subject to reapproval after a period of seven years. When applying IS EN 288 : Part 3 the welding consumables and procedures used for steel shall be such that the mechanical properties of deposited weld metal will not be less than the respective minimum specified values of the parent metal being welded. Testing shall be by a laboratory appropriately accredited by ILAB. Approval shall be by an Inspecting Authority acceptable to the Employers Representative using appropriately qualified.
1310 SR contd.	Welding Engineers, Welding Quality Engineers or equivalent. 7.1.3 Welder Qualification. All welders shall be approved to IS EN 287: Part 1 for steel and Part 2 for aluminium alloys. The tests shall include in addition an application test representative of the main structural joints on which the welder is to be approved to work. The main structural joints shall include, where relevant, the flange plate joint, the base compartment to shaft joint, the door reinforcement, any intermediate column joint, the column to bracket joint and the column seam weld. Welders shall be subject to reapproval after two years. Testing shall be by a laboratory appropriately accredited by ILAB. Approval shall be by an Inspecting Authority acceptable to the Employers Representative using appropriately qualified Welding Engineers, Welding Quality Engineers or Welding Inspectors or equivalent. 7.1.4 Inspection and Non-Destructive Testing 7.1.4.1 Inspection Personnel. The manufacturer shall provide suitable people to carry out inspection of production welds as required in 7.1.4.2 to 7.1.4.4. Personnel conducting visual inspection shall have a recognised certificate of competence appropriate to the type of welding being inspected. Personnel conducting non-destructive testing (NDT) shall be certified according to a recognised certification scheme appropriate to the equipment used and the weld groups inspected. Evidence of training and qualification shall be retained and made available when required. The results of all inspections shall be recorded.

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	7.1.4.2 Visual Inspection. All welds shall be subject to visual inspection in accordance with BS 5289 prior to any NDT and galvanizing. Weld surfaces shall be free of slag residues and sharp edges. All surfaces shall be free of traces of weld spatter, arc strikes and contaminants. The throat dimensions of butt welds and the leg length and apparent throat dimensions of fillet welds, as measured by a welding gauge and taking into account lack of fit, shall not be less than those specified, except that local shortfalls up to 0.5mm may be accepted provided the average over any 50mm length is not less than the specified dimension. The toe angle shall not be less than 110°. The surface of all welds shall be free from cracks, lack of fusion including overlap, and slag. Isolated discontinuous porosity may be accepted provided it is not detrimental to the galvanizing process. Undercut shall not result in a section loss of more than 5% over any 50mm length of joint, nor shall its depth exceed 0.5mm or 10% of the thickness, whichever is the less. 7.1.4.3 Magnetic Particle Inspection (MPI) and Liquid Penetrant Inspection. MPI shall be applied in accordance with BS 6072 to joints in steel lighting columns selected in accordance with 7.1.4.5, where any of the material thickness exceeds 20mm. Liquid penetrant inspection in accordance with BS 6443 shall be applied to transverse welds in aluminium columns selected in accordance with 7.1.4.5. Notwithstanding the requirements of 7.1.4.5, one of the above methods shall be applied as appropriate where on visual inspection the presence of cracking or lack of fusion may be suspected. To aid inspection the profile of the weld may be dressed by burr grinding provided that the specified throat size and leg length is still maintained. The surface of the weld shall be free of cracks, lack of fusion and slag. 7.1.4.4 Ultrasonic Testing. All butt joints selected in accordance with 7.1.4.5 shall be ultrasonically tested in accordance with BS 3923 where the column shaft is 8mm thick or greater. For aluminium the principles in BS 3923 shall be applied. The weld shall be free of cracks. The height of buried slag, lack of fusion or lack of penetration shall not exceed 3mm. Within 6mm of the outer surface, their individual length shall not exceed 5mm. The resulting net throat area loss over any 50mm length of weld shall not exceed 5%. 7.1.4.5 Frequency of Testing. Joints for MPI, LPI or ultrasonic testing shall be selected as follows: 10% of lighting columns of each type shall be inspected. The sample shall include all variations in joint geometry, material thickness and weld size covered by the basic type, that are within the scope of 7.1.4.3 and 7.1.4.4. If non-conformances are found the scope of MPI, liquid penetrant inspection and ultrasonic testing shall be doubled. If further non-conformances are found, the whole batch shall be tested. 7.1.4.6 Reporting. Inspection records for production welds shall be retained by the

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	manufacturer for seven years and those covering the production periods relating to the project.
1310 SR contd.	Lighting columns supplied shall be made available for examination. 7.1.5 Destructive Testing. Copies of certified reports of destructive tests on lighting columns supplied under earlier roads contracts shall be provided at the request of the Employers Representative. The Contractor shall supply sample joints cut from complete lighting columns for destructive testing as selected by the Employers Representative. The sample joints shall be cut from the column, bracket and welded anchorage where relevant. The basis of selection shall be as follows: (a) For orders of 1 to 150 lighting columns – one complete lighting column for each type, unless destructive testing has been carried out within the last six months on a lighting column of that type where the lighting column that was tested was selected by the Employers Representative to another contract complying with this Specification. (b) For orders of 151 to 300 lighting columns – 1 complete lighting column for each type. (c) For orders exceeding 300 lighting columns – 2 complete lighting columns for each type. (d) For lighting columns in excess of 12 m nominal height destructive testing may be waived where all of the following applies: A report is provided by an appropriately qualified Welding Inspection Consultant indicating that the welding designs, techniques, procedures and testing used by the manufacturer for the production of the columns are satisfactory; the Welding Inspection Consultant is commissioned by the Employers Representative to the contract or to another contract complying with this Specification; the Welding Inspection Consultant is afforded the same facilities as due to the Employers Representative and inspection takes place during the manufacturing process. Notwithstanding destructive testing carried out in accordance with sub-Clauses (a),(b) and (c) or waived in accordance with (d) the Employers Representative may select and test one complete lighting column of each type at time of delivery to site in accordance with Clause 1310 and NG 1310. Acceptance criteria shall be as specified in 7.1.4, except that in 7.1.4.2 the throat and leg dimension shall apply to the true rather than the apparent dimension. In the event that there is a non-conformance arising from a serious deviation in materials, preparation, assembly, or welding procedure, the batch concerned shall be rejected and further production of the columns affected stopped until such time as the fault has been corrected. A minor non-conformance shall only be accepted on the basis that further

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	sampling and testing shows that fault is not repetitive and in the view of the Employers Representative will not in that instance impair structural integrity. If the problem can be traced to a particular manufacturing period, operator, piece of equipment or batch of materials and if proper traceability to individual batches of components can be assured, only those batches affected may be subject to rejection. The destructive test reports shall be retained by the manufacturer and recorded in a register for a period of two years. The destructive test specimens shall be retained for a period of 12 months. These shall be made available for examination on future contracts with the National Roads Authority. 7.1.6 Remedial Work. Welds which do not comply with the Specification may be repaired to an approved procedure, as described in 7.1.2". Page 2 – Clause 7 Delete sub-clause 7.2 in its entirety.
1313.1 SR	Laminated Glass Fibre Reinforced Plastic (GFRP) Columns Manufacture of GFRP Laminates The columns shall be produced either by hand lay-up or mechanical moulding technique. The mechanical manufacture shall be carried out either by filament winding, centrifugal casting, compression moulding, resin injection or any other method accepted by the Employers Representative.
1313.7 SR	Materials for GFRP Laminates Any fillers and pigments incorporated in the resin shall form part of the total resin system and shall be subject to the acceptance of the Employers Representative.
1313.8 SR	Fibre reinforcement shall conform to the appropriate British Standards. Where glass fibre is used as the base for mat or chopped fibre it shall conform to BS 3691 and shall be treated with an appropriate finish compatible with the resin system used.
1313.13 SR	Testing of GFRP Laminates The colour fastness test shall be conducted in accordance with BS 2782 : Part 5 : Method 550A and the results assessed by Method 552A. Material with a colour change assessed greater than moderate will not be accepted.
1314.10 SR	Brackets for Laminated GFRP Lighting Columns Testing of Polyurethane Foam Evidence of quality control including results of tests similar to those required in sub-Clauses 6, 7 and 8 of this Clause shall be made available when required by the Employers Representative.
1315.1(i) SR	Specification for Design Loads to BS 5649: Part 6 : 1982

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	The Employers Representative evaluates a k value of 2.5 or less for the Site in accordance with the relevant reference in BS 5649: Part 6:1982 i.e. CP3: Chapter V: Part 2, when a value of 2.5 shall be used.
1401.4 SR	Electrical Works for Road Lighting and Traffic Signs - General The Contractor shall make all arrangements and provide facilities for the electricity supplier for the service connections and commissioning of the network.
1402.1 SR	Site Records When required in Appendix 14/1 the Contractor shall, on the completion of the electrical work, show on a set of drawings or transparencies or other suitable medium supplied by the Employer the position and identification mark of equipment requiring electrical connections, ducts, underground cables and joints and the type and depth of cables.
1402.2 SR	Locational measurements shall be taken of the underground equipment to the nearest 150 mm from the nearest edge of the carriageway or fence line. Offsets to cables and ducts shall be recorded at 20 m intervals along their line. Offsets shall be defined longitudinally by distance from a permanent highway feature, a marker post or other defined fixed point.
1402.3 SR	The Contractor shall keep a daily record of the work in sufficient detail, including the type and drum number of underground cables, to enable site records to be completed. A copy of the daily record shall be provided by the Contractor on the next working day for retention and use by the Employers Representative.
1402.4 SR	The Contractor shall supply to the Employers Representative one master and two prints of the 'as-built' drawings of traffic signal installations immediately upon completion of the installation work.
1403.1 SR	Location of Lighting Units and Feeder Pillars The position of Lighting Units and feeder pillars is described in Appendix 14/2. The exact location will be agreed on site before commencement of any associated ground work. The Contractor shall be responsible for recording the actual location.
1403.2 SR	In cases where the location of an item has been determined as indicated above and it is impossible because of underground obstruction to install the item then any excavation shall be backfilled and reinstated to its original condition.
1404.1 SR	Change of Lighting Arrangements No Lighting Unit shall be switched on or off, dismantled, resited or removed without prior approval of the Employers Representative.
1408.1 SR	Lamps Lamps shall be compatible with the luminaires used. Evidence of compatibility may be required by the Employers Representative.

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1408.3 SR	Lamps shall not be fitted until columns, brackets and sign posts have been erected and the luminaires have been installed.
1413.2 SR	Ignitors for Discharge Lamps Compatibility between ignitor, lamp and ballast shall be established to the satisfaction of the Employers Representative.
1415.2 SR	Capacitors Capacitors shall correct the lamp circuit power factor to not less than 0.85 lagging.
1417.1 SR	Base Compartment Fixing Arrangements Electrical equipment described in Clauses 1412, 1413, and 1415 shall be contained in a separate compartment in the lantern housing. Electrical equipment described in Clause 1416 shall be installed within the base compartment of the columns and fixed in accordance with the manufacturers' written instructions with corrosion resistant fixing screws.
1418.8 SR	Feeder Pillars A durable warning sign indicating 'Danger 400 Volts' or 'Danger 230 Volts' as appropriate, in 5cm high letters (or other size as specified in Appendix 14/4), shall be fixed to the front of the pillar where applicable. Each pillar shall have a permanent label fixed externally which identifies it as a public lighting pillar.
1420.1 SR	Earthing All earthing and bonding shall comply with the requirements of the National Rules for Electrical Installations and with any additional requirements specified in Appendix 14/4. Circuit protective and equipotential conductors shall be installed as shown on the drawings in the Contract and shall be green/yellow PVC or XLPE insulated or sleeved. Where bolted connections are required, these conductors shall be terminated in accordance with manufacturers' instructions in correctly sized purpose made lugs. Such connections shall be made with non-ferrous nuts, bolts and washers.
1420.5 SR	All extraneous conductive parts, as described in the National Rules for Electrical Installations shall, where required in these Rules, be bonded to the main earth terminal in accordance with these Rules and as required in Appendix 14/4. Earth electrodes shall comply with the requirements as specified in Appendix 14/4.
1421.1 SR	Underground and Ducted Cable Unless otherwise specified in Appendix 14/4 cables shall be in ducts and be PVC or XLPE insulated and sheathed, 600/1000 V grade with steel wire or aluminium strip armouring to BS 6346 or BS 5467 or of the type NYCY to VDE 0271. All conductors shall be of equal cross-sectional area when installed in ducts. The Contractor shall provide to the

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	Employers Representative evidence that each cable length delivered to Site has been tested at the place of manufacture and complies with the testing requirements of the relevant specification.
1421.5 SR	Cables shall be laid without sharp bends and kinks and in accordance with any particular requirements in Appendix 14/4. If required, additional protection and support shall be provided as described in Appendix 14/4.
1421.9 SR	Cables shall only be laid when the ambient temperature is above 0°C, and the cable has been stored at a temperature greater than 0°C for the previous 24 hours.
1421.13 SR	Cables laid directly in trench shall, unless otherwise specified in Appendix 14/4, be both bedded on and covered by a 100 mm thickness of lightly compacted graded sand or equivalent material passing a 2 mm BS sieve. Class 8 material complying with Table 6/1 and compacted to the requirements therein shall then be deposited to a thickness of 175 mm prior to further backfilling in compliance with sub-Clause 16 of this Clause.
1421.14 SR	A yellow, self-coloured PVC or polythene plastic tape for cable marking, not less than 0.1 mm thick and 150 mm wide with the wording "Street Lighting Cables Below" printed along the full length so as to occupy not less than 75% of its available length and occurring at least at 1 m intervals, shall be laid approximately 250 mm above any power supply cable. Where several cables are laid in one trench, only one line of marker tape need be installed.
1422.2 SR	Cable Joints Prior to any cable laying, the Contractor shall furnish to the Employers Representative evidence of the jointer's competence in the use of the adopted cable joint kit. A record shall be kept to enable cable joints to be identified with the jointer responsible for the work.
1422.3 SR	Cable joints shall be made only where described in Appendix 14/4. The approval of the Employers Representative is required for the provision of additional joints and they shall not be used for cables situated in a duct or trough.
1422.4 SR	The Contractor shall notify the Employers Representative before jointing commences so that he may have the opportunity of inspecting the whole of the jointing operations. Jointing shall only be carried out when all materials to be used in the jointing are free from visible signs of moisture and joints shall be left protected from the weather during the curing period.
1422.5 SR	Joints shall be adequately supported at all times. Backfilling shall not take place until the completed joint is in a fit condition to withstand any stresses which may be imposed upon it.
1424.2 SR	Inspection and Testing to be Carried Out by the Contractor

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	The following tests shall be carried out in the sequence indicated below and recorded on a Schedule, the format of which shall be agreed with the Employers Representative, and, unless otherwise agreed, be submitted to him immediately after completion of all the tests, including those on Lighting Units, within each network: (i) For Lighting Units (b), (d), (f), (g) apply. (ii) For networks (a), (b), (c) (where necessary), (e), (f), (g), (h), (j), (k) apply. Standard methods of testing are given in the National Rules for Electrical Installations. The details of testing shall be agreed with the Employers Representative. (a) Cable sheath insulation test. (b) Continuity of protective conductors including main and supplementary equipotential bonding. (c) Earth electrode resistance. (d) Insulation resistance at a test voltage of 500 V to be not less than 1.0 M ohm. (e) Insulation resistance at a test voltage of 500 V to be not less than 6 M ohm. (f) Insulation of the site-built assemblies. (g) Polarity, including the continuity of circuit conductors. (h) Earth fault loop impedance at every cut-out. (j) Operation of residual current devices. (k) Voltage readings shall be taken at each feeder pillar and at the terminals of the last current-using equipment on each circuit, with all equipment energised.
1424.3 SR	The Contractor shall give not less than 7 days' notice to the Employers Representative of his intention to carry out any of the tests specified and the Employers Representative shall be given the opportunity to witness such tests.
1424.4 SR	The Contractor shall furnish the Employers Representative with two copies of a certificate verifying compliance with the relevant National Rules for Electrical Installations upon satisfactory completion of the inspection and tests.
1502.2 SR	Security Systems - General Requirements All operations shall be arranged so that the communications installation is completed, tested and the test results submitted to the Employers Representative at least 8 weeks before the date for Substantial Completion of the Works and, where required in Appendix 15/1 any Section thereof, in order to allow time for the Employers Representative to commission the system. The Contractor shall allow sufficient time in his programme for any repairs and retesting which may be required to be completed satisfactorily before the aforementioned 8 week commissioning periods.
1502.3 SR	The Contractor shall provide facilities for the electricity supplier for service connections

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	and for the Employers Representative for commissioning of the system.
1502.4 SR	The Contractor shall demonstrate, in advance of commencing cable installation work, competency to undertake the necessary cable termination and testing requirements detailed in Clauses 1511, 1513, 1515, 1516 and 1518 to the satisfaction of the Employers Representative. The Contractor shall allow sufficient time in his programme to achieve compliance; 14 days notice, in writing, to the Employers Representative is required. The written consent of the ER shall be obtained before cable installation commences.
1504.1 SR	Site Records The Contractor shall keep a daily record in duplicate in a clear and legible form, on drawings, of all work carried out as it proceeds. One copy shall be kept available for the use of the Employers Representative during the Contract and shall, at Substantial Completion certificate stage of the contract, be handed to the Employers Representative for record purposes. (Handover during the Defects Periods is not acceptable). The following information shall be recorded on the drawings: - Cable routes, including cable lengths; - Cable size, type and drum number; - Cabinet positions and type; - Power supply interfaces; - Telecom and other interfaces; - Transmissison stations; - Signals; - Telephones; - Joint and sheath repair positions; - Duct locations including depth, number of ducts, duct material and the number and type of cable in each duct; - Cabinet references; - Any additional requirements stated in Appendix 15/1. The drawings shall be submitted to the Employers Representative at weekly intervals during the Contract.
1504.2 SR	Locational measurements shall be taken of the underground equipment to the nearest 100mm from the nearest edge of the carriageway or fence line. Offsets to the cables shall be recorded at 20m intervals and at every change of direction allong the line of the cable unless otherwise directed by the Employers Representative. Offsets shall be defined longitudinally by distance from a permanent road feature, a marker post or other defined fixed point.

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1504.3 SR	The Contractor shall keep a daily record of the work in sufficient detail including type and drum number of underground cables to enable site records to be completed. A copy of the daily record shall be provided by the Contractor on the next working day for retention and use by the Employers Representative.
1505.2 SR	Cabinets and Ancillary Items The Contractor shall be responsible for safe storage of the equipment including the provision of a dry heated store as described in Appendix 15/1. All equipment shall be secured by means of master keys, of which 2 originals of each shall be supplied to the Employers Representative on Substantial Completion of the Works.
1506.3 SR	Cables The approximate positions of cables to be installed and their terminating cabinets are described in Appendix 15/1. The exact location shall be agreed on site before the commencement of any associated ground work. At this time the Contractor shall also provide the Employers Representative with a schedule of cable lengths and their locations, after checking the lengths of cable routes on the Site.
1506.4 SR	Each drum of cable delivered to the Site shall be accompanied by duplicate copies of test certificates bearing the cable description and the name of the manufacturer. No cable length shall be laid until its manufacturer's test certificate has been submitted to the Employers Representative and the Contractor has tested and accepted the integrity of the sheath in accordance with the cable test specification. The results of the Contractor's test shall be notified to the Employers Representative. The location in the ground of cable lengths by reference to their drum numbers shall be kept with the daily records.
1506.5 SR	The location of buried cables shall be detected, confirmed and protected in accordance with the "Special Requirements in Relation to Motorway Communications Systems" and any additional requirements determined by the design.
1507.4 SR	Cable Laying Where agreed by the Employers Representative cable may be installed using a purpose built cable laying machine.
1507.5 SR	Cables shall be laid without sharp bends and kinks and in accordance with any particular requirements in Appendix 15/1. If required, additional protection and support shall be provided as described in Appendix 15/1 or as directed by the Employers Representative. Communication cables shall be installed without mechanical pulling.
1507.6 SR	Where cables are laid across or within 500mm of filter drains they shall be contained within a duct. The ducts shall be surrounded with 150mm of mix ST2 concrete in compliance with Clause 2602. In the event that a cable route coincides with the line of a

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	filter drain the Contractor shall inform the Employers Representative prior to continuing the trenching operation; an alternative trench line shall be agreed. Any damage caused by the Contractor to any drain shall be repaired and reinstated to the satisfaction of the Employers Representative.
1507.12 SR	Unless otherwise directed by the Employers Representative, cables laid in trenches shall be both bedded on and covered by a 75mm thickness of sand passing a 2mm sieve to BS 410. Class 1C material complying with Table 6/1 and compacted to the requirements therein shall be deposited to a thickness of 175mm prior to further backfilling to comply with sub-Clause 15 of this Clause.
1507.13 SR	A green self-coloured PVC or polythene plastic tape for cable marking not less than 0.1mm thick and 150mm wide with the wording "Caution Telephone Cables" printed along the full length so as to occupy not less than 75% of its available length and occurring at least at 1m intervals, shall be laid approximately 250mm above any communication cable. Where several cables are laid in one trench, only one line or marker tape need be installed, unless otherwise directed by the Employers Representative. The wording on the tape shall be "Electricity Cables" where power supply cables and communication cables are laid in one trench, and the tape shall be yellow.
1507.15 SR	Backfilling to trenches shall not take place until they have been inspected by the Employers Representative. Backfilling shall be in accordance with Clause 602 with material Class 1 or 2 complying with Table 6/1 and compacted to the requirements therein. The material shall be spread and compacted evenly without dislodging, disturbing or damaging cables, ducts or troughs. Power hammers shall not be used within 300mm of cables, ducts or troughs. The surface shall be reinstated as described in Appendix 15/1.
1507.16 SR	As unburied or exposed cable is liable to theft and/or vandalism, no cable is to be left exposed at the end of any work period. Any cable stolen and/or vandalised as a result of the Contractor's non-compliance with this requirement shall be replaced by a length equal to the original unbroken total length of cable involved (i.e. through joint(s) will not be accepted).
1507.17 SR	Where directed by the Employers Representative any cable trenches, or excavations left open overnight or between the finish of one work period and the start of the next work period are to be covered by steel plates. The steel plates are to be strong enough to withstand the passage of any vehicles permitted to drive on the roadway without the possibility of collapse or dislodgement.
1507.18 SR	Between adjacent, longitudinal cabinets a drum length of cable shall be laid in one operation, unless otherwise directed by the Employers Representative.

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1508.1 SR	Installation of Cabinets and Signal Posts The Contractor shall construct paved areas and foundations incorporating plinths for cabinets and signal posts as described in Appendix 15/1. The cabinets and signal posts shall be mounted on the plinths using holding down bolts. Paved areas shall be either constructed level or with a gentle fall away from cabinets as directed by the Employers Representative; cabinet doors shall be capable of opening and closing without being fouled by the paved area.
1511.2 SR	Cable Joints Cable joints in power supply cables shall be made where described in Appendix 15/1. The approval of the Employers Representative is required for the provision of additional joints. Approval will not be given for cable joints situated in a duct or trough. Heat-shrink type joints shall not be used.
1511.4 SR	Joints shall be made using a suitable jointing system in which all components are mutually compatible and adequate for the type of cables to be jointed. Joints shall be installed in accordance with the manufacturer's instructions. Unless agreed by the Employers Representative, the Contractor shall submit records to the Employers Representative to enable cable joints to be identified with the jointer responsible for the work.
1511.5 SR	The Contractor shall notify the Employers Representative before jointing commences so that he may have the opportunity of inspecting the whole of the jointing operations. Jointing shall only be carried out when all materials to be used in the jointing are free from visible signs of moisture and joints shall be left protected from the weather during the curing period. Joints shall be adequately supported at all times. Backfilling shall not take place until the completed joint is in a fit condition to withstand any stresses which may be imposed on it and has been approved by the Employers Representative.
1513.1 SR	Termination of Armoured Multi-pair Communication Cables The armour and sheaths shall be removed from the ends of the communication cable to reveal the pairs of insulated conductors. All surplus jelly shall be removed by the use of a clean dry cloth taking care not to stretch the insulation, and any fluid substance to aid the cleaning process shall have had the prior approval of the cable manufacturer and the Employers Representative. Such approval will not be unreasonably withheld provided that the substance has been shown to have no detrimental effect on the cable or, if applicable, the jointing system. Heat shall not be applied to any part of the cable. The cable crutch shall be fitted with a sleeve and the cable ends shall be glanded or cleated and sleeved. Glands, cleats and earth tags shall be of aluminium.
1513.6 SR	Where the Contractor is required to terminate cables into cabinet equipment containing

Clause / Table / Figure No.	Title
	operational circuitry; the Contractor shall notify the Employers Representative sufficiently in advance so that he may arrange for Other Contractors to attend the site to supervise or undertake all work within the cabinet for which the Contractor is responsible. This must not compromise the operational system(s).
1514.1 SR	Terminal Block Connectors Details of the manufacturer of terminal blocks proposed by the Contractor shall be submitted to the Employers Representative. The Contractor must demonstrate that his adopted terminal block is in all respects physically compatible with the design and that it has satisfactory electrical performance characteristics.
1518.2 SR	Cable Testing Cables shall be tested at the manufacturer's works to ensure compliance with the specifications and the tests shall be witnessed by the Employers Representative.
1518.3 SR	When installed, cables shall be tested by the Contractor in accordance with the Specifications and the Employers Representative shall arrange for the tests to be witnessed by a specialist if he so requires. The cable sections for Stage 2 tests shall be as described in Appendix 15/1.
1518.4 SR	Three copies of all cable test results shall be supplied to the Employers Representative on the completion of each test.
1518.5 SR	The Contractor shall, after testing, locate and expose any damaged outer sheath whether caused by himself or not and shall report all such damage to the Employers Representative. The Employers Representative shall be informed prior to the commencement of any operation to expose damaged cable and shall be allowed to be in attendance during the operation.
1518.7 SR	All test instruments requiring calibration shall have a current calibration certificate, the Contractor shall provide the Employers Representative with copies of all such certificates prior to the commencement of testing.
1518.8 SR	The Contractor shall give at least two weeks notice, in writing, to the Employers Representative of his intention to test any cable.
1519.6 SR	Labelling and Numbering The Contractor shall submit to the Employers Representative his proposals for cabinet labels.
1521.1 SR	Removal and Resiting of Existing Equipment Existing communications equipment shall be removed or resited where required in the Works, as detailed in Appendix 15/1. No equipment shall be removed or cables disconnected or cut until approved by the Employers Representative.

Clause / Table / Figure No.	Title
1521.2 SR	Existing redundant cabinets, telephone posts, housing and handsets, signal equipment, etc., as detailed in Appendix 15/1 shall be carefully removed to store. The location of the store shall be notified by the Employers Representative at the commencement of the removal works.
1521.3 SR	Where required in Appendix 15/1 redundant electronic or signalling equipment shall be removed by the Contractor under the supervision of the Employers Representative. At least 1 weeks notice shall be given by the Contractor to the Employers Representative of his intention to remove such equipment.
1521.6 SR	Buried cables to be removed shall be located and pegged throughout their routes, the Contractor shall also excavate trial holes to expose these cables at the pre-determined locations. Where directed by the Employers Representative the Contractor shall excavate that part of the cable route carefully by hand. Where the cable to be removed is sharing a trench with other existing cables, on completion of removal, all stones and contaminated material shall be removed from the cable trench, clean sand and warning tape shall be provided and installed and the cable trench shall then be reinstated in compliance with Clause 201; the Contractor shall then remove and dispose of all unsuitable and surplus material. Cable in ducts shall be carefully withdrawn, the Contractor must also fulfil the requirements for removal of duct seal, re-sealing and re-roping. Cables in troughs shall be carefully segregated and lifted out, the Contractor shall also remove all trough lids, all debris from troughs and all sand from troughs. On completion the Contractor shall provide and install clean sand, reinstate all trough lids, and provide and install new trough lids to replace any breakages caused during the preceding operation. Redundant cables are to be coiled onto drums at the time of removal and transferred to the site storage area. At a convenient time, to be identified by the Employers Representative, the Contractor shall remove the redundant cable from the drums and dispose of it. Cables on signal gantries shall be unclipped and taken down, the Contractor shall also transport these to the site storage area and dispose of these at a time to be advised by the Employers Representative. The Contractor shall provide and install new cable clips, where required, for retaining existing cables on the gantry structure and cable tray. The cable shall be removed in compliance with Clause 201.
1801.1 SR	Structural Steelwork - General Structural steelwork shall be as described in Appendix 18/1 and the drawings referred to therein and shall comply with the requirements of this Series.
2203.3 SR	Anchorage and Attachment Systems for Metal Parapets for Vehicle Containment Only anchorages complying with 2203.1 & 2203.2 and having a current Irish Agrément

Clause / Table / Figure No.	Title
	Board Roads and Bridges Certificate shall be incorporated into the Works. At least 4 weeks before installation commences the Contractor shall submit to the Employers Representative a copy of the certificate together with copies of all documents referred to therein. Anchorages in drilled holes of an expanding type shall not be used.
2204 SR	Parapets - Amendment and Additions to BS 6779: Part 1: 1998 Clause 6.6.1 Insert additional sentence at end of clause as follows: 'The anchorage shall include an internally threaded component to receive the holding down bolt.' Clause 6.6.5 End of Note 1 insert: 'The tensile strength of concrete shall be ignored in the calculation.' Clause 9.4 9.4.2.3.5 Insert additional paragraph at end of clause as follows: 'Previous Test Reports. Copies of certified reports of destructive tests on components supplied under earlier contracts with the Overseeing Organisation shall be provided where required in Appendix 22/1. Amendment and Additions to BS 6779: Part 1: 1998 Clause 9.4 Insert additional paragraph at end of clause as follows: '(f) For all other components, including end posts, post anchorages, safety barrier connections and other components: One component for each type, unless successful destructive testing has been carried out within the last 6 months on a component of that type under another contract with the Overseeing Organisation.' Clause 10.1.1 Insert additional paragraph as follows: The Contractor or manufacturer shall arrange for third party certification that the new parapet Design complies with the requirements of this standard. The certification shall be undertaken by a body or testing laboratory in any Member State of the European Economic Area, offering suitable and satisfactory evidence of technical and professional competence and independence. The Overseeing Organisation is likely to require examining the full record of testing. Annex B Clause B 2.2e delete '9.1.3.6' and insert '9.1.2.6'.
2207.1 SR	Inspection and Testing of Parapet Posts Unless otherwise described in Appendix 22/1, the components for production posts and all completed production posts shall comply with the acceptance criteria are described in Clause 9.4.3 of BS 6779: Part 1.
2207.2 SR	Unless otherwise described in Appendix 22/1, the Contractor shall only supply parapet posts of a type which have certification for static destructive testing in accordance with

Clause / Table / Figure No.	Title
	Clause 9.4.3.3.6 of BS 6779 : Part 1 Test certificates shall be valid for a period of six months from the date the posts were tested and certified.

(ii) Tables

Table 7/1 SR

Road Surfaces	
Surface Course	
- General	± 6mm
- Adjacent to a surface water channel**	+ 10 – 0mm
Binder Course**	± 6mm
Top surface of Base in pavements without binder course*	± 8mm
Base other than above*	± 15mm
Sub-base under concrete pavement surface slabs laid full thickness in one operation by machines with surface compaction	± 10mm
Sub-bases other than the above	+10 – 30mm

* The lower layer of Base or Binder Course laid in more than one layer shall comply with the tolerance for Base or Binder Course as appropriate.

** Where a surface water channel is laid before the adjacent road pavement layer the top of that layer, measured from the top of the adjacent edge of the surface water channel, shall be to the tolerances given in Table 7/1 SR.

(iii) List of Cancelled Clauses, Tables and Figures

Clause/ Table/ Figure Number	Title
131.2	Public Relations
612.3	Compaction of Fills

APPENDIX 0/2: Contract-Specific Minor Alterations to Existing Clauses, Tables and Figures Included in the Contract

(i) List of Altered Clauses, Tables and Figures

Clause No.	Alterations to be Made
Series 000: Introduction	
004.2	The reference Date is to be the "Designated Date" As defined in Clause 1 (1) of the Conditions of Contract
Series 100: Preliminaries	
Title	Add to Title "or British Board of Agrment Roads and Bridges Certificates"
104.5	On third line, after "Certificate", insert "or a British Board of Agreement Roads and Bridges Certificate"
104.6	On third line, after "Certificate", insert "or a British Board of Agreement Roads and Bridges Certificate"
115.1	Delete "10 days" and insert "2 weeks".
Series 500: Drainage and Service Ducts	
501.4(ii)	Delete "BS 2989 Grade Z2, coating type G/600", and insert "BS EN 10142 Grade D x 51D and Z600".
503.3(iii)	On the fourth line, substitute "mix ST2" for "mix ST4".
507.1	On the fourth line, after "Appendix 5/1", insert "and Appendix 5/2".
508.3	Delete "BS 5911: Part 2" and inserts "BS 5911: Part 230".
Series 600: Earthworks	
612.10(v)	Delete " <i>Tamping Roller</i> " and insert " <i>deadweight Tamping Roller</i> ".
618.5	Delete " <i>Treatments I or II shall</i> " and insert " <i>Topsoil shall</i> "
618.6	Delete " <i>Topsoil in Treatments I and II shall</i> " and insert " <i>Topsoil shall</i> "
625.1	Add to the end of Clause " <i>and standard BD 68</i> ".
626.2	Delete " <i>or other approved material</i> ".
Series 700: Road Pavements – General	
704.9	Delete " <i>whichever is the later</i> " and replace with " <i>whichever is the earlier</i> ".

Series 1700: Structural Concrete	
1702.1	Insert at end of clause <i>“normal and Rapid Hardening Portland Cement shall be certified to IS1:1991 in accordance with the “Standard Mark Licensing Scheme” operated by the National Standards Authority of Ireland (NSAI) and bear the Irish Standard Mark. If the Contractor or supplier proposes to use cement complying with a National Standard of another member State of the European Community considered equivalent to IS 1: 1991 and certified to that Standard under a Certification Scheme of another Member State of the European Community deemed equivalent to the NSAI “Standard Mark Licensing Scheme”, the equivalence of both the National Standard and the Certification scheme shall be established by NSAI. Proof of the Authority’s declaration of equivalence shall be furnished for the Employer’s Representative’s approval in advance of any concreting operations”.</i>
1702.2	Add at end of clause, <i>“Aggregates of marine origin may not be used.”</i>
1705.2	Add at the end of the clause: <i>“When ready mixed concrete is used, existing data on the properties of concrete mixes may be acceptable to the Employer’s Representative in lieu of trial mixes.”</i>
1708.4	Delete the paragraph in (ii) beginning <i>“Class U4 finish. This finish is for”</i> and replace with <i>“Class U4 is for surfaces which are to receive deck waterproofing. Unless the manufacturers of the waterproofing membrane requires a higher standard of finish, surfaces of deck shall be finished as follows:</i> <i>The surface of the concrete to be waterproofed shall be uniformly levelled, screeded and then power-floated to produce a plain textured surface. When the concrete deck is 28 days old, the surface shall be vacuum blasted with a “Blastrac” (or approved equivalent machine) vacuum blasting unit to remove laitance/skin from top of deck and to produce a tough “fine sandpaper” type surface on the concrete. Vacuum blasting unit shall use suitable steel shot, automatically re-circulated by the machine which shall also pick up all dust, laitance etc. (detached by the shot) by vacuum action. The finished surface shall be:</i> <i>Finished to an accuracy such that, when tested with a 3m straight edge, the maximum depression does not exceed 6mm, height of any ridge shall not exceed 2mm.</i> <i>Clean and dry before priming or waterproofing</i> <i>Free from membrane curing compounds, ice and projecting tying wires.</i> <i>Free from honeycombing, surface cavities, laitance, mortar or other surface deficiencies.”</i>
1709.9(ii)	On seventh line, delete <i>“where a surface coating is to be applied after application of siloxane”.</i>
1709.9(iii)	Delete existing sub-paragraph and insert: <i>“After water jetting the surface must be allowed to dry for at least the equivalent of three days at 15°C before the application of siloxane commences”.</i>

1709.9(iv)	Delete existing sub-paragraph and insert: <i>"All pores and blowholes in the concrete surfaces to be impregnated with siloxane and coated as specified in Appendix 17/2 shall be repaired as specified in 1709.13 prior to the application of siloxane."</i>
1709.9(v)	Delete this sub-paragraph.
1709.10(ii)	On third line, after <i>"concrete repairs"</i> insert <i>"other than as specified in 1709.13(iv)"</i> .
1709.10(iii)	On fourth line, delete <i>"application"</i> and insert <i>"applications"</i> .
1709.13(iv)	On sixth and seventh lines, delete <i>"at least two days"</i> and replace with <i>"at least the equivalent of three days at 15°C"</i> .
1709.14(iii)	On sixth line, delete <i>"200-230gms/m²"</i> and replace with <i>"200-250gms/m²"</i> .
1709.14(iv)	On sixth line, delete <i>"200-230gms/m²"</i> and replace with <i>"200-250gms/m²"</i> .
1710.3	Add at end of clause <i>"Concrete shall be placed in all sections of bridge structures by approved concrete pumps."</i>
1710.5(ii)	Add at end of sub-clause <i>"In the case of bridge decks, concrete shall be cured for a minimum of 14 days after casting or for the period required by Table 17/6, whichever is the greater.</i> <i>In warm or mild conditions, upper surfaces of bridge deck shall be cured by covering with plastic sheets. Sheets shall be lapped by 150m and covered with sand so that they cannot be uplifted by the wind.</i> <i>In addition, in cold conditions such concrete surfaces shall be covered and insulated against thermal shock and heat loss by methods subject to the approval of the Employer's Representative."</i>
Series 2000: Waterproofing for Concrete Structures	
2001.1	Insert at end of Clause <i>"Unintended depressions or excessive irregularities in the concrete surface shall preferably be dealt with by bush-hammering or planning. Where this is not possible, depressions are required to be filled in with cementitious material. It will be the responsibility of the Main Contractor to use non-shrink material of adequate strength which will bond tenaciously with the deck. Any repair material shall be shown, before using, to be compatible with the deck waterproofing system (including primer) which is subsequently to be laid. All repairs shall be subject to same curing requirements as concrete deck"</i> .
2003.3	Add to end of first sentence <i>"or a current British Board of Agreement Roads and Bridges Certificate"</i> .
Series 2200: Parapets	
2202.2	Replace all references to <i>'BS 6779 Part1 1992'</i> with <i>"BS 6779 Part 1"</i> .

2203	Replace all references to “BS 6779: Part 1:1992” with “BS 6779 Part 1”.
2207	Replace all references to “BS 6779: Part 1:1992” with “BS 6779 Part 1”.
2208	Replace all references to “BS 6779: Part 1:1992” with “BS 6779 Part 1”.
2208	Replace all references to “BS 5080: Part 1:1974 (1982)” with “BS 5080 Part 1”.
Series 2300: Bridge Expansion Joints and Sealing of Gaps	
2302.4	On lines 4 and 5 delete “ <i>or a secondary waterproof membrane provided</i> ” and replace with “ <i>and in addition, a secondary waterproofing system in the form of a continuous membrane shall be applied</i> ”.
2302.8	Before last sentence insert “ <i>The complete drainage system shall be accessible for cleaning.</i> ”

APPENDIX 0/3: List of Numbered Appendices Referred to in the Specification and Included in the Contract

This Appendix 0/3 is comprised of a list of the Numbered Appendices referred to in the Specification and included in this Contract.

Responsibility for the compilation/completion of the appendices is indicated by the following symbols:

- (i) E Employer compiles
- (ii) C Contractor to compile and submit to the Employer's Representative
- (iii) E/C Employer partially compiles and Contractor completes and submits to the Employer's Representative
- (iv) T/C Tenderer compiles and returns with his Tender. Post award of Contract the Contractor reviews and submits to the Employer's Representative
- (v) (P) The symbol 'P' indicates the appendix is a national pro-forma and the format must not be altered.

Where a Contractor or Tenderer is required to compile or complete an Appendix, they shall do so in accordance with the TII Publication "Guidance on Specification for Works", and providing information similar to that stated in the sample appendices as a minimum.

Appendix 0/3 is comprised of two lists, A and B, of numbered Appendices as follows.

List 'A' is a complete list of the Numbered Appendices referred to in the Specification for Works with those not adopted marked "Not Used". Those identified by the letters 'T' or 'C' shall be compiled by the Tenderer or the Contractor respectively.

List 'B' gives a list of Contract-specific Numbered Appendices devised for this Contract.

List 'A': List of Numbered Appendices Referred to in the Specification for Works

Compiled/ Completed By	Appendix No.	Title	Used
		INTRODUCTION	
E	0/1	Contract-Specific Additional, Substitute and Cancelled Clauses, Tables and Figures Included in Contract	Y
E	0/2	Contract-Specific Minor Alterations to Existing Clauses, Tables and Figures included in the Contract.	Y
E	0/3	List of Numbered Appendices Referred to in the Specification and Included in the Contract.	Y
E	0/4	List of Drawings in the Works Requirements.	Y
		PRELIMINARIES	
Not Used	1/1	Accommodation and Equipment for the Employer's Representative	N
Not Used	1/2	Vehicles for the Employer's Personnel	N
Not Used	1/3	Communication System for the Employer's Representative	N
E	1/4	Working and Fabrication Drawings	Y
E	1/5	Testing to be Carried Out by the Contractor.	Y
E	1/6	Supply and Delivery of Samples to the Employer's Representative.	Y
E	1/7	Site Extent and Limitations on Use.	Y
E	1/8	Operatives for the Employer's Representative.	Y
E	1/9	Control of Noise and Vibration.	Y
Not Used	1/10	Principle structures to be designed by the Contractor	N
E	1/11	Structural Elements and other Features designed by the Contractor	Y
E	1/12	Setting Out and Existing Ground Levels.	Y
E	1/13	Programme of Works	Y
E	1/14	Monthly Statements	Y
Not Used	1/15	Accommodation Works	N
E	1/16	Privately and Publicly owned Services and Supplies.	Y
E	1/17	Traffic Safety and Management	Y
E	1/18	Temporary Diversions for Traffic	Y
E	1/19	Routeing of Vehicles	Y
E	1/20	Recovery Vehicles for Breakdowns	Y
E	1/21	Information Boards	Y
E	1/22	Progress Photographs	Y
E	1/23	Substances Hazardous to Health.	Y

Compiled/ Completed By	Appendix No.	Title	Used
E	1/24	Quality Management Schemes	Y
E	1/25	Product Certification Schemes	Y
E	1/26	NSAI Agrément Certificates	Y
E	1/31	As-built Records	Y
		SITE CLEARANCE	
E	2/1	List of Buildings etc, to be demolished	Y
Not Used	2/2	Filling Trenches and Pipes	N
E	2/3	Retention of Material Arising from Site Clearance.	Y
Not Used	2/4	Explosives and Blasting	N
E	2/5	Hazardous Materials	Y
E	2/6	Specification for strip out of mechanical and electrical services and equipment	Y
		FENCING AND ENVIRONMENTAL NOISE BARRIERS	
E	3/1	Fencing, gates and Stiles	N
Not Used	3/2	Tree Protection Fencing	N
		SAFETY BARRIERS	
E	4/1	Safety Barriers	N
Not Used	4/2	Pedestrian Restraint Systems	N
E	4/3	Safety Barrier Terminals	N
E	4/4	Safety Barrier Maintenance	N
Not Used	4/5	Anti Glare Screens	N
Not Used	4/6	Safety Barriers: TII Standard Construction Details	N
E	4/7	Vehicle Parapet Systems	N
		DRAINAGE AND SERVICE DUCTS	
E	5/1	Drainage Requirements.	Y
E	5/2	Service Duct Requirements.	Y
Not Used	5/3	Surface Water Channels and Drainage Channel Blocks	N
Not Used	5/4	Fin Drains and Narrow Filter Drains and Geotextiles for Filter Drains	N
Not Used	5/5	Combined Drainage and Kerb Systems	N
E	5/6	Linear Drainage Channel Systems	Y
Not Used	5/7	Drainage and Service Ducts: TII Construction Details	N
Not Used	5/8	Thermoplastic Structural Wall Pipes and Fittings	N
Not Used	5/9	Attenuation	N

Compiled/ Completed By	Appendix No.	Title	Used
		EARTHWORKS	
E	6/1	Requirements for Acceptability and Testing of Earthworks Materials	Y
E	6/2	Requirements for Dealing with Class U1 & Class U2 Unacceptable Material	Y
E	6/3	Requirements for Excavation, Deposition, Compaction (other than Dynamic Compaction)	Y
Not Used	6/4	Rock Armour	N
Not Used	6/5	Geotextiles Used to Separate Earthworks Materials	N
E	6/6	Fill to Structures and Fill Above Structural Foundations	Y
E	6/7	Sub-Formation & Capping & Preparation & Surface Treatment of Formation	Y
E	6/8	Topsoiling, Grass Seeding and Turfing	Y
Not Used	6/9	Earthwork Environmental Bunds, Landscape Areas, Screening Mounds, Strengthened Embankments.	N
Not Used	6/10	Ground Anchorages, Crib Walling and Gabions	N
Not Used	6/11	Swallow Holes and other Naturally Occurring Cavities and Disused Mine Workings	N
E	6/12	Instrumentation & Monitoring	Y
Not Used	6/13	Ground Improvement	N
Not Used	6/14	Tie Bars	N
Not Used	6/15	Geosynthetic Cementitious Composite Mat (GCCM)	N
E	6/16	Grouting	Y
		ROAD PAVEMENTS – GENERAL	
E	7/1	Permitted Pavement Options	Y
E	7/2	Excavation & Reinstatement of Existing Surfaces	Y
Not Used	7/3	Surface Dressing	N
E	7/4	Bond Coats, Tack Coats and other Bituminous Sprays	Y
E	7/5	Road Pavement: TII Standard Construction Details	Y
E	7/6	Breaking Up or Perforation of Existing Pavement	Y
Not Used	7/7	Not Used	N
Not Used	7/8	Not Used	N
E	7/9	Cold Milling (Planing) of Bituminous Bound Flexible Pavement	Y
Not used	7/10	Microsurfacing	N
E	7/11	High Friction Surfacing	Y
Not used	7/12	Low Energy Bound Mixtures	N
Not used	7/13	Recipe Surface Dressing	N

Compiled/ Completed By	Appendix No.	Title	Used
		KERBS, FOOTWAYS AND PAVED AREAS	
E	11/1	Kerbs, Footways and Paved Areas	Y
Not Used	11/2	Access Steps	N
E	11/3	Kerbs, Footways and Paved Areas: TII Standard Construction Details	Y
		TRAFFIC SIGNS	
E	12/1	Traffic Signs: General	Y
Not Used	12/2	Traffic Signs: Reflective Markers	N
E	12/3	Traffic Signs: Road Markings and Studs	Y
Not Used	12/4	Traffic Signs: Cones, Cylinders, FTDs & Other Traffic Delineators	N
Not Used	12/5	Traffic Signs: Traffic Signal and Detector Loops	N
Not Used	12/6	Traffic Signs: Special Sign Requirements on Gantries	N
Not Used	12/7	Traffic Signs: Preparation and Finish of Metal and Other Surfaces	N
E	12/10	Traffic Signs: Stop signs	Y
		ROAD LIGHTING COLUMNS AND BRACKET	
E	13/1	Information to be Provided by the Designer for the Road Lighting Works when Specifying Lighting Columns and Brackets	Y
E	13/2	Column & Brackets Data Sheets 1 & 2	Y
E	13/3	Instructions for Completion of Column and Bracket Data Sheet	Y
Not Used	13/4	Certification for Lighting Columns	N
Not Used	13/5	Road Lighting Column and Brackets: TII Standard Construction Details	N
		ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS	
E	14/1	Site Records	Y
E	14/2	Location of Lighting Units and Feeder Pillars	Y
E	14/3	Temporary Lighting	Y
E	14/4	Electrical Equipment for Road Lighting	Y
Not used	14/5	Electrical Equipment for Traffic Signs	N
Not used	14/6	Preparation and Finish of Metal and Other Surfaces	N
		MOTORWAY COMMUNICATIONS	
Not Used	15/1	Motorway Communications	N
		PILING AND EMBEDDED RETAINING WALLS	
Not used	16/1	General Requirements for Piling and Embedded Retaining Walls	N
Not used	16/2	Precast Reinforced and Prestressed Concrete Piles and Precast Reinforced Concrete Segmental Piles	N
Not used	16/3	Bored Cast in Place Piles	N
Not used	16/4	Bored Piles Constructed Using Continuous Flight Augers and Concrete or	N

Compiled/ Completed By	Appendix No.	Title	Used
		Grout Injection Through Hollow Auger Stems	
Not used	16/5	Driven Cast-in-Place Piles	N
Not used	16/6	Steel Bearing Piles	N
Not used	16/7	Reduction of Friction on Piles	N
Not used	16/8	Non-Destructive Methods for Testing Piles	N
Not used	16/9	Static Testing of Piles	N
Not used	16/10	Diaphragm Walls	N
Not used	16/11	Hard/Hard Secant Pile Walls	N
Not used	16/12	Hard/Soft Secant Pile Walls	N
Not used	16/13	Contiguous Bored Pile Walls	N
Not used	16/14	King Post Walls	N
Not used	16/15	Steel Sheet Piles	N
Not used	16/16	Integrity Testing of Wall Elements	N
Not used	16/17	Instrumentation for Piles and Embedded Walls	N
Not used	16/18	Support Fluid	N
		STRUCTURAL CONCRETE	
E	17/1	Concrete – Classification of Mixes	Y
E	17/2	Concrete – Impregnation and Coating Schedule	N
E	17/3	Concrete – Surface Finishes	Y
E	17/4	Concrete – General	Y
		STRUCTURAL STEELWORK	
Not used	18/1	Requirements for Structural Steelwork	N
		PROTECTION OF STEELWORK AGAINST CORROSION	
Not used	19/1	(Specification for Works) Sheet No. Form BE/P1 (New Works) Paint System Sheet	N
Not used	19/2	(New Works) Requirements for Other Work	N
Not Used	19/3	(Specification for Works) Form BE/P2 Paint Data Sheet	N
Not Used	19/4*	(Specification for Works) Form BE/P3 Paint Sample Despatch List: Sheet 1	N
Not Used	19/4*	(Specification for Works) Form BE/P3 Paint Sample Despatch List: Sheet 2	N
Not used	19/5	(New Works) General Requirements	N
Not Used	19/6*	(Specification for Works) Form BE/PE1 (Maintenance) Paint System Sheet 1	N
Not Used	19/6*	(Specification for Works) Form BE/P1 (Maintenance) Paint System Sheet 2	N
Not Used	19/7	(Maintenance) Requirements for Other Work	N
Not Used	19/8	(Maintenance) General Requirements	N

Compiled/ Completed By	Appendix No.	Title	Used
		WATERPROOFING FOR CONCRETE STRUCTURES	
Not used	20/1	Form PWS Proprietary Waterproofing System Data Sheet (1991 & Annex 'A')	N
E	20/2	Waterproofing for Concrete Structures	Y
		BRIDGE BEARINGS	
Not used	21/1	Bridge Bearing Schedule	N
		BRIDGE EXPANSION JOINTS AND SEALING OF GAPS	
E	23/1	Bridge Deck Expansion Joint Schedule	Y
E	23/2	Sealing of Gaps Schedule (other than in Bridge Deck Expansion Joints)	Y
E	23/3	Replacement of expansion joints	Y
		BRICKWORK, BLOCKWORK AND STONEMWORK	
Not used	24/1	Brickwork, Blockwork and Stonework	N
Not used	24/2	Brickwork, Blockwork and Stonework: TII Standard Construction Details	N
		SPECIAL STRUCTURES	
Not used	25/1	Structures to be Designed by the Contractor	N
Not used	25/2	Requirements for Reinforced Soil and Anchored Earth Structures	N
Not used	25/3	Requirements for Reinforced Clay Brickwork Retaining Walls of Pocket Type and Grouted Cavity Construction Structures	N
		MISCELLANEOUS	
Not Used	26/1	Ancillary Concrete	N
E	26/2	Bedding Mortar	
Not used	26/3	Cored Thermoplastic Node Markers	N
		WATERMAINS, UTILITIES AND ACCOMMODATION WORKS	
E	27/1	Requirements for Watermains	Y
Not used	27/2	Watermains: Road Construction Details	N
		TRENCHLESS INSTALLATION OF ROAD DRAINAGE & SERVICE DUCTS	
Not Used	28/1	Trenchless and Minimum Dig Techniques	N
		CCTV SURVEY OF ROAD DRAINAGE SYSTEMS	
Not Used	29/1	CCTV Survey of Road Drainage Systems	N

List 'B': List of Numbered Appendices, project specific

Compiled/ Completed By.	Appendix No.	Title	Used
E	1/31	As-Built Records	Y
E	6/14	Embedded Rock	Y
Not Used	25/5	Structures To be Design by the Contractor	N
E	55/1	Repair Product – Additional and Modified Requirements	Y
E	55/2	Additional Requirements for Reinforcement	Y
E	55/3	Requirements For Execution of Concrete Repairs	Y
E	55/4	Additional Requirements for Sprayed Concrete	Y
Not Used	55/5	Additional Requirements for Crack Injection	N
Not Used	55/6	Requirements for Survey of Structure	N
Not Used	55/7	Additional Requirements for Galvanic Anodes	N

APPENDIX 0/4: List of Drawings Included in the Contract

List of drawings by O'Connor Sutton Cronin included in the contract:

FILE NO.	DRAWING NAME
D870-OCSC-XX-XXDR-C-0001	Site Location Plan
D870-OCSC-XX-XXDR-C-0101	General arrangement Layout Plan Sheet 1 of 3
D870-OCSC-XX-XXDR-C-0102	General arrangement Layout Plan Sheet 2 of 3
D870-OCSC-XX-XXDR-C-0103	General arrangement Layout Plan Sheet 3 of 3
D870-OCSC-XX-XXDR-C-0104	General arrangement Standard Details Sheet 1 of 2
D870-OCSC-XX-XXDR-C-0105	General arrangement Standard Details Sheet 2 of 2
D870-OCSC-XX-XXDR-C-6000	Lighting Column Corbel RC Details

Brought into the Contract by Reference

- The TII Standard Construction Details contain drawings brought into the Contract by reference. Unless otherwise stated below the whole drawing is brought into the Contract.
- Uisce Éireann Infrastructure Standard Details
- Uisce Éireann Code of Practice and Specification.
- CIRIA Report 753 The SUDS Manual
- Eurocodes and standards generally.
- Guidelines for Managing Openings in Public Roads
- Cork County Council Exterior Lighting Design Requirements

APPENDIX 1/1: Accommodation and Equipment for the Employer's Representative

Not Used.

APPENDIX 1/2: Vehicles for the Employer's Personnel

Not Used.

APPENDIX 1/3: Communication System for the Employer's Representative

Not Used.

APPENDIX 1/4: Working and Fabrication Drawings

1. Whenever required by the Employer's representative, the Contractor shall supply calculations, test reports, data sheets, etc. in support of his detailed working and fabrication drawings. Such documents shall remain the property of the Employer's representative.
2. The Contractor shall submit three copies of all relevant documents to the Employer's representative at least two weeks in advance of the date on which the Contractor proposes to commence such works.
3. All drawings shall be supplied by the Contractor in AutoCAD 2018 and Civil 3D where applicable and requested by the Employer's Representative or another format acceptable to the Employer's Representative. Three printed paper copies of each drawing shall also be provided.
4. Drawings shall be to an appropriate scale and standard and in sufficient detail to enable the Employer's representative to assess the Contractors proposals.
5. The Contractor shall provide the following working and/or fabrication drawings to the Employer's Representative as a minimum:
 - a. Traffic Management Proposals as required by the Contract
 - b. Fabrication drawings for parapet and barriers
 - c. Construction plan for the resurfacing works incl. storage areas for any material removed from the bridge decks
 - d. Construction plan for the prevention of debris below
 - e. Temporary works (if required)
6. The Contractor shall engage fabricators and precast Specialists as necessary to deliver fabrication drawings to the Employer's Representative for items as listed.

APPENDIX 1/5: Testing to be Carried out by the Contractor

GENERAL

1. Tests comparable to those specified in this Appendix shall be necessary for any equivalent work, goods or materials proposed by the Contractor.
2. Tests carried out by the Contractor to demonstrate compliance with the Specification, shall be carried out in a suitably accredited laboratory.
3. Unless otherwise shown in this Appendix 1/5 of the Specification, tests for work, goods or materials as scheduled under one clause are required for all such work, goods or materials in the Works.
4. Unless otherwise shown in this Appendix 1/5 of the Specification, test certificates for work, goods or materials as scheduled under any one Clause shall be required for all such work, goods or materials in the execution and completion of the Works.
5. The scope of the testing covered in Appendix 1/5 should not be regarded as exhaustive. Routine tests carried out by manufacturers and suppliers in compliance with an Irish or British Standard or other standard or specification are not included but where a standard or specification makes provision for a test certificate this is indicated in the Appendix 1/5.
6. The schedule of tests for the Contract should be completed by selecting the tests and data from Appendix 1/5. Different frequencies and additional tests should be included as appropriate. Where the frequency of testing in Table NG 1/1 is given by reference to a Clause in the TII Specification for Road Works (SPW), the frequency requirements of the Clause should be repeated in full in Appendix 1/5.
7. Tests carried out by the Contractor to demonstrate compliance with the Specification shall be carried out by a laboratory approved by the Employer. The Contractor shall provide details of his proposed laboratory / laboratories to the Employer's Representative within 1 week of the Starting Date.
8. Tests comparable to those specified in this Appendix will be necessary for any equivalent work, goods or materials proposed by the Contractor (See sub-Clause 105.4).
9. (IL) indicates that an INAB test report or certificate is required.
10. (IAB) indicates that an Irish Agreement Board Certificate, or British Agreement Board Certificate, is required.
11. Cube strength tests are not required for concrete complying with Clause 2602.
12. In addition to the testing requirements in this Appendix, the Contractor will nominate one of the Contractor's Personnel to take samples as instructed by the Employer's Representative and in accordance with the sampling frequency and requirements outlined in Appendix 1/6. The individual proposed by the Contractor shall be competent as a sampling operative. The ability of the nominee to carry out sampling duties will be subject to assessment by the Employer's Representative.
13. The tables on the following pages give the minimum frequency of testing to be carried out by the Contractor to demonstrate compliance with the Specification. Testing shall be carried out immediately after sampling and results shall be passed to the Employer's Representative on completion of testing.
14. The Contractor shall carry out additional testing as and when instructed by the Employer's Representative.
15. Waterproofing membrane testing in accordance with DN-STR-03009 and Appendix 1/5.
16. Drainage testing as detailed in Appendix 1/5 and 5 of this Specification.

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 400					
407	Anchorage in drilled holes	On-site tensile load test	10%	Required	
	Road restraint system	As required by the system manufacturer	As required by the system manufacturer		As required by the system manufacturer
	Ground Conditions	In situ testing (sub- Clause 407.6 & 7)	As required by sub-clause 407.7.		
	Metal parapets			Required (BS 6779 Part 1)	Quality management scheme applies
	Welding for parapets	Welding procedures (Manufacturer's tests)	(Every 7 years)		
		Welder qualification (Manufacturer's tests)	(Every 2 years)	Required	
		Production testing (Manufacturer's tests)			
	Welded joints for parapets	Destructive testing			
	Parapet posts	Production testing as specified in BS 6779: Part 1: 1992 (Manufacturer's tests)		Required	Certification in accordance with Clause 2207 is required
	Anchorage in drilled holes for parapets	Loading test on Site	10%		

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 500					
501	Pipes for drainage and service ducts				
	Vitrified clay		[See Note A]		Product Certification Scheme applies <i>[Note A: Additional manufacturer's tests are provided for in the relevant standard but should normally not be required.]</i> <i>[Note B: Certificates are provided for in the relevant standard but should normally not be required except for pipes which are not quality marked in accordance with relevant standard.]</i>
	Concrete – PC/SRC	Not exceeding 900mm dia.		[See Note B]	
	Concrete- Pre-stressed				
	Iron - Cast				
	Iron Ductile		[See Note B]		
	UPVC				
	Plastics (see Table 5/1)				
	Corrugated steel		(Manufacturer's tests)	Required (AASHTO)	
	Corrugated steel bitumen protection				
	Concrete PC/SRC exceeding 900mm dia.		(Manufacturer's tests)	As per Clause 509.10	

Table 1/1 Testing Details

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
		Other materials			Required	NSAI Agrément Certificate or equivalent required
503	Pipe bedding					
			Grading and fines content (Washing and sieving method to be used)	1 per week (min of 3)	Required	<i>[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of IS EN 13242.</i>
			Water Soluble Sulphate (WS) content (IN)	5 per source		
			Resistance to fragmentation (IL)	1 per source		<i>[LA Category]</i>
505	Filter medium backfill					
			Plastic index (IL)	1 per source	Required	<i>[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of IS EN 13242]</i>

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
		Grading and fines content (Washing and sieving method to be used)	1 per 500 tonnes		[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of IS EN 1324.] [LA Category]
		Water Soluble Sulphate (WS) content (IL)	5 per source		
		Resistance to fragmentation (IL)	1 per source		
506	Sealing existing drains				
	Concrete				
	Grout				
507	Chambers				
	Precast concrete				Product certification scheme applies
	Corrugated galvanised steel	(Manufacturer's tests)		Required	Product certification scheme applies
	Manhole steps				Product certification scheme applies
	Steel fitments				
	Covers, grates and frames				Product certification scheme applies
	Cover bolts				Quality management scheme applies

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
508	Gullies and pipe junctions				Product certification scheme applies
	Precast concrete				
	Cast iron and steel				
509	Watertightness of joints	Air test	All pipelines with watertight joints <i>[As required in Appendix 5/1 for partly watertight joints]</i>	Required	
512	Backfill to pipe bays	Grading	1 per 50 tonnes (min of 3)		
		Water Soluble Sulphate (WS) content (IL)	5 per source		
513	Permeable backing to earth retaining structures				
	Granular Material	Piping Ratio (as Cl 513)	1 per 100 tonnes (min of 3)		
		Permeability (as Cl 513)			
	Precast hollow concrete blocks	(Manufacturer's tests)		Required	
514	Fin Drains	(Manufacturer's tests)		Required	INAB (or equivalent) certification applies

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
515	Narrow Filter Drains				
		Geotextile, pipes and fittings	(Manufacturer's tests)	Required	INAB (or equivalent) certification applies
		Granular fill	Plastic Index (IL)	Required	
			Resistance to fragmentation (IL)		
			Water soluble sulphate (WS) content (IL)		
			Oxidisable sulphides (OS) content and total potential		
			sulphate (TPS) content (IL)	Required	<i>[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of IS EN 13242.]</i>
			Grading and fines content		
			Permeability (IL)		

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
517	Linear drainage systems	Load test	A minimum of 1 test per 1000m for each type and source	Required	Certification that the system complies with Clause 517 is required <i>[Quality mark in accordance with relevant standard or equivalent applies]</i>
518	Thermoplastic structured wall pipes and fittings	(Manufacturer's tests)		Required	INAB (or equivalent) certification applies
519	Geotextiles for filter drains	(Manufacturer's tests)	1 per source	Required	Certification that the system complies with Clause 519 is required <i>[Quality mark in accordance with relevant standard or equivalent applies]</i>

Table 1/1 Testing Details

Clause	Work, Goods or Material			Test	Frequency of Testing	Test Certificate	Comments
Series 600							
601	Acceptable material						
631 to 633		Class	General Description				
635 to 637		1	General granular fill	Grading	1 test per 1,000m ³ for each source	Required	
640				Uniformity Coefficient	1 test per 1,000m ³ for each source		
				MCV	As Required		
				MC	1 test per 1,000m ³ for each source		
			1C only	LA Coefficient (IL)	1 test per 1,000m ³ for each source (min of 2 total per source)	Required	
		2	General cohesive fill	Grading	1 test per 1,000m ³ for each source	Required	
				Plastic Limit	1 test per 1,000m ³ for each source		
				MC	1 test per 500m ³ for each source		

Table 1/1 Testing Details

Clause	Work, Goods or Material			Test	Frequency of Testing	Test Certificate	Comments
				MCV	1 test per 500m ³ for each source		
				Undrained Shear Strength	1 test per 1,000m ³ for each source (min of 2 total per source)		
601 631 to 633 635 to 637 640 (Cont'd)				Effective Angle of Internal Friction and Effective Cohesion	1 test per 1,000m ³ for each source (min of 2 total per source)	Required	
		4	Landscape fill	Grading (IL)	1 test per 2,000m ³ for each source	Required	
				MC (IL)	1 test per 1,000m ³ for each source	Required	
				MCV (IL)	1 test per 500m ³ for each source*		
		5	Topsoil	Grading	1 test per 500m ³ (min of 1 per day during topsoiling works)	Required	
		6	Selected granular fill				Class 6 testing to be reviewed by Engineer and frequencies varied as necessary to provide confirmation that materials and material sources provide results that are consistently compliant

Table 1/1 Testing Details

Clause	Work, Goods or Material				Test	Frequency of Testing	Test Certificate	Comments
				(Class 6A, 6B & 6C)	Grading	1 test per 1,000m ³ for each source		
					Uniformity Coefficient	1 test per 1,000m ³ for each source		
					Plastic Limit (IL)	1 test per 2,000m ³ for each source		
					LA Coefficient (IL)	1 test per 1,000m ³ for each source (min of 2 total per source)		
				(Class 6C Only)	Moisture Content (IL)	1 test per 2,000m ³ for each source		
601 631 to 633 635 to 637 640 (Cont'd				(Class 6A & 6C Only)	Slake Durability (IL)	1 test per 1,000m ³ for each source (min of 2 total per source)		
				(Class 6F1, 6F2 & 6F3)	Grading	1 test per 500m ³ for each source		
					Optimum MC (IL)	1 test per 500m ³ for each source		
					MC	1 test per 500m ³ for each source		

Table 1/1 Testing Details

Clause	Work, Goods or Material				Test	Frequency of Testing	Test Certificate	Comments
					LA Coefficient (IL)	1 test per 1,000m ³ for each source		
					Slake Durability (IL)	1 test per 1,000m ³ for each source		
					Total Sulfur Content (IL)	1 test per source (source approval)		
					Class RA (asphalt) content (IL)	2 per source		
					Bitumen Content (IL)	2 per source		
				(Class 6G)	Grading	1 test per 250m ³ for each source (min of 2 total per source)		
					LA Coefficient (IL)	1 test per 500m ³ for each source (min of 1 total per source)		
				(Class 6H Only)	Grading	1 test per 200m ³ for each source		
					Plastic Limit (IL)	1 test per 500m ³ for each source		
					LA Coefficient (IL)	1 test per 200m ³ for each source		

601
631 to 633
635 to 637
640
(Cont'd)

Table 1/1 Testing Details

Clause	Work, Goods or Material				Test	Frequency of Testing	Test Certificate	Comments
					MC (IL)	1 test per 200m ³ for each source		
					MCV (IL)	1 test per 200m ³ for each source		
					pH Value (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
					Chloride Ion Content (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
					Water soluble sulfate content (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
					Oxidisable sulfides (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
					Resistivity (IL)	1 test per source (source approval)		
					Redox Potential (IL)	1 test per source (source approval)		

Table 1/1 Testing Details

Clause	Work, Goods or Material				Test	Frequency of Testing	Test Certificate	Comments
601 631 to 633 635 to 637 640 (Cont'd)				(Class 6I & 6J Only)	Grading	1 test per 200m ³ for each source		
					Uniformity Coefficient	1 test per 500m ³ for each source		
					MC (IL)	1 test per 200m ³ for each source		
					MCV (IL)	1 test per 200m ³ for each source		
					Effective Angle of Internal Friction and Effective Cohesion (IL)	1 test per 200m ³ for each source (min of 1 test per week)		
					Coefficient of friction and adhesion (IL)	1 test per source (source approval)		
					pH Value (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
					Chloride Ion Content (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		

Table 1/1 Testing Details

Clause	Work, Goods or Material				Test	Frequency of Testing	Test Certificate	Comments
601 631 to 633 635 to 637 640 (Cont'd)					Water soluble sulfate content (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
					Oxidisable sulfides (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
					Resistivity (IL)	1 test per source (source approval)		
					Redox Potential (IL)	1 test per source (source approval)		
					Organic Content (IL)	1 test per source (source approval)		
					Microbial Activity (IL)	1 test per source (source approval)		
					LA Coefficient (IL)	1 test per 200m ³ for each source		
					Slake Durability (IL)	1 test per 500m ³ for each source		
				(Class 6K, 6L & 6M)	Grading	1 test per 200m ³ for each source		

Table 1/1 Testing Details

Clause	Work, Goods or Material				Test	Frequency of Testing	Test Certificate	Comments
					Plastic Limit (IL)	1 test per 500m ³ for each source		
					Resistivity (IL)	1 test per source (source approval)		
					Water soluble sulfate content (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
					Oxidisable sulfides (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
					Chloride Ion Content (IL)	Source approval and 1 test per 500m ³ for each source		
					pH Value (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
601 631 to 633 635 to 637 640 (Cont'd)				(Class 6K & 6M Only)	Uniformity Coefficient	1 test per 500m ³ for each source		
					Optimum MC (IL)	1 test per 200m ³ for each source		
					MC (IL)	1 test per 200m ³ for each		

Table 1/1 Testing Details

Clause	Work, Goods or Material				Test	Frequency of Testing	Test Certificate	Comments
						source		
					MCV (IL)	1 test per 200m ³ for each source		
					LA Coefficient (IL)	1 test per 200m ³ for each source (min of 1 total per source)		
				(Class 6N1, 6N2 & 6P)	Grading	1 test per 200m ³ for each source		
					LA Coefficient (IL)	1 test per 200m ³ for each source		
					Undrained Shear Strength (IL)	As Required		
					Effective Angle of Internal Friction and Effective Cohesion (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
					Permeability (IL)	Source approval and 1 test per 500m ³ for each source		
					MC	1 test per 200m ³ for each source		

Table 1/1 Testing Details

Clause	Work, Goods or Material				Test	Frequency of Testing	Test Certificate	Comments
601 631 to 633 635 to 637 640 (Cont'd)					MCV (IL)	1 test per 200m ³ for each source		
					pH Value (IL)	Source approval and 1 test per 500m ³ for each source		
					Water soluble sulfate content (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
					Oxidisable sulfides (IL)	Source approval and 1 test per 500m ³ for each source (min of 1 test per week)		
					Slope Stability (IL)	Source approval and 1 test per 500m ³ for each source		
					Slake Durability (IL)	1 test per 200m ³ for each source		
				(Class 6Q)	Testing and frequency as per Class 1 Material with the addition of the following:			
					Water soluble sulfate content (IL)	1 test per 200m ³ for each source (min of 1 total per source)		
					Oxidisable sulfides (IL)	Source approval and 1 test per 500m ³ for each source		

Table 1/1 Testing Details

Clause	Work, Goods or Material				Test	Frequency of Testing	Test Certificate	Comments
						(min of 1 test per week)		
					Chloride Ion Content (IL)	1 test per 200m3 for each source (min of 1 total per source)		
					pH Value (IL)	1 test per 200m3 for each source (min of 1 total per source)		
601 631 to 633		7	Cohesive Material (Class 7H)	Testing and frequency as per Class 2 Material with the addition of the following:				
635 to 637 640 (Cont'd)				Water soluble sulfate content (IL)	Source approval and 1 test per 500m ³ for each source			
				Oxidisable sulfides (IL)	Source approval and 1 test per 500m ³ for each source			
				Chloride Ion Content (IL)	Source approval and 1 test per 500m ³ for each source			
				pH Value (IL)	Source approval and 1 test per 500m ³ for each source			
		8	Miscellaneous fill	MC	Source approval and 1 test per 500m ³ for each source			

Table 1/1 Testing Details

Clause	Work, Goods or Material			Test	Frequency of Testing	Test Certificate	Comments
				MCV (IL)	Source approval and 1 test per 500m ³ for each source		
601.11 & 601.12	Fill adjacent to cementitious materials or metallic elements			Water soluble sulfate content (IL)	1 test per 250m ³ (min of 1 test per location)		
				Oxidisable sulfides (IL)	1 test per 250m ³ (min of 1 test per location)		
602.20	Material within 350mm of designed final surface of road or central reserve.			Frost Heave (IL)	1 test per 5,000m ³ (min of 1 total per source)		
609	Geotextiles Used to Separate Earthworks Materials			Durability	1 test per source/supplier		
				Tensile Load	1 test per 500m ² (min of 1 test per source/supplier)		
				CBR Puncture Resistance	1 test per 500m ² (min of 1 test per source/supplier)		
				Permeability	1 test per 500m ² (min of 1 test per source/supplier)		
				Pore Size	1 test per 500m ² (min of 1 test per source/supplier)		
612	Compaction of Fill Material						
	Method Compaction			Field Dry Density (IL)	1 test per 10,000m ²		

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
	End Product Compaction	Optimum MC (IL)	1 test per each class of material and each source		
		Field Dry Density (IL)	1 test per 250m ³		
616	Preparation and surface treatment of formation			Required	
		Where capping is omitted on formation	CBR ¹ (PLT or other test agreed with Engineer) (N)	1 test per 200m length (min daily), or as agreed by Engineer*.	See Appendix 6/7 for specification requirements for granular material at formation. CBR (PLT) test to be carried out on completed surface of Earthworks, i.e. top of subgrade/ formation.
			Grading/uniformity coefficient	1 test per 50m length (min daily), or as agreed by Engineer*.	
			PI (N)	As directed by Engineer *	
618	Topsoiling and grass seeding	Rate of spread of fertiliser	1 test per 1,000m ²		
		Rate of spread of seeding			

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
		Chemical analysis of fertiliser	1 per source		
		Grass seed germination and purity (Manufacturer's test)	1 per source	Required prior to sowing	
622	Earthworks for reinforced earth and anchored earth structures	Redox Potential	5 locations within the affected area		
	Reinforcing Elements	Coefficient of friction	1 test for each type of element with each type of fill		
	Anchor Elements	Adhesion			
624	Ground Anchorages	Proof Loading	Every anchor		
626	Gabions	Gabion mesh	Source Approval	Required	
642	Earthworks materials adjacent to structures	Constrained soil modulus (M*)	3 on each side of structure		
614	Lime and Cement Improvement - U1	Water soluble sulfate content	Source Approval		
		Organic Content	Source Approval		
		Rate of spread	1 per 500m ²		

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 700					
Series 700	Sub-base and roadbase material beneath surface of a road or paved central reserve	Frost heave (IL)	1 per source		

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 800					
801	Unbound mixtures placed within 500mm of cement bound materials, concrete pavements, structures or products	Water soluble sulfate (WS) content (IL)	1 per 200m3 for each source (min of 5 total per source)*	Required	
802		Oxidisable sulphides (OS) content (IL)	1 per 200m3 for each source (min of 5 total per source)		
804					
805					
806	Unbound mixtures placed adjacent to metallic structural elements forming part of the Works	Water-soluble sulfate (WS) content (IL)	1 per 200m3 for each source (min of 5 total per source)		
807		Oxidisable sulfides (OS) content (IL)	1 per 200m3 for each source (min of 5 total per source)		
808					
809	Unbound mixtures	Grading and fines content	1 per 1000 tonnes or minimum of 2 per day		<i>[Results of routine control tests from the factory production control system operated by the producer to be provided - see Annex C of IS EN 13242]</i>
		Flakiness index (IL)	1 per week		
		Los Angeles Coefficient (IL)	2 per year		
		Methylene Blue (IL)	1 per week		

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
		Water absorption (IL)	[As Required]		[See NG 801.10]
801	(Contd)	Magnesium Sulphate	1 per 2 years	Required	[Declared values from the factory production control system operated by the producer to be provided - see Annex D of IS EN 13285]
802		Soundness (IL))			
804		Types A, B, C & D granular material	OMC (IL)		
805		Moisture Content	1 per 1000 tonnes or		
806			minimum of 2 per day		
807					
808		Types B, C, D & E granular material	Liquid Limit (IL)		
809		Types A & C granular material	CBR (IL)		
			Density (IL)		
		Type C granular material	Percentage of crushed or broken particles and of totally rounded particles in coarse aggregates		
		Type A granular material	Plasticity index (IL)		
810	Cement Bound Mixtures	Water soluble sulphate (WS)	1 per 200m3 for each source (min of 5 total per source)		[See NG 808 & 820]
821		content (IL)			
822					

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
823		Oxidisable sulphides	1 per 200m3 for each	Required	<i>[See NG 808 & 820]</i>
824		(OS) content (IL)	source (min of 5 total per		
825			source)		
826		Tests for control and checking of HBM	Tests specified in Table 8/15 and Table 8/16		<i>[See NG 825]</i>
		Coefficient of linear expansion (IL)	<i>[As required]</i>		<i>[See Clause 819]</i>
		Tests for laboratory mixture design	As specified in Clause 826		<i>[See NG 826]</i>

Table 1/1 Testing Details

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
Series 900						
2.2	Constituent materials					
3						
4		Bond and tack coats	Requirements per	As per Type Test report	Required	Constituent materials include aggregate, binder, fillers, additives, chippings, pre-coated chippings, reclaimed asphalt, and all other materials that comprise the product. For products not covered by a Harmonised Technical Specification, material properties to be tested at the beginning of the contract to verify the values declared. Tables refer to those contained in NRA Series 900.
5			Tables 15	applicable to the Contract		
6		Bituminous mixtures	Requirements per	As per Type Test report		
7.2			Tables 1, 2, 4, 5, 7,	applicable to the Contract		
7.3			8,			
8.1			10, 11 & 14 Clause			
8.4			4.2.4 for precoated			
8.6			chippings			
9		Aggregate for Surface Courses – Bituminous Mixtures	Friction After Polishing Test (IS EN 12697-49)	1 test per property per source (source approval)		
		Surface dressing	Requirements per Tables 15, 17 & 18	As per Type Test report applicable to the Contract		
	Surface Dressing - Aggregate	Friction After Polishing Test (IS EN 12697-49)	1 test per property per source (source approval)			
	High friction surfacing – binders	Requirements per Table 23a	1 test per property per source (source approval)			

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
	High friction surfacing – manufactured aggregates	Requirements per Table 23b			
	High friction surfacing – natural aggregates	Requirements per Table 23c			
	Low energy bound mixtures – Paving Grade and Polymer Modified Bitumens	Requirements per Table 14	1 test per property per source (source approval)		
	Low energy bound mixtures – Virgin Aggregates and Virgin Filler	Requirements per Table 24a			
	Low energy bound mixtures – Cationic Bitumen Emulsions	Requirements per Table 24b			
	Permanent repair material systems	Requirements per Table 26a	1 test per property per source (source approval)		
	Emergency repair material systems	Requirements per Table 28a	1 test per property per source (source approval)		
	Reclaimed asphalt	Requirements per Tables 13a & 13b	As per Type Test report applicable to the Contract		
3	Product Composition				

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
4 5 6 8.1	Bituminous mixtures – All mixtures	Grading (IL)	A minimum of 1 per 600 tonnes or minimum 2 per five day period or part thereof whichever is greater.	Required	IS EN 13108-21 Factory Production Control (FPC) procedures apply. The samples shall be taken in conjunction with the product manufacturer. Portions of the same samples shall be split between the manufacturer, Contractor and the Employer's Representative to enable subsequent test results to be compared
		Binder content (IL)			
	Low energy bound mixtures	Combined grading (IL)	1 per day	Required	The samples shall be taken in conjunction with the product manufacturer. Portions of the same samples shall be split between the manufacturer, Contractor and the Employer's Representative to enable subsequent test results to be compared
		Binder content (IL)			
8.4 8.6	Permanent repair material systems	Requirements per Table 26b	1 test per property per source (source approval)		
	Emergency repair material systems	Requirements per Table 28b	1 test per property per source (source approval)		

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
9 10	Works				
	Bituminous mixtures - All mixtures	Temperature of mixture at time of delivery	Per delivery		
		Layer thickness	1 pair of cores every 1,000 linear metres laid per lane.		Measurement taken for each core extracted for in situ air void analysis.
		Temperature of mixture at time of rolling	Continuously		
		Air void content (IL)	1 pair of cores every 1,000 linear metres laid per running lane.	Required	Cores taken from the wheel tracks.
		Water sensitivity (IL)	1 per Contract		
	Bituminous mixtures – Containing >10% reclaimed asphalt	Recovered penetration (IL)	As required per Series 900	Required	
		Recovered softening point (IL)			
		Indirect tensile strength (IL)			
		Moisture induced			Requirement is to make available to

Table 1/1 Testing Details

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
			sensitivity test conditioning (IL)			the Employer's Representative
			Rheology (IL)			Requirement is to make available to the Employer's Representative
		Bituminous mixtures - Asphalt Concrete base and binder course specific	Permanent Works – In situ air void content within 100mm of joint (IL)	1 pair of cores every 250 linear metres laid per running lane	Required	Cores centred 100mm from the final joint position.
			In situ air void content at refusal (IL)	1 pair of cores every 1,000 linear metres laid per running lane		Cores taken from the wheel tracks.
			Resistance to permanent deformation (IL)	6 cores from the first kilometre length of material from each source; 1 core		Cores taken from the wheel tracks
				from each subsequent running lane kilometre		
			Stiffness (IL)	1 pair of cores every 1,000 linear metres laid per running lane		Cores taken from the wheel tracks.

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
	Bituminous mixtures - Asphalt Concrete surface course specific	Macrotexture - Volumetric Patch (IL)	10 over 50 metres lane length	Required	Refer to Series 900 for requirements regarding minimum test coverage.
		Resistance to permanent deformation (IL)	6 cores from the first kilometre length of material from each source; 1 core from each subsequent running lane kilometre		Cores not to be taken from the wheel tracks.
	Bituminous mixtures - Hot Rolled Asphalt surface course specific	Resistance to permanent deformation (IL)	6 cores from the first kilometre length of material from each source; 1 core from each subsequent running lane kilometre	Required	Cores not to be taken from the wheel tracks.
		Rate of Spread of Chippings for shoulder-to-shoulder cover	At Contract start		Refer to Series 900 for requirements of repeating measurements.
		Rate of Spread of Chippings for mechanical chipping spreader	1 per 100m or 1 per day		Refer to Series 900 for requirements of repeating measurements.
		Macrotexture - Volumetric Patch (IL)	10 over 50 metres lane length	Required	Refer to Series 900 for requirements regarding minimum test coverage.

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
	Bituminous mixtures - Stone Mastic Asphalt binder course specific	Resistance to permanent deformation (IL)	6 cores from the first kilometre length of material from each source; 1 core from each subsequent running lane kilometre	Required	Cores taken from the wheel tracks.
	Bituminous mixtures - Stone Mastic Asphalt surface course specific	Macrotexture - Volumetric Patch (IL)	10 over 50 metres lane length	Required	Refer to Series 900 for requirements regarding minimum test coverage.
		Resistance to permanent deformation (IL)	6 cores from the first kilometre length of material from each source; 1 core from each subsequent running lane kilometre		Cores not to be taken from the wheel tracks.
	Bituminous mixtures - Porous asphalt surface course specific	Relative hydraulic conductivity (IL)	Every 1,000 linear metres laid per lane and fraction thereof*	Required	
	Bond and Tack Coat	Rate of spread of binder	1 every 20,000 square metres or 1 ever month, whichever is greater		
		Accuracy of spread of binder	1 every 6 months		
	Surface Dressing	Rate of spread of	As required per Series 900		

Table 1/1 Testing Details

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
			binder			
			Accuracy of spread of binder			
			Rate of spread of chipping			
			Accuracy of spread of chipping			
		High friction surfacing	Volumetric patch (IL)	10 over 50 metres lane length	Required	Refer to Series 900 for requirements regarding minimum test coverage.
			Volumetric patch (IL)	10 over 50 metres lane length	Required	Refer to Series 900 for requirements regarding minimum test coverage.
			Surface shear strength of installed system (IL)	2 per substrate type		At least 1 test measured in the wheel track zone. Test locations at least 20 metres apart.
		Low energy bound mixtures	Moisture content (IL)	1 core every 50 linear metres laid per lane.	Required	
			Relative in-situ density (IL)			
			Air voids content (IL)			
			Indirect tensile stiffness modulus (IL)	1 pair of cores every 250 linear metres laid per lane.		1 core per pair taken from the wheel track zone.

Table 1/1 Testing Details

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
		Repair systems (PRMS, LSRS, ERMS)	Volumetric patch (IL)	1 per discrete area	Required	Methodology described in IS EN 13036- 1 should be followed with number of test measurements to suit size of repair.

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1000					
1001	Cement types as stated in sub-Clause 1001.3			Required	Certificate to be provided monthly* for each type of cement. Quality management and product certification schemes apply
	Cements (all types)	Chloride content	Monthly		Tests to be carried out by the manufacturer and results included on the test certificates required above
	Ground granulated blastfurnace slag	Sulphate content	Monthly		
		Acid-soluble alkali content	Daily (PC) Weekly (PFA ggbs)		
	Aggregates	Grading and fines content	1 per delivery (min 1 weekly per source)		Results of routine control tests by the manufacturer/ supplier to be provided. Product certification scheme applies
		Shell content (IL) (Only required where marine aggregates are used)	Monthly		
		Flakiness index (IL)	Monthly		
		Resistance to fragmentation (IL)	Every 6 months		
		Chloride ion content (IL)	Daily		

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
		Acid soluble sulphate content (IL)	Monthly		
	Fine aggregate	Acid-soluble material (IL)	Monthly		
	Water	Tests specified in IS EN 1008	<i>[As required].</i>		
		Chloride content	Monthly		
		Sulphate content	Monthly		
		Acid-soluble alkali content	Weekly		
	Admixtures	Chloride content	1 per consignment	Required (BS 934-2)	<i>[See sub-Clause 1001.5]</i>
		Sulphate content	1 per consignment	Required	
		Acid-soluble alkali content	1 per consignment		
1002 1003 1004 1044	Concrete	Air content test (IL)	As required in Table 10/9	Required	
		Density of in situ Concrete cores (IL)	As required in Table 10/9		
		Cube strength (IL)	As required in Table 10/9		
1005	Consistence	Compaction index (IL)	As required in Table 10/9		<i>[See sub-Clause 1005.2]</i>

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
		Vebe (IL)			
1011 1012	Dowel bars Tie bars			Required (BS 4449)	Product certification scheme applies
	Dowel bars and supporting cradles	Load test	1 per arrangement		
	Sheathed dowel bars	Bond stress	4 bars		
	Cranked tie bars (coated)	Bend test	4 bars		
		Salt fog cabinet	4 bars		
1015	Joint filler board	Weathering test	3 per source		Normally undertaken by manufacturer
		Compression and recovery	4 per source		
		Extrusion	1 per source		
	Cork filler board	Immersion in water	2 per source		
		Immersion in acid	2 per source		
1016 1017	Applied sealants	Initial Penetration	1 per 1000m or 1 per day	Required (BS EN 14188-1, BS 2499-2, BS 5212-1, BS 5212-2)	

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
				(IS EN 13880-2, IS EN 13880-3, and BS 4254)	
		Resilience	1 per 1000m or 1 per day		
	Compression seals			Required	
		Compression set	1 per type of seal	(ASTM D2628) (BS 2752)	
		Immersion in oil	1 per type of seal	(BS 4443-4, Method 10 and IS EN ISO 2440) (IS EN ISO 1856) (BS 903: Part A16 or IS ISO 1817)	
	Self expanding Cork seal	Tests specified in Clause 1017	1 per type of seal	Required	

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
1026 1044	Surface macrotexture	BS EN 13036-1 Volumetric Patch Technique (IL)	1 per day (set of 10)	Required	
1027	Aluminised curing compound	Efficiency Index	1 per source		

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1100					
1101	Precast concrete kerbs, channels, edgings and quadrants	Bending strength	Minimum of 8 per 1000 units of each product (IS EN 1340)	Required	
1102	In situ asphalt kerbs	Grading	1 test per 500 metres laid	Required	<i>[See BS 5931 for materials for in situ asphalt kerbs]</i>
		Binder Content			
1107	Concrete block paving	Compressive strength	Minimum of 8 per 1000 units of each product (ISEN 13389)	Required	
1108	Clay pavers	Bending strength	Minimum of 8 per 1000 units of each product (IS EN 1344)	Required	
		Skid resistance	Minimum of 8 per 1000 units of each product (IS EN 1344)		
1109	Cellular grass paving systems				NSAI Agrément certificate or equivalent scheme applies

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1700					
1702 1703 1704	Cement types as stated in sub-Clause 1702.1			Required	Certificate to be provided monthly* for each type of cement. Quality management and product certification schemes apply.
	Cements (all types)	Chloride content	Monthly		Tests to be carried out by the manufacturer and results included on the test certificates required above
		Sulphate content	Monthly		
		Acid-soluble alkali content	Daily (PC) Weekly (PFA ggbs)		
	Ground granulated blast furnace slag	Grading and fines content	1 per delivery (min 1 weekly per source)		Results of routine control tests by the manufacturer/ supplier to be provided. Product certification scheme applies
		Shell content (IL) (Only required where marine aggregates are used)	Monthly		
		Flakiness index (IL)	Monthly		
		Resistance to fragmentation (IL)	Every 6 months		
		Drying shrinkage (IL)	Monthly		
		Chloride content (IL)	Daily		

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
1702		Sulphate content (IL)	Monthly		
1703					
1704					
(Contd)					
		Blast furnace slag			
		Bulk density (IL)	1 per 500 tonnes		
		Stability (IL)	1 per 500 tonnes		
		Sulphur content (IL)	1 per 500 tonnes		
		Water			
		Tests specified in IS EN 1008	[As required].		
		Chloride content	Monthly		
		Sulphate content	Monthly		
		Acid-soluble alkali content	Weekly		
	Admixtures	Chloride content	1 per consignment	Required (IS EN 934-2)	[See sub-Clause 1702.3]
		Sulphate content	1 per consignment	Required	
		Acid-soluble alkali content	1 per consignment		
1707	Concrete	Cube strength (IL)	Prestressed concrete – 2 cubes from 12m ³ or 2 batches whichever	Required	Contractor to cast and test sufficient copies to demonstrate cube strength before transfer

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
			represents the lesser volume		
			Reinforced Concrete - 2 cubes from 24 m ³ or 4 batches whichever represents the lesser volume		
			Mass Concrete – 2 cubes from 50 m ³ or 50 batches whichever represents the lesser volume		[See also Table NG 17/1]
			Additional cubes for special purposes		
		Cube strength identity testing as described in Appendix 17/4 (IL)	2 cubes from each of 2 samples of each batch		[See sub-Clause 1707.2 and Appendix 1/6]
		Density	[As required]		[Requirements should be given in Appendix 17/1 as appropriate]
		Modulus of elasticity			

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
1707 (Cont'd)	Fresh concrete	Consistence (IL) <i>[The method should be stated in Appendix 17/1]</i>	Each batch		<i>[See sub-Clause 1707.2]</i>
		Air content	Each batch		
		Cement content	<i>[As required]</i>		
		Water/cement ratio			
1709	Silane			Required for each delivery	Certificate that the silane complies with Clause 1709 is required (Cl 1709.2)
		Refractive Index	Three samples		<i>[See sub-Clause 1709.2 (ii)]</i>
		Trial panels			<i>[See sub-Clause 1709.8]</i>
1710	Concrete packing Mortar packing Epoxy resin bonding agent				
	Precast concrete manufactured off Site	Cube strength (Manufacturer's tests)			

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
1711	Grouting and Duct Systems for Post-tensioned Tendons				CARES Scheme for Supply and Installation of Post-tensioned Systems In Concrete Structures or an equivalent scheme is required. Quality management and product certification schemes for cement apply
		Full scale trials			See sub-Clause 1711.1 and Appendix 17/6
		Air pressure tests			See sub-Clause 1711.3 and Appendix 17/6
		Duct assembly verification tests			See sub-Clause 1711.3 and Appendix 17/6
		Fluidity	See Table 17/7		See sub-Clause 1711.8 and sub-Clause 1711.9 and Table 17/8
		Bleeding			
		Volume change			
		Cube strength			
		Sieve			
		Sedimentation			

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
	Admixtures			Required	Quality management and product certification schemes apply Data on their suitability, including previous experience should be made available. See sub-Clause 1711.10
1712	Reinforcement				Product certification scheme applies
	Steel bars			Required (BS 4449 & IS EN 10080)	
	Steel wire			Required (BS 4482 & IS EN 10080)	
	Steel fabric			Required (BS 4483 & IS EN 10080)	
	Stainless steel			Required (BS 6744)	

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
1713	Fabricated reinforcement			Required	Certification that fabricated reinforcement complies with the routine inspection/testing requirements of BS 8666 is required if the fabrication is not covered by a product certification scheme listed in Appendix 1/25
1716	Reinforced jointing systems	Permanent elongation Characteristic strength (Manufacturer's tests)		Required for each type of connection	NSAI Agrément certificate or equivalent scheme to apply
1717	Reinforcement metal arc welding	Welding procedure approval (BS 7123) Welder approval (BS 7123)	As required in BS 7123		Tests should be carried out by an independent testing body specified in BS 8666
1718	Prestressing Tendons				Product certification scheme applies CARES (PT6-PT8)
	Steel wire			Required (BS 5896)	
	Steel bar			Required (BS 4486)	

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
1718 (Cont'd)	Seven-wire Strand			Required (BS 5896)	
	Pre-stressing steel (all types)	Proof load Breaking load Elongation Ductility Relaxation Modulus of elasticity	<i>[As required]</i>		
	Super strand to BS 5896 or other than lowest strength 3-7 mm dia. wires to BS 5896	0.1% proof load Breaking load	Each reel		
1724	Post-tensioning anchorages	Tests in accordance with IS EN 13391 (Manufacturer's tests)		Required (IS EN 13391)	Product certification scheme applies CARES Scheme
1726	Stainless steel bar			Required (BS 6744)	Product certification scheme applies
1727	Inspection and testing of structures and components	As required by Appendix 17/4	As required in Appendix 17/4	Required	

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2400					
2401	Masonry cement			Required (IS EN 413-2)	Quality management scheme applies
		Chloride content	Monthly		Test to be carried out by the manufacturer and results included on the test certificate
2402	Sand			Required per consignment (IS EN 13139)	
		Chloride content	Monthly		Test to be carried out by the manufacturer and results included on the test certificate
2404	Mortar admixtures			Required (IS EN 934-3)	Product certification scheme applies
2405	Lime			Required (IS EN 459-1)	
2406	Bricks				Product certification scheme applies

Table 1/1 Testing Details

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
		Clay	Active soluble salt content (IS EN 772-5) Compressive strength (IS EN 772-1) Water absorption (IS EN 772-7) Freeze/thaw resistance			
		Calcium silicate				
		Concrete				
2407	Blocks					
		Concrete			Required (IS EN 772-2)	
2408	Manufactured Stone		In accordance with IS EN 771-5		Required	
2410	Stainless Steel					
2411		Wire/fabric			Required (IS EN 10088-1)	
		Bars			Required (BS 6744)	

Table 1/1 Testing Details

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2600					
2601.2	Bedding mortar materials				Certification in accordance with Clause 2601 is required
2601	Bedding Mortar	Flow cone test	Each batch		
		Flow between glass plate			
		Compressive strength			
		Expansion test			
		Water absorption			
		Elastic stability	1 per source		
		Flow cone test	Each Load		
		Compressive Strength			
2604	Plastic coating to fencing posts, gates and ancillaries	In accordance with BS 1722 Part 16			

APPENDIX 1/6: Supply and Delivery of Samples to the Employer's Representative

1. Samples comparable to those specified in this Appendix shall be necessary for any equivalent work, goods or materials proposed by the Contractor (Refer to Sub-Clause 105.4 of the Specification).
2. Unless otherwise shown in this Appendix 1/6 samples of work, goods or materials schedule under any one Clause are required for all such works, goods or materials in the Works.
3. Unless otherwise scheduled under Clause 2602 of the Specification samples of concrete complying with that Clause are not required.
4. These samples shall be in addition to those taken and tested by the Contractor in accordance with Clause 105.2 of the Specification.

Clause	Sample Description	Frequency of Sampling	Delivery Location	Comments
300	Parapet mesh panels and handrails	Per Structure	Site Compound Laboratory	For Approval
503, 505, 512, 513	Samples of Aggregates	Samples to establish compliance with the Specification shall be as the Employer's Representative may reasonably require. (see Appendix 1/5 for probable frequency)	Site Compound Laboratory	
612	Field Dry Density test samples		Site Compound Laboratory	
600 series	Samples of earthworks materials		Site Compound Laboratory	
800 series	Samples of road pavements unbound materials		Site Compound Laboratory	
900 series	Samples of bituminous mixtures		Site Compound Laboratory	
1000 series	Samples of fresh concrete and aggregates		Site Compound Laboratory	
924	Samples of binder as described in sub-Clause 924.14	2 samples for each shift worked or each 1000m ² completed, whichever is the lesser	Site Compound Laboratory	
1700 series	Samples of aggregates and fresh concrete		Site Compound Laboratory	
2409	Samples of natural building stone	One sample comprising not less than 10 stones per type	Site Compound Laboratory	

Notes

1. Samples comparable to those specified in this Appendix will be necessary for equivalent work, goods or materials proposed by the Contractor (See sub-Clause 105.4)
2. Unless otherwise shown in this appendix, samples of work, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.
3. Unless otherwise scheduled under Clause 2602 samples of concrete complying with that Clause are not required.
4. More materials will be required by the Employers Representative's team throughout the Contract especially samples of those materials the Contractor wishes to re-use from the earthworks operation and those materials considered or suspected as hard material by the Employer's Representative. The frequency of the delivery of these samples to the Employer's Representative's office will be as is set out in Table 1/5 of this document. At his discretion the Employer's Representative may decrease or increase the rate sampling based on the results of testing. The delivery of these samples in no way alleviates the Contractor of his responsibilities with regards to testing materials as set out in Table 1/5 or in other places in the Contract Documents.
5. (IL) indicates INAB laboratory accreditation is required for sampling.
6. Samples and all necessary supporting information are to be provided by the Contractor to the Employer's Representative within a defined period of the Contract Starting Date at the latest, or earlier if deemed necessary by the Contractor's programme for delivery of the Works as listed in Table 1/6.2. A further time period from the date of delivery of such samples to the Employer's Representative is required to make a written objection to a Contractor's proposals.
7. The Employer's Representative's period for objection is 10 working days from when the Employer's Representative has received from the Contractor enough information to make a purposeful review of the matter submitted should it wish to make one.
8. The Contractor shall not implement any submission before the period has ended, or contrary to any outstanding objection given with the period.
9. Cut sheets/brochures/data sheets for all materials and products are to be provided by the Contractor to the Employer's Representative within two months of the Contract Starting Date at the latest, or earlier if deemed necessary by the Contractor's programme for delivery of the Works. A further 10 days from the date of delivery of such data to the Employer's Representative is required to review and the Client revert if necessary, with an objection on these proposals. The Contractor shall maintain a complete file of all materials and products proposed for use in construction of the Works including dates of submission of same to the Employer's Representative.
10. Supply of Alternatives
 - Trade names and/or suppliers are sometimes used in this Specification for the purpose of brevity and clarity of technical, aesthetic, and functional intent. Such references are for the convenience of the tenderer in clearly indicating the standard of technical, aesthetic, and functional requirements sought by the Employer. The intention is not to favour one product over another or to eliminate other products/suppliers.

- Other materials/suppliers may be put forward for consideration as equivalent materials to those stated in the Specification. Approval for substitution of equivalent materials/suppliers will be given where the alternative material/supplier are demonstrable equal in full accord with the original Specification.
- Equivalence of an offered substitution will be judged on the basis of objective, clear and verifiable independent proof of similar compliance with equal standards to those specified. Where appropriate verification is provided through a detailed technical dossier, drawings, data sheets and/or a test report from a recognised body, a material/product substitution will be permitted by the Employer's Representative.
- Any increased costs arising whatsoever from such a substitution in terms of redesign, rescheduling, health and safety issues or other matters, shall be borne by the Contractor.
- Alternative suppliers/installers will need to prove their ability to perform their sub-element part of the main contract through the submission of proof of their technical and/or professional capacity (education, experience, equipment as a minimum).
- The Employer's Representative will determine on a case-by-case basis, from a technical, aesthetic and functional perspective, what constitutes an equivalent standard/product. Verification will take place only after the award of Contract, as part of the contract management regime. A time period of 10 working days is to be allowed to check submissions and provide samples as indicated in this Specification.

Product	Timescale	Timeframe for Approval of Sample
Sample Road Markings	4 weeks prior to installation	Within 10 days of receipt of sample from Contractor
All utility covers	2 weeks prior to installation	Within 10 days of receipt of sample from Contractor
Public lighting elements, (i.e. poles, heads, minim pillars, etc.)	4 weeks prior to installation	Within 10 days of receipt of sample from Contractor

Table 1/6.2 - Supply and Delivery of Samples to the Employer's Representative

APPENDIX 1/7: Site Extent and Limitations on Use

1. Extent of the Site

- a. The extent of the site lies within the area bounded by the 'Site Boundary' lines as indicated on the Drawings in Volume A Part B. Site extent may also extend to incorporate additional tie-ins where tie-in within the site extents are not physically possible.
 - Areas necessary for the proper implementation of Traffic Management measures.
 - Areas necessary for work to new and existing public lighting, utility ducts, road drainage, foul drainage, watermains / utilities, permanent and temporary traffic signs etc.
 - Areas necessary for utility works and/or tie-ins to roads, footpaths, verges, walls, fences, road markings, ducting, and drainage.
 - Areas necessary for retention and, or protection of existing boundaries, including structures.
 - Areas necessary for accommodation works.
 - Areas necessary for landscape protection, earthworks and preparation.
 - Areas necessary for reinstatement of lands and boundary fences disturbed by the works.
 - Areas necessary for as-built surveys.
 - Any areas outside the above for which the Contractor has obtained the written consent of both the owner/lessee/occupier and the Employer to the intended use.
- b. In addition, and subject to the agreement of the Client and approval of the Employer's Representative, the extent of the Site shall include areas required for traffic control measures by the Contractor in compliance with Appendix 1/17, 1/18, 1/19 and 1/20 of the Specification, as and when necessary.
- c. The Contractor shall be fully responsible for all traffic management associated with the works. Detailed traffic management proposals shall be submitted to the Employer's Representative for acceptance.
- d. The Extent of the Site for the installation of plant for statutory or other bodies outside the site boundaries will be limited by the terms of the wayleaves acquired by statutory or other bodies for execution of the works, should such works be required.
- e. The Contractor shall take account of the requirement to prevent trafficking of the newly laid surface course until cured and achieved strength to accept loading.
- f. The Contractor is limited in the use of access routes by means of public roads to the site as stated in Appendix 1/19 and this Appendix 1/7.
- g. The Contractor shall ensure the safe passage of all road users using public roads within the Extent of the Site, and at traffic management interfaces, at all times. Details of all proposed diversions shall be agreed in advance with the Employer's Representative in accordance with Appendix 1/17.

2. Limitations of the Use of the Site

- a) Site Constraints shall be those as defined by the Employer. The Contractor may not store any materials or plant, except in locations described in the Contract or otherwise consented to by the Employer. The Contractor shall maintain and facilitate existing vehicular and pedestrian flows to existing roads, entrances buildings and general traffic, as specified in Clauses 117 and 118 of the Specification for Road Works.

- b) The site shall be used by the Contractor only for the purposes connected with the Implementation of the Works Requirements and to the approval of the Employer's Representative.
- c) Temporary footpaths etc. must be provided where required.
- d) The Contractor shall ensure that temporary facilities, parked vehicles and plant, stockpiled material and the like are not situated within or adjacent to the site area so as to adversely affect users of the Public Roadway.
- e) The Contractor shall ensure that access is maintained to all private and public properties affected by the works.
- f) The Contractor shall abide by the requirements of An Garda Síochána at all times and in particular shall comply with their requirements relating to traffic management.
- g) The Contractor shall take account of any anti-social behaviour that might occur on this site / compound.
- h) The Contractor shall comply with the requirements of the Department of Agriculture, Disease Eradication Scheme where such a need arises.
- i) Entry onto the Site shall be from public roads unless the Contractor enters into separate agreement with landowners to allow access through lands not forming part of the Site.
- j) The Contractor shall employ the use of a road sweeper to ensure the public roads and footpaths remain free of detritus.

3. Existing Services

- a) Full information has been provided to the Contractor, as part of the Background Information, in relation to the extent of existing known services within the site extents. The Contractor must, and have included for within the Contract Sum, have allowed for hand-digging around existing services.
- b) As part of the Works the Contractor must alter existing utility chambers and manholes in accordance with the Works Requirements. The Contractor must include, within the Contract Sum, provision for working around live services, connections and cabling within the chambers as part of the Works.
- c) The existing services, as shown in the Background Information, are contained within a variety of different types of ducting and pipework. The materials of the ducting and pipework varies from PE, uPVC, Wavin and Concrete. The Contractor shall have provided for, within the Contract Sum, for working around and hand digging around these services and for providing due care so as not to damage, break or alter the existing service ducting and/or pipework.
- d) The Contractor must liaise with all relevant 3rd Parties and Utility Providers in relation to their services, ducting and chambers prior to any alterations to same. The Contractor must ensure that there are no service disruptions to any existing service resulting from the Contractor's works.
- e) Any existing CCTV poles, cameras and networks within the site extents is to be maintained throughout the course of the works. Prior to the removal of the CCTV as part of the works, as part of the Contractor's method of construction, the Contractor shall erect suitable replacements prior to disconnection of the existing.

4. Access to Businesses/Properties

- a) The Contractor must ensure that access is maintained to all businesses/properties during the working hours of each individual business/property.

- b) Access for pedestrians, cyclists and vehicular traffic is to be maintained to all properties along the route as per the Conditions of Contract. The Contractor must, prior to obstructing an entrance into any premises, receive written approval from the owner/occupier. The Contractor must issue the written agreement to the Employer's Representative prior to commencing works.

5. Public Safety

- a) The Contractor shall be responsible for complying with all statutory requirements with respect to Public Safety for all works in connection with this Contract. The Contractor's particular attention is drawn to the requirements of the Safety, Health and Welfare (at Work) Act 2005 (as amended and enacted) and the Safety, Health and Welfare at Work (Construction) Regulations 2013 (and amendments thereto).
- b) The Contractor shall allow for taking all necessary precautions to protect members of the public in general who may venture near to or within the site boundary.
- c) The Contractor shall submit to the Employer prior to commencement of the works, for his comment, proposals for complying with these requirements.
- d) The Contractor shall take all necessary precautions to prevent trespassers onto the site.
- e) The Contractor shall notify the Employer of the person delegated with the responsibility for site safety.

Other Requirements

- a) The Contractor shall maintain all public rights of way and access to private property during the course of the Works. The Contractor shall be required to construct and maintain temporary pedestrian and/or vehicular access including, where necessary, temporary bridging for frontages during the execution of the works and the whole of the works shall be carried out so as to cause the minimum inconvenience to the public, Statutory Bodies and other road users.
- b) The Contractor is to permit access by the Employer (and their agents / Contractors) at all times during the works at the direction and approval of the Employer. Access vehicles will include cars, MPV's, maintenance vans (carrying up to 8 people) and 3 axle delivery / service vehicles / emergency vehicles weighing up to 20 tonne.
- c) The Contractor is to permit access by utility providers (and their agents / Contractors) at all times during the works at the direction and approval of the Employer. Access vehicles will include cars, MPV's, maintenance vans (carrying up to 8 people) and 3 axle delivery / service vehicles / emergency vehicles weighing up to 20 tonne.

APPENDIX 1/8: Operatives for the Employer's Representative

Not Used.

APPENDIX 1/9: Control of Noise and Vibration

Noise

1. The noise levels (see Note (i) below) scheduled below for periods outside the normal working hours will only be permitted when consent has been given to exceptional working. Otherwise there shall be no construction noise outside of normal working hours.
2. The noise level, Leq (see Note (ii) below) from all sources when measured 2.0m above the ground at any monitoring station shall either not exceed the appropriate level given in the Schedule or not exceed by more than 3 dB(A) the existing ambient noise level, Leq (see Note (iii) below), at the monitoring station measured over the same period, whichever level is the greater. The maximum sound level shall not exceed the level given in the Schedule below. Exceptionally, the Contractor may be given permission to carry out works which exceed the noise levels in the Schedule, provided that 5 working days' notice of the date and timing of these works is given to the Employer's Representative / Department of Agriculture, Food and the Marine and the Contractor demonstrates that he intends to take all reasonable matters to mitigate the noise nuisance. After consultations with the Employer and any other interested bodies, a decision will be given within 3 working days of receipt of the notice.

Days and Times	Hours	dB LAeq,1hr	dB LAmax
Monday –Friday inclusive	08.00 – 18.00	65 leq	75
Saturday	08.00 – 14.30	65 leq	75

Notes:

- (i) Noise levels relate to free field conditions. Where noise control stations are located 1m from facades of buildings, the permitted noise levels can be increased by 3 dB(A).
 - (ii) The ambient noise level, Leq, at a noise control station is the total Leq from all the noise sources in the vicinity over the specified period.
 - (iii) The existing ambient noise level, Leq, at a control station is the total Leq from all the noise sources in the vicinity over the specified period prior to the commencement of the Works.
 - (iv) Maximum sound level is the highest value indicated on a sound level meter which means the requirements of BS 5969 Type 1 or 2 set to SLOW response and frequency weighting A.
3. The Contractor shall comply with the current national guidelines as specified in Transport Infrastructure Ireland Guidelines for the Treatment of Noise and Vibration in National Road Schemes (Revision 1, 25th October 2004). The Contractor shall adopt good site practice in accordance with BS 5228: Part 1: 1997 (Noise Control on Construction and Open Sites and any similar British Standard or Code of Practice which may be considered relevant.
 4. Without prejudice to the Contractor's obligations under the preceding paragraph the Contractor shall comply in particular with the following requirements:
 - a) All vehicles and mechanical equipment shall be maintained in good and efficient working order and shall be fitted with effective exhaust silencers;
 - b) All compressors shall be "sound reduced" models fitted with properly lined and sealed acoustic

covers which shall be kept closed whenever the machines are in use and all ancillary pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers;

- c) Machines in intermittent use shall be shut down in the intervening periods between works or throttled down to a minimum. Generators, or any other plant, shall not be left running / operational after hours unless in an emergency, and agreed with the Employer's Representative;
 - d) Where practicable, plant with directional noise characteristics shall be positioned to minimise noise at adjacent properties;
 - e) Static machines shall be sited as far away as practicable from inhabited buildings;
 - f) Where it is necessary to provide power for the running of traffic signals, pumps etc., at any time outside normal working hours, then the sources of such power shall be from mains electricity except if the Employer's Representative agrees in writing that alternative plant may be used, after consultation with the Department of Agriculture, Food and the Marine.
 - g) Good relations with people living and working in the vicinity of the roadworks are important. People who are likely to be affected by the noise shall be informed, by letter drop or other appropriate means, of any works to be carried out outside normal working hours. Notification of the public shall take place at least one week prior to the commencement of Site works;
 - h) The Contractor shall organise his operations with regard to the positioning of plant and the location of haul routes etc., so that it minimises construction noise to adjacent properties;
 - i) The period referred to as 'night' for the purposes of the Contract shall be from 18:00 hours to 08:00 hours;
5. Transport Infrastructure Ireland guidelines provide indicative noise levels that are considered to be typically acceptable, though more stringent limits are appropriate where pre-construction noise levels are low. Limits are suggested for both the 1-hour "A" weighted equivalent continuous noise level (LAeq,1hr) and for the maximum noise level (LAmx). While limits are suggested for evening working and for working daytimes on Sundays and Bank Holidays it is assumed that the explicit permission of the Employer would be required before non-emergency works are conducted at these times.
6. The Contractor shall furnish such information as may be required by Cork County Council, and/or the Employer's Representative in relation to noise levels emitted by plant or equipment used or installed on the Site or which the Contractor intends to use or install on the Site and also afford all reasonable facilities to enable such Authorities to carry out such site noise-monitoring as may be necessary.
7. The Employer's Representative shall have the right to order the Contractor to cease using any item of plant insufficiently silenced or generating noise levels in excess of those specified.
8. Compliance with these conditions and the other requirements of the Contract will not of itself constitute any grounds for defence against any proceedings, whereby any occupier of premises may complain to a Court of law of a noise nuisance.

Vibration Control

9. The vibrational limits reported below shall be complied with throughout the site, and the Contractor shall

ensure that no exceedance of these limits shall occur within the site boundary.

10. The limits of vibrational amplitude and resultant peak particle velocity shall be limited to 2mm/sec.
11. The Contractor shall include for vibration monitoring at all locations where works are undertaken within 50m of an existing structure.
12. The Contractor shall provide equipment for monitoring vibrations both within and outside the site as directed by the Employer's Representative.
13. The Contractor shall comply with BS6472: 1992 Evaluations of Human Exposure to Vibration in Buildings (1Hz-80Hz). Any vibration monitoring carried out shall also be in compliance with BS6472: 1992. The Contractor shall also adopt good site practice in accordance with BS 5228: Part 1: 1997.
14. Compaction of material on site shall be achieved by dead rolling only. The use of vibration rollers shall not be permitted on this Contract. This requirement does not relieve the Contractor of his duties under the Contract.

Mud and Dust Control

15. The Contractor shall ensure that adequate provision is made to damp down areas where activities are likely to create dust. Measures shall include the spraying by pressure hoses to suppress dust and also the provision of bowsers and suction road sweepers where appropriate.
16. Plant shall be sited and screened where necessary to minimise dust emission to adjoining areas.
17. All stockpiles shall be covered to prevent the generation of dust.
18. The Contractor shall ensure that off-site observations and monitoring of dust takes place to confirm that steps are successful in minimising dust release from site.
19. The Contractor shall take all measures necessary to prevent spillage onto public roads adjoining the Site and all roads forming part of the Site. The Contractor shall, using wheel washing equipment or other methods as approved by the Employer's Representative, prevent mud from the site being carried onto any surface or facilities in use by the public. In the event of mud or site material being deposited on a public road surface, the Contractor shall take all necessary steps to ensure the roads are cleaned immediately using road vacuum sweepers, or similar methods to be approved by the Employer's Representative, without adversely affecting public traffic.
20. If such levels of cleanliness are not maintained the Employer shall make alternative arrangements for road cleaning and charge this to the Contractor.
21. Damage to any highways, bridges, footpaths or right of ways (including services drains and sewers) caused by any vehicles used in connection with the Works shall be made good by or at the expense of the Contractor. No materials shall be stored on the highway.
22. For the purpose of this clause the term "highway" shall be deemed to include any road or footpath, on or off the site, used by the public, together with any kerbs, gullies, sewers, street lighting, public utility services or tree planting associated therewith.

General

23. The Local Authorities with jurisdiction for environmental matters are: Cork County Council.
24. Notwithstanding the above, the Contractor shall comply with the following general requirements.

25. The Contractor shall comply with all current statutory rules and regulations regarding control of noise and pollution and shall ascertain from the Local Authority what requirements, restrictions or consents, if any, shall apply to the Works in this respect. The Contractor shall take due cognisance of the requirements of this Appendix 1/9 in this regard and the permitted levels stated herein. Where the allowable levels of this Appendix 1/9 exceed those of the local authority, the former shall be deemed to apply. The Contractor shall demonstrate such compliance to the Employer regularly monitoring air quality, dust and noise levels on site, taking all necessary measures to ensure that specified levels of pollution are not exceeded. The Contractor shall allow for any costs and expenses arising from such compliance.
26. The Contractor shall allow for all costs and expenses arising from such compliance.
27. Explosives shall not be permitted for use on this Contract.
28. The Contractor shall not interfere with or otherwise injuriously affect in any way possible or any watercourse or water supply.
29. The Contractor shall be liable for and shall indemnify the Employer against any expense, liability, loss, claim or proceedings whatsoever in respect of damage, noise, vibration, fumes, dust, smoke and other nuisance and any alleged nuisance or any negligence on the part of the Contractor arising out of or in the course of or by reason of the carrying out of the Works.
30. The Contractor shall take all reasonable precautions to prevent operatives, including those employed by sub-Contractors, from trespassing on adjacent property.
31. Should the Contractor wish, or is required, to erect scaffolding on, or otherwise make use of adjoining land or property, he shall serve notices, obtain written permission, pay any fees or charges the cost of which is to be included within the Contractor's offer, subsequently clear away and make good any damage to the satisfaction of the Employer.
32. The Contractor shall take all necessary precautions to minimise any disturbance, inconvenience or nuisance to the occupiers and users of neighbouring properties and to the public generally and allow for executing any noisy or offensive operations at such times and in such a manner as not to cause unnecessary inconvenience.
33. If in the opinion of the Employer any of the arrangements, etc. for control of noise, fumes, pollution and all other statutory obligations are inadequate the Employer reserves the right to arrange the necessary remedial action and to set off such costs against monies due to the Contractor.
34. The Contractor shall take all necessary precautions to avoid excessive electromagnetic disturbance of apparatus outside the site.
35. The Contractor must ensure that all electrical equipment and plant is suppressed so as to cause no unacceptable electrical or other interference to surrounding properties.

APPENDIX 1/10: Structure to be Designed by the Contractor

The following structural items are to be designed by the Contractor.

1. All site hoarding
2. Temporary works.

Other Structures to be designed by the Contractor are as agreed with the Employer's Representative at time of tender. The Contractor must have provided for, within the Contract Sum, for the provision of design services for the above items in accordance with the TII Method of Measurement Series 2500 (CC-RMP-02500).

APPENDIX 1/11: Structure Elements and Other Features to be Designed by the Contractor

Structural Element and Other Feature to be Designed by the Contractor	Location	Design Specification
Carriageway Protection Measures	All locations	Series 100
Protection measures for privately and publicly owned services and supplies	All locations	Series 100
Foundations Fencing & Gates	All locations	Series 300
Traffic Management Plans	All locations	Chapter 8 of Traffic Signs Manual
Waste Management Plan	All locations	
Construction Environmental Management Plan	All locations	
Holding down bolts for lighting columns.	All locations	Series 1300
Anchorage for rebar for lighting column corbels.	All locations	Series 1700

APPENDIX 1/12: Setting Out and Existing Ground Levels

1. The setting out data (in the form of an AutoCAD file) will contain the following (where available):

- Co-ordinates and Levels of Permanent Ground Markers
- Horizontal and Vertical setting out information for the following elements:
 - Road Centrelines,
 - Carriageway Edges,
 - Hard shoulder / hard strip / verge,
 - Site extents,
 - Traffic islands.

Tie-ins shall be agreed on site between the Contractor and Employer's Representative where necessary.

2. The Contractor shall set out the works by reference to the Ordnance Survey Datum (Malin Head), to which all levels quoted in the Contract documents refer. Horizontal alignment shall be determined in accordance with Ordnance Survey Irish Transverse Mercator co-ordinates, to which all references to Eastings and Northings in the Contract documents refer.
3. The Contractor shall verify existing alignments at tie-in points at the commencement of the works and notify the Employer's Representative of any discrepancy so that the alignments may be adjusted to provide a smooth transition to existing.
4. The Contractor is to re-survey all existing survey stations on the site to confirm the easting, northing and level at each station. The results of this survey work shall be provided to the Employer's Representative for verification prior to any setting-out of construction work.
5. The Contractor shall obtain in writing the Employer's Representative's approval for the setting out prior to the commencement of physical works.
6. The Contractor shall allow 24 hours between the setting out of any portion of the Works and the commencement of construction so that the setting out may be checked by the Employer's Representative. The 24-hour period shall commence only once the Contractor has informed the Employer's Representative that the setting out has been completed. Such checking shall be entirely at the discretion of the Employer's Representative. Any reduction in this timing shall be agreed in advance with the Employer's Representative.
7. All survey control stations shall be carefully preserved except where construction requires their removal. Before such removal substitute stations shall be established by the Contractor to the satisfaction of the Employer's Representative.
8. Permanent markings for setting out shall not be applied to surfaces that will be retained at the end of the Contract.
9. The Contractor shall make himself fully aware of the data available on the drawings and should in particular consider any implications on services where vertical profile is not available. The Contractor will at his own expense be required to alter the vertical profile of services and provide associated valves, bends, anchorages as required where such is warranted to avoid clashes or achieve a compliant design.

General Requirements

Accuracy of Setting Out

10. The Contractor shall ensure when setting out that he complies with all requirements for special accuracy and critical dimensions shown on drawings or otherwise specified. Where work is not otherwise specified the Contractor must not exceed the tolerances in BS5606.
11. The Contractor shall ensure that appropriate methods are employed to identify the accuracy of measurements to be made in verifying the Works.
12. The Contractor shall use appropriate instruments and methods and monitoring and control procedures to ensure that specified standards of accuracy are obtained, and provide systematic checking as the work proceeds to ensure that the adopted methods, materials, monitoring and control procedures are adequate.
13. All equipment utilised by the Contractor and/or Consultants shall have a valid relationship to a recognised measurement control standard.
14. The Contractor shall take corrective action in respect of work not complying with the standard of accuracy or tolerances specified, including rectification of work already carried out, adjustment of methods or materials used, increased supervision of identified source of inaccuracy. When any adjustment of design and/or details may be required the Contractor shall immediately notify the Employer.
15. The Contractor shall, wherever satisfactory accuracy, fit and/or appearance of the work are likely to be critical or difficult to achieve, obtain consent to proposals or to the appearance of the relevant aspects of the partially finished work as soon as possible.

Setting Out

16. The Contractor shall accurately, truly and properly set out the Works and be responsible for the correctness of the positions, levels, dimensions and alignment of all parts of the Works and shall provide all necessary instruments, appliances, materials, equipment and labour in connection therewith. The Contractor shall ensure the careful protection and reservation of all benchmarks, sight-rails, pegs and other materials/equipment used in setting out the Works.

APPENDIX 1/13: Programme of Works

Programme of Works

1. The Contractor shall provide a resourced programme prior to the Starting Date, in the form of a Gantt / Bar chart (an electronic copy to be compatible with Microsoft Project or similar approved). This programme shall be produced as a result of critical path analysis and must abide by the constraints stated or implied in the Contract. It shall show the level of detail appropriate to each stage of the works, and all activities and restraints shall be given a short title. The Critical Path shall be clearly indicated. All events shall be numbered and annotated with earliest and latest event dates. Proposed plant and resources assigned to each element shall be indicated.
2. The critical path analysis referred to above shall be provided to the Employer's Representative. Appropriate phasing of the works shall be taken into account in the preparation of any Programme submitted to the Employer or his Representatives.
3. The Contractor will not be permitted to commence any work on site prior to obtaining written approval from the Employer's Representative that the proposed Works Programme complies with this Appendix to the Specification. Any delays in complying with this requirement shall be attributable to the Contractor.

Schedule of Stated Constraints

4. The Contractor shall note the following Schedule of Stated Constraints:
 - (i) The Contractor's programme should take into account that access to any commercial units along or adjacent to the route should be kept open during the working hours of each individual business/property. The Contractor must liaise with each business/property owner/occupier to achieve agreement on times where access/entrances can be temporarily closed to facilitate the Works. This agreement must be in writing and issued to the Employer's Representative prior to commencement of the works.
 - (ii) Road closures are not permitted for this project. One lane of traffic must be maintained on all public roads during the course of the works.
 - (iii) The Contractor may only impact upon normal traffic on one section of the road at any one time. A section subject to traffic management must be reopened to full traffic flows prior to traffic management being put in place on a second section.
 - (iv) The extent of alterations to existing privately and publicly owned utility services are outlined in Appendix 1/16 of the Specification. Many of the proposed alterations to existing services require ducting or other Works to be undertaken by the Contractor prior to undertaking permanent alterations or diversions. In some cases the services need to be altered temporarily for a period before the permanent alterations can be undertaken.
 - (v) Site Extent and Limitations on Use (see Appendix 1/7);
 - (vi) Traffic Safety and Management (see Appendix 1/17);
 - (vii) Approval by the Employer's Representative of Works Proposals and changes to Sub Contractors or personnel in accordance with the timescales stated or implied in the Contract;

- (viii) Trial sections and demonstrations as required under the Specification;
- (ix) Requirement to erect temporary or permanent fencing in accordance with the requirements of Appendix 3/1 and any accommodation works agreements or requirements included in this contract;
- (x) Keeping all side roads and accesses to
- (xi) commercial properties along the route open at all times during the works;
- (xii) Adhering to temporary restrictions on working areas imposed by the Department of Agriculture, Food and the Marine where required to facilitate works by others;
- (xiii) Maintaining access to public and private properties for the duration of the works.
- (xiv) Maintaining existing rights of way at all times for the duration of the Contract.
- (xv) Constraints on working hours for the purposes of limiting noise and vibration nuisance are listed in Appendix 1/9;
- (xvi) Any statutory limitations on site clearance;
- (xvii) Obtaining all road opening licences and tree felling licences required for the works;
- (xviii) Site closure periods including working time to decommission works in advance of clearing the site.

5. The level of detail to be provided in the programme should not be less than the following:

Level 1

- a. Within 15 days after receiving the notice under Clause 4.9 of the Conditions of Contract and any subsequent revision to this programme a Gantt / Bar chart programme providing the following level of detail:
- (i) Roadworks and Structures (each section of the works and each traffic management phase)
 - a) Mobilisation – (site offices/compound establishment)
 - b) Fencing
 - c) Site Clearance
 - d) Topsoil Strip
 - e) Earthworks
 - f) Structures
 - g) Footpaths
 - h) Drainage
 - i) Capping Layer
 - j) Sub-base
 - k) Bituminous courses: Base and Binder Course
 - l) Surfacing
 - m) Signing and lining
 - n) Traffic Signals
 - o) Demobilisation
- (ii) All privately or publicly owned services and supplies. The Contractor shall provide separate programmes in respect of each utility/body.
- (iii) Traffic management measures including operation of site access, plant crossings and temporary diversions

for traffic. The Contractor shall be fully responsible for all traffic management associated with the works. Detailed traffic management proposals shall be submitted to the Department of Agriculture, Food and the Marine, Cork County Council Traffic Department and the Employer's Representative for approval in accordance with Appendix 1/17, and shall take into account all pedestrian accesses, footpaths and private entrances.

(iv) Accommodation Works.

(v) Landscaping Works.

- a) Planting
- b) Grass seeding
- c) Removal of existing trees
- d) Planting trees
- e) Maintenance Period

(vi) In addition to the above the Contractor shall make allowances for the following (non- exhaustive):

(vii) To provide vehicular (where currently available) and pedestrian access to all properties including businesses and schools at all times during the entire works.

Level 2

At least four weeks before the commencement of any item of work, Bar Charts of the detailed programmes incorporating the following details:

- (i) Each element of Works
- (ii) Roadwork's:
- (iii) Footways
- (iv) Utility services protection
- (v) Surface Water drainage

Progress

6. The Contractor shall ensure that the progress of the Contract Works is maintained both on and off the Site and shall take such measures as may be necessary to ensure that the periods for completion of the Contract Works are achieved.
7. The Contractor shall monitor his own performance against the Contract programme and prepare comprehensive reports for the Employer at agreed intervals in which particular reference is made to the viability of Sectional Completion, Practical Completion and any other dates shown.
8. The Contractor shall ensure that the progress of the Contract Works is maintained both on and off the Site and shall take such measures as may be necessary to ensure that the periods for completion of the Contract Works are achieved without additional expense.
9. The progress report is to be prepared and issued two days before each site meeting and shall include:
 - A statement of overall progress compared to that previously reported.
 - Actual progress achieved compared with that planned on the baselined construction programme, together with explanations of any differences. The report must cover in detail both activities on the critical path and

activities that are crucial to completion, any changes in the critical path, coming critical activities, and activities approaching criticality. Any trends in progress shall be identified and where appropriate duration to completion of key activities shall be reported. Actual and potential sources of delay shall be highlighted, together with proposed corrective action and measures to mitigate the impact of delay. (Activity status reports shall be produced for all activities in progress identifying for each activity: planned and actual start and finish dates, +/- weeks, % complete as planned, % actually complete, and duration remaining to completion).

- A report on off-site progress of design, procurement, lead-in activities, and manufacture/fabrication activities.
 - Information requirements and outstanding information, including both information to the Contractor, and from the Contractor to the Employer; identifying the dates that the information is required.
 - Details of Instructions issued and requested, and any Confirmation of Instructions issued by the Contractor.
 - Records of any incidents that may result in an insurance claim, affect tenants trading, or reported under the Health & Safety requirements.
 - Current technical queries.
 - Contract date for completion and sectional/phased completion dates, together with any extension of time agreed or being claimed (including reasons).
 - Labour (number and description of tradesmen, labourers, and supervisors), plant (number, type, and capacity of all plant excluding hand tools), and materials schedules; identifying any shortages and stating corrective action being taken.
 - Provide a monthly labour return, classified by trade, giving a total number of personnel employed on site and indicating the number of new starts.
 - Any difficulties and delays in the execution of sub-contracts, stating corrective action being taken.
10. Subsequent to the production of the Progress Report the Contractor shall, if necessary, update the programme and/or method statement to demonstrate how he proposes to overcome any delays which may have occurred. The recommendations, changes in logic and/or durations shall be submitted to the Employer in the form of a schedule indicating both the previous and amended data. The updated programme and/or method statement will come into effect only upon approval of the Employer.
11. Where the sequence of work on site is varied, the Contractor is to revise the Construction Programme to reflect such amendments and obtain the Employer agreement prior to the next monthly update.
12. The Contractor shall wherever possible achieve a continuous rate of progress on individual operations. The Contractor should avoid only partially completing an operation and then leaving it for an extended period.

APPENDIX 1/14: Monthly Statements

1. The Contractor shall submit Interim Payment Statements to the Employer's Representative in accordance with Clause 11 of the Conditions of Contract. The monthly statements submitted by the Contractor to the Employer's Representative in accordance with the Conditions shall, whenever dealing with matters covered by the Bills of Quantities, be set out under Part and Section headings similar to those in the Bill of Quantities and shall separately identify each item and specify quantity, unit, rate and value.
2. In respect of Compensation Events, the Contractor shall separately show in his Interim Payment Statement quantities, units and rate of goods and/or materials and also details of any other matters to which he considers himself entitled. The Contractor shall allow the Employer's Representative to inspect invoices for goods or materials included in the statement.
3. Where the Contractor's monthly statements include works for which the Contractor considers extra payment is due, then reference to orders given by the Employer's Representative, notices given by the Contractor in accordance with the Contract, and relevant records shall be stated.
4. **The Contractor shall note the requirements of Clause 11 of the Conditions of Contract, and the deductions that may be levied for failing to comply with the referenced clauses within.**
5. When the valuation amount is agreed between the Employer's Representative and the Contractor, and a certificate for payment issued by the Employer's Representative, the Contractor is to forward an invoice for that amount to the Employer for payment purposes.

APPENDIX 1/15: Accommodation Works

No accommodation works currently scheduled.

APPENDIX 1/16: Privately and Publicly Owned Services and Supplies

General

1. The Contractor shall liaise with all local authorities and statutory undertakers and other bodies which have any jurisdiction with regard to the Works and shall obtain from them the location of all existing services and their requirements in relation to the Works.
2. The Contractor must satisfy himself as to the exact location of all services, prior to carrying out work in any area of the Site. Information, in relation to the location of existing services has been provided to the Contractor within Volume A Part B and within Volume 0 of the Tender Documents.
3. No arrangements have been made in respect of temporary alterations of service and supplies necessary for the execution of the works. The Contractor shall make arrangements with the Statutory Undertakers for such temporary alterations of service or supplies.
4. The Contractor shall make arrangements with the Statutory Undertakers and others concerned for the co-ordination of his work with all work that needs to be done by them or their Contractors concurrently with the Works. Compliance with the periods of notice given in this Appendix does not relieve the Contractor of his obligations.
5. Private services to individual properties have not generally been listed or shown on the Drawings. The Contractor shall make arrangements with the Statutory Undertakers and others concerned for the phasing of all necessary disconnections and diversions of private services affected by the Works.
6. Disconnected apparatus shall be removed by the Contractor only with the prior consent of the Authority concerned.
7. It may be necessary to extend some of the existing services and their protection to ensure that maintenance access is available outside the extent of carriageway construction.
8. The names, addresses and telephone numbers of the authorities and public utilities companies serving in the locality are available upon request.
9. The services and supplies affected by the Works are shown on the issued Contract drawings.
10. All chamber covers, gratings and frames are to comply to D400 unless service provider specifies a lower grade.
11. As part of the Works the Contractor must alter existing utility chambers and manholes in accordance with the Works Requirements. The Contractor must include, within the Contract Sum, provision for working around live services, connections and cabling within the chambers as part of the Works.
12. The existing services, as shown on the Contract Drawings, are contained within a variety of different types of ducting and pipework. The materials of the ducting and pipework varies from uPVC, Wavin and Concrete. The Contractor shall have provided for, within the Contract Sum, for working around and hand digging around these services and for providing due care so as not to damage, break or alter the existing service ducting and/or pipework.
13. The Contractor must liaise with all relevant 3rd Parties and Utility Providers in relation to their services, ducting and chambers prior to any alterations to same. The Contractor must ensure that there are no service disruptions to any existing service resulting from the Contractor's works.

14. Construction traffic, including all traffic at site accommodation areas, shall only be permitted to transverse buried services after protective measures which are agreed with the Employer's Representative have been implemented. The Contractor shall restrict construction traffic to approved designated crossing points only.
15. Disconnected apparatus shall be removed by the Contractor only with the prior consent of the Authority concerned.
16. Where necessary, the Contractor shall liaise with all service providers and ensure full co-ordination of inputs between each. The Contractor shall provide attendance on all service providers and shall set out the works.
17. The Contractor is responsible for locating and protecting any underground services in the vicinity of any excavations.
18. The Contractor is responsible for temporarily supporting any underground services in the vicinity of any excavations.
19. The Contractor shall refer to the HSA publication "Code of Practice for Avoiding Danger from Underground Services" and any other relevant publications when dealing with or working nearby underground utilities and services.
20. The Contractor shall refer to the ESB publication "Code of Practice on Overhead Electricity Lines in Construction" and any other relevant publications when dealing with or working nearby overhead lines.
21. The names, addresses and telephone numbers of the authorities serving in the locality are listed below in the Table below.
22. Where necessary, watermains over the proposed excavation shall be maintained in its current position throughout the works. The Contractor shall propose any temporary works required to do so and obtain the approval of DAFM, the Local Authority and Employers Representative prior to undertaking any works.
23. Services and Supplies affected by the works: The Contractor must liaise with each services provider and work within the notification periods as required by each service provider.

Service	Location	Notice Req'd to Commence	Group	Time For Completion	Address	Contact Details
Uisce Éireann	Shown in Volume 0 surveys	6 weeks	F	See App 1/13	Uisce Éireann Foley Street, Dublin 1	Water & Wastewater Queries 1850 278278
ESB	Shown in Volume 0 surveys	4 weeks	G	See App 1/13	ESB Networks St. Margarets Road, Finglas, Dublin 11	Esb.ie
Eir / Buried Telecoms	Shown in Volume 0 surveys	6 weeks	F	See App 1/13	114 St. Stephen's Green West, Dublin 2	pdbureau@openeir.ie

Group Descriptions.

- a. Work expected to be completed before the commencement of the works.
- b. Work required in the contract which does not require prior work by the Contractor.
- c. Work required in the contract which does require prior work by the Contractor.

- d. Work expected to be under construction at the commencement of works
- e. Work required to be carried out jointly by the Contractor (all civil works) and the Statutory Undertaker (cabling only) in close liaison and co-operation with each other.
- f. Work to be wholly undertaken by the Contractor (in liaison with statutory undertaker).

The Contractor will lay ducts. A utility service provider needs to supervise all works adjacent to their infrastructure. USP will come to site to lay new cables in the ducts. The Contractor is to facilitate and coordinate this.

SPECIAL REQUIREMENTS IN RELATION TO TELECOM PROVIDERS

(EIR, BT/ESAT AND Virgin Media/UPC).

- 24. Prior to commencement of any works or moving heavy plant or equipment over any position of the Site in the vicinity of **EIR, BT/ESAT AND Virgin Media/UPC** plant or apparatus, the Contractor shall contact **EIR, BT/ESAT AND Virgin Media/UPC** directly to arrange a meeting on site to discuss the works proposals and confirm details of **EIR, BT/ESAT AND Virgin Media/UPC** underground equipment or plant with **EIR, BT/ESAT AND Virgin Media/UPC**. On notification of the Works by the Contractor, **EIR, BT/ESAT AND Virgin Media/UPC** will nominate a designated Liaison Officer to deal with the Contractor regarding the location and protection of existing plant.
- 25. The Contractor shall be liable for the safety and security of **EIR, BT/ESAT AND Virgin Media/UPC** plant, where the Works cause its disturbance or exposure, from malicious or other damage. In the event of damage, however small or insignificant it may seem, the Contractor shall immediately notify the Employer's Representative and report the occurrence to **EIR, BT/ESAT AND Virgin Media/UPC**.
- 26. The Contractor shall be liable for the cost of repair of all damage to **EIR, BT/ESAT AND Virgin Media/UPC** plant throughout the area covered by his contract and shall make his insurers aware that should damage result to existing **EIR, BT/ESAT AND Virgin Media/UPC** plant during construction work, **EIR, BT/ESAT AND Virgin Media/UPC** will seek to recover from the Contractor the cost of traffic loss (i.e. loss of revenue) in addition to the repair costs.
- 27. Should the Contractor's Works Proposals or method for construction of the proposed Works necessitate the temporary or permanent relocation of **EIR, BT/ESAT AND Virgin Media/UPC** plant in certain areas both in longitudinal and transverse situations, the Contractor shall ascertain the extent of such relocation before commencement of the Works. The position of such relocations shall be agreed with the Employer's Representative.
- 28. Notwithstanding the provisions of the Works Requirements, the Contractor shall make every effort to ensure that **EIR, BT/ESAT AND Virgin Media/UPC** plant will be located clear of other services. Where the specified clearance cannot be obtained it may be necessary to shift the services. As a minimum, the following clearances should be provided:

- a) Where **EIR, BT/ESAT AND Virgin Media/UPC** Plant and E.S.B. cables are placed in parallel situations the clearance should be 600mm (measured radially) for High Voltage Cables and 450mm (measured radially) for Low Voltage Cables.
 - b) Where **EIR, BT/ESAT AND Virgin Media/UPC** Plant and E.S.B. cables cross, the clearance should be 300mm for High Voltage Cables with a concrete slab of not less than 75mm protecting the E.S.B. cable, and 100mm for Low Voltage Cables.
29. **EIR, BT/ESAT AND Virgin Media/UPC** will provide Cable Watchers who will be required when excavating close to existing working cables, specifically Fibre Optic, PCM and ETS Cables or where otherwise deemed necessary by **EIR, BT/ESAT AND Virgin Media/UPC**. The cost of this attendance on Site shall be recouped from the Contractor by **EIR, BT/ESAT AND Virgin Media/UPC**.
30. Where such details show that the Contractor's works or the movement of plant or equipment may endanger **EIR, BT/ESAT AND Virgin Media/UPC** plant the Contractor must give the liaison Officer for each provider at least one week's notice of the date of which it is intended to commence such work or movement of plant and equipment in order that the presence of buried plant can be indicated by markers to be supplied by **EIR, BT/ESAT AND Virgin Media/UPC** and placed by the Contractor under the supervision of an **EIR, BT/ESAT AND Virgin Media/UPC** representative. The Contractor shall ensure **EIR, BT/ESAT AND Virgin Media/UPC** plant is protected from danger.
31. In the event of an **EIR, BT/ESAT AND Virgin Media/UPC** marker being disturbed for any reason it shall not be replaced other than in the exact position and to its former depth unless the repositioning is carried out at the direction and under the supervision of an **EIR, BT/ESAT AND Virgin Media/UPC** representative.
32. The Contractor shall take particular care in relation to the protection of **EIR, BT/ESAT AND Virgin Media/UPC** Plant and Apparatus, where such Apparatus includes the presence within the Site of optical fibre and/or co-axial cabling. The Contractor should particularly note that damage to such Apparatus is extremely disruptive to the Company network and costly to reinstate. The Contractor shall make every effort to avoid the disturbance of Apparatus more than is absolutely necessary for the completion of the Works in accordance with the Contract.
33. When excavating around, moving or backfilling around Apparatus, the **EIR, BT/ESAT AND Virgin Media/UPC** Representative shall be given adequate notice, which shall not be less than 3 working days, of the Contractor's intentions in order that he may supervise the works.
34. All excavation adjacent to Apparatus shall be carried out by hand until the exact extent and/or location of Apparatus is known. Mechanical borers and/or excavators shall not be used within 1.0m of Apparatus without the supervisory presence of an **EIR, BT/ESAT AND Virgin Media/UPC** Representative. To prevent any

movement of Apparatus during excavation, complete shuttering shall be used as directed by the Employer's Representative if: -

- a) Excavation is deeper than the depth of cover of adjacent Apparatus.
- b) Excavation is within 1.0m of Apparatus in stable soil
- c) Excavation is within 5.0m of Apparatus in unstable soil

35. If for the completion of the Works the Contractor intends using any of the following: -

- (i) Pile driving equipment within 10.0m of Apparatus;
- (ii) Explosives within 20.0m of Apparatus;
- (iii) Laser equipment within 10.0m of Apparatus;

The Contractor shall advise the **EIR, BT/ESAT AND Virgin Media/UPC** Representative, giving at least 7 Working Days written notice, in order that any special protective measures for the Apparatus affected may be arranged.

36. All **EIR, BT/ESAT AND Virgin Media/UPC** manholes, joint boxes and/or other access points and chambers within the Site shall be kept clear and unobstructed. Access for vehicles, winches, cable drums and/or any further equipment required by **EIR, BT/ESAT AND Virgin Media/UPC** for the maintenance of its Apparatus, shall be maintained at all reasonable times. The Contractor shall particularly note that footway type jointing chambers are not specified for carriageway loadings and will need to be adequately protected and/or demolished and rebuilt under the supervision of an **EIR, BT/ESAT AND Virgin Media/UPC** Representative where such chambers are likely to be placed at risk, either temporarily or permanently, from the movement of plant and/or equipment on the Site.

37. The covers to **EIR, BT/ESAT AND Virgin Media/UPC** chambers and/or Apparatus shall only be lifted by means of appropriate keys obtained from the **EIR, BT/ESAT AND Virgin Media/UPC** Representative and under the direct supervision of the **EIR, BT/ESAT AND Virgin Media/UPC** Representative. No employee of the Contractor or of any sub-Contractor employed by the Contractor shall enter any chamber and/or Apparatus of **EIR, BT/ESAT AND Virgin Media/UPC** unless under the supervision of the **EIR, BT/ESAT AND Virgin Media/UPC** Representative and in any case not before the mandatory gas check has been carried out in the presence of the **EIR, BT/ESAT AND Virgin Media/UPC** Representative and such checks have shown it to be safe to enter the Chamber and/or Apparatus. The **EIR, BT/ESAT AND Virgin Media/UPC** Representative shall be given reasonable access to all Apparatus and chambers when required.

SPECIAL REQUIREMENTS IN RELATION TO THE E.S.B.

Statutory Regulations :-

38. Where work is being carried out, all relevant statutory requirements must be adhered to. The Construction (Safety, Health and Welfare) Regulation 1975 states in Section 132, part xvi: "Before any operation or works to which these regulations apply are commenced and also during the progress thereof, all practicable steps be taken to prevent danger to persons employed from any live electrical cable or apparatus which is liable to be a source of danger, either by rendering such cable or apparatus electrically dead or otherwise". It is the duty of every Contractor to comply with the 1975 regulations and any subsequent revisions and amendments.

Working in proximity to live overhead cables.

39. The Contractor shall familiarise himself and his staff with the contents of the ESB Networks Publication "Avoidance of Electrical Hazards when Working Near Overhead Electric Lines" and ensure that all of the recommendations for safe working systems are implemented prior to any works commencing.
40. In particular, the Contractor shall note the requirements for attendance and supervision by ESB when such works are undertaken and ensure that suitable notification, but no less than 10 Working Days, is provided to ESB to arrange site attendance where required.

Working in proximity to live underground cables

41. The Contractor shall familiarise himself and his staff on safe digging practices and ESB Networks Job Sheet "Safe System of Working for Digging", its publication "Avoidance of Electrical Hazards when Digging" (available at http://www.esb.ie/esbnetworks/safety_environment/safe_digging.jsp) and HSA publication "HSA Code of Practice for Avoiding Danger from Underground Services" (http://www.hsa.ie/eng/Publications_and_Forms/Publications/Construction/).
42. In particular, the Contractor shall note the requirements for attendance and supervision by ESB when such works are undertaken and ensure that suitable notification, but no less than 10 Working Days, is provided to ESB to arrange site attendance where required.
43. In all cases covered above, a care and maintenance system must be introduced by the Contractor in order to ensure that barriers and warning notices remain effective for the duration of the work.
44. Except under such restrictions as the ESB Representative may impose for the safety of persons and the protection of property **WORKS SHALL NOT BE CARRIED OUT** or cranes or other plant erected operated and/or dismantled or materials stored within the 'prohibited space' which is that space within a radius of: -
- (i) 15.0m of live overhead electricity lines where lines are carried on steel towers;
 - (ii) 9.0m of live overhead electricity lines where the lines are carried on wood poles

Together with anywhere vertically above this space. These distances shall be maintained at all times between any Overhead Electricity Lines or anything connected to such Overhead Electricity Lines owned leased or rented by the ESB.

Potential dangers

45. The Contractor shall note the following:

- (i) The Contractor and any sub-Contractor employed by him shall particularly note and bring to the attention of their respective employees the danger of 'Flash-over' where as a result of the very high voltages being transmitted potential lethal shocks can occur in close proximity to live Overhead Electricity Lines WITHOUT ANY CONTACT BEING MADE.
- (ii) Debris produced when trimming or felling trees and/or from demolition MUST NOT fall or be projected into the 'Prohibited Space'. Similarly excavation spoil must not be dumped or accumulated so as to cause infringement of the 'Prohibited Space'.
- (iii) Special care MUST be taken when using material, which shall include but not be limited to, rope wire and/or measuring tape and the like.
- (iv) The Contractor shall exercise particular care when carrying out work which involves the use of water jets or piped slurry. Liquids when being carried or used for the purposes of the Works MUST NOT be allowed to splash fall or otherwise be projected into the 'Prohibited Space'.
- (v) If a crane or other equipment is used crane stops fencing and warning notices shall be provided by the Contractor to ensure that there can be no encroachment on the 'Prohibited Space' by crane load or other equipment even if the crane load or other equipment slips fails or overturns.
- (vi) Portable ladders used in the vicinity of live Overhead Electricity Lines shall be of wood or other non-conducting material and shall not be reinforced by metal attachments running along stiles of the ladders. Even ladders without reinforcement can lead to serious electrical shocks if allowed to come close to live overhead equipment and therefore special precautions must be taken to ensure that the ladder cannot slip and encroach on the 'Prohibited Space'.
- (vii) Any disturbance of or attachment to any Plant or Equipment or Electric Cables(s) shall ONLY be carried out by the Staff of the Company or its authorised Contractors and/or agents.
- (viii) Long objects, which shall include but not be limited to, pipes scaffold poles ladders and/or long handled tools or any object of such length that if carried vertically could infringe on the 'Prohibited Space' MUST BE CARRIED HORIZONTALLY.

46. Work should not be carried out in the immediate vicinity of the overhead lines during periods of poor visibility. If this is not reasonably practicable additional precautions MUST be taken including but not limited to the erection of appropriate barriers to ensure maintenance of the appropriate safety clearances.

47. In the absence of specific information provided by the ESB, it must be assumed at all times that an overhead electric line is live.

48. The Contractor shall consult the ESB Engineers not less than fourteen days before it is proposed to commence where any underground or overhead electricity cables or apparatus will be affected by the proposed work. The Contractor shall make all necessary arrangements with the ESB to safeguard the cable or apparatus.
49. The permission of the ESB Engineers must be obtained in writing before plant or equipment is operated or work of any kind is carried out within 12 metres of overhead lines. The Contractor shall give at least one weeks' notice to the ESB Engineers of the dates upon which it is intended to operate plant or equipment or carry out any work for which permission has been given by the ESB's Engineers. Liaison with the ESB should be continued until the construction work has been completed.
50. Access for plant and materials and the working of plant should be under direct supervision of a responsible person appointed by the Contractor to ensure that the safety precautions are observed. Self-adhesive danger stickers (obtainable free from the Board) that warn machinery operators of the hazards of working in close proximity to overhead electric lines should be placed on the cab window of machines. Before starting work in the vicinity of overhead electric lines machinery operators, in particular, should be briefed by the responsible supervisors on the dangers existing and the precautions to be observed.
51. Lateral clearance for Public Lighting i.e. horizontal clearance from the nearest conductor = Height of the column + 1 metre. The ESB should be consulted to provide clearances before any standards can be erected.
52. Other services should be 250mm from underground cabling with the exception of where they run parallel which should be first cleared depending on the length of run.
53. In the event of the ESB requiring emergency and/or maintenance work to be executed on the Electricity Cable(s) whether Overhead Electricity Lines or Buried Electricity Cables during the period of the Contract the Contractor shall afford all reasonable facilities and access to the staff of the ESB or its authorised Contractors and/or agents.
54. The Contractor shall make his insurers aware that should damage result to existing ESB plant during construction work, ESB will seek to recover from the Contractor the cost of traffic loss (i.e. loss of revenue) in addition to the repair costs.

SPECIAL REQUIREMENTS IN RELATION TO UISCE ÉIREANN

55. Uisce Éireann is the statutory authority for Water Services provision across County Cork and for co-ordinating foul and surface water disposal and water supply functions (if applicable). These functions are dealt with by:

WATER DEPARTMENT:

56. The Contractor shall at all times maintain close liaison with the appropriate Uisce Éireann Departments in connection with any works affecting their services or any of the Department's apparatus.
57. Before commencing work in the vicinity of the Department's works or apparatus the Contractor shall give the Environmental Services Department and Water Services Department reasonable notice.
58. Water supply to be maintained throughout works. Installation of proposed slab shall be done in a way to retain continuous water supply.
59. Whenever requested, Uisce Éireann will endeavour to indicate the approximate position of their sewers, manholes, water mains, ducting, cabling and other apparatus, but before carrying out any excavation by mechanical means the Contractor shall expose the services by hand to satisfy himself of the exact position.
60. The Contractor shall not permit heavy plant to travel over Uisce Éireann sewers, water mains or other apparatus unless suitable protection plates or concrete slabs have been provided to the satisfaction of the Employer's Representative.

Programme, Routing of Vehicles

61. Cork County Council Traffic Department and the Employer's Representative shall be fully informed of the Contractor's programme in respect of the public roads before the commencement of any operations that will impact on the road network. The proposed routing of vehicles on public roads, together with the necessary signing shall be approved by the Employer's Representative and Cork County Council Traffic Department prior to the Starting Date.
62. In addition, the Contractor shall give at least 5 working days' notice to Cork County Council Traffic Department and the Employer's Representative of any operations which may involve the use of public roads by Contractor's Plant and/or abnormally heavy volume or oversized construction traffic.

Precaution Against Damage

63. The Contractor shall take all necessary precautions to prevent damage which may be caused by his operations to existing infrastructure including road pavement, drainage outfalls, roadside drainage, kerbs, verges, road signs, fences, hedges etc. and shall indemnify Cork County Council and the Department of Agriculture, Food and the Marine in respect of the consequent costs of making good any damage which may occur to these installations as a result of his operations.

Removal of Signs

64. All signs displaying the name of the Contractor or the name of Sub-Contractor or of suppliers shall be removed from the site within six months of the date of the Certificate of Substantial Completion for the whole

of the Works.

65. Emergency signs shall be removed one week prior to the issue of the Defects Certificate.
66. Information boards, if applicable, shall be removed one week prior to the issue of the Defects Certificate.

Liability for Costs

67. Should the Contractor after due warning be in default in any way in relation to the above requirements, the Employer's Representative and/or Employer will make the necessary arrangements to rectify the situation and will recover the expense thereof from the Contractor.

Special Requirements for Environmental Considerations

68. The Contractor shall identify all Controlled Waters (including ditches, which may be affected by the works) and the permanent or temporary discharge points to these watercourses.
69. The Contractor shall note that failure to provide suitable preventative measures to control surface water runoff and implement silt and pollution control measures on site could lead to prosecution under the Control of Pollution Act 1974, as amended by Schedule 23 of the Water Act 1989 and Schedule 16 of the Environment Act 1995. The Employer's Representative's approval for discharges will be required and the Employer's Representative may have to suspend work until adequate pollution prevention measures have been carried out where the Contractor is in breach of agreed procedure. Notwithstanding this, approval or otherwise of any method statement shall not absolve the Contractor of any of his duties in relation to the above Environmental Considerations.
70. In the event of spillage of any polluting substance and/or pollution of any Controlled Waters, the Contractor must notify the Employer's Representative, Department of Agriculture, Food and the Marine and Cork County Council immediately by telephone.
71. Materials which may cause pollution shall not be stored near Controlled Waters nor shall they be stored in such a manner that they may fall or be carried into Controlled Waters. All refuse and debris arising from the site in the vicinity of Controlled Waters shall be collected and removed as required so that none may fall or be carried into the Controlled Waters.
72. In the event that temporary sanitation cannot be connected to the public foul sewerage system, the Contractor shall apply to the Employer's Representative for consent for any discharge in compliance with Section 34(1) of the Control of Pollution Act 1974.
73. The Contractor must not use construction plant in any Controlled Waters without the prior written approval of the Employer's Representative. Such approval will only be given where it can be demonstrated that plant is

secure from oil leaks, etc.

74. Where construction plant has to cross watercourses, temporary bridges or culverts, it should be installed with suitable mud splashguards. The fording of any Controlled Waters will not be permitted without the Contractor obtaining the prior written approval of the Employer's Representative.
75. Construction plant washing facilities (including wheel washes) shall be designed to operate on total recirculation wherever possible. Where this cannot be achieved, the disposal of wash water to any Controlled Waters shall not take place without adequate settlement and oil removal prior to discharge. The Contractor will require the Employer's Representative's approval for such discharges.
76. Borehole drilling or other ground investigations can produce a polluting effluent, which may require treatment before being discharged to Controlled Waters. The Employer's Representative must be advised by the Contractor of the measures to be taken to prevent pollution before the commencement of any such operations liable to give rise to an effluent.

Oil Pollution

77. The Contractor must ensure that oil is stored well away from any drain or Controlled Waters. Oil storage tanks must be located on an impermeable base and be surrounded by an impervious bund with no surface water outlet. The bund must be capable of retaining at least 110% of the volume of the tanks.
78. Valves and couplings connected to oil storage tanks must be located within the bund and delivery hoses should be fitted with trigger-type handles suspended back within the bund after use. Valves and trigger filler handles must be kept padlocked when not in use.
79. The transportation of fuel and oil across the site in drums or other containers must be avoided as far as practicable. Where this is unavoidable, extreme caution must be taken to avoid spillages or leaks. The Contractor shall hold adequate stocks of oil absorbent and containment materials on site. The Contractor must ensure that relevant staff are familiar with the use of these materials.
80. Surface water, together with any material which accumulates within the storage tank bund, must be removed by means of a mutually controlled positive lift pump. Oil contaminated water must be disposed of at an appropriate licensed tip site, incineration plant or oil recovery plant.
81. The Contractor shall ensure that personnel are nominated as being responsible for the supervision of the filling of oil storage tanks, vehicles etc. and that a "Nominated Person" is available at all appropriate times. Diesel pumps, generators and similar equipment shall be placed on drip trays to collect minor spillages or leaks.

82. Mobile fuel and lubricant servicing units must be provided with appropriate quality delivery hoses with trigger-type delivery nozzles. These vehicles, when not in use must be parked in a secure area within an impermeable bund. Vehicles and plant must not be refuelled near drains or Controlled Water. Oil powered pumps, generators and the like should be positioned on impervious drip trays surrounded by earth or sand bunds and located at least 10 metres from any Controlled Waters. The use of such plant adjacent to Controlled Waters is not permitted and the disposal of waste oil/oily waters from the drip trays must be by the methods outlined in this Specification.
83. The Contractor shall take all reasonable measures to ensure the security of his oil storage facilities from acts of wilful damage or vandalism.
84. The Contractor shall make precautions to ensure that no site works affect the appearance of the finished paved surface.

Concrete Works

85. Cement, grout and unset concrete (unless specialist products as approved by the Employer's Representative are used) must not be allowed to enter any Controlled Waters. Prevention may be achieved by diverting the Controlled Waters away from the working area with fixed shuttering or sandbags or by damming the flow upstream and pumping it beyond the working area. The inlet to the pump should be screened. Residual cement or concrete must be removed from the original channel before the Controlled Waters are returned to it. The Contractor must obtain all relevant approvals from the necessary overseeing authorities before any diversion of Controlled Waters can proceed.
86. The Contractor must ensure that drainage from excavations where concrete is being, or has been, newly poured shall not be pumped or allowed to issue directly into Controlled Waters without the prior approval of the Employer's Representative.
87. Tools and equipment must not be washed in Controlled Waters. If it is necessary to wash equipment on site, this must be done well away from Controlled Water and wash water must not be discharged directly into Controlled Waters or road drains without appropriate treatment. The Contractor must ensure that if concrete has to be sprayed in the vicinity of Controlled Waters, (e.g. on retaining walls, etc.) suitable protective sheeting is provided to prevent rebounded or windblown concrete from falling into Controlled Waters. Rebounded material must be cleared away before sheeting is removed.
88. The direct discharge from any concrete batching plant to Controlled Waters will not be permitted. Subject to consultation with the Employer's Representative a discharge to a soakaway may be permissible.

Miscellaneous

89. The Contractor shall take suitable precautionary measures as agreed with the Employer's Representative to

prevent any material from falling into Controlled waters when concreting, bitumen spraying, blast cleaning or painting operations are being carried out above Controlled Waters.

90. The Contractor should note that any approval by the Employer's Representative of the Contractor's proposals will not relieve the Contractor of his responsibilities with respect to any pollution which may occur. The Department of Agriculture, Food and the Marine will not be held liable for any damage or pollution resulting from operations on the site.
91. The Contractor shall provide Uisce Éireann Drainage Department in advance of the commencement of the Works the names of responsible personnel on site together with 24-hour contact telephone numbers.

SPECIAL REQUIREMENTS IN RELATION TO PRIVATELY OWNED SERVICES

General

92. Privately owned services include watermains, sewers, rising mains and all other services pipes, drains, valves, fittings and manholes owned or held in trust for private individuals or groups, community groups or private or publicly owned Companies. The Contractor shall liaise with the owners of private services in connection with any works affecting these services, prior to and during the course of these works.
93. The Contractor shall ensure that all private services affected by his works be maintained fully functional during the course of the Works except for the short periods required for making connections to divert these services temporarily or permanently.
94. Connections to private services shall only be made by agreement with the owners of the services.
95. Where there is a possibility of Private Services being encountered, either on account of the Contractor's working methods, or based on updated information, before carrying out any excavation by mechanical means the Contractor shall locate and expose the services by hand in order to identify their exact location.

SPECIAL REQUIREMENTS IN RELATION THE OFFICE OF PUBLIC WORKS

General

96. The Contractor shall contact the Office of Public Works before commencing any works that may, either directly or indirectly, interfere with streams, rivers and controlled waters.

SPECIAL REQUIREMENTS IN RELATION TO THE DEPARTMENT OF THE ENVIRONMENT, HERITAGE AND LOCAL GOVERNMENT

General

97. The Contractor shall take all reasonable steps to permit access to the site by the Department or its representatives at all times and shall permit the Department or its representatives to survey and take such observations and measurements as it requires.

Protection of Natural Heritage Interests

98. The Contractor shall ensure that all personnel (Contractors, sub-Contractors, Specialists, and suppliers) are informed of, and trained as necessary, on requirements for protection of natural heritage interests during the conduct of work and that all personnel are informed of any sites, features or species subject to statutory protection.
99. If any protected site, feature or species is inadvertently damaged as a consequence of the Works the Department shall be informed within 24 hours and all reasonable steps taken to accommodate the Department's recommendations in respect of repair or compensation for the damage.
100. If, at any time, a protected plant or animal is encountered, or evidence suggesting the presence of a protected animal is detected, the Contractor shall immediately inform the Employer's Representative and shall consult the Department to agree necessary actions.
101. If at any time and for any reason, construction activities or stockpiles of soil, spoil or other material, are liable to cause elevated dust deposition on areas or features of interest for nature conservation which would be adversely affected by dust, the Contractor shall, with the advice of the appropriate Advisor and in consultation with the Department, minimise dust generation and/or dispersion.
102. If at any time and for any reason construction activities are liable to cause levels of noise or vibration to affect any species or areas of interest for nature conservation or features of geological or physiographic interest which would be adversely affected by the noise or vibration, the Contractor shall, with the advice of the appropriate Advisor and in consultation with the Department, adopt means to minimise the noise or vibration.

SPECIAL REQUIREMENTS IN RELATION TO INLAND FISHERIES IRELAND

103. The Contractor shall take all necessary measures to minimise environmental damage to watercourses and waterbodies in the area impacted by the Construction Works.
104. The Contractor shall retain a copy of the following documents on site for the duration of the works and shall ensure that all relevant method statements for works near or on watercourses or waterbodies comply with the

requirements within these reference documents:

- Transport Infrastructure Ireland “Guidelines for the Crossing of Watercourses During Construction of National Road Schemes”
- Inland Fisheries Ireland “Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites”
- Inland Fisheries Ireland “Fishery Guidelines for Local Authority Works”.
- Cork County Council Documents

105. The Contractor shall take sufficient protective measures to ensure that no concrete or cement materials, silt, mud, earth or other solid materials or runoff shall discharge into any waters or onto any areas that may in the future runoff into surface waters.

106. The Contractor shall provide a method statement outlining his proposals for the safeguarding of watercourses from all construction materials and also for the storage of on-site materials.

107. All chemicals, fuels, oils and other liquids used on the construction site shall be stored in double skinned containers within suitably bunded areas. Chemical absorbent material will be stored on site at all times in accordance with a suitable contingency plan in the event of any spills. Such a contingency plan shall include the provision of oil booms at all times for use in the event of an emergency.

108. The Contractor shall observe the requirements of CIRIA document 532 – Control of Water Pollution from Construction Sites.

109. Prior to commencement of any works on site near watercourses or that may impact on watercourses, the Contractor shall arrange to meet representatives of the Inland Fisheries Ireland to discuss the scheme in advance of preparing and submitting a method statement to the satisfaction of the Inland Fisheries Ireland.

Gas Mains

110. Gas pipe installation shall in accordance with Guidelines for Designers and Builders – Domestic Sites document and Gas Networks Ireland, Standard Conditions of Contract for the Installation of Gas Supply requirements. All notifications and approvals shall be the responsibility of the Contractor. The Contractor shall on making contact with Gas Networks outline to the client any formal applications, payments and approvals required. The Contractor will be required to include in his price all elements associated with liaison and delays associated with Gas Networks Ireland.

It shall be the responsibility of the Contractor to ensure the Gas Networks can facilitate the provision of the gas lines at a time suitable to the Contractor.

Any omission or instruction to the Contractor for additional gas lines or removal of gas lines from the

Contractor shall be instructed in accordance with the contract and where gas main is not placed the trenching shall not be undertaken by the Contractor and associated cost shall be removed.

Natural gas is a highly flammable gas; lighter than air and will rise when released; nontoxic (but can suffocate in enclosed or confined spaces); and made up mostly of methane and has a smell added for safety purposes. Behaviour During an uncontrolled escape, natural gas will behave in the following ways: In open excavation, where there is a clear path to the atmosphere, natural gas will rise, dilute and disperse into the air. If the path to the atmosphere is blocked, the gas will travel through soil, ducts, drains, sewers and voids. It can also follow the line of other buried utility services. This can lead to gas entering a building or other confined spaces and may lead to a fire or explosion.

Gas Networks Ireland should be contacted when any work adjacent to Gas Mains is required.

APPENDIX 1/17: Traffic Safety and Management

1. Definitions:

- a) **Traffic Management System:** A traffic management system is the method chosen to direct traffic through or around the Site to facilitate construction of the permanent Works.
- b) **Traffic Management Operation:** A traffic management operation consists of those activities necessary to assemble, maintain, alter or remove a traffic management system.
- c) **Traffic Management Equipment:** Traffic management equipment consists of all signs and their covers, cones, cylinders, studs, barriers, TVCB's, road markings and lights, including their support and fixings and any cabling, piping, joints, connectors, gas/electric supply, weighting down and any other thing required for any traffic management system.
- d) **Carriageway Occupation:** Carriageway occupation is the period of time from the start of placing the first cone on the carriageway at the commencement of a taper within a traffic management system to the time of removal of the last cone from the carriageway when removing the taper of a traffic management system.
- e) As defined in Traffic Signs Manual: Chapter 8 (Safety Zone, Works Area & Working Space)
- f) **Works Traffic:** Vehicles or items of plant that are required within the Works Area for the purposes of carrying out the Works.

General

- 2. The Contractor is reminded of the Limitations of the use of the site in Appendix 1/7. Dinish Bridge is a Department of Agriculture Food and the Marine (DAFM) asset within the footprint of the Fishery Harbour Centre (FHC), which is operated and managed by the DAFM. The bridge is the only means of access by road or foot to Dinish Island for persons attending the businesses, fishing vessels and fishing industry adjacent enterprises located on Dinish Island and as such DAFM will be one of the primary consultees in relation to notifications.
- 3. The carrying out of the works necessitates the setting up, maintenance, alteration and removal of Traffic Safety and Management measures. The Contractor shall be responsible for planning, implementation, maintenance and removal of traffic safety and management measures required in order to facilitate the work. The Contractor shall consult with DAFM and Cork County Council where appropriate prior to formal submission of any traffic management plans.
- 4. Without prejudice to the General Conditions of Contract, the Contractor shall, ten Working Days prior to the commencement of the Works on or near a public road, submit for review and approval detailed traffic management plans, DAFM, to Cork County Council and the Employer's Representative.
- 5. All Bus Services are to be retained throughout the scheme. The Contractor shall liaise with all Bus Service Operators in order to phase the works to accommodate existing Bus services including arrangements for

temporary bus stops.

6. The Contractor shall implement the Traffic Management System prior to the commencement of any works in the area governed by that Traffic Management Plan only on confirmation of approval from the Employer's Representative. The Traffic Management Plan shall show the sequence of construction, within the programme constraints of Appendix 1/13, and include the following information as a minimum:
 - Phasing of the works.
 - Drawings showing traffic management layout, including:
 - Geometric Design (where applicable)
 - Position of traffic signals
 - Width of lanes
 - Working areas and Safety zones
 - Access and exit locations for construction
 - Signing
 - Road markings
 - Temporary public lighting
 - Temporary traffic lights
 - Provision for emergency services
 - Provisions for local access
 - Temporary Bus Stop positions
 - Provision for Pedestrians
 - Timing and duration of operations
7. Drawings showing the Contractor's detailed Traffic Management Plans shall be at a scale not less than 1:1000, supplemented with drawings at 1:500 or 1:250 scales as necessary, or as required by the Employer's Representative. A3 drawings are acceptable.
8. The Contractor's traffic management proposals shall ensure that construction joints in the surface course are within 15mm of the lane road markings or centreline as deemed appropriate by the Employer's Representative.
9. The Contractor shall also include within his team a traffic manager whose responsibility it will be to liaise weekly with DAFM and Cork County Council where appropriate to maintain satisfactory arrangements for deliveries for the construction works, and to avoid congestion with respect to implementation of approved Traffic Management Plans.

Undertaking the Works

10. All of the works within public roads take place on roads with posted speed limits of 50-80kph. In accordance with Chapter 8 of the Traffic Signs Manual, the designation of the road for Traffic Management Design

Parameters will be Level 2.

11. The Department of Agriculture, Food and the Marine have advised that Road Closures will not be permitted required for the works.
12. A static lane closure is envisaged to be used for the works. A static lane closure is appropriate for works that are confined to a fixed location and where minimum lane widths can be maintained. Following lane closure design, the PSCS shall develop a suitable method of controlling traffic past the works site.
13. Temporary safety barriers placed around the working area should be clearly defined by temporary road markings, signage and coning as specified in the Traffic Signs Manual. The PSCS shall carry out a risk assessment before commencing any works on site, to determine the type of barriers (if any) and cones most suitable for the works.
14. Any temporary pedestrian tracks shall be properly segregated and protected from trafficked lanes and construction activities. Where works occupy footpaths then dedicated protected routes must be provided that do not require crossing of the carriageway in accordance with Chapter 8 of the Traffic Signs Manual. The routes must be adequately supervised and maintained to ensure that pedestrians do not encroach into the works area.
15. The Contractor shall programme the works with the aim of ensuring the safety of pedestrians at all times, and keeping the disruption to pedestrians to an absolute practical minimum, and provide the Employer's Representative with a method statement to demonstrate how he intends to do that.
16. It is the Contractor's responsibility to keep informed, inter alia by close liaison with DAFM, the Gardaí, Cork County Council and the Employer's Representative, of other ongoing or planned construction events, which may impact upon his works.
17. The Contractor must submit the developed Construction Stage Traffic Management Plan to for review and approval before commencement of construction. The Contractor is responsible for the erection, maintenance and removal of all traffic management measures and signage.
18. The Cork County Council and Transport Infrastructure Ireland procedures for road opening licences must be strictly adhered to for works on public roads. The Contractor is entirely responsible for obtaining Road Opening Licences as necessary to enable him to fulfil his contractual obligations.
19. Existing traffic, together with access for local property owners, schools and the emergency services, will have to be facilitated as part of the Contractors traffic management plan.

20. The Contractor shall continually risk assess all temporary traffic management installations to determine if the measures taken have had the desired effect in reducing traffic speeds to an appropriate level during the course of the works. If traffic speeds are deemed inappropriate, the Contractor is to provide additional traffic management measures to reduce such speeds to a level appropriate to the works. The design of any such measures must be subjected to risk assessment which must be passed to the PSDP for review before being implemented.

Traffic Safety and Management

21. The Contractor shall be responsible for obtaining written approval of all Traffic Safety and Management, including Traffic Management Plans. The Contractor shall provide, erect and maintain such traffic signs, road markings, lamps, barriers and traffic control signals and such other measures as may be necessitated by the works in accordance with the following:

(i) Traffic Control Layouts (in order of priority from a-f below)

- a) The recommendations contained in Chapter 8 of the Traffic Signs Manual published by The Department of Transport, 2019, (hereafter known as Chapter 8).
- b) The recommendations contained in "Guidance for the Control and Management of Traffic at Road Works", Department of Transport
- c) The requirements of above-mentioned documents shall be provided insofar as they do not contradict the requirements of the Road Traffic Act 1961 and any subsequent amending and supporting legislation including but not restricted to:
 - The 1968 Road Traffic Act
 - The 1994 Road Traffic Act
 - The 1993 Roads Act
 - The Road Traffic (Signs) Regulations 1997 (SI 181 of 1997) and the provisions of the law of Ireland in general and in particular.
- d) The sign background colour for all statutory and warning signage layout and sign working shall be in accordance with the requirements of the Irish DOE Traffic Signs Manual 1996, and amended Chapter 8, 2019.
- e) Safety zones in accordance with the requirements of Chapter 8 shall be provided with each Traffic Control Layout.
- f) In any event the layouts, traffic lane widths, safety zone widths, sign spacing, cone and barrier spacing and all other components of any proposed temporary road works layout, shall have the prior approval of the Department of Agriculture, Food and the Marine and Cork County Council as appropriate and shall be submitted to the Employer's Representative at least 14 days prior to the installation of the Traffic Management measures. Any such Traffic Management Plan shall comply with the requirements of Section 2 (ii) of this Appendix 1/17.

22. Full time access to all properties and businesses must be maintained and managed. Should traffic- signal-controls be used then they must be vehicle actuated and suspended in favour of manually operated

STOP/GO control to prevent unacceptable delays or queuing. Traffic management measures implemented must be cognisant of the large number of private and commercial accesses located along the route which must be actively managed.

23. The Contractor is required to provide VMS signs on both approaches to the works to warn motorists of the hazard and lane closure/queuing traffic as appropriate. The location of the VMS signs must be agreed with the Employer's Representative. The Contractor must consult with DAFM, the Local Authority and the Gardaí prior to the implementation of static lane closures. VMS should be provided for a minimum of one week in advance of the proposed temporary traffic management works. The VMS shall advise motorists of the forthcoming works. The VMS signs are to remain in place until issue of the Certificate of Substantial Completion, or until directed otherwise by the Employer's Representative.
24. Regular meetings between the Employer's Representative, DAFM, the Contractor, Cork County Council, the Gardaí and other emergency services shall be arranged by the Contractor and shall take place throughout the Construction Period; as well as at initiation or changes of Traffic Management layouts and at any other time deemed necessary by any of these parties. Such meetings shall take account of any special events that may require particular Traffic Management Operations.
25. The works are to be programmed in such a manner as to reduce disruption to local residents, schools and businesses along the road.

Notice Requirements

26. When Temporary Traffic Orders are required for proposals put forward by the Contractor, he must submit his draft Order to the Cork County Council Traffic Department and the Area Engineer, allowing the following notice periods for approval:

a) Amending or making Traffic Orders	8 weeks
b) Authorisation of non-prescribed sign	8 weeks
c) Authorisation of Mobile Lane Closure	2 weeks
d) Moving permanent sign to be compatible with the state of the works as described in Clause 117.11.	4 weeks
e) Authorisation of three-way signal control	8 weeks
f) Approval for the use of Temporary Vertical Concrete Barriers	3 weeks

Notwithstanding the foregoing, those periods (if any) stated in Appendix 1/13 are not available for Traffic Management installations.

Maintenance

27. While the Traffic Management System is installed on the carriageway, the Contractor shall ensure that the cones, signs, cylinders, barriers, lamps, temporary studs and markings (including any diversionary signs off

site) are inspected regularly. In areas where resurfacing is required, the Traffic Management System shall be removed within 30 minutes of inactivity unless otherwise agreed with the Employer's Representative. The Traffic Management layouts shall be maintained in accordance with the requirements of Chapter 8 of the Traffic Signs Manual or as approved by the Employer's Representative. All Traffic Management operatives shall be trained to the industry standard.

28. The Contractor shall apply for, and obtain, any Road Control Licences as required by Cork County Council Roads Control Section (i.e. T2 Permit or other as applicable to the nature of the works site) where works are proposed on the public road.
29. The Contractor shall be responsible for the maintenance of all public roads, site access roads and temporary diversions within the site until issue of the Certificate of Completion. In addition, maintenance of public roads outside the site boundary may be required, as directed by the Employer's Representative.
30. The Contractor shall keep a daily record of all defects, the times when they were identified or reported to him, the action taken to correct the defects and the times when they were successfully corrected. A copy of this record shall be forwarded to the Employer's Representative on the following day, until the completion of those works requiring lane or carriageway occupation.
31. In the event of an accident occurring adjacent to any of the works, the Contractor shall immediately contact the Garda Síochána and the Employer's Representative informing them of the following:
 - Location of the accident,
 - The seriousness of the accident and whether any persons are trapped, whether the collision involves vehicles carrying inflammable, corrosive or hazardous substances, whether there is any possibility of ignition from leaking chemicals.
32. The Contractor shall provide telephone numbers of a minimum of 3 No. personnel who can be contacted by the Garda Síochána and / or Employer's Representative both during and outside normal working hours and who shall be responsible for initiating action should it be reasonably required in the event of an emergency.
33. The Contractor shall be responsible for maintaining the running traffic carriageway and any pedestrian routes adjacent to the Works in a clean, clear and safe condition at all times.
34. The Contractor shall maintain arrangements whereby he can quickly call out personnel outside the normal working hours to carry out any maintenance work needed for an emergency. The Employer's Representative shall be provided with a list of names, addresses and telephone numbers of the Contractor's staff who are responsible for the organising of emergency work.
35. In the event of an accident occurring within the site, and once broken down or damaged vehicles and debris

have been removed, the Contractor shall, on the direction of the Employer's Representative, restore the road surface to its original condition, reinstate safety fencing and anchorages to the satisfaction of the Employer's Representative. The Contractor shall submit to the Employer's Representative within 48 hours fully detailed and separate records of plant, labour and materials used for restoration and reinstatement for record purposes.

36. The Contractor shall ensure that all signs, cones, barriers, delineators and bollards used in connection with the Works shall be inspected and if necessary cleaned regularly, at intervals not greater than once a week and when necessary. The Contractor shall ensure that all reflective patches and sleeves on cones or other delineators are cleaned or replaced at intervals of not greater than seven days, or as necessary to maintain effective reflectivity.
37. The Contractor shall be responsible for ensuring that temporary footpaths must be sealed using either a bituminous bound material or concrete surfacing. Temporary footpaths consisting of compacted aggregates will not be permitted.
38. Strict measures shall be put in place at construction access points in order to mitigate the risk of haul vehicles dropping fill or other construction material onto the existing road carriageway whilst hauling material to the site and also whilst exiting the site back onto the road network. Such measures must include:
 - Wheel Wash Facilities shall be provided on site at all times to ensure the wheels of every haul vehicle are kept clean and free of construction debris.
 - Road Sweeper/Cleaner shall be available on site at all times to clean up any spillage from construction vehicles occurring on the road carriageway and to ensure that the existing road network is kept clean and free of construction debris.
 - Measures to control dust generated by construction vehicles shall be provided on site.

Site Vehicles, Personnel and Plant

39. No vehicles shall exceed 30kph when travelling within the works areas of the site, and a maximum of 15kph speed limit is to be observed adjacent to works in progress, accommodation or standing plant. Temporary speed limit signs are to be erected as appropriate, or as directed by the Department of Agriculture, Food and the Marine, Cork County Council or the Employer's Representative.
40. Only vehicles essential for carrying out the works shall be permitted within the works area. Non- essential vehicles, particularly private cars, shall not enter the working areas. The Contractor shall provide sufficient parking for employees' cars, and other non-essential vehicles, at a location away from the working areas and shall provide transport to the site as necessary.
41. All vehicles travelling within the works area shall be equipped with a flashing amber lamp of sufficient intensity to be clearly visible in daylight. The flashing lamp must be visible from all angles and must not be obscured

by any parts of the vehicle structure or load. Certain vehicles shall require more than one lamp. The use of “lighting bars” incorporating more than one lamp and/or prism reflectors is permitted. The use of Hazard lights as an alternative will not be permitted.

42. All necessary lighting, signs and notices for directing pedestrians and traffic throughout the carrying out of the Works are to be provided by the Contractor. If in the opinion of the Employer the lighting, signs and notices are inadequate the Employer reserves the right to arrange the necessary provisions and set off such costs against the monies due to the Contractor.

Road/Lane closures and other restrictions

43. A full road closure will not be permitted for any part of the works. One lane of traffic must be maintained at all times. Pedestrian access must be maintained at all times.
44. The Contractor shall at all times liaise with, and comply with the requirements of An Garda Síochána.
45. When excavating along the carriageway edge the Contractor shall ensure that the level difference between the carriageway and the works is never greater than 50mm within 0.5m of a running lane.
46. The minimum running lane width through the works shall be in accordance with the requirements of Chapter 8 of the Traffic Signs Manual. The Contractor shall develop his Traffic Management Plans and agree with Department of Agriculture, Food and the Marine and Cork County Council in advance.
47. Temporary warning sign W170: Other Hazard with supplementary plate P069 “No Road Marking” in accordance with 6.21.15 of the Traffic Signs Manual, subject to approval by the Employer’s Representative, shall be displayed following resurfacing. The signs shall be required until road markings are reinstated.
48. Where temporary lane closures are required, stop/go signs shall be used where the length of lane closure does not exceed 300 metres and temporary traffic lights shall be used where the length of lane closure exceeds 300 metres. Temporary lane closures on more than one section of the road shall not be permitted, unless otherwise agreed in writing with the Employer’s Representative and Cork County Council.

Manual Traffic Signal Control

49. Traffic flows shall be monitored at all times and manual traffic signal control implemented should the situation demand, or at the request of the Employer’s Representative. Operators shall be in radio contact at all times of manual control.

Signing before roadworks commence & Diversion Signing

50. “Works start here” signs shall be erected by the Contractor at least three weeks before start of works unless instructed otherwise by the Employer’s Representative. Variable Message Signs (VMS) should be erected at

least one week before the start of the works advising motorists the period over which the works will take place unless instructed otherwise by the Employer's Representative.

Maintenance Requirements

51. The Contractor shall sweep, patch, remove debris, restore road surface to its original condition using Dense Bitumen Macadam (delay set macadam shall not be permitted) and maintain the trafficked carriageway surfaces within the Site Limits and for 100 metres beyond each end, to allow traffic to pass safely within the speed restrictions of the sites. This shall be carried out, as a minimum, three times daily or as required by the Employer's Representative.

Control of Dust and Mud on the Road

52. The Contractor shall keep all roads, accesses and rights of way, leading to, from or crossing the site free from mud, slurry and any other hazardous substance that is deposited through his operations. Any such substance deposited by the Contractor or his sub-Contractors on any such road shall be removed immediately by the Contractor at his expense. The Contractor shall use a suction sweeper for this purpose, the use of a tractor and mechanical brush shall not be permitted.
53. The Employer's Representative shall have the authority to close any such site access if such a substance deposited is not promptly removed by the Contractor and any losses or expenses incurred as a result shall be borne by the Contractor.
54. The Contractor shall take all measures necessary to prevent spillage onto public roads adjoining the Site and all roads forming part of the Site. In wet weather the Contractor shall, using wheel washing equipment or other methods as approved by the Employer's Representative, prevent mud from the site being carried onto any surface or facilities in use by the public. In the event of these occurring, the Contractor shall take all necessary steps to ensure the roads are cleaned immediately using road vacuum sweepers, or similar methods to be approved by the Employer's Representative, without adversely affecting public traffic.

Local Roadways

55. Where construction work is required on side roads or junctions, which lie outside the Site Extents, the Contractor shall consult with Cork County Council Traffic Department with regard to any restrictions that may apply.

Lane Closure Bulletin/Summary of Traffic Management Installations

56. The Contractor shall maintain a record of all Traffic Management operations implemented.
57. The Contractor shall submit to the Employer's Representative daily, in an electronic form compatible with MS Office applications or equivalent, a Lane Closure Bulletin detailing all Traffic Management restrictions on the Network, including nil returns.

58. Within 5 days of the completion of all Works, the Contractor shall provide the Employer's Representative, in electronic form compatible to MS Office applications or equivalent, with a summary of the Traffic Management Installations used.
59. The required reporting proforma for both the above submissions to the Employer's Representative is in Annex 1.
60. Roads closed for site access and Traffic Management Plan shall be agreed with both the Employer and the Employer's Representative prior to implementation.

Specific Requirements

61. Where Works are likely to impede on any local accesses or entrances, the Contractor shall give a minimum of 10 days' notice to the inhabitants of the impending works.
62. Where lane closures are likely to be required, the Contractor shall complete and issue the lane Closure Bulletin overleaf.
63. Where works are undertaken on public roads, the Contractor shall provide a minimum length of 25m of temporary safety barrier on the approach to the pedestrian crossing points as part of his traffic management works.
64. The Contractor shall not impede the right of way into any private access or business along or adjacent to the alignment. The Contractor shall take all measures necessary to ensure that access is maintained at all times.
65. The Contractor shall be fully responsible for all traffic management associated with the works. Detailed traffic management proposals shall be submitted to the Employer's Representative for approval in accordance with this Appendix, and shall take into account all pedestrian accesses, footpaths and entrances to private developments.
66. The responsibilities of the Contractor shall include, but not be limited to the Co-ordination, co-operation and agreement with the Employer's Representative, Cork County Council and the Garda Síochána in all matters relating to Traffic Management.
67. Where road opening is required for services or tie-ins, the Contractor shall obtain the relevant road opening licences to undertake the work. It should be noted that a separate road opening licence shall be required from Cork County Council for each individual road opening.
68. The Contractor shall also provide information including qualifications of the Traffic Operations Supervisor,

who shall be responsible for the implementation of the developed TMP onsite.

69. The Contractor is to provide and maintain and make available to the public a 24hr contact number for the PSCS/Contractor. Where access to residences or property is required then a suitable access/egress procedure should be agreed with the relevant parties and coordinated through the Temporary Traffic Operations Supervisor.

ANNEX 1

STANDARD LANE CLOSURE BULLETIN

Lane Closure Bulletin/Summary of Traffic Management Installations*	
ITEM	INFORMATION
Road Number/Name e.g. Park Road	
Location (use grid reference if location name is ambiguous)	
Start Date and Time (use 24 hour clock)	
Estimate Finish/Finish* Date and Time (use 24 hour clock)	
Type of Restriction e.g. Hard Shoulder, Northbound Lane	
Nature of Works	
Traffic Management restrictions e.g. Mobile Lane Closure	
Start Location (State marker post or prominent feature)	
End Location (State marker post or prominent feature)	
Slip Road Closures (State junctions, directions and on/off)	
Mandatory Speed Limit	
Diversion Route (In the case of road closures, alternative routes and wide loads)	
Contacts	
Other Comments	

**Delete as necessary*

APPENDIX 1/18: Temporary Diversions for Traffic

Not used.

APPENDIX 1/19: Routeing of Vehicles

Permitted Access to and from the site

1. Access to the construction sites will be permitted only from the controlled access points, off the public road, which shall be agreed in advance with the Employer's Representative. The access point shall have advance warning signage and will be suitably wide to allow access for all vehicles in one turning movement from the public road. Under no circumstances shall queuing of delivery vehicles be permitted on public roads.
2. The Contractor, his sub-Contractors and suppliers shall only use the permitted Access Routes for purposes in connection with the works unless otherwise agreed by the Employer's Representative.
3. Access into and out of the sites shall be directly from and onto the public roadway. Suitable works access and exits shall be provided in accordance with the Traffic Signs Manual Chapter 8.
4. Vehicles leaving the sites shall be subject to the requirements of Appendix 1/17 "Traffic Safety and Control", paragraph 55-57, "Control of Dust and Mud on the Road".

The use of Permanent Works by Construction Traffic.

5. Trafficking of the pavement forming part of the permanent works by construction traffic shall be avoided unless measures approved by the Employer's Representative have been taken to protect it from damage. Approval from the Employer's Representative does not relieve the Contractor of his responsibilities under the contract.
6. No tracked machinery shall be allowed on finished pavement at any time during the works.

Loaded Dump Trucks

7. No licences will be issued to the Contractor on this project for loaded dump trucks on public roadways going to or from the sites as part of the Contract. All materials removed from the site shall be by appropriately permitted vehicles/hauliers, and shall be transported to a suitably licensed site. All such documentation shall be copied to the Employer's Representative prior to the removal of any material from the site.

Movement of Machinery and Plant Across Public Roads.

8. The Contractor shall limit all movements across public roads, but where this is deemed necessary by the Employer's Representative, the Contractor shall erect advance warning signage to advise motorists of an impending crossing point, irrespective of the duration for which the crossing point shall be active, and also use two flag men to manually control traffic for each crossing.

APPENDIX 1/20: Recovery Vehicles for Breakdowns

Not used.

APPENDIX 1/21: Information Boards

Not used.

APPENDIX 1/22: Progress Photographs

1. The following schedule describes the progress photographs to be taken in accordance with Clause 122 of the Specification.

Table 1/22: Progress Photograph Schedule

Location	Type and Print Size (mm x mm)	No. of Negatives in a set	Aerial / Ground	Frequency Required	Remarks
Whole Site	Digital photos of minimum size 10 Megapixels	20	Ground	Prior to Starting Date and at weekly intervals until completion	
Whole Site	Digital photos of minimum size 10 Megapixels	20	Aerial	Prior to Starting Date and at fortnightly intervals until completion	

2. Digital images shall be taken with a professional single lens reflex (SLR), 10 million pixel or more digital camera shot at highest resolution and saved in a tif or highest quality jpeg format with a minimum file size of 18 megabytes, unless otherwise instructed in writing by the Employer's Representative.
3. Copyright of all progress photographs shall become the property of Department of Agriculture, Food and the Marine.
4. 1 No. proof / index print of each digital image shall be printed on photographic paper and made available to the Employer's Representative.
5. Proof / index prints shall be made available to the Employer's Representative within seven days of exposure. Any that shall be unacceptable shall be retaken immediately.
6. All photograph prints shall be labelled and presented in suitably sized albums to the written approval of the Employer's Representative. Each album shall have an index print or prints for easier identification.
7. All digital images shall be stored on CD-R's and shall include file name, shot number plus encoded time / date.
8. All progress photographs shall be reproduced and supplied to the Employer's Representative on CD-R in a digital format. The digital format used shall be approved in writing by the Employer's Representative.
9. Additional progress photographs shall be taken, as required by the Employer's Representative.

APPENDIX 1/23: Substances Hazardous to Health

General

1. All works shall be carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 and any subsequent relevant legislation.
2. The Contractor shall provide the Employer's Representative with a copy of his Safety Statement and shall revise it as necessary in light of any revised or additional obligations required by law. The statement shall include the Contractor's detailed procedures to be followed in the event of any accident including minor incidents.
3. The Contractor shall be aware of and take the necessary precautions detailed in SA 8/94 "Use of Substances Hazardous to Health in Highway Construction".

Restrictions in relation to Traffic Management Measures

4. The Contractor shall not store or arrange unloading of any substances considered hazardous to health at or near any traffic management safety zones or systems.
5. Where any burning of road markings is to be undertaken on public roads, this shall be undertaken during off peak hours, excluding school opening and closing times in the locality.

Restrictions in Relation to Working Practices

6. The Contractor shall take all reasonable precautions to use substances that are not known to be hazardous to health for use in the construction of the contract. Where the use of such substances is unavoidable, the Contractor shall ensure that all employees are advised of the proper methods for use of such substances and the consequences of not following recommended use.
7. These substances shall be stored in accordance with the manufacturer's recommendations.
8. Where potentially hazardous substances are encountered during excavations or any part of the works, the Contractor should seek the advice of a specialist sub-Contractor regarding the identification, treatment and disposal of such substances.
9. The Contractor shall ensure that all hazard sheets for materials to be used in the works are displayed prominently in the stores, and that all employees can read and understand these sheets. In any event, the Contractor shall ensure that toolbox talks address the subject of all materials to be used in the works and their potential risks.
10. Suitable PPE equipment shall be provided at all times.

Measures to be taken to Protect Members of the Public

11. All work should be planned to avoid generating dust - a water bowser shall be on site to enable dust to be dampened down when necessary.
12. The Contractor shall be required to provide temporary screening where there is risk of dust, arisings or debris impacting on the public. This temporary screening shall protect members of the Public in close proximity to the works including motorists and other road users.
13. Screening shall be of sufficient construction to protect the public from substances potentially hazardous to health, which are being used by the Contractor or as a result of the works.
14. For minor cutting with hand tools a fine water spray should be used.
15. Live carriageways are to be protected from dust or spray arising from Site clearance (or construction) which might otherwise reduce visibility.

APPENDIX 1/24: Quality Management Schemes

The following is the list of accepted quality management schemes referred to in sub-Clauses 104.3 and 104.4 of the TII Specification for Roadworks.

Scheme

1. Description: Manufacturers of Portland Cement

Certification Body:	Or
BSI, 389 Chiswick High Road, London W4 4AL, UK	The Certification and Inspection Dept. NSAI, Eolas, Glasnevin, Dublin 9

Specification:

Cement shall be in accordance with the 500 and 1700 Series of the Specification and shall be manufactured to comply with all of the appropriate requirements of one of the following British Standards or the equivalent Irish Standard or European Norm.

BS 12 - Specification for Portland Cement

BS 146 - Specification for Portland Blastfurnace Cements

BS 1370 - Specification for Low Heat Portland Cement

BS 4027 - Specification for Sulphate-Resisting Portland Cement

BS 4246 - Specification for High Slag Blastfurnace Cement

BS 6588 - Specification for Portland Pulverised Fuel Ash Cements

2. Description: Supply and Erection of Fences

<u>Certification Body:</u>	Or
BSI, 389 Chiswick High Road, London W4 4AL, UK	The Certification and Inspection Dept. NSAI, Eolas, Glasnevin, Dublin 9

Specification:

BS 1722 : Parts 1 to 13 - Specification for Fences.

Safety fencing shall be in accordance with Series 400 of the Specification and the drawings referred to in the Contract.

Note:

This scheme applies to safety fencing. The part of this scheme which relates to safety fences requires training on an approved course run through the Local Government Management Board or the Construction Industry Training Board.

3. Description: Manufacture of Safety Fencing Components

<u>Certification Body:</u>	Or	Or
BSI, 389 Chiswick High Road, London W4 4AL, UK	The Certification and Inspection Dept. NSAI, Eolas, Glasnevin, Dublin 9	Lloyd's Register Quality Assurance Ltd. Norfolk House, Wellesley Road, Croyden CR9 2DT, UK

Specification:

Safety fencing components shall be in accordance with Series 400 of the Specification and the Drawings referred to in the Contract.

4. Description: Manufacture of Industrial Fasteners and Associated Items

<u>Certification Body:</u>	Or	Or
BSI, 389 Chiswick High Road, London W4 4AL, UK	The Certification and Inspection Dept. NSAI, Eolas, Glasnevin, Dublin 9	Lloyd's Register Quality Assurance Ltd. Norfolk House, Wellesley Road, Croyden CR9 2DT, UK

Specification:

Nuts, bolts and fixings shall be in accordance with the Specification and shall be manufactured to the requirements of the following standards or their equivalent Irish or British Standard or European Norm.

BS 3410 - Specification for Metal Washers for General Engineering Purposes

BS 4320 - Specification for Metal Washers for General Engineering Purposes

BS 4395 - Specification for High Strength Friction Grip Bolts and Associated Nuts and Washers for Structural Engineering

BS 4933 - Specification for ISO Metric Black Cup and Countersunk Head Bolts and Screws with Hexagon Nuts

ISO 898 - Mechanical Properties of Fasteners

Part 1: Bolts, Screws and Studs

Part 2: Nuts with Specified Proof Load Values

ISO 4014 - Hexagon Head Bolts Product Grades A and B

ISO 4016 - Hexagon Head Bolts Product Grade C

ISO 4017 - Hexagon Head Screws Product Grades A and B

ISO 4018 - Hexagon Head Screws Product Grade C

ISO 4032 - Hexagon Nuts, Style 1 Product Grades A and B

ISO 4034 - Hexagon Nuts Product Grade C

Alternatively, nuts, bolts and fixings shall be manufactured to the dimensions and tolerances of the Standards listed above, using materials to the following Standards.

BS 6105 - Specification for Corrosion Resistant Stainless Steel Fasteners

ASTM A325-89 Specification for High Strength Bolts for Structural Steel Joints

Notes:

- (i) Where the Contractor can demonstrate that the fastener required is made by fewer than three firms within this scheme, the requirements to comply with the scheme shall be deemed not to apply.
- (ii) Where the Contractor obtains fasteners from a stockist, the stockist shall be registered under Part 1 of the BSI Registered Stockist System. The System Requirement shall be Level A, Quality Assured Material with Lot Traceability (P00012). Where the Contractor can demonstrate that the fastener required is supplied by fewer than three stockists within this system, the requirements to comply with the System shall be deemed not to apply.

5. Description: Application of Road Markings

<u>Certification Body:</u>	Or	Or
BSI, 389 Chiswick High Road, London W4 4AL, UK	The Certification and Inspection Dept. NSAI, Eolas, Glasnevin, Dublin 9	Lloyd's Register Quality Assurance Ltd. Norfolk House, Wellesley Road, Croyden CR9 2DT, UK

Specification:

Road marking material shall be in accordance with Series 1200 of the Specification and shall be manufactured to comply with all of the appropriate requirements and the following standards.

BS 3262 - Hot-applied Thermoplastic Road Marking Material Part 2: Specification for Road Performance

BS 6044 - Specification for Pavement Marking Paint

BS 6088 - Specification for Solid Glass Beads for Use with Road Marking Compounds and for Other Industrial Uses

6. Description: Traffic Sign Manufacture

<u>Certification Body:</u>	Or	Or
BSI, 389 Chiswick High Road, London W4 4AL, UK	The Certification and Inspection Dept. NSAI, Eolas, Glasnevin, Dublin 9	Lloyd's Register Quality Assurance Ltd. Norfolk House, Wellesley Road, Croyden CR9 2DT, UK

Specification:

All works shall be in accordance with the relevant Clauses of Series 1200 of the Specification.

Address of United Kingdom Accreditation Service (UKAS) from whom details of SSDs can be obtained:

United Kingdom Accreditation Service (UKAS)

21 - 47 High Street Feltham

Middlesex TW13 4UN

United Kingdom

Telephone: +44 (0) 20 8917 8400

Facsimile: +44 (0) 20 8917 8500

Address of Irish National Accreditation Board (NAB): Irish National Accreditation Board (NAB)

BM TRADA Certification Limited Stocking Lane Hughenden Valley High Wycombe Buckinghamshire HP14 4NR United Kingdom Telephone: +44 (0) 1494 565484 Facsimile: +44 (0) 1494 565487 E Mail: enquiries@bmtrada.com	British Standards Institution 389 Chiswick High Road London W4 4AL United Kingdom Telephone +44 (0) 20 8996 9000 Facsimile +44 (0) 20 8996 7400 E Mail: info@bsi.org.uk				
Bureau Veritas Quality International (BVQI) Ltd 2nd Floor Tower Bridge Court 224 – 226 Tower Bridge Road London SE1 2TX United Kingdom Telephone: +44 (0) 020 7661 0700 Facsimile: +44 (0) 020 7403 8163 E Mail: info@bvqi.com	<table border="1"> <tr> <th colspan="2">European Quality Assurance (EQA) Ltd</th></tr> <tr> <td> Navigation House 48 Millgate Newark Nottinghamshire NG24 4TY United Kingdom Tel: +44 (0) 1636 611226 </td><td> EQA (Ireland) Ltd 15 Greenmount House Greenmount Office Park Harold's Cross Dublin 6W Republic of Ireland Tel: +353 (0) 14734188 </td></tr> </table>	European Quality Assurance (EQA) Ltd		Navigation House 48 Millgate Newark Nottinghamshire NG24 4TY United Kingdom Tel: +44 (0) 1636 611226	EQA (Ireland) Ltd 15 Greenmount House Greenmount Office Park Harold's Cross Dublin 6W Republic of Ireland Tel: +353 (0) 14734188
European Quality Assurance (EQA) Ltd					
Navigation House 48 Millgate Newark Nottinghamshire NG24 4TY United Kingdom Tel: +44 (0) 1636 611226	EQA (Ireland) Ltd 15 Greenmount House Greenmount Office Park Harold's Cross Dublin 6W Republic of Ireland Tel: +353 (0) 14734188				

	Fax: +44 (0) 163611704 E Mail: ega@ega.co.uk	Fax: +353 (0) 14734191 E Mail: ega@indigo.ie
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Wilton Park House, Wilton Place Dublin 2
 Republic of Ireland
 Telephone: +353 (0) 1 6073003
 Facsimile: +353 (0) 1 6073109 E Mail: nab@nab.ie

Addresses of Certification Bodies:

ISOQAR Ltd First Floor West Point 501 Chester Road Manchester M16 9HU Telephone: +44 (0) 161 877 6914 Facsimile: +44 (0) 161 877 6915 E Mail: enquiries@isoqar.com	Lloyd's Register Quality Assurance (LRQA) Ltd Hiramford Middlemarch Office Village Siskin Drive Coventry CV3 4FJ United Kingdom Telephone: +44 (0) 2476 88 2222 Facsimile: +44 (0) 2476 63 9493 E Mail: enquiries@lrqa.com
National Quality Assurance (NQA) Ltd Warwick House Houghton Hall Park Houghton Regis Dunstable LU5 5ZX United Kingdom Telephone: +44 (0) 1582 539 000 Facsimile: +44 (0) 1582 539 000 E Mail: enquiries@nqa.com	Premier Assessments Ltd Suite 6 The Derwent Business Centre Clarke Street Derby DE1 2BU United Kingdom Telephone: +44 (0) 1332 202556 Facsimile: +44 (0) 1332 205067
QA International Certification Ltd Suite 2-4 Cleveland Hall Cleveland Street Darlington Co Durham DL1 2PE United Kingdom Telephone: +44 (0) 1325 384272 Facsimile: +44 (0) 1325 480980	SGS Yarsley ICS SGS United Kingdom Ltd SGS House 217 - 221 London Road Camberley Surrey GU15 3EY United Kingdom Telephone: +44 (0) 1276 691133 Facsimile: +44 (0) 1276 691155 E Mail: ukenquiries@sgsgroup.com

UK Certification Authority for Reinforcing Steels (CARES) Pembroke House 21 Pembroke Road Sevenoaks Kent TN13 1XR United Kingdom Telephone: +44 (0) 1732 450000 Facsimile: +44 (0) 1732 455917 E Mail: general@ukcares.com	National Standards Authority of Ireland (NSAI) Glasnevin Dublin 9 Republic of Ireland Telephone: +353 (0) 1 8073800 Facsimile: +353 (0) 1 8073838 E Mail: info@nsai.ie
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APPENDIX 1/25: Product Certification Schemes

1. The following is a list of accepted product certification schemes referred to in Clauses 104.4 and 104.6 of the Specification. This is not an exhaustive list.

Marked Schemes

- **IIRS Product Certification Scheme**
- **IAB Certification Scheme**
- **UK Kite mark/Safety mark**
- **Other equivalent, to the approval of the Employer's Representative**

Certification body: The Certificate and Inspection Department, National Standards Authority of Ireland, Eolas, Glasnevin, Dublin 9, Ireland.

BS No. or equivalent Irish Standard	Title	Specification Series
IS EN 295	Specification for vitrified clay pipes, fittings and ducts	500
IS EN 197	Cement - Composition, Specifications and Conformity Criteria for Common Cements	500 1700
IS EN 12620	Aggregates for Concrete	500 1700
IS EN 124	Gully tops and manhole tops for vehicular and pedestrian areas. Design requirements, type testing, marking, quality control.	500
IS EN 1916	Concrete pipes and fittings, unreinforced, steel fibre and reinforced.	
BS 437	Specification for cast iron spigot and socket drain pipes and fittings	500
IS EN 13101	Steps for underground man entry chambers Requirements, marking, testing and evaluation of conformity.	500
IS EN 1401	Plastic piping systems for non-pressure underground drainage and sewerage. Unplasticized poly(vinylchloride)(PVC-U). Specifications for pipes, fittings and the system	
IS EN 1452-1	Plastics piping systems for water supply. Unplasticized poly(vinylchloride) (PVC-U). General	

BS No. or equivalent Irish Standard	Title	Specification Series
IS EN 1452-2	Plastics piping systems for water supply. Unplasticized poly(vinylchloride) (PVC-U). Pipes	
IS EN 1452-3	Plastics piping systems for water supply. Unplasticized poly(vinylchloride) (PVC-U). Fittings	
BS 3506	Specification for unplasticised PVC pipe for industrial purposes	500
BS 4962	Specification for plastics pipes and fittings for use as sub soil field drains	
IS EN 588-1	Fibre-cement pipes for sewers and drains – pipes, joints and fittings for gravity systems.	500
4346	Joints and fittings for use with unplasticised PVC pressure pipes	500
4962	Specification for plastics pipes and fittings for use as sub-soil field drains	500
5481	Specification for unplasticised PVC pipe and fittings for gravity sewers	500
BS 5911	Part 1: Precast concrete pipes, fittings and ancillary products	500
BS 5911	Part 3: Precast concrete pipes, fittings and ancillary products Specification for unreinforced and reinforced concrete manholes and soakaways.	500
BS 5911	Part 4: Precast concrete pipes, fittings and ancillary products Specification for unreinforced and reinforced concrete inspection chambers.	500
BS 5911	Part 5: Precast concrete pipes, fittings and ancillary products Specification for prestressed non-pressure pipes and fittings with flexible joints	500
BS 5911	Part 6: Precast concrete pipes, fittings and ancillary products Specification for road gullies and gully cover slabs	500
IS.1	Portland Cement	500 900 1600 1700 2400
IS.5	Aggregates for Concrete	500 900 1600

BS No. or equivalent Irish Standard	Title	Specification Series
		1700 2400
IS.6	Concrete Sewer Pipes	500
IS.58	Standard Specification (Clayware land drainage pipes) Order 1953	500
IS.166	Concrete Surface Water Pipes	500
IS EN 877	Cast iron pipes and fittings, their joints and accessories for the evacuation of water from buildings – Requirements, test methods and quality assurance.	500
IS EN 598	Ductile iron pipes, fittings, accessories and their joints for sewerage applications. Requirements and test methods	500
BS 3262	Hot-applied thermoplastic road marking materials	1200
IS EN 1436	Road marking materials –Road marking performance for road users	1200
IS EN 1423	Road Marking materials. Drop on materials. Glass beads, antiskid aggregates and mixtures of the two.	1200
6088	Specification for solid glass beads for use with road marking compounds and for other industrial uses	1200
IS EN 1871	Road marking materials – Physical properties	1200
IS EN 1790	Road markings materials – performed road markings	1200
IS EN 60920	Specification for ballasts for tubular fluorescent lamps. General and safety requirements	1400
IS EN 60921	Specification for ballasts for tubular fluorescent lamps. Performance requirements	1400
IS EN 60922	Specification for general and safety requirements for ballasts for discharge lamps (excluding tubular fluorescent Lamps)	1400
IS EN 60923	Specification for performance requirements for ballasts for discharge lamps (excluding tubular fluorescent lamps)	1400
IS EN 61347-1	Lamp control gear. General and safety requirements	1400
IS EN 61347-2-8	Lamp control gear. Particular requirements for ballasts for fluorescent lamps	1400
IS EN 61347-2-	Lamp control gear. Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)	1400
IS EN 61048	Specification for capacitors for use in tubular fluorescent and other discharge lamp circuits. General safety requirements.	1400

BS No. or equivalent Irish Standard	Title	Specification Series
IS EN 61049	Specification for capacitors for use in tubular fluorescent and other discharge lamp circuits. Performance requirements.	1400
BS 1370	Specification for low heat Portland Cement	1700

A. Safety Mark

Certification Body: BSI, 389 Chiswick High Road, London W4 4AL

Certification Body: National Standards Authority of Ireland, Eolas, Glasnevin, Dublin 9.

BS No. or equivalent Irish Standard	Title	Specification Series
IS EN 60155	Glow starters for fluorescent lamps	1400
IS EN 60598	Luminaires for road and street lighting	1400

B. Other Marked Schemes

Electric Cables

Certification Body: British Approvals Service for Cables (BASEC), 360Silbury Boulevard, Milton Keynes, Bucks MK9 2AF.

Certification Body: The Certification & Inspection Department, National Standards Authority of Ireland, Eolas, Glasnevin, Dublin 9.

BS No. or equivalent Irish Standard	Title	Specification Series
BS 5467	Specification for cables with thermosetting insulation for electricity supply for rated voltages of up to and including 600/1000V and up to and including 1900/3300V	1400 1500
BS 6004	Specification for PVC-insulated cables (non-armoured) for Electric power and lighting	1400
BS 6346	Specification for PVC-insulated cables for electricity supply	1400

C. Reinforcing and Prestressing Steel

Certification Body: UK Certification Authority for Reinforcing Steels (CARES), Pembroke House, 21 Pembroke Road, Sevenoaks, Kent TN13 1XR.

Certification Body: The Certification & Inspection Department, National Standards Authority of Ireland, Eolas, Glasnevin, Dublin 9.

BS No. or equivalent Irish Standard	Title	Specification Series
IS EN 13391	Mechanical tests for post-tensioning systems	1700
BS 4449	Specification for carbon steel bars for the reinforcement of concrete	1000 1700 2500
BS 8666	Specification for the scheduling, dimensioning, bending and cutting of steel reinforcement for concrete	1700
EN ISO 4066	Construction drawings – Bar Scheduling	1700
BS 4482	Specification for cold reduced steel wire for the reinforcement of concrete	1000 1700
BS 4483	Specification for steel fabric for the reinforcement of concrete	1000 1700
BS 5896	Specification for high tensile steel wire and strand for the prestressing of concrete	1700

D. Non-Marked Schemes

Ready Mixed Concrete

Certification Body: The Quality Scheme of Ready Mixed Concrete, Wolsey House, 3 High Street, Hampton, Middlesex TW12 2SQ.

Certification Body: The Certification & Inspection Department, National Standards Authority of Ireland, Eolas, Glasnevin, Dublin 9.

Certification Body: Specification: The supply of ready mixed concrete shall comply with the Specification for Works, in particular the 1000 Series and 1700 Series Specification.

BS No. or equivalent Irish Standard	Title	Specification Series
BS 146	Specification for Portland blast furnace cements	1000 1700
IS EN 12620	Specification for Aggregates for Concrete	500 1000 1100 1700 2600

BS No. or equivalent Irish Standard	Title	Specification Series
IS EN 12878	Pigments for the colouring of Building Materials based on the Cement and/or Lime – Specifications and Methods of Test	500 900 1000 1600 1700 2400 2600
EN 12620	Specification for air-cooled blastfurnace slag aggregate for use in construction	1000 1700
BS 1305	Specification for batch type concrete mixers	500 900 1000 1600 1700 2400 2600
IS EN 12350-7	Testing fresh concrete. Air Content. Pressure Methods.	500 900 1000 1600 1700 2400 2600
IS EN 1008	Mixing water for concrete – Specification for sampling, testing and assessing the suitability of water, including water recovered from processes in the concrete industry, as mixing water for concrete.	500 900 1000 1600 1700 2400 2600
3797	Specification for lightweight aggregates for masonry units and structural concrete	1700
3892	Pulverised fuel ash Part 1: Specification for pulverised-fuel ash for use as a cementitious component in structural concrete	500 1000 1700
BS 4027	Specification for sulphate-resisting Portland cement	500 900

BS No. or equivalent Irish Standard	Title	Specification Series
		1000 1600 1700 2400 2600
146	Specification for blastfurnace cements with strength properties outside the scope of BS EN 197-1.	1700
EN 934	Admixtures for concrete, mortar and grout.	1000 1700
IS EN 480	Admixtures for concrete, mortar and grout. Testing Part 1: Reference concrete and reference mortar for testing. Part 2 Determination of setting time Part 3: Determination of water soluble chloride content Part 11: Determination of air void characteristics in hardened concrete. Part 12: Determination of the alkali content of admixtures	500 900 1000 1600 1700 2400 2600
IS EN 206	Concrete Specification, performance, production and conformity.	500 900 1000 1600 1700 2400 2600
8500	Concrete Complementary Standard to BS EN 206-1 Part 1: Method of specifying and guidance for the specifier. Part 2: Specification for constituent materials and concrete.	
IS EN 197	Cement Part 1: Cement - Composition, specifications and conformity criteria for common cements. Part 2 Cement Conformity evaluation Part 4 Cement Composition, specifications and conformity criteria for low early strength blastfurnace cements	500 900 1000 1700
6699	Specification for ground granulated blast furnace slag for use with Portland cement	1000 1700

BS No. or equivalent Irish Standard	Title	Specification Series
IS EN 15167	Ground granulated blastfurnance slag for use with concrete, mortar and grout. Part 1: Definitions, specifications and conformity criteria Part 2:: Conformity evaluation	500 900 1000 1600 1700 2400 2600
IS EN 13055-1	Lightweight aggregates. Lightweigh aggregates for concrete, mortar and grout	1700
IS EN 450	Fly ash for concrete	500 1000 1700

APPENDIX 1/26: NSAI Agrément Certificates

Table 1/26 contains a list of types of work, goods or materials for which proprietary products are required to have an NSAI Agrément Certificate or equivalent.

Table 1/26: Requirements for Agrément Certificates

Description	Specification Series
Concrete Slab	1700
Waterproofing	2000

Where types of work, goods or material for which proprietary products are required to have an NSAI Certificate, a British Agrément Board Certificate or equivalent shall be acceptable.

Types of work, goods or material other than those listed may be required to have a British Agrément Board Roads and Bridges Certificate at the instruction of the Employer's Representative.

APPENDIX 1/31: As Built Records

As-built Records

1. The Contractor shall submit with any application for Substantial Completion Certificate for any part of the Works, to the Employer's Representative, complete as-built records for that part of the Works in conformity with this Appendix 1/31. Substantial Completion will only be certified for that part of the Works with accompanying complete as-built records in conformity with this Appendix 1/31. The Contractor shall retain and store a copy of all such records in accordance with the other provisions of the Contract.
2. As-built records shall be submitted in hard copy and on USB. One complete hard copy of the as-built records and three copies of each USB shall be supplied to the Employer's Representative fully labeled and indexed. The format for labeling and indexing shall meet the requirements of the Employer's Representative, as shall the electronic format of the data on the USB.
3. All drawings, references and sections within the USB copy shall be hyperlinked to their appropriate sections. All AutoCAD layers shall also be included in the as-built records. As a minimum, all drawings shall be provided in AutoCAD 2018 DWG format as extracted from the detailed compilation of all data in Civil 3D, or equivalent as Approved by the Employer's Representative, and also in DWF format.
4. The particular requirements of the as-built records are that they shall include, as a minimum, the following:
 - (i) All as-built records as specified for the Safety File in this Appendix 1/31;
 - (ii) Design data as detailed within this Appendix 1/31;
 - (iii) For design elements, one copy of each of all design drawings on A1 size paper clearly marked "As-Built Drawing"; and copies of all drawings in AutoCAD DWG and DWF format and schedules in Microsoft Word or Microsoft Excel format as appropriate and written to a DVD-ROM with a lifetime warranty;
 - (iv) All records of below ground as-built services, ducts/cables, culvert measurements and surfaces shall be portrayed and submitted in Civil 3D;
 - (v) All record of above ground features shall be portrayed and submitted in Revit format;
 - (vi) On completion above and below ground models they are to be incorporated into a single 3D model in Navisworks. It should have facilities to allow users to open and combine the 3D models, navigate them in real-time and review the model using a set of tools including comments, material information, redlining, viewpoint, and measurement;
 - (vii) Photographs as specified in the Appendix 1/22;
 - (viii) An "Execution and Completion Report" identifying the actual types of materials and construction that were used throughout the Works;
 - (ix) Overall comprehensive ducting and cable schedule which matches the site wide identification/tagging system used.
 - (x) Each duct to be mapped to indicate its location and details of any cables contained therein;
 - (xi) All details in respect of each cable shall be included in the schedule, including but not limited to, product

data, testing, certifying and commissioning of all cables as specified in Appendix 14/1.

5. For the purposes of these As-Built Records, a defect shall mean a failure of any component in the Works during the construction of the Works, including, but not limited to, deterioration in the road pavement including chip loss, deterioration of trench reinstatement on roads, loose pavers, unexpected movement of earthworks slopes, evidence of poor drainage and the like, subsidence and/or movement of pavement works, and subsequent identification of the use of materials within the Works that would not have met the requirements of the Specification.
6. Where the Works involve alterations, or additions, to roads, utilities or other features outside the extent of the Site, the As-Built Records pertaining to such shall be in a separate file or separately identified so that it can be passed to Cork County Council or other relevant utility provider. In such cases, it shall not be acceptable to cross-refer to other As-Built Records and the file, or part, shall be a stand-alone document.
7. The Defects Certificate will not be issued on any part of the Works until complete As-Built Records for that part of the Works in conformity with this Appendix 1/31 have been approved by the Employer's Representative.

Information to be supplied for the Safety File

8. The drawings and other information listed in this Appendix are the minimum requirements that shall be incorporated, as appropriate, to form the Safety File. The Safety File shall contain an index listing all drawings and other information provided with reference to information that shall be in other records to which the file cross-refers. The Safety File shall be submitted as an electronic file and in hard copy for the approval of the Employer's Representative.
9. The safety file for the Project shall in most instances be a composite document incorporating information on individual elements making up the project.
10. The following additional information, as a minimum, shall also be included in the Safety File for the Project:
 - (i) Hazardous materials data sheets;
 - (ii) Relevant method statements, including, but not limited to, method statements for dismantling, modification or demolition of any Works;
 - (iii) Operation and maintenance manuals; and
 - (iv) Service requirements.
 - (v) Maintenance plan for items going forward.

As-Built Drawings

11. As-built drawings shall be provided by the Contractor detailing all of the various elements of the Works and the following in Navisworks, including but not limited to;
 - (i) All ducts clearly identified by a unique reference number;
 - (ii) All chambers clearly identified by a unique reference number and these should be linked to a duct and chamber schedule in EXCEL;
 - (iii) All services installed including all fittings, connections, chambers, and manholes including invert and cover levels;
 - (iv) All cables installed on site;
 - (v) Access control and communications equipment;
 - (vi) All structures constructed as part of the Works including all sub-surface formation levels;
 - (vii) All finished surface levels;
 - (viii) All retained existing ground levels
 - (ix) All existing services encountered and retained on Site;
 - (x) All street furniture;
 - (xi) All fencing and railing, and
 - (xii) Landscaping Works.
12. The drawings shall have all non-existing background information.
13. Drawings showing the construction of control and communications equipment in the Works shall be provided showing, as a minimum, location and details of the type of equipment and routes interconnecting cables and power supply.
14. Statements shall be provided detailing the equipment functionality.
15. Drawings showing the construction of landscaping Works shall be provided showing, as a minimum, the location and extent of planting and grass seeding areas including type of planting and seeding, species, numbers and sizes as appropriate.
16. Drawings shall be provided showing the location and extent of hard landscaping including type of material as appropriate.
17. Drawings shall be provided showing the areas of landscape cut and fill.

Design Information

18. Design information shall be provided including the following, as a minimum:
 - (i) All details necessary to allow the works to be reviewed by a third party,
 - (ii) All details necessary to allow construction to proceed,

- (iii) All details listed as a requirement of the As Built drawings,
- (iv) Details of the design of any diversions required to utilities necessary for completion of the Works.

Construction Methods

- 19. Information shall be provided on methods of construction where special techniques were necessary, for example, de-watering or ground freezing.
- 20. Any significant unanticipated health and safety problems that arose during construction, and the steps taken to overcome them, shall be described.

Materials

- 21. The Contractor shall provide details of materials and products used in the Works. This shall list all suppliers by name, address and material product supplied. Where products or materials are covered by SI No. 619 Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001, the full details of the product or material specification shall be given.
- 22. Where sub-Contractors are responsible for activities involving the construction, installation or application of products or materials, names and addresses of such sub-Contractors shall be given.

Maintenance Facilities/Procedures/Manuals

- 23. Full information on maintenance facilities, procedures and manuals shall be prepared.
- 24. An operations and maintenance manual shall be provided for all plant, machinery or equipment forming part of the Works. The manual shall detail the methodology for comprehensive testing, routine maintenance, fault repair and testing. The operation and maintenance manual shall detail the following, as a minimum, in separate sections;
 - (i) Introduction: Summary of the project history and purpose;
 - (ii) Health & Safety: General commentary on the Health and Safety duties of the plant operatives, advice on specific hazards present on the plant and recommendations for dealing with visitors to the plant;
 - (iii) Process Description: General description of the treatment process employed on the Plant. Each unit operation shall be described and its purpose as part of the process detailed;
 - (iv) Process Parameters: Details of the plant process and control parameters. Details shall be provided for each individual item and for the overall plant;
 - (v) As-Built Drawings: A3 size reduced copies of the final drawings detailing all installed items;
 - (vi) Panel Wiring Diagrams: As-built details;
 - (vii) Equipment Schedule: Detailed list of the equipment provided on the plant. Each item of equipment shall be identified complete with the details of the duty, manufacturer, nameplate, and consumables;
 - (viii) Maintenance schedule: List of duties required of the operating staff separated into daily, weekly, monthly and yearly duties. Model record sheets shall be provided for guidance; and

(ix) Manufacturer's Literature: Original literature not photocopies, from the equipment manufacturers.

25. Hardcopies of the operations and maintenance manuals shall be provided in hardwearing 4 ring PVC binders with front and side labels indicating the project and manual title and the series number of the manual and the volume. Each manual shall include a table of contents which shall list the entire manual contents with the contents specific to the volume highlighted. The table of contents shall generally be as per the above list, with each of the main sections broken down into appropriate subsections. Each item of equipment shall have its own subsection in the section containing the manufacturer's literature. Dividers shall be provided for each section and subsection.
26. Electronic copies of the operations and maintenance manuals shall be provided on USB in PDF format, with identical content to the hardcopy, to allow the creation of a replacement hardcopy from the softcopy. The electronic copy shall be fully bookmarked to assist in its use.
27. The Contractor shall supply two hardcopies of the operations and maintenance manual, each containing an electronic copy of the manual, and a further three electronic copies.

Demolition

28. The Contractor shall provide information in respect of the health and safety implications to operatives and others where total or partial decommissioning, demolition or dismantling of existing elements is proposed.
29. The Contractor shall provide details of any health or safety implications that the removal of any plant, services, machinery, or equipment, particularly electrical/electronic, may have on others outside of the Site.

APPENDIX 2/1: List of Buildings etc, to be demolished

Not used.

APPENDIX 2/2: Filling Trenches and Pipes

Not used.

APPENDIX 2/3: Retention of Material Arising from Site Clearance

- 1) All materials arising from the demolition and site clearance process are to be disposed of offsite to an approved licenced waste facility. The Contractor is to submit to the Engineer the permits for both transportation and disposal of the haulier and licence facility respectively at least 2 weeks prior to material been disposed of offsite.
- 2) The existing gate at northern end of bridge to be taken up, stored and reinstated following the surfacing works.

APPENDIX 2/4: Explosives and Blasting

Not used.

APPENDIX 2/5: Hazardous Materials

1. The Contractor shall ensure that appropriate measures are taken to safeguard the health of the Contractor's operatives and the general public for the duration of the works.
2. In the event that hazardous materials are discovered on the site, the Employer's Representative is to be informed immediately.
3. The Employer's Representative has the right to request that tests be carried out on any suspected hazardous materials to determine their exact nature.
4. Under certain circumstances, specialist Contractors may be required to remove the hazardous materials from site. The Contractor shall seek the approval of the Employer's Representative where the services of a Specialist Contractor in accordance with Appendix 6/2 are to be engaged. The Contractor shall ensure that the Specialist sub-Contractor, if any, shall comply with all relative legislation regarding the required permits and licensing for the disposal of hazardous materials.
5. Hazardous materials arising from site clearance and/or excavations shall be disposed of only at licensed sites.
6. The Contractor shall note the following non-exhaustive list of legislation, which applies to Employers and Employees when working in the vicinity of Asbestos;
 - European Communities (Protection of Workers) (Exposure to Asbestos) Regulations 1989
 - European Communities (Protection of Workers) (Exposure to Asbestos) (Amendment) Regulations 1993
 - European Communities (Protection of Workers) (Exposure to Asbestos) (Amendment) Regulations 2003

Others;

 - The Safety, Health and Welfare at Work Act 2005
 - The Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001
 - The Safety, Health and Welfare at Work (Carcinogens) Regulations 2001
7. It should be noted in particular that the European Communities (Protection of Workers) (Exposure to Asbestos) Regulations 1989 require that employers must seek to eliminate, reduce, enclose, or at a last resort to use personal protective equipment. The requirement to implement safe working procedures shall be determined by a risk assessment to determine primarily the type of Asbestos.
8. It is a requirement of the Contract that the Contractor carries out all works associated with the implementation of the above legislation and all other relevant legislation. This includes not only for the protection of workers

during the removal phase but also the safe disposal of asbestos materials (in whatever form) to a disposal site in accordance with the Local and National guidelines / legislation governing the Safe Disposal of Asbestos materials.

APPENDIX 2/6: Specification for the Strip out of Existing Mechanical and Electrical Services and Equipment

General

1. The Contractor shall strip out, disconnect, remove, protect, salvage, retain, store, transport, dispose of and/or reinstate existing mechanical and electrical services and equipment as described in the Works Requirements and shown on the Contract Drawings.
2. No item shall be removed, disconnected, cut or made redundant until authorised by the Employer's Representative. Existing equipment shall not be removed, and cables shall not be disconnected or cut, until approved by the Employer's Representative.
3. The extent of strip out shall be as stated on the drawings.
4. The affected equipment shall be lighting columns, luminaires, feeder pillars, posts, brackets, trays, containment, supports, fixings, and associated items
5. All strip-out works shall be carried out in accordance with the Contract, relevant statutory requirements, utility requirements where applicable, and any manufacturer's recommendations where retained or re-used items are affected.
6. The Contractor shall protect all live, operational, retained or adjacent services and equipment from damage, contamination, overloading, vibration, impact, or accidental disconnection during the Works.
7. Before commencing strip-out works, the Contractor shall locate and verify all existing services and equipment by survey, records, trial holes, opening-up and other appropriate means.
8. The Contractor shall submit a method statement for the strip-out works, including:
 - a. isolation and permit arrangements;
 - b. temporary works, if required;
 - c. sequence of dismantling;
 - d. protection of live services;
 - e. storage and handling;
 - f. disposal routes;
 - g. reinstatement measures;
 - h. and any temporary support or diversion arrangements.
9. Where the Works affect utility-owned or operator-controlled systems, the Contractor shall coordinate with the relevant authority and shall comply with all notice periods and access requirements.

APPENDIX 3/1: Fencing, Gates and Stiles

1. Locations of Fences, Gates and Stiles

The locations of fencing, gates and stiles are shown on the issued Contract drawings. The existing gate at northern end of bridge to be taken up, stored and reinstated following the surfacing works.

2. Treatment of Timber

Posts and rails are to be pressure treated with Creosote under controlled Vacuum and Pressure Processes in accordance with the Rueping Method. The fencing materials are to be creosote impregnated as PDM fencing or similar approved.

APPENDIX 3/2: Fencing: Transport Infrastructure Ireland Road Construction Details

All fencing to be provided as part of the works must comply with Series 300 of the Transport Infrastructure Ireland Specifications for Roadworks Volume 1 and Volume 4. The Transport Infrastructure Details from Volume 4 of the Specifications for Roadworks are shown but not limited to the list below.

TII Standard Detail Drawing Number	Title
CC-SCD-00301	Timber Post and Rail Fence Types A and B
CC-SCD-00302	Stud Fence
CC-SCD-00303	Concrete Post and Rail Fence
CC-SCD-00304	Timber Post and Wire Fence
CC-SCD-00305	Cleft Chestnut Pale Fence
CC-SCD-00306	Concrete Post and Mesh Fence
CC-SCD-00317	Steel Palisade Security Fence
CC-SCD-00318	Cranked Concrete Post and Mesh
CC-SCD-00321	Timber Post and Tension Mesh Stud Fence

APPENDIX 4/1: Safety Barrier

1. The locations of vehicle restraint systems are shown on the Contract Drawings in Volume A Part B.
2. The performance criteria for the safety barriers and vehicle restraint systems are scheduled in the table overleaf. All safety Barriers, their terminals and transitions shall strictly comply with TII document DN-REQ-03034 The Design of Road Restraint Systems.
3. Testing for anchorages and attachment systems, posts and foundations in accordance with Clause 407 shall be carried out by the Contractor, who shall also provide the equipment. All testing requirements and procedures to IS EN 1317.
4. The Contractor shall carry out loading tests on the following quantity of post foundations:
5. Posts in cast in-situ sockets in concrete foundations - 20%
6. Posts in cast in-situ sockets in continuous concrete beam - 10%
7. All VRS rely on certain ground conditions in order to function satisfactorily. Testing, as described in the CC-SPW-00400, shall be undertaken to ensure that the system performs as intended.
8. Testing shall be carried out at locations determined by, and in the presence of the Employers Representative.

9. Schedule of Safety Barriers:

Barrier Ref No	Start Chainage of LoN	End Chainage of LoN	Hazard Information				Barrier Type	Single/Double Sided	Safety Barrier Performance Criteria				
			Hazard Description	Hazard Chainage	Location	Drawing Reference			Containment Level	Impact Severity Level	Working Width	Vehicle Intrusion	Set-back
South West	CH 206	CH 226	Embankment, Water, Bridge Parapet	CH 0.00 to CH 234	Verge	0102	Aluminium	Single	N2	A	W2	VI ₄	0.6m minimum
South East	CH 206	CH 226	Embankment, Water, Bridge Parapet	CH 0.00 to CH 234	Verge	0102	Aluminium	Single	N2	A	W2	VI ₄	0.6m minimum

Provide agreed transitions from proposed safety barrier and bridge parapets, see drawing D870-OCSC-XX-XX-DR-C-0105 for further details. The length of the terminals assumed in the safety barrier design is 7m. LoN includes transitions and excludes terminals.

APPENDIX 4/3: Pedestrian Restraint Systems

Not used

APPENDIX 4/3: Safety Barrier Terminals

- 1. The locations of safety barrier terminals are shown on the Contract Drawings in Volume A Part B.
- 2. The performance criteria for all safety barrier terminals are as follows:

Terminal Classification:	T110
Impact Severity:	A
Permanent Lateral Displacement Class:	X1, Y1
Exit Box Class:	Za1, Zd1
Direction Class:	BDT

APPENDIX 4/4: Safety Barrier Maintenance

Not used

APPENDIX 4/5: Anti-Glare Screens

Not used.

APPENDIX 4/6: Safety Barriers: TII Standard Construction Details

Not used.

APPENDIX 4/7: Vehicle Parapet Systems

1. The locations of Vehicle Parapet Systems are shown on Drawings Nos D870-OCSC-XX-XX-DR-C-0101 & D870-OCSC-XX-XX-DR-C-0102
2. The performance classes for the Vehicle Parapet Systems are shown on the above drawings/scheduled in the following table.
3. Schedule of Vehicle Parapet Systems

Structure Ref No	Length of Vehicle Parapet	Height of Vehicle Parapet	Vehicle Parapet Type	Vehicle Parapet Performance Criteria		
				Containment Level	Impact Severity Level	Working Width
East Parapet	190 m	1.25 m	Aluminium	N2	A	W2
West Parapet	190 m	1.25 m	Aluminium	N2	A	W2

Provide agreed transitions to proposed safety barrier, see drawing D870-OCSC-XX-XX-DR-C-0105 for further details. The length of the parapet includes transitions.

4. Mesh panels shall be provided to the vehicle containment parapet as shown on Drawing D870-OCSC-XX-XX-DR-C-0105. Panels shall be fully compatible with the parapet system, shall not compromise the certified containment performance, and shall be fixed in accordance with the parapet manufacturer's details. Any fixings, penetrations or interface details shall be designed so as not to reduce the structural capacity, continuity or function of the parapet.
5. Drilling and fixing of the vehicle parapet to the existing concrete edge beam shall be carried out strictly in accordance with the parapet manufacturer's approved installation instructions and the accepted anchorage details.
 - a. Prior to drilling, the Contractor shall verify the location of reinforcement and shall not cut, drill through, or otherwise compromise the existing reinforcement.
 - b. Anchorages shall be installed in sound, clean and dry holes, tightened to the manufacturer's specified torque, and tested where required in accordance with the manufacturer's requirements.
 - c. All fixings and anchorages shall be compatible with the parapet system and shall not reduce its certified containment performance
 - d. The concrete surface below the baseplate to be lightly scabbled with a needle gun prior to grouting.

APPENDIX 5/1: Drainage Requirements

General

1. The existing and proposed surface water drainage layout, where applicable, are shown on the 0500 Series Drawings.
2. The Wastewater drainage shall comply Uisce Éireann Specifications. Uisce Éireann Specifications include documents, Code of Practice for Wastewater Infrastructure, Wastewater Infrastructure Standards Details and General Civil Engineering Specification -IW-TEC-300-01.
3. The location of the existing drainage is to be confirmed on site and the information to be provided to the Employer's Representative.

Surface Water Drainage Pipework

4. The surface water carrier drains will be as detailed on the Contract drawings and in accordance with Uisce Éireann's Code of Practice. Pipes must be fully BBA approved and HAPAS approved. Pipes must have 1.2m cover minimum cover in trafficked areas. Concrete surround to be provided if cover is less than 1.2m but this must be agreed in writing with the Employer's Representative.
5. The requirements for bedding and backfill materials are indicated on the 500 series drawings.
6. The width of the trench required is in accordance with TII CC-SCD-00521. The trench should provide for a minimum of bedding below pipe as per TII CC-SCD-00521 or as per manufacturers recommendations, whichever is more onerous. Local soft spots must be removed and filled in accordance with TII specification for works. The pipe must sit evenly on the bed and must be free of voids under the pipe. Bedding shall be as indicated on the 500 series drawings.
7. Bedding to be in accordance with TII CC-SCD-00521 or manufacturer's requirements, whichever is more onerous.
8. Compaction above pipes should not be carried out until a minimum cover of 300mm is achieved. Compaction equipment shall be sized so as not to exert an undue stress on the pipe. Further backfill to the required level should be carried out in layers no greater than 150mm.
9. Gully pipes shall be uPVC of 160 diameter shall be Class 120 spigot and socket joints with rubber ring fittings (fitted in accordance with manufacturers specification) to comply with IS EN 1916 and IS6.
10. Where uPVC pipes are used they shall have Type Z bedding and surround in accordance with CC-SCD-00521.

Jointing

11. Pipes are generally manufactured in 6 metre lengths and are joined with straight couplers or suitable fittings (e.g. tees, wyes, bends etc.)
12. Pipes should provide a fully watertight seal when installed.
13. Leak tightness should be in accordance with BS EN 1277:1997. Note, the maximum permitted angular deflection is 2°.
14. Rubber seals used in watertight applications must be in accordance with BS EN 681-1:1996
15. Manufacturer's recommendations should be followed for joining of pipes.

Jointing uPVC Pipes

16. The handling, installation and jointing of uPVC pipes shall be in accordance with the provisions of "Recommendations for Handling and Installation of Unplasticised PVC Pipe" (Ref. SR.3) or "Recommendations for Handling and Installation of uPVC Buried Drains and Sewers" (ref. SR7) as appropriate. Both documents are published by the National Standards Authority of Ireland.

Handling and Storage of Pipes

17. Handling should be done carefully and in accordance with national health and safety guidelines. Dragging of pipes and fittings must be avoided. HDPE pipes and fittings become slippery in wet or in cold weather and extra precautions may be necessary.
18. All pipe stacks should be made on firm, flat ground to support the weight of the pipes and lifting equipment. For safety and Pipes and fittings should be transported and stored in their packaging.
19. The stacking height for pipes should be limited to not more than 3 meters. Pipes should be not be stored in open areas subject to high winds. It is recommended that pipes are not stored in direct sunlight for more than 3 months.

Tolerances for Pipelines, Shafts and Tunnels

20. The position of the internal face of any pipeline, shaft or tunnel shall not deviate from that described in the contract by more than the following permissible deviations:

Work Category	Dimension or Alignment	Possible Deviation
Pipeline	Line and Level	20mm
Pipe Jacking	Line	75mm

	Level	50mm
Shafts and Chambers	Vertically	1 in 300
Shafts and Tunnels	Finished Diameter	1% but not exceeding 50mm
Tunnels without secondary lining	Line (shield drive)	75mm
	Line (hand drive)	50mm
	Level (shield drive)	50mm
	Level (hand drive)	25mm
Tunnels with secondary lining.	Line	20mm
	Level	10mm
Shaft, tunnel and sewer lining segments	Maximum lipping between edges of adjacent segments	5mm

Junctions and Laterals on Sewers

21. Laterals shall be laid from the junctions to the boundary of the properties.
22. Junctions and laterals shall be effectively sealed with an end cap, the location of which shall be positively indicated.

Cleansing of Pipelines

23. On completion of construction internal surfaces of pipelines shall be cleaned thoroughly in such a way as to remove all oil, grit and other deleterious matter.

Precautions Prior to Testing Pipelines

24. Before testing any pipeline, the Contractor shall ensure that it is anchored adequately and that thrusts from bends, branch outlets or from the pipeline ends are transmitted to solid ground or to a suitable temporary anchorage.
25. Open ends shall be stopped with plugs, caps or blank flanges properly jointed.
26. Testing against closed valves shall not be permitted without the prior written consent of the Employer's Representative.
27. Should the Contractor be compelled to test against a valve, the valve shall have been tested at the manufacturer's works to the full maximum test pressure before delivery on site.

Notification of Test

28. The Contractor shall notify the Employer's Representative at least one clear working day beforehand of his intention to test a section of pipeline.

Testing Non-Pressure Pipelines

29. Non-pressure pipelines laid in open cut shall be tested after they are jointed and before any concreting of backfilling is commenced, other than such as may be necessary for structural stability whilst under test.
30. The pipelines shall be tested by means of an air and water test in accordance with the Greater Dublin Strategic Drainage Study (GDSDS) documents and by a closed circuit television (CCTV) examination as specified in the contract, in lengths determined by the course of construction, in accordance with a programme approved by the Employer's Representative.
31. A further test shall be carried out after the backfilling is complete.

Water Test for Non-Pressure Pipelines

32. This testing should be in accordance with the GDSDS.
33. The test pressure for non-pressure pipelines up to and including 750mm nominal bore shall be not less than 1.2m head of water above the pipe soffit or ground water level, whichever is the higher at the highest point, and not greater than 6m head at the lowest point of the section. Steeply graded pipelines shall be tested in stages in cases where the maximum head, as stated above, would be exceeded if the whole section were tested in one length.
34. The pipeline shall be filled with water and a minimum period of 2 hours shall be allowed for absorption, after which water shall be added from a measuring vessel at intervals of 5 minutes and the quantity required to maintain the original water level noted. Unless otherwise specified, the length of pipeline shall be accepted if the quantity of water added over a 30 minute period is less than 0.5 litre per lineal metre per metre of nominal bore.

Air Test for Non-Pressure Pipelines

35. This testing should be in accordance with the GDSDS.

CCTV Inspection of Pipelines

36. This testing should be in accordance with the GDSDS. (more highlighted below)
37. Where internal inspection of pipelines by CCTV is required, the Contractor shall provide all necessary equipment, including suitable covered accommodation for viewing the monitor screen, together with personnel experienced in the operation of the equipment and interpretation of results.
38. The intensity of illumination within the pipe and the rate of draw of the camera shall be such as to allow a proper examination of the inside of the pipe. Provision shall be made for the movement of the camera to be stopped and its position recorded and for permanent photographs to be taken at any point requested by the Employer's Representative.

Infiltration

39. Non-pressure pipelines (including tunnels) and manholes shall be tested for infiltration and backfilling. All inlets to the system shall be effectively closed, and any residual flow shall be deemed to be infiltration.
40. The pipeline, including manholes, shall be accepted as satisfactory if the infiltration, including infiltration into manholes, in 30 minutes does not exceed 0.5 litre per lineal metre per metre of nominal bore.
41. Notwithstanding the satisfactory completion of the above test, if there is any discernible flow of water entering the pipelines at a point which can be located either by visual or CCTV inspection, the Contractor shall take such measures as are necessary to stop such infiltration.

Chambers and Gullies

42. All storm manhole chambers are to be raised/lowered to suit proposed ground levels. Cover to be placed are shown in the Contract Drawings. The manhole shown on the drawings is a Contractor design element.
43. All surface water drainage manholes shall be Contractor designed elements and comply with the requirements of BS 5911:part 200 and Clause 507 of the Specification. Manholes shall be tested for watertightness to the satisfaction of the Employer's Representative and in accordance with the requirements of the GDSDS. (more highlighted below).
44. Gullies are to be trapped sulphate resisting pre-cast concrete. For Gully details refer to TII CC-SCD- 00510.

Ironworks

45. Manhole covers, gully frames and other ironwork shall be set or reset to the final levels prior to the laying of the uppermost surface course, or in areas where no surfacing works are being undertaken, to the level of the adjacent verge. The Contractor must allow for adjusting all gullies within the site extents as indicated in the Contract Drawings within his fixed price lump sum.
46. Chamber covers, gratings and frames shall be lockable in accordance with BS EN124-2, 2015, and shall be class D400. A 300mm wide protective concrete surround shall be included for all chamber covers in grassed areas.
47. Gully gratings and frames shall be in accordance with EN124-2, 2015 and shall be class D400. All gratings shall be flat-topped and lockable and the frames shall have no flange on the kerb face to permit a flush fit. The waterway area for the gully grating shall not be less than 800cm².

Cutting Pipes Square

48. Where sewers enter manholes, the pipes shall be cut square with the internal facing of the manhole wall. No jagged edges or rough faces shall be left on the pipe. Pipes are to be placed before the walls are cast and

are to be built into the wall as it rises. Connections of pipes to manholes should not be done by boxing out and subsequently building in the pipe.

Treatment of Severed or Redundant Surface Water Drains

49. Unless otherwise shown on the drawings, where existing chambers or gullies are made redundant by the Works they shall be removed where they are within 1m of formation and backfilled with UGM sub base material. Chambers extending below this level and those beneath the existing pavement shall be removed down to 1m below formation and the remainder shall be cleared of all silt and debris and backfilled with mix ST1 Concrete.
50. Where existing pipes are made redundant by the works, they shall be removed or grouted up in accordance with Clause 506.3 of the Specification.

Connections to Existing Drains

51. Where required, the Contractor shall break into existing manholes to make necessary connections and make good manhole walls on completion of connection works. The Contractor shall take all measures necessary to ensure no blockages occur in the existing network during these works, and shall make suitable provision for over pumping existing volumes.

Protection of Existing Drains

52. All work carried out to existing sewers shall have the prior approval of the Employer's Representative.
53. Where existing drains are beneath or within 0.5m of the edge of the proposed carriageway, they shall be protected in accordance with TII CC-SCD-02751. The Contractor shall not be permitted to expose the existing pipe nor disturb the in-situ material surrounding the pipe. All work carried out to existing sewers shall have the prior approval of the Employer's Representative, or Cork County Council Water Services Department, where appropriate.
54. Where existing land drains are severed by the works, the Contractor shall connect these into the proposed drainage system. Where the drains connect into a cut zone, they shall be tied into the top of slope interceptor drainage system. Where drains are severed through the excavation and replacement of material beneath proposed embankment, the Contractor shall extend the land drain into the slope toe drain where such a drain is to be constructed. Where this will not be constructed, the Contractor shall extend the land drain through the embankment starter layer or replaced material in accordance to the detail shown in CC-SCD-00520.

Foul Main General

55. Plastic pipes for drainage and sewerage shall have ultimate pipe stiffness (STES) in excess of 1400 N/m² tested in accordance with BS 4962 and IS EN 13476. Resistance to impact shall comply with BS 4962 except that the striker used in the test shall have a mass of 1kg and a 25mm hemispherical radius.

56. The Contractor shall submit test certificates to the Employer's Representative for all pipes proposed by the Contractor for use in the Works prior to the installation of those pipes. The Employer's Representative may at its sole discretion direct that pipes incorporated in the Works, where test certificate have not been presented, be exhumed and replaced. All costs associated with such a direction shall be borne by the Contractor.
57. The Contractor shall ensure that plastic pipes are not subject to deterioration due to sunlight during the period between manufacture and installation in the ground as Specified in Clause 501.2 of the TII Specification for Road Works. Specified in CC-GSW-00500 – Notes for guidance on the Specification for Road Works Series NG 500 – Drainage and Service Ducts. Section NG 501 and NG 518
58. Coupling sealing rings shall be manufactured from elastomers, conforming to the performance requirements of IS EN 681: Part 2. All seals shall be ethylene propylene diene monomer (EPDM) or equivalent. Joint lubricants for sliding joints shall have no deleterious effect on either the joint rings or pipes and shall be unaffected by the material to be conveyed.
59. Joints in non-porous pipework shall be watertight as specified in Clause 504.3 and in filter drains partly tight as specified in Clause 504.6 of the TII Specification for Road Works. Specified in CC-GSW-00500 – Notes for guidance on the Specification for Road Works Series NG 500 – Drainage and Service Ducts section NG 504 and NG 509.
60. Clearing of the existing chambers, gullies and drains is to be carried out to Clause 509.5 of the TII Specification for Road Works. Specified in CC-GSW-00500 – Notes for guidance on the Specification for Road Works Series NG 500 – Drainage and Service Ducts section NG 509.
61. Before entering or breaking into an existing sewer or drain, the Contractor shall give notice of his intention to do so to, and receive written approval to proceed from, the authority responsible for the pipeline to which the connection is to be made.
62. All drainage and sewerage pipework shall be air tested in accordance with Clause 509.2 of the TII Specification for Road Works. Specified in CC-GSW-00500 – Notes for guidance on the Specification for Road Works Series NG 500 – Drainage and Service Ducts section NG 509. The Contractor shall ensure that all testing procedures and results shall use and state the same pipeline and chamber annotation as that shown on the as-constructed drawings for the Works.
63. The Contractor shall also prepare, and present to the Employer's Representative for approval, a schedule for all drainage constructed as part of the Works. The schedule shall, at the very minimum, detail the following for each pipeline and chamber:

Date of Jet Washing

64. Date and details of the air-test and result achieved. If the air-test failed, the reason why, the repair (if required) undertaken including exact location of the repair, and details of the retest.

CCTV Results

65. All tests and results must be witnessed and signed off by the Employer's Representative. No test result will be accepted in the absence of the Employer's Representative sign off and the Contractor shall be responsible for any retesting arising and costs associated therein.

APPENDIX 5/2: Service Duct Requirements

GENERAL REQUIREMENTS

1. Service ducts for electricity, data, telecommunications and traffic cabling, together with associated cable chambers, shall be installed in accordance with the requirements indicated on the relevant Construction Drawings and in accordance with TII 'Specification for Works' & Cork County Council Specification. The standard TII 'Standard Construction Details' in respect of service ducts and cable chambers shall be deemed to apply except where modified or superseded by the Contract Drawings and Specification.
2. Generally, 100mm ducting will be used for longitudinal duct runs along road verges and footpaths, with 150mm ducts used for crossing roads.
3. This Appendix 5/2 shall be read in conjunction with Appendix 1/16, which provides additional specific requirements in respect of each of the particular services, as well as Appendix 12/5 in respect of traffic.
4. Each batch of ducting shall include the manufacturers name QA details.
5. The positioning, depth and colour coding of pipes for service ducts shall generally conform to the recommendations set out in the U.K. National Joint Utilities Group (NJUG) Publication 'Volume 1: Guidelines on the Positioning and Colour Coding of Underground Utilities Apparatus' and I.S. 370:2007 'Colour Code for Buried Plastics Piping' unless stated otherwise within the Service Provider's particular requirements.
6. In addition, the minimum cover depths for service ducts shall be in accordance with the following, unless specific cover depths are specified under a particular Service Provider requirements:
 - 750mm in trafficked areas
 - 550mm in non-trafficked areas
7. Where minimum cover is not achievable as part of the construction of the new road alignment, a protective concrete slab is to be provided to the existing and proposed services as per the Contract drawings.
8. In addition to the colour coding of ducts, the ducts shall be stamped with the words 'Telecommunications Cables', 'Danger Electricity Cables' etc. as appropriate printed in large block capital continuously along their length, to the approval of the Employer's Representative.
9. Any other deviation from the guidelines contained in the above NJUG publication requires approval by the Employer's Representative.
10. The installation of telecommunications ducts shall comply with the 'Recommendations for Underground Telecommunications Cable Works for Roads, Commercial and Residential Schemes' as published by the Department of Public Enterprise.

PIPES FOR SERVICE DUCTS

Ducts

11. All pipes, bends, coupling, etc. shall be from a single manufacturer. Unless otherwise indicated, pipes for service ducts shall generally be uPVC single wall pipes with a minimum wall thickness of 3.8mm complying with Class B or better of BS 3506, or HDPE single wall pipes with a minimum wall thickness of 5mm complying with IS EN 50086-2-4. All pipes used shall be suitable for the depth of burial and the types of cables to be pulled through them.
12. Ducts shall be of 'Normal' duty in accordance with IS EN 50086-2 and shall comply with IS EN 50086- 2 in terms of duct deformation and impact resistance requirements.
13. Ducts shall have a smooth low friction inner surface completely free of ripples, sharp edges and protrusions.
14. All ducts shall have large radius bends at changes in directions. All radius bends (11.25°, 22.5°, 45° & 90°) shall only be used with the approval of the Employer's Representative.
15. Ducts shall have a circumferential mark to indicate the correct push-in distance for duct jointing for spigot and socket joints.
16. The internal diameter of all pipe ducts shall be as indicated on the Contract Drawings.
17. All duct joints shall be watertight and shall be fitted with draw rope in accordance with Clause 501.8.

Duct Handling and Storage

18. Care should be taken when loading/unloading ducts to avoid damage to the ducts. Any damaged or defective ducts shall be marked in a conspicuous manner and removed from Site.
19. Ducts shall be stored on a smooth flat horizontal surface, supported by side supports at intervals of not more than 1.5m and fully in accordance with the manufacturer's recommendations. Ducting supplied in factory strapped bundles may not require side supports, however care should be taken when removing strapping, when tension may be released.
20. Socket ducts shall be stacked in layers in accordance with manufacturer's recommendations and with the socket at alternate ends of each layer. The socket on one layer should project beyond the duct spigots on the layer below so that the ducts are evenly supported along their length.
21. Duct stacks shall not exceed 7 layers with a maximum height of 2m.
22. The method of stacking shall be such as to ensure that the integrity of the ducts is maintained and that distortion is avoided.

23. Ducts shall not be stored in a place where they are likely to be in contact with surface water or other foreign matter which could make its way into the ducts.

EXCAVATION, BEDDING, LAYING AND SURROUNDING OF PIPES FOR SERVICE DUCTS

Excavation, Bedding and Surround for Service Ducts

24. All excavation for service ducts shall be carried out by the Contractor to Clause 502 of Transport Infrastructure Ireland 'CC-SPW-00500-Specification for Road Works Series 500'. Bedding and surrounding of ducts shall be carried out in accordance with Clause 503 of Transport Infrastructure Ireland 'CC-SPW-00500-Specification for Road Works Series 500'.
25. All ducts shall be laid to the depths specified above, unless specified otherwise by particular Service Provider, with bedding, surround and backfill in accordance with CC-SCD-00561 and CC-SCD-00562 or the particular service provider's requirements, as appropriate.
26. Material for the bedding and surround to all ducts and multi-ducts shall be clean and sharp and conforming to BS EN 12620:2002.
27. Ducts shall be evenly and solidly bedded and all sand shall be compacted to the degree specified without voids to ensure adequate support. Particular care shall be taken to ensure that sand is compacted into the spaces in between any multi-ducts.
28. Ducts passing under roads carrying heavy vehicles shall be completely surrounded with lean-mix concrete to a minimum radial thickness of 150mm.

Duct Laying

29. Each duct shall be carefully examined immediately prior to laying and any damaged or defective ducts shall be marked in a conspicuous manner and removed from Site.
30. The location and arrangement of the various duct banks shall generally be as indicated on the Contract Drawings, but the precise positions/lines of the duct banks shall be agreed between the Contractor and the Employer's Representative before commencement of the works.
31. Ducts shall not be laid in trenches where water is lying in the bottom.
32. Every effort must be made to prevent dirt ingress into the ducts. Allowing dirt to enter ducts on the basis that the dirt should be removed later during the duct cleaning process is not acceptable.
33. Bricks or other hard packings shall not be used as temporary duct supports.

34. Ducts shall be aligned as straight as possible in the horizontal and vertical directions. All sweeps shall be gradual as possible and jointed above ground prior to installation.
35. For ducts in trefoil formation, the ducts shall be bound together with duct ties at 3m intervals or more frequently as required to maintain the duct formation.
36. Where duct routes are located within the loading zone of influence of existing structures the trench shall be filled with concrete of minimum strength 10N/mm² in order to ensure the structural integrity of the adjacent structure.
37. Ducts shall be laid on the trench bed with the sockets towards the duct layer. The spigot end and inside of the duct to be joined shall be thoroughly cleaned with a dry rag. A duct shall be temporarily inserted to prevent ingress of soil or foreign material prior to jointing.
38. The spigot end of the duct shall be pushed into the socket initially by hand and then driven in to achieve proper engagement by tapping with a hammer against a suitable wooden batten placed across the remote socket. Full engagement is when the indicator on the duct seals properly. Joints shall be made in such a manner as to avoid any sharp internal edges that may interfere with cabling operations.
39. Cutting of ducts shall be with a suitable non-electrical hand cutting tool. All cut ends shall be square to the axis of the duct and all burrs removed before use. Cutting of occupied ducts, if required, shall be carried out with extreme care.
40. Ducts not required to enter a jointing chamber shall by-pass the chamber either to the side or beneath the chamber. In certain circumstances and with the approval of the Employer's Representative, ducts may pass through the chambers uninterrupted. All ducts for medium voltage cables shall be plug-and- socket water-sealed.
41. Telecommunications ducts along the main runs shall be plug-and-socket air- and water-tight to facilitate the blowing of fibre optic cables.

Crossing of Electricity Ducts

42. A minimum radial clearance of 300mm between the outer services of ducts shall be provided where telecommunications or traffic ducts cross electricity ducts. Wherever possible, the telecommunications or traffic ducts shall cross above the electricity ducts.
43. Where it is not possible to provide the minimum 300mm clearance, a reduced separation may be agreed with the Employer's Representative on the basis that mechanical protection overlaid with marker warning strip

shall be inserted between the crossing ducts. This mechanical protection may be in the form of concrete blocks or tiles, or hot dip galvanised steel plating to the approval of the Employer's Representative.

Duct Cleaning and Testing

44. Immediately after ducts are laid they shall be cleaned with an approved brush or swab in accordance with the manufacturer's recommendations and to the approval of the Employer's Representative, following which the ducts shall be tested by drawing a cylindrical wooden/iron mandrel through them in accordance with Transport Infrastructure Ireland 'Specification for Works'.

Draw Ropes and Duct Plugs/Caps

45. Immediately after cleaning and testing, each individual duct run shall be fitted with a single piece polypropylene draw rope with a minimum 8 kN breaking strength. The type of draw rope used shall be approved by the Employer's Representative prior to installation.
46. A surplus of 2 metres of draw rope shall be left neatly coiled at each end of each duct run, with the ends suitably and effectively secured to prevent accidental withdrawal of the rope.
47. After installation of the draw ropes a plastic purpose-made plug or cap shall be placed in/over all open ends of ducts to prevent ingress of water and/or foreign matter. Duct plugs/caps shall be approved by the Employer's Representative prior to installation.

Backfilling and Reinstatement of Existing Footways, Verges and Carriageway

Backfilling

48. Backfilling shall be carried out in accordance with Clause 505 of Transport Infrastructure Ireland 'CC- SPW-00500-Specification for Road Works Series 500' and with the 'Guidelines for the Opening, Backfilling and Reinstatement of Trenches in Public Roads' issued by Department of the Environment, Heritage and Local Government.
49. Backfill material shall be Clause 808 material.
50. Backfilling shall be undertaken immediately after the bedding, laying and surrounding of the ducts and shall be compacted in layers of no greater than 150mm. In order to minimise post-construction settlements, it is essential that the correct backfill materials are utilised and that the compaction methods employed are in accordance with the best engineering practices.
51. Pavement layers should be reinstated in accordance with TII CC-SCD-00705 where the carriageway is being reinstated.

Marker Tapes

52. Distinctive marker tapes shall be provided over all service ducts at a depth of 180mm from the surface in footways and 350mm from the surface in carriageways and in the apron slab areas, or as otherwise directed by the Employer's Representative or as per Service Provider's requirements.
53. Marker tape shall be 300mm wide PVC, coloured as detailed below, with the words 'Telecommunications', 'Electricity' etc. as appropriate printed in large block capitals continuously along its length, all to the approval of the Employer's Representative. The tape shall provide full lateral cover over the ducts and shall be in vertical alignment with the duct run. For large duct configurations, more than one width of tape may be necessary to cover the extra width of the duct section.
54. The marker tape shall be manufactured from high quality material to an approved international or national standard in order to ensure its long-term performance with regard to physical integrity and readability.
55. Marker tape shall be in accordance with Service Providers requirements.

Marker Tiles or Posts

56. Cable duct marker tiles or posts shall not be required.

Surface Reinstatement

57. Surface reinstatement shall generally be in accordance with Transport Infrastructure Ireland 'Specification for Works' and to the particular requirements detailed in the Contract Documents and Drawings.

Cable Chambers

58. The construction of the cable chambers shall be in accordance with the relevant Standard Construction Detail for each service provider.
59. Adequate and safe access/egress to the cable chambers shall be provided to facilitate the installation and future maintenance of cables.

Frames and Covers to Cable Chambers

60. Frames and covers to cable chambers shall comply with the requirements of IS EN 124 and shall be as described in Appendix 5/1 and 5/2 of this Specification.
61. Cable chamber frames and covers shall be set square to structure or kerb lines.
62. All chamber covers are to be lockable. All lockable covers to be removed from locked end. Frames must be laid to allow for easy removal of covers.

- 63. All chamber covers located in grassed areas shall include a 300mm wide, 150mm deep 30N20 protective concrete surround, trowelled and bull nosed.
- 64. Chambers with covers which are positioned in areas with paving slabs shall be recessed, suitable to accept the paving slabs, by Galco or approved equivalent.
- 65. The paving within each recessed cover shall have a steel nameplate affixed displaying the utility provided, as applicable and agreed with the individual service provider and as accepted by the Employer's Representative.

Specific Ducting and Chamber Requirements for Service Providers

General

- 66. All ducts and chambers shall be constructed in accordance with the various Service Provider's requirements.
- 67. In some cases, as indicated in Table 5.1, the Service Provider will install the ducts and chambers (including fixtures and fittings), otherwise ducts and chambers must be installed by the Contractor. In all cases the Contractor shall carry out the excavations and backfilling (to Service Provider's specification), required to facilitate the laying of the service.
- 68. Table 5.1 below also outlines where ducts and chambers (including fixtures and fittings) will be supplied and/or installed by the service provider and where ducts and chambers (including fixtures and fittings) will be supplied by and/or installed by the Contractor.

Provider	Supply of Ducts and Chambers incl. fixtures and fittings	Ducts & Chambers installed by	Connection of service By
Storm Water Drainage	Contractor	Contractor	Contractor
Foul Water Drainage	Contractor	Contractor	Contractor
Watermains	Contractor	Contractor	Uisce Éireann
Gas Networks	Gas Networks	Gas Networks (Ducts) & Contractor (Chambers)	Gas Networks
EIR	Contractor	Contractor	EIR
ESAT/BT	Contractor	Contractor	ESAT/BT
Virgin Media/UPC	Contractor	Contractor	Virgin Media/UPC
Telecom (Spare)	Contractor	Contractor	N/A
Unidentified	Contractor	Contractor	Contractor
Traffic	Contractor	Contractor	Cork County Council
ESB	Contractor	Contractor	ESB
Public Lighting	Contractor	Contractor	Contractor

TABLE 5.1

Note: In all instances in Table 5.1 the Contractor is responsible for the excavation of trenches bedding and backfilling of ducts and pipes.

Existing Covers

69. Raising of the existing covers must comply with the particular requirements of the surface providers outlined below.

EIR

EIR ducts

Dimensions: Ave. Outside Diameter (mm): 99.6 – 100.5 Wall Thickness (mm): 3.1 – 3.5

Lengths: 6m plus the socket

Colour: Black

Joints: The socket shall have a min. length of 100mm and a slight taper allowing the spigot to engage at between $\frac{1}{3}$ & $\frac{2}{3}$ of socket length. The spigot end shall have a chamfer.

Tensile Strength: (ISO 6259-2) – Frequency: Every Shift

Dumbell Sample cut from pipe = 115mm x 25mm Type 2 Oven Softening temperature = 125 – 130°C

Duration of heating / softening = 1 minute per mm of thickness Speed of Machine = 5.0 ± 0.5 mm per minute

Tensile strength = ≥ 45 N/mm² Elongation = $\geq 80\%$

Impact Test: (BS 2782: Part 11: Method 1108A)

Frequency: Every Shift - Sample length: 200mm. Test to be carried out at 20°C and 0°C

Conditioning 20°C for 30 minutes and 0°C for 2 hours. Strike within 60 seconds of removal from conditioning bath.

T.I.R. $\leq 10\%$ = Accept

Pipe Diameter. (mm)	Impact Weight (D 25 head)	Drop Height (Metres)	No. of Samples / Shift	No. of Strikes per Sample
100	2 Kg	2	4	6
60	1 Kg	2	8	3

Reversion Test Frequency: Every Shift

Sample length = 150mm approx.

Lines Scribed = 100mm apart Oven Temperature = 150°C

Immersion Time = 30 minutes

Remove and allow for cooling. Measure any change in distance between the scribed lines, which shall not be greater than 5%.

Compression test. EN 50086-2-4 (Clause 10.2)

10 days after manufacture. Sample Length: 200mm Compression rate: 15mm per min.

Force at least 450 N at 5% deflection.

Cutting Test. Cut through 1.5 Meters of overhanging pipe without fracturing.

"It shall be possible to cut fully through an unsupported overhang length of 1.5 metre of duct without the duct showing any evidence of fracturing before the complete cut is made".

MARKING: White Ink at one-metre intervals

WAVIN (or equivalent)- 100mm Eircom Duct – day – shift - year

EIR chambers

70. All existing EIR chambers are to be raised/lowered to suit proposed ground levels.
71. Where new chambers are required they shall be constructed by the Contractor in accordance with the EIR Specification. All chambers must be constructed to the satisfaction of EIR.
72. Contractor must allow for resetting all EIR Chambers within the works area to suit proposed road levels. Chambers must be raised/reset under the supervision of and to the satisfaction of EIR and in accordance

with EIR Specification.

73. Covers for EIR chambers must be EN124-certified, and must be to a minimum rating of B125 (for use on footways) or E600 (for use in carriageways).

All chambers on EIR plant must be:

- EN124 compliant; &
- Fit-for-Purpose in the EIR network.

74. In addition to EN124 compliance, the following are EIR's minimum requirements for recessed covers to conform to EIRs existing network construction practises & procedures:

- The size of the frame and cover should fit EIR standard chambers
- The frame should fit on all four walls
- The covers must be capable of being lifted with EIR's standard lifting keys
- The covers should be designed for one-person lifting (using a lifting key & wooden roller bar)
- The manufacturer should ensure that, when installed, the units should have no lips or gap.

75. Covers must be lockable. Where covers are lockable:

- Locks must be fitted by the manufacturer
- Locks must be capable of use with EIR's standard locking key
- Locking bolt needs to be captive (e.g. with circlip)
- Plastic bung cover to be fitted over locking bolt to keep out dirt, mortar etc

76. All EIR chamber covers must bear the following markings (a-d):

- a) EN124
- b) the appropriate class (e.g. B125, E600)
- c) the name and /or identification mark of the manufacturer
- d) the mark of a certification body. and may bear:
- e) additional markings related to the application or the owner
- f) product identification (name and/or catalogue number)

77. For use on EIR chambers, covers which do not bear the name "EIR" plus markings EN124 are to be considered unacceptable.

78. As per EN124, the class of unit which should be used is :

Group 4 (minimum class D400)

Carriageways of roads (including pedestrian streets)

79. Individual covers and support bars should be interchangeable (e.g. the same lids could be used for JB4's,

JB4(A)'s, JB4(B)'s and JB4(C)'s).

80. EIR approved covers can be sourced from EJ (<http://www.ejco.com>) (Formerly Cavanagh Foundry Ltd) or from CUBIS Industries (<http://www.cubisindustries.com>)

ESB

ESB Ducts

81. The layout of existing ESB ducts/mini pillars are shown on the Drawings provided as part of the Background Information. The Contractor is required to satisfy themselves as to the location of all existing services.
82. ESB Ducts for MV/LV cables shall be in accordance be provided in accordance with Standard Specification for ESB MV/LV Networks Ducting (Minimum Standards) http://www.esb.ie/esbnetworks/en/downloads/MV-LV_Duct_Summary.pdf?v=20101028 and <http://www.esb.ie/esbnetworks/en/downloads/MV-LV-Installation-Drawings.pdf?v=20101028>
83. Trench Installation Sequence shall be in accordance with Standard Specification for ESB MV/LV Networks Ducting (Minimum Standards).
84. Minimum Ducts Spacing for ESB Ducts shall be in accordance with Standard Specification for ESB MV/LV Networks Ducting (Minimum Standards).
85. Marker tape shall be in accordance with Standard Specification for ESB MV/LV Networks Ducting (Minimum Standards).
86. Duct Surround Material shall be in accordance with Standard Specification for ESB MV/LV Networks Ducting (Minimum Standards).
87. All other requirements of Standard Specification for ESB MV/LV Networks Ducting (Minimum Standards) must be complied with by the Contractor.
88. Each duct should be provided with a strong continuous 10mm polypropylene draw rope free of knots and securely anchored at each end.
89. Where it is not possible to provide the minimum 300mm clearance, a reduced separation may be agreed with the Employer's Representative on the basis that mechanical protection overlaid with marker warning strip shall be inserted between the crossing ducts. This mechanical protection may be in the form of concrete blocks or tiles, or hot dip galvanised steel plating to the approval of the Employer's Representative.

ESB Pillars and vaults

90. All pillars and vaults for ESB shall be in accordance with the particular requirements of ESB, and the Contractor shall liaise with ESB and the Employer's Representative immediately on commencement to ensure that all equipment, method statements and programme issues are understood and approved.
91. The Contractor is referred to the ESB document '*Electrical Services Guidebook for Housing Schemes*' for details of ESB requirements in relation to mini pillars and associated vaults, as well as ducting layouts at mini pillar vaults.
92. All mini pillars must be earthed.

BT/ESAT

BT/ESAT Ducts

93. There are no schedule BT/ ESAT duct works required as part of the Contract.
94. Where the Contractor proposes any diversionary works to existing BT/ ESAT infrastructure BT require up to 120 days notice of intention to carry out work that may be deemed intrusive or to have any potential impact on the BT network.
95. In addition BT/ESAT must be furnished with a sign off on the proposed civils plan prior to work starting.
96. For any new ducting works BT/ESAT will provide the ducts for any works which shall be 2x100mm ducts to BT/ESAT specification.
97. The Contractor shall install BT/ESAT ducts and rope to the approval of BT/ESAT. Ducts in verge will be laid at minimum cover of 450mm. Ducts in carriageway will be laid at min cover of 750mm.
98. The installation of BT/ESAT ducts shall comply with the 'Recommendations for Underground Telecommunications Cable Works for Roads, Commercial and Residential Schemes' as published by the Department of Public Enterprise.

BT/ESAT Chambers

99. BT/ESAT shall construct the chambers and supply the covers. BT/ESAT will install cable and jointing.
100. The Contractor shall liaise with BT/ESAT to co-ordinate the installation of BT/ESAT chambers. The Contractor is responsible for programming of these works with BT/ESAT.

VIRGIN MEDIA/UPC

Virgin Media/UPC ducts

101. Where required, the installation of Virgin Media ducts shall comply with the 'Recommendations for Underground Telecommunications Cable Works for Roads, Commercial and Residential Schemes' as published by the Department of Public Enterprise.
102. The Contractor shall supply and install the proposed 2x110mm green (RAL 6010) twinwall duct with rope as indicated in the contract drawings.
103. The proposed ducts must be in accordance with the general duct requirements.
104. Ducts laid in private property will be laid solely by Virgin Media/UPC Contractors. The Contractor must facilitate Virgin Media/UPC Contractors as required.
105. Ducts to be laid with 450mm cover in non-trafficked areas and 750mm cover in trafficked areas.

Virgin Media/UPC Chambers

106. Virgin Media/UPC chambers must be constructed in accordance with Virgin/UPC Specifications as indicated on drawing TII Cable Joint Management SCD.
107. Virgin Media/UPC chambers are to be constructed by the Contractor. Cover and frames to be supplied by Virgin Media/UPC

Telecom (Spare) ducts

108. Spare ducts shall meet the requirements of EIR's specifications, with the exception that the ducts shall be Dia. 100mm twin wall and purple in colour.

Telecom (Spare) Chambers

109. Spare duct chambers shall meet the requirements of EIR's specifications.

TRAFFIC

Traffic Ducts

110. Ducts for traffic shall be 100mm internal diameter, smooth bore, single wall constructed in medium density polythene with a wall thickness of not less than 5mm. Ducts shall be orange in colour marked at 1m centres in white lettering with 'Traffic Signals'. Couplers shall be orange and fixed at one end. One securely fixed polypropylene draw wire shall be provided in all ducts after cabling works have been completed.
111. Ducts in the footway area shall be laid in a bed of sand and surrounded by sand in accordance with CC-SCD-00562. The compacted thickness of sand above and below the duct shall be a minimum of 50mm, and at each side of the duct 25mm. The remainder of the trench shall be backfilled to underside of sub base

with Clause 808 granular material. Ducting shall have a minimum cover to finished ground level of 450mm. If the works are associated with road/ footpath construction works it is recommended that ducting be laid as late as possible in the work programme, just prior to final landscaping if possible, in order to minimise exposure to damage by other operations.

- 112. Road Crossing Ducts shall be protected by a cover of mix ST2 concrete and have a minimum depth of 450mm. The duct ends shall be protected from ingress of rubble or other material.
- 113. Refer to Specification Appendix 7/2 for reinstatement details where ducts are proposed in existing pavements
- 114. Cable chambers shall be as specified on the drawings. Proprietary products by Centurion or similar approved.
- 115. See Specification Appendix 12/5 for further information on the installation of Traffic Signals.

Traffic Chambers

- 116. Traffic chambers shall meet the requirements laid out in Appendix 12/5.

TREATMENT OF EXISTING DUCTS

General

- 117. The Contractor shall be responsible for locating, supporting and protecting all existing services as detailed in Appendix 1/16 in situ during the works. Details of existing services are based on preliminary information from Statutory Undertakers. There is no guarantee as to the accuracy of this information and the Contractor shall liaise with relevant stakeholders prior to undertaking any works in connection with the services or utilities.
- 118. The Contractor shall be fully responsible for all Statutory Undertaking and Public Services works including making all necessary arrangements, provision of builders work and attendances as required, etc.
- 119. The Contractor shall refer to the HSA publication “Code of Practice for Avoiding Danger from Underground Services” and any other relevant publications when dealing with or working nearby underground utilities and services.
- 120. The Contractor shall refer to the ESB publication “Code of Practice on Overhead Electricity Lines in Construction” and any other relevant publications when dealing with or working nearby overhead lines.
- 121. Should any ducts be damaged during the works, the responsibility for repair of these ducts shall lie with the Contractor.

122. The Contractor is responsible for locating and protecting any underground services in the vicinity of any excavations.

123. As part of this contract where possible and unless indicated otherwise in the drawings all existing ducts and services are to be protected in situ. In all cases, where there is slack available on existing ducting, the ducting should be lowered to increase the cover to those ducts.

General treatment of all existing ducts located within the extent of the excavation.

124. Where existing services are located within the extent of the proposed excavation, these services should be carefully exposed by the Contractor. The need and use of tracing equipment, trial holes and slow digging/hand digging should be allowed for by the Contractor in his lump sum. The Contractor is advised that existing services may include intermittent and or total lean mix bedding surround and backfill. These ducts should be protected by the Contractor during the works. Should these services be damaged by the Contractor during the works, the Contractor is fully responsible for the repair, costs associated with these repairs and any other consequential costs.

125. Services that are exposed within the excavation during the works, shall be lowered if slack is available and protected/surrounded with 150mm of lean mix concrete to ST2 as per TII's CC-SCD-00561 or as otherwise agreed with individual service providers.

General treatment of existing ducts partly exposed within the extent of the excavation.

126. Where existing service ducts are located at the base of the excavation, and are partly exposed, the Contractor shall be responsible for the protection of these ducts during the works. The Contractor shall expose these ducts, lower where slack is available and protect with lean mix concrete in accordance with TII CC-SCD-00561. Should these services be damaged by the Contractor during the works, the Contractor is fully responsible for the repair, costs associated with these repairs and any other consequential costs.

Existing ducts below excavation level.

127. Where existing service ducts are located below the base of the excavation, the Contractor shall be responsible for the protection of these ducts during the works. Should these services be damaged by the Contractor during the works, the Contractor is fully responsible for the repair, costs associated with these repairs and any other consequential costs.

128. Existing watermains that are to be retained within the footprint of the site extents, where the distance from the finished ground level to the external crown of the watermain is less than 1200mm, should be protected in situ through the use of precast concrete slabs in accordance with TII CC-SCD-02751.

APPENDIX 5/3: Surface Water Channels and Drainage Channel Blocks

Not used.

APPENDIX 5/4: Fin Drains and Narrow Filter Drains and Geotextiles for Filter Drains

Not used.

APPENDIX 5/5: Combined Drainage and Kerb Systems

Not used

APPENDIX 5/6: Linear Drainage Channel Systems

Not used

APPENDIX 5/7: Drainage and Services Ducts: TII Road Construction Details

This Appendix gives reference to the TII Road Construction details relevant for drainage and ducting elements

1. Drainage

RCD/500/01 - Chamber Types
RCD/500/02 - Chamber Type A
RCD/500/03 - Chamber Type B
RCD/500/04 - Chamber Type C
RCD/500/05 - Chamber Type D
RCD/500/06 - Chamber Type E
RCD/500/07 - Chamber Type E Hinged Grating Details
RCD/500/08 - Vertical Backdrop in Manholes
RCD/500/09 - Chamber Type F
RCD/500/10 - Precast Concrete Gully
RCD/500/11 - In-situ Concrete and Blockwork Gullies
RCD/500/12 - Gully Grating
RCD/500/13 - Chamber Fittings - Ladder, Typical Arrangement Handhold and Safety Chain
RCD/500/14 - Typical Chamber Details
RCD/500/17 - Drainage Channel Blocks Type A, B and C
RCD/500/18 - Herringbone Filter Drains
RCD/500/19 - GA of Small Headwalls
RCD/500/20 - Filter Drains Trench and Bedding Details
RCD/500/21 - Surface Water Drains Trench and Bedding Details
RCD/500/22 - Cross section of concrete surface water channel
RCD/500/23 - Drainage Channel Blocks Type A, B, and C
RCD/500/24 - Drainage Channel Blocks Type D, E, and F
RCD/500/25 - Typical Swale Detail
RCD/500/26 - In-line Outlet to Triangular Surface Water Channel
RCD/500/27 - In-line Outlet to Trapezoidal Surface Water Channel
RCD/500/28 - Weir Outlet to Surface Water Channel
RCD/500/29 - Slope Drainage Herringbone Filter Drains
RCD/500/30 - Central Reserve Detail of Standard Dual Carriageway Super elevated with Concrete Barrier Restraint
RCD/500/40 - Edge of Pavement Drains Fin Drains and Narrow Filter Drains
RCD/500/41 - Edge of Pavement Drains Installation of Fin Drains
RCD/500/42 - Edge of Pavement Drains Installation of Narrow Filter Drains
RCD/500/43 - Edge of Pavement Drains Under Channel Drainage
RCD/500/50 - Rock Armour Scour Protection

RCD/500/51 - Self Clearing Inlet Grid Detail

RCD/500/52 - Outlet Grid Detail

RCD/500/53 - G.A. of Formed Headwalls 150-1800 Diameter Pipes

2. Ducting

RCD/500/60 - Transverse Ducts

RCD/500/61 - Trench Cross Sections Under Trafficked Areas

RCD/500/62 - Trench Cross Sections Under Non-Trafficked Areas

RCD/500/63 - Duct Crossing Types

RCD/500/64 - Footway/Verge Draw Pit

RCD/500/65 - Carriageway Draw Pit Type A

RCD/500/66 - Carriageway Draw Pit Type B

RCD/500/66 - Duct Spacer and Strapping for Trenchless Construction

APPENDIX 5/8: Thermoplastic Structural Wall Pipes and Fittings

Not used

APPENDIX 5/9: Attenuation

Not used

APPENDIX 6/1: Requirements for Acceptability and Testing Etc. of Works Materials

Earthworks Overview

1. The earthworks must be programmed, planned and executed taking particular, but not exclusive, account of the constraints given in other Appendices and any specific details presented in the Geotechnical Reports.
2. Clause 602 of the Specification sets out arrangements the Contractor shall make for maintaining the integrity of the acceptable materials arising from the site. The attention of the Contractor is especially drawn to the physical constraints as listed below.
3. The Contractor shall note that his earthworks construction must be planned and carried out taking into account the following particular constraints:
 - (i) The limitations on the use of public roads as laid out in Appendix 1/19.
 - (ii) The programme constraints outlined in Appendix 1/13.
 - (iii) Rerouting of services.
 - (iv) The site extents outlined on the Drawings.
 - (v) The limitations on noise/vibrations and dust control measures as required in Appendix 1/9.
 - (vi) Any contaminated ground identified.
 - (vii) Areas of soft ground identified in Appendix 6/13.
 - (viii) Maintaining traffic flows as specified in Appendix 1/17.
 - (ix) Significant cuttings in soil and rock.
 - (x) The disposal of unsuitable material to properly licensed tips, where applicable.
 - (xi) The construction of slabs and other miscellaneous works required as part of the construction.
 - (xii) Complying with the Specification for Road Works (SRW), published by TII.
 - (xiii) Testing requirements as detailed in Appendix 1/5.
 - (xiv) The excavation of cuts, the construction of fill and any works that could cause uncontrolled spilling of material onto existing roads.
4. Unacceptable material Class U1 could be encountered on the scheme. The Contractor may process this material so that it complies with the permitted constituents and material properties of Table 6/1 for a material. The Contractor shall obtain a Landfill Licence or any other necessary permit or planning permission or an exemption from the relevant authority within whose jurisdiction the Contractor intends to dispose of the unacceptable U1A materials as appropriate.
5. Unacceptable Material Class U1 Grade 1 material refers to material classified as Category C (Soils suitable for disposal to a Non-Hazardous Licenced Landfill) in accordance with Waste Acceptance Criteria (WAC) set out in Directive 1999/31/EC (The Landfill Directive) and the Council Decision of 19 December 2002 or such legislation as is current at award of Contract.

Classification & Testing Of Materials

6. The permitted classes, acceptable limits and material properties required for acceptability for fills appropriate to this contract are given in Table 6/1 of this Specification Appendix. Unless described in this Appendix, grading requirements for each class of material are given in Table 6/2 of the TII SRW and compaction requirements given in Table 6/4 of the TII SRW.
7. The relevant classification and acceptability testing as specified in Appendix 1/5 shall be carried out by the Contractor on each class of earthworks material seven days prior to placement or as agreed by the Engineer. All testing shall be undertaken and be stored and handled in accordance with BS5930.
8. The Contractor shall provide copies of all classification test results and acceptability testing to the Engineer prior to import or placement of the material but not more than five days from completion of the testing or as agreed by the Engineer.
9. Where acceptability of materials is questionable, or the Employers Representative is of the opinion that material properties have changed, further testing may be requested.
10. The Contractor shall maintain accurate records of where the samples were taken and when and where this earthworks material is placed in the permanent works. Copies of these records shall be regularly submitted to the Engineer.

Groundwater

11. The Contractor shall allow and be responsible for the control of groundwater in all temporary excavations and in all temporary situations during the course of the works, and it shall be noted that pumping into existing watercourses or sewers shall only be permitted upon provision of a detailed Method Statement and its subsequent approval by the relevant authorities.
12. The Contractor shall take all necessary measures to prevent any surface runoff from the construction works flowing directly into any of the watercourses, both existing and proposed, on the site. The Contractor shall provide measures to channel surface water runoff to specific discharge points where silt traps, screens and any other measures deemed necessary will be employed to prevent any excessive clouding of the watercourses.
13. Where pumping is undertaken and discharge is into an existing watercourse, a method statement of the intended operation (which should include the Contractors methodology to limit silt, debris and other contamination entering the watercourse) shall be presented for approval.

Special Requirements

14. The frequency of testing of earthworks materials is indicated in Appendix 1/5.
15. Where nuclear density gauge is employed to monitor in situ or compacted density, dry density or moisture content, the gauge shall have been calibrated within the previous seven days, and the measurement shall have been calibrated against other measures of the required properties obtained by other tests.
16. CBR value of cohesive subgrades (generally with strength in the range $2\% < \text{CBR} < 6\%$) may be assessed using cone penetrometers as described in HD25.
17. To demonstrate the correlation of CBR and/or strength testing with MCVs, additional testing will be required. In situ CP (e.g Mexiprobe) testing with laboratory MCVs and CBRs measured on samples taken at the same location, with moisture content testing to demonstrate sample equivalence will be carried out to demonstrate that $\text{CBR} = 3$ is achieved on material within 1.0m of sub-formation. A series of tests at a minimum average rate of one set (i.e. 1 no. CBR, 1 no. MCV and 1 no. DCP all carried out on a sample of the same Class 2 cohesive general fill material at the same moisture content) per day will be carried out during the first four weeks of earthworks operations, giving a minimum of 20 nos. sets of data, to provide an initial correlation. Thereafter test data will be collected at a rate of two sets per month with a minimum of two sets for each earthworks fill element.

Table 6/1 Classification and Acceptability Criteria

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
1A	Well graded granular material	General Fill	Any material or combination of materials	(i) grading	BS 1377: Part 2	Table 6/2	Table 6/2	Table 6/4 Method 2
				(ii) uniformity coefficient	See note 5 TII SRW	10	-	
				(iii) mc	BS 1377: Part 2	OMC – 2%	OMC +2%	
				(iv) MCV	Clause 632	-	-	
1B	Uniformly graded granular material	General Fill	Any material or combination of materials	(i) grading	BS 1377: Part 2	Table 6/2	Table 6/2	Table 6/4 Method 3
				(ii) uniformity coefficient	See note 5 TII SRW	-	10	
				(iii) mc	BS 1377: Part 2	OMC – 3%	OMC +2%	
				(iv) MCV	Clause 632	-	-	
1C	Coarse granular material	General Fill	Any material or combination of materials	(i) grading	BS 1377: Part 2	Table 6/2	Table 6/2	Table 6/4 Method 5
				(ii) uniformity coefficient	See Note 5 TII SRW	5	-	
				(iii) Los Angeles coefficient	Clause 635	-	50	

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
2A	Wet cohesive material	General Fill	Any material or combination of materials	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 1 except; for materials with liquid limit greater than 50, determined by BS 1377: Part 2, only tamping or grid rollers shall be used.
				(ii) plastic limit (PL)	BS 1377: Part 2	-	-	
				(iii) mc	BS 1377: Part 2	PL -3%	-	
				(iv) MCV	Clause 632	8	15	
				(v) undrained shear strength of remoulded material	Clause 633	-	-	
				(vi) effective angle of internal friction (Ø') and effective cohesion (c')	Clause 636	Φ' = 34 c' = 0	-	
2B	Dry cohesive material	General Fill	Any material or combination of materials	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2
				(ii) plastic limit (PL)	BS 1377: Part 2	-	-	
				(iii) mc	BS 1377: Part 2	-	PL -3%	
				(iv) MCV	Clause 632	8	15	

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
				(v) undrained shear strength of remoulded material	Clause 633	-	-	
				(vi) effective angle of internal friction (ϕ') and effective cohesion (c')	Clause 636	$\phi' = 34$ $c' = 0$	-	
2C1	Stony cohesive material (High Fines Content)	General Fill	Any material or combination of materials	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2
(ii) mc				BS 1377: Part 2	-	-		
(iii) MCV				Clause 632	8	15		
(iv) Undrained shear strength of remoulded material				Clause 633	-	-		
(v) effective angle of internal friction (ϕ') and effective cohesion (c')				Clause 636	$\phi' = 34$ $c' = 0$	-		

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
2C2	Stony cohesive material (Low Fines Content)	General Fill	Any material or combination of materials	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2
				(ii) mc	BS 1377: Part 2	-	-	
				(iii) MCV	Clause 632	8	15	
				(iv) Undrained shear strength of remoulded material	Clause 633	-	-	
				(v) effective angle of internal friction (Ø') and effective cohesion (c')	Clause 636	Φ' = 34 c' = 0	-	
2D	Silty cohesive material	General Fill	Any material or combination of materials	(i) grading	BS 1377: Part 2	Table 6/2	Table 6/2	Table 6/4 Method 3 (except that vibration techniques shall not be permitted)
				(ii) mc	BS1377: Part 2	-	-	
				(iii)MCV	Clause 632	8	15	
				(iv) Undrained Shear Strength of Remoulded Material	Clause 633	-	-	

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
				(v) effective angle of internal friction (ϕ') and effective cohesion (c')	Clause 636	$\phi' = 34$ $c' = 0$	-	
4	Various	Fill to landscape areas	See App 6/1	(i) grading	BS 1377: Part 2	As agreed by the ENGINEER	As agreed by the ENGINEER	See Clause 620 and App 6/1
				(ii) mc	BS 1377: Part 2	-	-	
				(iii) MCV	Clause 632	5 or as specified by the ENGINEER	15 or as specified by the ENGINEER	
5A	Topsoil, or turf, existing on Site	Topsoiling	Topsoil or turf designated as Class 5A in the Contract	(i) grading	Clause 618	-	Clause 618	-
5B	Imported topsoil	Topsoiling	Material complying with BS 3882	-	-	-	-	-

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
5C	Imported turf	Turfing	Material complying with BS 3969	-	-	-	-	-
6A	Selected well graded granular material	Below water	Natural gravel, crushed gravel, crushed rock other than argillaceous rock (Note 7) or gravel, crushed concrete or any combination thereof. (Properties (v) and (vi) only apply when material is described as argillaceous as defined in Clause 601.5)	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	
				(ii) uniformity	See Note 5	10	-	
				(iv) plasticity index	BS 1377 : Part	Non-plastic		
				(v) Los Angeles Coefficient	Clause 635	-	50	
				(vi) Slake Durability	Clause 634	95%	-	
6C	Selected	Starter layer	Natural gravel,	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
	uniformly graded granular material		crushed gravel, crushed rock other than argillaceous rock Note 7 or gravel, crushed concrete, or any combination thereof.	(ii) uniformity coefficient	See Note 5	10	-	
				(iii) plasticity index	BS 1377: Part 2	Non-plastic		
			(Property (vi) only applies when material is described as argillaceous as defined in Clause 601.5)	(iv) Los Angeles Coefficient.	Clause 635	-	50	
				(v) mc	BS 1377: Part 2	OMC – 2%	OMC + 2%	
				(vi) Slake Durability	Clause 634	95%	-	
6F1	Selected granular material	Capping	Natural gravel, crushed gravel or combination of both, excluding argillaceous	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 6
				(ii) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-	

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
			rock Note7. Recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar- bitumen binders. Property (vii) in the next column shall not apply if the Class RA (asphalt) content of recycled aggregate is 20% or less.	(iii) mc	BS1377 Part 2	-	Optimum mc	
				(iv) Los Angeles coefficient	Clause 635	-	50	
				(v) total sulfur content	IS EN 1744-1: 2009 Test No. 11	-	1%	
				(vi) Class RA (asphalt) content	BS EN 933-11	-	50%	
			Property (v) as set out in SR21: 2009	(vii) bitumen content	BS EN 12697-1 or BS 12697-39	-	2%	

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
			(Property (viii) only applies when material is described as argillaceous as defined in Clause 601.5)	(viii) Slake Durability	Clause 634	95%	-	
6F2	Selected Granular Material	Capping	Crushed rock (other than argillaceous rock Note 7) and crushed concrete. Recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar- bitumen binders.	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 6
				(ii) optimum mc	BS 1377: Part 4 (Vibrating Hammer Method)	-	-	
				(iii) mc	BS 1377: Part 2	-	Optimum mc	
				(iv) Los Angeles coefficient	Clause 635	-	50	
				(v) total sulfur content	IS EN 1744-1: 2009 Test No. 11	-	1%	
				(vi) Class RA (asphalt) content	BS EN 933-11	-	50%	

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
			Property (v) as set out in SR21: 2009 Property (vii) in the next column shall not apply if the Class Ra (asphalt) content of recycled aggregate is 20% or less.	(vii) bitumen content	BS EN 12697-1 or BS 12697-39	-	2%	
			(Property (viii) only applies when material is described as argillaceous as defined in Clause 601.5)	(viii) Slake Durability	Clause 634	95%	-	
6F3	Selected Granular Material		Natural gravel, crushed gravel or sand, or a combination thereof, excluding	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Table 6/4 Method 6
				(ii) optimum mc	Clause 613	-	-	
				(iii) mc	Clause 613	OMC-2%	Optimum mc	

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
			argillaceous gravel or sand. Recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-bitumen binders. Property (vii) in the next column shall not apply if the Class Ra (asphalt) content of recycled aggregate is 20% or less. Property (v) as set out	(iv) Los Angeles coefficient	Clause 635	-	50	
				(v) total sulfur content	IS EN 1744-1: 2009 Test No. 11	-	1%	
				(vi) Class RA (asphalt) content	BS EN 933-11	-	50%	
				(vii) bitumen content	BS EN 12697-1 or BS 12697-39	-	2%	

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
			in SR21: 2009					
6N1	Selected granular material	Fill to structures	Crushed rock, other than argillaceous rock Note 7, and crushed concrete (Property (xii) only applies when material is described as argillaceous as defined in Clause 601.5)	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	End product 95% of maximum dry density of BS 1377 : Part 4 (Vibrating hammer method)
				(ii) Los Angeles coefficient	Clause 635	-	50	
				(iii) undrained shear parameters (c and ϕ)	Clause 633	-	-	
				(iv) effective angle of internal friction (ϕ') and effective cohesion (c')	Clause 636	$\phi' = 38$ $c' = 0$	See App 6/6	
				(v) permeability	Clause 640	5×10^{-5} m/s	-	
				(vi) mc	BS 1377 : Part 2	OMC-2%	OMC+2%	
				(vii) MCV	Clause 632	-	-	

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
				(viii) pH value	BS 1377 : Part 3	6	9	
				(ix) water soluble sulfate content	IS EN 1744-1:2009 Test 10	-	1.5gms/litre SO ₄	
				(x) Oxidisable sulfides	IS EN 1744-1:2009 Test 11 and Test 12	-	0.3% SO ₄	
				(xi) slope stability test (where required in App 6/6)	Clause 610	-		
				(xii) Slake Durability	Clause 634	95%	-	
6N2	Selected granular material	Fill below structures	Crushed rock, other than argillaceous rock Note 7, and crushed concrete (Property (xii) only	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	End product 95% of maximum dry density of BS 1377 : Part 4 (Vibrating hammer method)
				(ii) Los Angeles coefficient	Clause 635	-	50	
				(iii) undrained shear parameters (c and ϕ)	Clause 633	-	-	

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
			applies when material is described as argillaceous as defined in Clause 601.5)	(iv) effective angle of internal friction (φ') and effective cohesion (c')	Clause 636	Φ' = 40 c' = 0	-	
				(v) permeability	Clause 640	5 x 10 ⁻⁵ m/s	-	
				(vi) mc	BS 1377 : Part 2	OMC-2%	OMC+2%	
				(vii) MCV	Clause 632	-	-	
				(viii) pH value	BS 1377 : Part 3	6	9	
				(ix) water soluble sulfate content	IS EN 1744-1:2009 Test 10	-	1.5gms/litre SO ₄	
				(x) Oxidisable sulfides	IS EN 1744-1:2009 Test 11 and Test 12	-	0.3% SO ₄	
				(xi) slope stability test (where required in App 6/6)	Clause 610	-		
				(xii) Slake Durability	Clause 634	95%	-	

Class	General Material Description	Typical Use	Permitted Descriptions (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
8	Class 1 or Class 2 material	Lower trench fill	Any, except there shall not be any stones or lumps of clay>40mm nominal diameter	(i) mc	BS 1377: Part 2	-	-	Tab 6/4
				(ii) MCV	Clause 632	7	15	

1. App = Appendix
2. Tab = Table
3. Where in the Acceptable Limits column reference is made to App 6/1, only those properties having limits ascribed to them in Appendix 6/1 shall apply. Where Appendix 6/1 gives limits for other properties not listed in this Table such limits shall also apply.
4. Where BS 1377: Part 2 is specified for mc, this shall mean BS 1377: Part 2 or BS 812: Part 3 as appropriate.
Uniformity coefficient is defined as the ratio of the particle diameters D₆₀ to D₁₀ on the particle-size distribution curve, where: D₆₀ = particle diameter at which 60% of the soil by weight is finer D₁₀ = particle diameter at which 10% of the soil by weight is finer
5. Determination of moisture content shall be made from that part of the material passing the 20 mm BS Sieve.
6. Material defined as argillaceous in accordance with Clause 601.5 may be permitted for incorporation in the permanent works, provided that it is demonstrated by slake durability and LA abrasion testing that the material will be sufficiently durable. Where acceptable limits in this regard are not provided in Table 6/1 they shall be included within Appendix 6/1.
7. Refer to particular requirements in Clauses 601.11, 601.12 and 643. A petrographer's detailed mineralogical description may be required as described under section 3.4.2 of SR 21.

APPENDIX 6/2: Requirements for Dealing with Class U2 Unacceptable Material General

General Requirements

1. For the purpose of this Contract, Unacceptable Material Class U2 shall be as defined in SRW Clause 601.3, and/or defined as hazardous wastes under the Waste Management Acts and Regulations, 1996 and 2010, where hazardous chemical properties shall be defined as containing biodegradable (putrescible) material (i.e. capable of producing landfill gas), containing leachate, capable of producing leachate, containing radioactive materials, asbestos or containing petroleum products.
2. Excavated material is to be recovered or disposed of in accordance with relevant legislation. Where feasible excavated material will be beneficially re-used in accordance with relevant legislation provided re-use does not cause harm to human health or the environment.

Measures for Dealing with Unacceptable Material Class U1 and U2

3. It is possible that Unacceptable Material Class U1 and U2 material may be encountered within the Made Ground across the site. For the purposes of this Contract this unacceptable material has been subdivided into Unacceptable Material Class U1 Grade 1 material and Unacceptable Material Class U2 Grade 2 material.
4. Unacceptable Material Class U1 Grade 1 material refers to material classified as Category C (Soils suitable for disposal to a Non-Hazardous Licenced Landfill) in accordance with Waste Acceptance Criteria (WAC) set out in Directive 1999/31/EC (The Landfill Directive) and the Council Decision of 19 December 2002 or such legislation as is current at award of Contract.
5. Unacceptable Material Class U2 Grade 2 material refers to material Category D (Soils suitable for disposal to a Hazardous Licenced Landfill) in accordance with Waste Acceptance Criteria (WAC) set out in Directive 1999/31/EC (The Landfill Directive) and the Council Decision of 19 December 2002, or such legislation as is current at award of Contract.
6. Previous site investigations have indicated the possible presence of material classified as Class U2 Grade 1/Category C (Soils suitable for disposal to a Non Hazardous Licenced Landfill) in accordance with Waste Acceptance Criteria (WAC) set out in Directive 1999/31/EC (The Landfill Directive) and the Council Decision of 19 December 2002, or such legislation as is current at award of Contract.
7. A method statement shall be submitted by the Contractor to the Employer's Representative for review detailing how this or any other potentially contaminated material will be sampled and tested. The Contractor shall carry out sampling and testing based on a 5m grid spacing and to depths appropriate to the risk, extent and degree of contamination anticipated. Further samples to reduce the grid spacing may be taken after the initial analysis if required by the Employer's Representative.

8. In the event that the Contractor encounters or suspects the presence of any Unacceptable Material Class U2 Grade 2 not already identified in the Contract, he shall cease any excavation work in that area immediately and notify the Employer's Representative. The Contractor shall make arrangements to have the material inspected by an approved Sub-Contractor, specialising in the identification, sampling and testing of such material.
9. The Contractor shall submit a Method Statement to the Employer's Representative detailing his proposals for dealing with the Class U2 material. The Employer's Representative will, if satisfied with the proposals, provide written permission to proceed with the treatment of the U2 material. For removal and replacement of the U2 material, the Contractor shall make arrangements for the Class U2 material to be excavated and removed off site by a specialist waste disposal Contractor approved by the Employer's Representative and disposed of to an appropriately licensed landfill or recovery site with the appropriate waste permission in place such as an EPA licence or a local authority waste permit in accordance with the current Irish Waste Management legislation and associated statutory instruments. No such material shall leave the site without the prior written consent of the Employer's Representative. The Contractor shall keep records of the materials removed and shall obtain the Employer's Representative's authentication of the records.
10. Surface water flow from the area of the U2 material shall be strictly controlled by an arrangement of a series of grips and sumps and pumped to dedicated storage tanks to the Employer's Representative's satisfaction.
11. The pumped water shall be sampled and tested to determine the required treatment before it can be discharged to the receiving watercourse. The water is not to be discharged to a receiving watercourse without the prior written consent of the Employer's Representative. Groundwater/leachate from contaminated areas shall be contained by a method to be agreed with the Employer's Representative and pumped to the dedicated storage tanks. The Contractor shall carry out such treatment on the groundwater/leachate as required by the Employer's Representative to bring the water to such a standard as to permit its return to the receiving watercourse.

Stockpiling of Class U2 Materials On-Site

12. Excavated contaminated material for immediate disposal off site shall not be placed in temporary stockpiles on site prior to classification and disposal, unless otherwise agreed by the Employer's Representative.
13. Material excavated and designated for treatment shall be transported to the appropriate process area for treatment.
14. Where contaminated materials are to be stockpiled, the Contractor shall construct impermeable hard standings with adequate drainage for leakage or provide impermeable containers for storage prior to disposal.

Leachate and Contaminated Water

15. Groundwater/Leachate from contaminated areas shall not be discharged to public or private surface water or foul sewers, nor to watercourses without prior approval from the appropriate authority. Should groundwater or leachate be found in contaminated areas, it shall be contained so as to prevent contamination of uncontaminated ground, prior to disposal off site.
16. Groundwater/leachate pumped or collected from any contaminated area shall be stored in secure containers prior to appropriate off site disposal unless otherwise shown on the drawings. The Contractor shall ensure that contaminated waters do not discharge onto the ground. All such waters will be transferred by tanker off site for appropriate disposal unless otherwise shown on the drawings.
17. Drainage arisings and leakage from areas of contaminated material stockpiles shall be collected and stored in secure containers prior to appropriate off site disposal. The Contractor shall ensure that contaminated waters do not discharge onto ground. All such waters shall be transported and disposed off site in an appropriate facility following the procedures outlined below for transport and disposal of Class U2 contaminated materials.

Control of landfill Gas and Leachate

18. Excavations into or adjacent to landfill wastes material may encounter concentrations of landfill gas, leachate or other hazardous substances. The Contractor shall take all measures necessary to protect site staff, adjacent landowners, members of the public or the environment from any harmful effects arising from his operations.
19. The Contractor shall take appropriate measures to prevent infiltration of landfill gas and leachate into the drainage system, whether on or off site

Waste Disposal and Transport

20. It is the Contractor's responsibility to ensure that all class U2 material and waste produced or encountered on site is dealt with (including but not limited to handling, storage, transport, treatment, disposal etc) in accordance with all current regulations and legislation as well as other requirements of relevant authorities.
21. Prior to remove any Class U2 materials from site, the Contractor shall submit a method statement for the transport and disposal of such materials with details including (but not limited to) of the carrier, the licensed facility, method of disposal etc to the Employer's Representative for approval.
22. The burning of any type of waste on site shall not be permitted.

APPENDIX 6/3: Requirements for Excavation, Deposition, Compaction (Other than Dynamic Compaction)

General

1. Earthworks requirements including lines, levels and standard details are shown on the Contract drawings.
2. Excavation and filling are required to construct levelled platforms for the roadways and landscape areas.
3. Excavation is required to or below sub formation as shown on the drawings, soft spots/areas identified during inspection on site prior to filling or foundation construction or as instructed by the Employer's Representative.
4. Fill shall be constructed from the base of the excavation level with slopes at a gradient of 1(v):2(h) or as shown on the 0600 Series drawings with capping material beneath the roadways and hard standing areas unless otherwise agreed or instructed by the Employer's Representative.
5. Method Compaction shall be carried out in accordance with Table 6/4 of the TII SRW otherwise end-product compaction will be required. The Contractor shall submit their proposal in writing to the Engineer for approval where end-product compaction is to be carried out.
6. All excavated material shall be classified as unacceptable material Class U1 or U2 and shall be removed off site.

Blasting

7. Blasting shall not be permitted as part of the Works.

Excavations, Cuttings and Cut Slopes Requirements

8. The cuts in in-situ material shall be constructed with slopes at a gradient as shown on the earthworks drawings.
9. Undercutting of cutting slopes or toes of cuttings shall be in accordance with Clause 603 of the Specification for the temporary excavation of trenches for drainage, construction of foundations, soft spots etc in order to prevent any detrimental effect to adjacent earthworks taking into account all temporary works, the site conditions and method of working. The Contractor shall ensure that all slopes and batters of permanent or temporary earthworks or other excavations are safe or adequately supported to prevent failure. Adequate support shall be provided to exposed services and/or adjacent services, structures, road and adjacent land.
10. Undercutting at the toe of existing slopes of existing embankments or newly constructed earthworks platforms or embankments shall be adequately supported to prevent the failure of the slope. These excavations shall be kept free of all water and dewatering may be required.

11. Excavations within 5m of the toe of any slope shall be less than 10m in length along that slope and shall be backfilled immediately.
12. Temporary excavation shall not be permitted within 10m of either end or either side of another excavation or open trench at the toe of an earthworks slope unless otherwise approved in advance by the Employer's Representative following submission by the Contractor of a detailed method statement.
13. Dewatering including pumping water from within an excavation shall be in a controlled manner in order to avoid migration of fines in the adjacent soils and to avoid movement of adjacent structures or earthworks. It is the responsibility of the Contractor to monitor and prevent any movement of existing structures or earthworks.
14. Where the excavations require supporting and the Contractor chooses to provide supports and struts, these shall be removed progressively as filling occurs unless otherwise directed by the Employer's Representative.
15. If boulders of a size greater than 600mm are encountered during excavation, then they shall be removed by splitting, breaking or other method to the satisfaction of the Employer's Representative. If such boulders are located at formation level, then the void formed shall be backfilled with capping 6F1 or 6F2.
16. It shall be the responsibility of the Contractor to temporarily control the inflow and level of groundwater within or adjacent to the excavation to allow the required works and inspection to be carried out in accordance with the Contract.

Construction of Fill

17. Upon completion of topsoil stripping and/or excavation below earthworks as shown on the drawings or required in the specification or directed by the Employer's Representative, the Contractor shall inspect and proof roll all areas of prior to filling for the construction of embankments and platforms.
18. The proof-rolling shall consist of at least two passes of a smooth-wheeled roller without vibratory action and having a minimum mass per metre roll width of 5000kg, or other suitable method agreed with the Employer's Representative.
19. In cohesive soils, a minimum undrained shear strength value of 50kPa is required beneath the fill. Where it is unclear that a minimum undrained shear strength of 50kPa can be achieved from visual inspections, the undrained shear strength shall be measured by a Geonor H-60 shear vane. The size range of the vane should be modified depending on the strength of the soil.
20. The foundation level of fill and/or base of the excavation shall be kept dry and compacted prior to inspection and proof rolling and during construction.
21. A minimum CBR of 4% is to be achieved at subformation unless otherwise instructed or agreed by the

Employer's Representative.

22. Soft spots/areas at formation/base of the excavation shall be defined as areas where the soil does not meet the minimum shear strength requirements and/or display excessive deformation during proof rolling. The extent of soft spots shall be determined by inspection during proof-rolling. Unless otherwise instructed or agreed by the Employer's Representative, soft spots shall be excavated and backfilled in with Class 6F1 or 6F2 material.
23. Upon completion of stripping or excavation to the formation level of areas in cut, at grade or shallow fill (e.g. for construction of earthworks, pavement foundation) or excavation of insitu ground to be replaced as shown on the drawing or required in the contract, the Contractor shall notify the Employer's Representative for inspection and witnessing proof rolling. It is the responsibility of the Contractor to provide safe access to the area and level of inspection to the Employer's Representative as well as plant and labour for proof rolling of same.
24. Proof-rolling shall consist of at least two passes of a smooth-wheeled roller without vibratory action and having a minimum mass per metre roll width of 5000kg, or other suitable method agreed with the Employer's Representative.
25. In granular material, the material at the base of the excavation shall be kept dry and compacted prior to proof rolling.
26. Where the material at the base of top soil stripping or excavation for the construction of earthworks platform (fill or insitu material in cuts) does not meet the above criteria or display in the opinion of the Employer's Representative showing excessive movement.
27. Prior to the deposition of any fill material in an excavation, the Contractor shall submit detailed records of the inspection and proof rolling including location and depth of any soft spots and remedial work undertaken to the Employer's Representative for approval.
28. The Contractor's particular attention is drawn to Clause 608 (Construction of Fills) of the Specification and the requirement to provide protection against weather. Protection including (but not limited to) sealing the surface of earthworks, providing an adequate fall and/or temporary drainage to avoid water ponding at any time within the earthwork's areas shall be required.

Cohesive/granular fill interfaces

29. Cohesive/granular fill interfaces shall be constructed such that drainage of the interface is towards the edge of the embankment. The slope of the interface shall be such that any water drains to the outside of the embankment. No pockets of granular material shall be formed within cohesive material.

Compaction

General

30. Requirements of compaction shall comply with Table 6/4 and Clause 612 unless otherwise instructed by the Employer's Representative.

Method Compaction

31. Additional compaction in the top 600mm over the full width of the embankments to Clause 612.10 is required.
32. The frequency of field dry density testing shall be as set out in Appendix 1/5.

End Product Compaction

33. A nuclear surface density gauge (NDG) will be permitted for measuring the in-situ bulk density and moisture density in order to determine the moisture content and dry density of the compacted material in place of sand replacement tests (SRT calibrated for the materials on site) provided that it is calibrated for each type of material (site won or imported) used on site. The gauge shall be calibrated in accordance with BS 1377: Part 9 for each area and each layer of material tested. For each type of material tested, the calibration test results shall be submitted to the Employer's Representative for approval prior to its use on site and with the end product test results for the in-situ material.

Benching to Receive Fill

34. Filling against existing slope is not required but benches shall be provided to backfill battered excavations or to replace unstable material within new slopes. Benches shall be 0.5m in height for each step.
35. Additional compaction shall be carried out within two metres each side of the upright face of the lower bench immediately following the compaction of the first layer of fill material on the upper bench to ensure adequate (95%) compaction occurs at the steps.

Cuttings & Embankment Faces

36. Cutting and embankment slopes shall be benched or arrowed prior to receiving any topsoil.

Making Good Prior to Topsoiling

37. All cuttings and embankment slopes shall be made good prior to placing topsoil as shown on the drawings in accordance with Clause 603.7 of the Specification. Any ruts shall be backfilled with material of the same Class as the surrounding fill and levelled. Any protruding boulder or other large particle shall be removed and replaced with material of the same Class as the surrounding fill levelled.

Contractor to Keep Records of Fill Placement

38. The Contractor shall keep records of the following for each fill area:
- (i) Contract Identification and name of Earthworks Sub-Contractor
 - (ii) Date and Hours Worked
 - (iii) Details of fill location

- (iv) Weather conditions and minimum / maximum air temperatures
- (v) Rate of input of general fill material (number and size (in m³) of loads per hour) and locations where material was excavated and class of material; details of haulage plant and number operating
- (vi) Details of spreading and compaction plant operating (Reference number, type, and mass per m width roll for compaction plant)
- (vii) Details of any plant stoppages for meal breaks and servicing, breakdowns, etc.: times, duration, and reasons
- (viii) Details of any fill treatment carried out.

The Contractor shall submit two copies of these records to the Employer's Representative within 24 hours of the completion of each day's work. Each copy shall be signed by the Contractor.

APPENDIX 6/4: Not used

Not used

APPENDIX 6/5: Geotextiles Used to Separate Earthworks Materials

1. Geotextile for separating earthworks materials shall comply with BS8006 and EN965.
2. Geotextiles shall be synthetic non-woven, thermally bonded or mechanically needled fabric composed of UV stabilised polypropylene or polyester filaments, except that where the geotextile is in contact with PFA it shall be synthetic non-woven mechanically needled fabric composed of UV stabilised polypropylene filaments.
3. All geotextiles which are to be incorporated in the permanent works shall have a minimum life expectancy of 120 years.
4. Testing of geotextiles shall be in accordance with the Specification and relevant European Standards to confirm the supplier specifications. The frequency of testing of geotextiles shall be as shown in Table 1/5.
5. General purpose Geotextile Filter/Separator materials shall meet the following criteria:

Mean wide width strip tensile strength	13 kN/m minimum	BS EN ISO 10319:1996
Mean CBR puncture resistance	20 kN minimum	BS EN ISO 12236:1996
Mean trapezoidal tear resistance	575 N minimum	ASTM D4533
Mean AOS O90 pore size	0.05 – 0.35 mm	BS EN ISO 12956:1999
Permeability, 10 cm head	10 litres/m ² sec min.	BS EN ISO 11058:1999
6. Geotextiles used in the Works shall, when exposed to UV light in an accelerated weathering test, carried out and interpreted in accordance with BS PD 6533:1993 Section B, have a resistance to UV light and weathering, such that the time to reduce the characteristic tensile strength by 50% exceeds 3 months. They shall have a resistance to chemical and biological degradation, such that when tested in accordance with index test methods in BS PD 6533:1993 Sections 4 & 5, the reduction in characteristic tensile strength does not exceed 25% of the original value. The Contractor shall provide test results confirming that all relevant materials comply with these criteria.

Laying and Lapping

7. Supply and Handling
 - (i) Geotextiles shall be supplied to site in an undamaged condition and shall not be damaged by site handling, whether supplied in the form of rolls or packages. The methods of supply and handling adopted shall ensure that: the geotextile is supplied dry, and remains dry; the geotextile is protected from abrasion and damage; the geotextile is protected from contamination; the geotextile is protected from exposure to sunlight (ultra-violet radiation in particular).
 - (ii) Items within consignments of geotextiles shall be supplied to site clearly marked with the name of the product and its grade or code number, in order that it shall easily be identified both before and after removal of any wrapping.

(iii) Geotextiles may be stored in the open (outdoors) provided that such storage is safe, secure and free from hazard. Geotextiles shall not, by virtue of their storage environment, be subject to temperature extremes or other harmful conditions. Geotextiles shall be stored on an even, and preferably horizontal, surface.

(iv) Geotextiles shall be stockpiled or stored in such a way that the weight of overlying material does not damage that which is below. Any geotextiles damaged during storage should be removed from site. Wrapping provided shall not be removed before the geotextile is used unless replaced by alternative wrapping that shall provide the required protection.

8. Installation Procedure

(i) The geotextiles shall at all times prior to placement be stored under cover and suitably protected from direct sunlight and water. Care shall be taken to ensure that the geotextiles are not damaged during placement or during the deposition, spreading and levelling of the fill material. No traffic or site plant shall be permitted to traffic the reinforcement prior to placing the fill.

(ii) The fabrication and installation shall be planned and implemented taking into account existing or diverted services and drainage works.

(iii) Jointing shall be by overlapping only and all overlaps shall be a minimum of 500mm. Any punctures or damage to geotextiles shall be made good by overlaying with geotextile having an overlap of at least 500 mm from the edge of the damaged area. The number of joints shall be kept to an absolute minimum.

9. Requirement for Placing and Compaction of Fill

(i) Placing and compaction of fill shall be carried out so that the reinforcement shall be installed at the specified level on top of compacted fill, completed formation or completed sub-formation as appropriate. The surface on which the geotextile is to be placed shall comply with the surface level tolerance in Clause 616.

(ii) Fill shall not be tipped directly onto the geotextile. Fill shall be carefully spread onto previously placed geotextile and shall be taken forward and placed by hand-raking or suitable plant with a bucket type that causes the covering material to cascade onto the geotextile. Operation of construction plant directly on the installed geotextile is not permitted and its covering with fill material shall be carried out immediately after laying and jointing.

(iii) During placing and compaction of fill, care shall be taken to avoid displacing the geotextile. At overlaps, the top piece of geotextile shall be the first to be covered by fill and no fill shall be permitted to come between overlapping layers.

10. The frequency of sampling and testing of geotextiles shall be as shown in Table 1/5. Samples for testing in accordance with Clause 609 shall be taken in accordance with the prescriptions of BS EN 963 `Geotextiles -

Sampling and Preparation of Test Specimens'. The sampling report shall be sent with the samples to the test laboratory and a copy shall be delivered to the Designer within 3 days of the sampling.

11. Samples of installed geotextiles are to be retained by the Contractor for a minimum of 12 months.

APPENDIX 6/6: Fill to Structures and Fill Above Structural Foundations

1. Fill to structures and fill above structural foundations shall comprise Class 6N1, Class 6N2 and/or Class 6P. Backfill to be compacted in accordance with Clauses 610, 611 and 612.
2. Prior to placing blinding concrete at the design foundation level, or immediately prior to filling the excavation where no blinding layer is required, the formation shall be investigated by the Employer's Representative (using shear vane or dynamic probes as appropriate and at a frequency determined by the Employer's Representative) to confirm that the formation strength meets the design requirements.
3. Requirements for plate bearing tests to prove formation to structural foundations are shown on the structure drawings. Generally, one plate test will be carried out per structure. Where directed by the Employer's Representative additional plate bearing tests shall be carried out to confirm that the formation strength meets the design requirements.
4. The investigation shall identify the presence and extent of any 'soft spots' (i.e. strength below that required by the design). For soft spots beneath structures, soft spots shall be excavated and backfilled with a minimum of 300mm of compacted Class 6N2 granular material.
5. Backfill depths as required to provide the finished footpath levels.
6. All backfill / granular fill / capping within 1m of concrete structures, footpaths or foundations shall have water-soluble sulphate and oxidisable sulphides limits in accordance with Clause 808.

APPENDIX 6/7: Sub-Formation & Capping & Preparation & Surface Treatment of Formation

1. The build-ups are shown on the 700 and 1700 series drawings.
2. The existing surface levels shall be reinstated following the construction of the slabs.
3. The Contractor shall carry out CBR and in-situ density testing at sub-formation to confirm that the required design CBR value has been achieved. If the required CBR has not been achieved on fill, the Contractor shall replace and make good the defective fill. In areas where sub-formation is within in-situ material, the soft material should be excavated and replaced with Class 6F1 or 6F2 material as directed by the Employer's Representative.
4. Class 6F1 or 6F2 material shall be in accordance with Table 6/1 and shall not be frost susceptible.
5. Preparation and surface treatment of the sub-formation, including tolerances, shall be in accordance with Clause 616.1 as specified for formation.
6. Material used within 350mm of the final road surface shall not be frost susceptible. Requirements for lateral extent of capping and sub-formation, sub-formation shaping and crossfalls shall be as shown on the pavement construction drawings and in the road construction details.
7. Preparation and surface treatment of formation and sub-formation shall be carried out immediately prior to laying pavement foundation materials or sub-base. If at any time the subgrade becomes softened due to precipitation or site activities, the subgrade shall be stripped by at least 40mm to expose a competent sub-formation that shall be recompacted. Where the sub-formation level is reduced in this manner the pavement foundation construction thickness shall be increased with capping (or sub-base if appropriate).
8. Preparation of sub-formation shall be carried out only after installation of adequate subgrade / sub- formation drainage that shall be fully operational. Adequate temporary drainage shall be determined by the Contractor to suit the site conditions and method of working (attention is drawn to the moisture susceptible nature of some of the soils on this site).
9. At the time of trimming sub-formation which is required to receive capping at all areas, sub-formation shall be inspected and proof rolled and the Contractor shall carry out in situ CBR and density tests.
10. CBR and in situ density tests shall be carried out at subformation at a frequency of not less than 20m spacing along the carriageway of the main road and each side road, slip road, roundabout and each side of the carriageway where the conditions differ.

11. The Contractor shall notify the Employer's Representative prior to trimming sub-formation for inspection and witnessing proof rolling and testing. It is the responsibility of the Contractor to provide plant, equipment and labour for proof rolling and testing at the time of trimming sub-formation.
12. Based on the inspection, proof rolling and testing, further excavation may be required by the Employer's Representative to achieve sub formation on a subgrade layer meeting the Contract requirements and with the required thicknesses of capping and/or subbase.
13. The Contractor shall make good any area not meeting the contract requirement and/or, in the opinion of the Employer's Representative showing excessive movement. This shall involve the excavation of the material in the defective area and replacement with acceptable capping material or if in granular fill, with acceptable granular material of the same class unless otherwise agreed with the Employer's Representative. The area shall subsequently be re-inspected and/or in-situ tests be carried out as required by the Employer's Representative.
14. In cut or at grade areas (including shallow embankments), the Contractor shall excavate below sub formation as shown on the drawings or as required to meet the specification requirements following inspection of subformation and achieve the required thickness of capping and subbase depending on the subgrade or otherwise as directed by the employer's Representative.
15. Prior to the deposition of capping, the Contractor shall submit detailed records of the subformation inspection and test results including details of defective areas and remedial work undertaken to the Employer's Representative for approval.
16. Where the required CBR of 15% has not been achieved at formation, the Contractor shall excavate and replace the defective material and make good the area as agreed with the Employer's Representative.
17. CBR Tests shall consist of a plate loading test in accordance with BS1377 Part 9 and the CBR value shall be calculated from the results of the 2nd loading cycle. The plate shall not be less than 450mm diameter but a 600mm plate maybe required depending on the material tested at each location. The Contractor shall provide a method statement including details of the equipment, reaction load and calculation of the CBR value for approval by the Employer's Representative.

APPENDIX 6/8: Topsoiling, Grass Seeding and Turfing

General

1. The maximum height of topsoil stockpiles shall be as per Clause 602.10, i.e. 2m.
2. The Contractor shall comply with the provisions of Clause 618.3.
3. All verges, side slopes and infill areas at rear of footway shall be topsoiled and seeded (Treatment 1) in accordance with Clause 618.4 (i) as indicated on the drawings.
4. Topsoiling shall be in grassed verges, rear of footway and landscaping areas as shown in drawings to the following thicknesses:
 - Earthworks slopes, verges and grass areas: 150mm thickness
 - Planting areas for trees, shrubs or hedges: 200mm thickness
5. In the event of a surplus of Class 5A topsoil arising from the site, the topsoil shall be retained within the site for the use by the Employer and placed at a location agreed with the Employer.
6. Where the existing ground has been disturbed by the Contractor, it shall be topsoiled and grassed as per the requirements of this Appendix.
7. Additional areas where Topsoiling and seeding is required are as identified on the Contract Drawings.

Groundworks Preparation

8. All grading operations on side slopes adjoining the road should be carried out so as to provide a rounded cross-sectional profile. The finished grading shall contain no localised depressions or mounds.
9. Subsoil cultivation shall be carried out with a subsoiler or ripper to depths depending upon soil texture and degree of compaction (min 450mm) and including any access route prior to topsoiling (where applicable).
10. After major grading has been carried out, topsoil shall be spread evenly on formation levels to depths recommended by the Employer's Representative.
11. Topsoil shall be good quality medium topsoil loam, easily moulded when moist. It must be neither too sticky nor leave a smooth polished surface when smeared. It shall be free from all chemical or other pollutants, without excessive proportions of stones or flints and those present must not exceed 50mm gauge. It must not include subsoil, excessive proportions of clay, sand, chalk or lime, nor may it contain rubbish or other extraneous material, pernicious weeds or couch grass whether roots or top-growth, or roots of trees or shrubs. In addition to the requirements of Table 6/1, Class 5A topsoil shall be free from propagules of aggressive and noxious weeds.

12. Topsoil shall be reduced to a fine tilth by stone raking or harrowing. All stones or other debris with any dimension greater than 25mm shall be collected and removed off site and any other remaining stones or debris shall not be upstanding more than 25mm. The topsoil shall then be lightly rolled and compacted to the thickness described in the Contract and shall remain 25mm - 50mm above all finished levels to allow for settlement.
13. Finish level of topsoil to be 50mm above the finish level of ironmongery, footpaths etc.
14. Tracked vehicles are prohibited from travelling on areas, which have been newly topsoiled.

Seeding

15. The Employer's Representative shall be given 5 working days notice in advance of the Contractor's intention to seed, in order that arrangements may be made for the Department of Agriculture Seed Labels on each bag to be checked by the Employer's Representative.
16. The seedbed shall be prepared by reducing to a fine tilth by raking or harrowing with a spike and chain harrow (light and uniform rolling). All stones larger than 25mm in any one dimension shall be removed. No seed shall be sown until the cultivation and preparatory work has been approved. Finished levels shall have fullness under moderate consolidation to 25mm - 50mm above paths, kerbs and manholes.
17. Prior to seeding, fertiliser consisting of an approved compound containing not less than 10% Nitrogen, 10% Phosphorous and 20% Potassium or similar composition shall be evenly distributed on the topsoil at a rate not less than 75g/m.
18. Sowing of grass seed shall be carried out during calm weather conditions by an even distribution using a blend of seed consisting of the following grasses; 60% Dwarf Perennial Ryegrass, 20% String Creeping Red Fescue, 15% Slender Creeping Red Fescue and 5% Highland Browntop Bent Grass. The Contractor shall arrange for sowing during periods August/October and/or March/April unless otherwise agreed.
19. Prior to the first cut, the landscape Contractor is to arrange for the hand picking of any stones greater than 25mm in any dimension which may arise on the surface as a result of settlement and the areas are to be rolled with a lightweight roller.

Maintenance

20. When grass is established between 40-75mm high, it should be topped with a rotary type mower to leave 25-50mm of growth to encourage tillering. Mowing machines used for this purpose shall be in a good state of repair, and evenly set with sharp blades to avoid laying or pulling young grass. If the sward is likely to be very heavy, the cuttings shall be removed.

21. The grass is to be maintained by the Contractor during the maintenance period to a height of 40mm and not greater than 70mm. Grassed areas shall be cleared of grass cuttings on completion of mowing operations.
22. No payment shall be made to the Contractor if the seed fails due to any cause whatsoever. The Contractor shall be required to repeat the seeding until a good sward is obtained. Grass areas shall only be accepted when germination has proved satisfactory and all weeds removed.

APPENDIX 6/9: Earthwork Environmental Bunds, Landscape Areas, Screening Mounds, Strengthened Embankments

Not used

APPENDIX 6/10: Ground Anchorages, Crib Walling and Gabions

Not used

APPENDIX 6/11: Swallow Holes and other Naturally Occurring Cavities and Disused Mine Workings

Not used

APPENDIX 6/12: Instrumentations and Monitoring

Not used

APPENDIX 6/13: Ground Improvement

Not used.

APPENDIX 6/14: Embedded Rock

Approval of rock sources

1. Prior to importing rock to the site, the contractor shall submit to the engineer for approval current test results from the proposed source demonstrating compliance with the specified criteria when tested in accordance in bs 812:1975 or bs 6345: part 1 1984 as appropriate. the engineer's approval of any proposed source of rock will be conditional not only upon the production of relevant test result certificates, but on a visit to the quarry source to examine, shape, size, weight and character of the proposed rock. Representative samples of each grade and weight of armour rock will be agreed and such reference rocks will be clearly marked and held on site to be a reference standard against which rocks from that same source will be judged for acceptance.
2. Only material from a source approved in writing by the engineer shall be used in the works of this contract and no rock shall be accepted from outside an approved quarry source. Such approval shall only be considered as conditional approval for any source or portion of a source and such approval may be withdrawn if the stone from the quarry or part of the quarry or other source does not conform to the requirements of this specification. Field rock will not be accepted.
3. The quality of the material at a source shall be uniform to such an extent that the necessary rate of delivery will not be adversely affected by testing and/or production delays.
4. Approval of a source of supply shall not be construed as relieving the contractor of his obligations to supply material in the finished works in conformity with the requirements of this specification and the contractor shall carry out all such testing, etc. as is necessary to ensure compliance therewith. The source of the rock shall be such as to ensure the provision of a uniform structure both in colour and appearance.

Acceptance and testing of material

5. After the engineer has given conditional acceptance of a source of supply, all material from that source shall be subject to quality control approved by the engineer or his representative at the source and/or at the site of the works. Any material, which, in the opinion of the engineer or his representative, does not conform to the requirements of this specification in regard to its proposed use, will be rejected and if necessary it shall be removed from the site without cost to the contract.
6. The frequency and nature of laboratory testing on the rock or other material samples shall be as directed by the engineer or his representative to ensure compliance of the materials with this specification. The actual number of tests will depend on the uniformity of the material strata in the sources selected by the contractor and the method of operations at the source.
7. The embedded rock shall comply with the following specification:

Diameter	150 – 300 mm
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Density of stone

8. All rock shall be quarried with a minimum saturated surface dry density of 2600kg/m³.

Suitability of materials

9. The engineer shall confirm the suitability of a material for a particular use in the works.
10. Materials which will be unsuitable are those containing; toxic chemicals or unstable toxic salts; frozen materials; excessive amounts of water; matter susceptible to spontaneous combustion; material containing excessive amounts of vegetable or organic matter, or any other deleterious matter which, in the opinion of the engineer will be detrimental to the works or the environment.

Quality of stone

11. Stone should be crushed and angular from strong inert rock, which shall exclude shale's and weak sandstone's.
12. All individual stones shall be dense, sound, durable rock, free from all cracks, joints and bedding planes, which could result in breakdown of the rock in a marine environment. It shall be capable of being handled and placed without fracture or damage. Individual pieces shall be prismoidal in shape and free from irregular rectangle angles. The aspect ratio between dimensions measured at right angles to one another shall not exceed 3.0.

Setting out of rock armour mound and placing tolerances

13. The Contractor's method of setting out shall be agreed with the Engineer, and as shown in the drawings. On the basis of the agreed setting out the placing tolerances shall be established as follows:-
- i) A placing trial at a suitable location will be implemented where rock is placed using the plant to be used in the main construction. The nature of the trial shall be agreed between the engineer or his representative and the Contractor. As a result of the trial, placing tolerances shall be agreed.
 - ii) In the event that agreement is not reached, the engineer shall have the final say on the acceptable tolerances.
 - iii) A repeat trial may be needed.
 - iv) The Contractor's method of setting out shall be such as to ensure construction of the scour protection to the foundation levels and rock profiles agreed with the engineer.

Placing of embedded rocks

14. Embedded rocks are to be placed in a systematic way such that the finished construction consists of a significant rock face that will act as scour protection to the adjacent embankment. the surface of the rock shall present a close packed uneven face to the watercourse to achieve maximum energy dissipation.
15. The method of placing the material is to be approved by the engineer' representative prior to commencement of work. Embedded rocks shall be individually placed so each rock is securely held by its neighbours. Rocks shall not be placed so that they obtain their stability on a plane by frictional resistance alone.
16. Rocks shall be lowered into place and not dropped. Particular care shall be taken not to puncture the filter fabric where such fabric is used.
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APPENDIX 7/1: Permitted Pavement Options

General

1. The pavements detailed in this appendix are only to be constructed at the locations shown on the Contract Drawings in accordance with the relevant Specification clauses and appendices.
2. The Contractor shall make good any pavement which is damaged alongside the installation of new kerb . This may require the provision of surface course and binder course as per the specification overleaf alongside newly laid kerbs.
3. Pavement edge details to be in accordance with CC-SCD-00701 or CC-SCD-00702 where appropriate.
4. Joints between the existing pavement and new construction shall be undertaken in accordance with the schematic transverse and longitudinal joint sections shown on CC-SCD-00703 and CC-SCD-00704 respectively.
5. Any existing surface course shall be thoroughly removed by cold milling or hand tools in accordance with Appendix 7/9 prior to the new surface course being laid.
6. The Contractor shall undertake a visual pavement condition survey of the existing binder course following planning in accordance with Clause 702.5 in advance of resurfacing.
7. The Contractor shall monitor the temperature of the materials during placement behind the paver screed at intervals coinciding with the initial discharge of each load of material, during the discharge and at the end of the load being discharged, to ensure continuity of the placement temperature.
8. All surfacing materials shall take account of the requirements of DN-PAV-03023 March 2015 - Surfacing Materials for New and Maintenance Construction, for Use in Ireland (including Amendment No. 1 dated June 2015, and Amendment No. 2, dated January 2016)

SHEET 1 – PAVEMENT TYPE – Full Road Build-Up

1	Location: As shown on the 0100, 0700 Series Drawings	General Requirement
2	Grid for checking surface levels of pavement courses, if different from the requirements of Cl. 702.4: Long dim: Trans dim:	N/A N/A
3	Category of Road Surface regularity (Cl. 702.7 and Cl. 702.8): Longitudinal Regularity: Transverse Regularity:	A Yes 20m
4	Requirements for coarse aggregates – Polished Stone Value (PSV), Aggregate Abrasion Value (AAV) (CC-SPW-00900, Cl. 3.2.2, 5.2.2, 6.2.2, 8.4.1.1, 8.6.1.1):	Minimum PSV = 65 Maximum AAV = 10
5	Requirements for pre-coated chippings – Polished Stone Value (PSV) for general use mixtures, PSV for mixtures for roundabouts, Aggregate Abrasion Value (AAV) (CC-SPW-00900, Cl. 4.2.4):	N/A
6	Requirement for the friction after polishing test (DN-PAV-03074, Cl. 2.26):	No
7	Freezing and thawing (soundness) category if different from the requirements (CC-SPW-00900, Tables 1, 4, 7, 10 and 17):	N/A
8	Compaction control and extraction of cores if different from the requirements (CC-SPW-00900, Cl. 10.1.9, 10.1.9.1, 10.1.9.2, 10.1.9.3, 10.1.9.4):	N/A
9	Sealant to be applied to the whole of any freestanding edge on the outside of the finished pavement on the low side of the camber (CC-SPW-00900, Cl. 10.1.8):	Yes
10	Any tests additional to those required by IS EN 13108–20, IS EN 13108–21 or the relevant SRW (CC-SPW-00900, Cl. 1.2, 1.3):	N/A
11	Whether sub-base material may be spread in more than one layer (Cl 802.4).	Yes

Permitted Pavement Type– Full Road Build-Up				
Pavement Course	Clause (Series 900)	Mixture Designation / Material	Thickness (mm)	Particular Requirements
Surface Course	4.1.3	HRA 30/14F SURF 40/60 DES IN ACCORDANCE WITH TII CC- SPW-00900 CL. 4.1.3	40mm	Resistance to polishing of chippings shall be minimum PSV = 65 Resistance to abrasion of chippings shall be maximum AAV = 14
Binder Course	3.1.4	AC 20 dense bin 40/60 des	Varies	Nominal Size: 0/20mm Minimum thickness 50mm Maximum thickness 55mm
Protection to waterproofing	N/A	IS EN 13108-4 recipe type F wearing course mixture designation 0/2	20mm	
Total Pavement Thickness (excluding sub-base and capping)			115mm	Average

SHEET 2 - PAVEMENT TYPE – Road Inlay

1	Location: As shown on the 0100, 0700 Series Drawings	General Requirement
2	Grid for checking surface levels of pavement courses, if different from the requirements of Cl. 702.4: Long dim: Trans dim:	N/A N/A
3	Category of Road Surface regularity (Cl. 702.7 and Cl. 702.8): Longitudinal Regularity: Transverse Regularity:	A Yes 20m
4	Requirements for coarse aggregates – Polished Stone Value (PSV), Aggregate Abrasion Value (AAV) (CC-SPW-00900, Cl. 3.2.2, 5.2.2, 6.2.2, 8.4.1.1, 8.6.1.1):	Minimum PSV = 65 Maximum AAV = 10
5	Requirements for pre-coated chippings – Polished Stone Value (PSV) for general use mixtures, PSV for mixtures for roundabouts, Aggregate Abrasion Value (AAV) (CC-SPW-00900, Cl. 4.2.4):	N/A
6	Requirement for the friction after polishing test (DN-PAV-03074, Cl. 2.26):	No
7	Freezing and thawing (soundness) category if different from the requirements (CC-SPW-00900, Tables 1, 4, 7, 10 and 17):	N/A
8	Compaction control and extraction of cores if different from the requirements (CC-SPW-00900, Cl. 10.1.9, 10.1.9.1, 10.1.9.2, 10.1.9.3, 10.1.9.4):	N/A
9	Sealant to be applied to the whole of any freestanding edge on the outside of the finished pavement on the low side of the camber (CC-SPW-00900, Cl. 10.1.8):	Yes
10	Any tests additional to those required by IS EN 13108–20, IS EN 13108–21 or the relevant SRW (CC-SPW-00900, Cl. 1.2, 1.3):	N/A
11	Whether sub-base material may be spread in more than one layer (Cl 802.4).	Yes

Permitted Pavement Type– Road Inlay				
Pavement Course	Clause (Series 900)	Mixture Designation / Material	Thickness (mm)	Particular Requirements
Surface Course	4.1.3	HRA 30/14F SURF 40/60 DES IN ACCORDANCE WITH TII CC-SPW-00900 CL. 4.1.3	40mm	Resistance to polishing of chippings shall be minimum PSV = 65 Resistance to abrasion of chippings shall be maximum AAV = 14
Regulating Course	3.1.4	AC 20 dense Bin 40/60 des	Varies	Maximum 40mm Minimum 25mm
Total Pavement Thickness (excluding sub-base and capping)			Varies	Maximum 80mm Minimum 65mm

APPENDIX 7/2: Excavation and Reinstatement of Existing Surfaces

General

1. Refer to the drainage and utilities contract drawings for the locations of any trenches which are to be excavated in existing paved surfaces.
2. No excavation will be permitted within the proposed carriageway following completion of the surface course.
3. Reinstatement of trenches in existing carriageways necessitated during the course of the works shall comply with CC-SCD-00705 (Bituminous) of the TII Standard Details and “Guidelines for Managing Openings in Public Roads – Guidelines for the Openings, Backfilling and Reinstatement of Openings in Public Roads, Second Edition (Rev 1), April 2017”.
4. Pavement edge shall be finished as per CC-SCD-00702 (in-situ kerb) of the TII Standard Details where kerbs are used and as per CC-SCD-00701 (Pavement Type 1) of the TII Standard Details at all other locations.
5. Transverse joints between the existing pavement and the new pavement shall be constructed as per CC-SCD-00703 of the TII Standard Details.
6. Longitudinal joints between the existing pavement and the new pavement shall be constructed as per CC-SCD-00704 of the TII Standard Details.

Temporary Trench Reinstatements

7. Trenches which are to be excavated in the existing carriageway or temporary pavement, for the laying of drainage or service ducts, as required during the works shall be reinstated in accordance with the Specification and the following requirements:
 - Prior to excavation, the sides of the trenches are to be marked out and any bituminous bound pavement cut with a saw;
 - Existing pavement shall be broken out with reasonable care and attention not to damage the existing pavement being retained alongside;
 - The temporary re-instatement of these trenches, once the service has been laid, will consist of ST2 mix concrete backfilling to within 50mm of the existing surface;
 - Immediately prior to the laying of the surface course material, as stated in section 3 above, the edges of the existing pavement shall be cleaned of all loose material and coated with an appropriate hot bituminous binder;
 - The final 50mm is to be finished with close graded Asphalt Concrete Surface Course to Clause 3.1.9;
 - The joint formed between the reinstated pavement and the existing pavement shall also be sealed with an appropriate hot bituminous binder;
 - The requirements of Specification Clause 706.3 and 706.9 shall also apply;
 - The use of delay set bituminous material will not be permitted.

APPENDIX 7/3: Surface Dressing

Not used

APPENDIX 7/4: Bond Coats Tack coats and Other Bituminous Sprays

1. Surface preparation of the milled surface shall comply with SRW Series 900, Clause 10.1.4.
2. A bond coat shall be sprayed onto the surface before placing each layer in accordance with SRW Series 900, Clause 10.1.4.
3. Bond coats and other bituminous sprays shall comply with the requirements of Clause 10.1.4. A bond coat shall be sprayed onto all surfaces immediately prior to the placing of inlays/overlays and regulating material over the full extent of the works and where bituminous surfaces are left exposed for more than 4 weeks.
4. Before spraying is commenced, the surface shall be prepared in accordance with Clause 10.1.4. All surfaces (except new pavement layers) shall be mechanically suction swept before application of bond coat.
5. It is the responsibility of the Contractor to keep the new pavement areas free of traffic or dirt. If new pavement layers have been trafficked or soiled prior to overlaying, it shall be the responsibility of the Contractor to have the surface thoroughly clean (including mechanically suction swept) and sprayed at his own expense.

APPENDIX 7/5: Road Pavements: TII Standard Construction Details

1. The following TII standard construction details are included in the works.

SCD Drawing Number	SCD Drawing Name
CC-SCD-00703	Transverse Joint Between New Construction and Existing Road
CC-SCD-00704	Longitudinal Joint Between New Construction and Existing Road

APPENDIX 7/6: Breaking Up of Perforation of Existing Pavement

1. Breaking up pavement may be required for the construction of the works as shown on the Contract Drawings.
2. The Contractor shall carry out the breaking up of redundant pavement in accordance with the Safety, Health and Welfare at Work Regulations and the Works Requirements. It is the responsibility of the Contractor to ensure that breaking up of the pavement is carried out in such a manner that will not damage other service or utility works including drainage system etc. that are to be retained or will form part of the new works.
3. Adequate precaution shall be taken to ensure that breaking of the existing pavement does not exceed the specified boundaries that form part of the existing pavement. Areas of the pavement to be broken shall be delineated both longitudinal and transversely by saw cutting prior to breaking up.
4. Where the Employers Representative agrees that existing carriageway to be built over can be left in place, the existing carriageway is to be punctured to its full depth and at centres no greater than a 0.5m radius.

APPENDIX 7/7: Not used

Not used

APPENDIX 7/8: Not used

Not used

APPENDIX 7/9: Cold Milling (Planing) of Bituminous Bound Flexible Pavement

1. The Contractor shall choose whether to profile plane or constant depth plane, in order to achieve the pavement design specified in Appendix 7/1 and the area shown on the 700 series drawings.
2. Cold milling shall comply with CC-SPW-00900, Clause 2.1.
3. In accordance with CC-SPW-00900, Clause 10.1.1.1, the Contractor shall carry out a sweep of the area to locate any buried metalwork within the area to be cold-milled.

Schedule: Sweeping Areas Prior to Cold-milling	
Drawing No.	Location
Areas identified as to be overlaid in Series 0700 Drawings	All locations where milling of existing pavement is indicated or where required to comply with CC-SCD-00703 and CC-SCD-00704.

APPENDIX 7/10: Microsurfacing

Not used

APPENDIX 7/11: High Friction Surfacing

High Friction Surfacing

Darck grey Coloured Calcined Bauxite Anti-Skid surfacing shall be applied to both drainage channels along the edge of the carriageway for the full length of the bridge or as otherwise specified by the Employers Representative. Surfacing shall comply with Clause 924 of the NRA Specification for Roadworks and shall be installed fully in accordance with manufacturer's instructions. The Calcined Bauxite Aggregate shall have a PSV of not less than 65 and the texture depth of the installed surfacing shall not be less than 1.5mm.

SHEET 1: Information to be provided by the Purchaser

	Type HF1
1 Location [NRA HD 300 Clause 5.31 (i)]	As drawings
2 Traffic Volume. [NRA HD 300 Clause 5.31 (ii) – cv/lane/day]	100cv/lane/day
3 Site Category and Investigatory Level. [NRA HD 300 Clause 5.31 (iii)]	K Approaches to traffic signals, pedestrian crossings IL0.5
4 Description of existing surface. [NRA HD 300 Clause 5.31 (iv)]	Existing concrete Surface
5 Pre-treatment. [NRA HD 300 Clause 5.31 (v) – responsibility, type, design, process]	None
6 Length of application if greater than 50m [NRA HD 300 Clause 5.31 (vi)]	200m
7 Type of binder – if different from Series 900 [Series 900 Clause 7.3.2.1 and NRA HD 300 Clause 5.31 (vii)]	As Series 900
8 Minimum declared PSV of chippings – if different from Series 900 requirements. [Series 900 Clause 7.3.2.2, Table 23a	As Series 900
9 Maximum AAV of chippings – if different from Series 900 requirements. [Series 900 Clause 7.3.2.2, Table 23a and Table 23b, and NRA HD 300 Clause 5.31 (viii)]	As Series 900
10 Design Working Life. [Series 900 Clause 10.2.4.7, NRA HD 300 Clause 5.31 (ix) – normally 5 years]	5 years
11 Macrotexture [Series 900 Clause 7.3.3.2 and HD 300 Clause 5.31(x)]	≥0.5 for individual measurement and ≥ 0.8 mean
12 Level of fatting up (% area affected – P1) acceptable [Series 900 Clause 7.3.3.1 and HD 300 Clause 5.31 (xi)]	As HD300 Table 5.2
13 Level of delamination (% area affected – P2) acceptable [Series 900 Clause 7.3.3.1 and HD 300 Clause 5.31 (xi)]	As HD300 Table 5.2
14 Level of fretting (% area affected – P3) acceptable [Series 900 Clause 7.3.3.1 and HD 300 Clause 5.31 (xi)]	As HD300 Table 5.2
15 Level of grinning (% area affected – P4) acceptable [Series 900 Clause 7.3.3.1 and HD 300 Clause 5.31 (xi)]	As HD300 Table 5.2
16 Pull Off test frequency - after curing and at 1 year where applicable [NRA HD 300 Clause 5.31(xii)]	1 per 50m

SHEET 2: Information to be provided by the Contractor

1. A copy of IS EN ISO 9001 certificate showing at least the name of the Producer, the name of the certification body and the reference number and date of the certificate. A copy of the relevant part of the Producer's Quality Assurance (QA) document showing the appropriate scope (high friction surfacing) and the quality management scheme described in Appendix A and limitations of the certification. The Purchaser will wish to inspect all or any of the Producer's QA documentation as part of the vendor assessment system and may wish to satisfy itself on the nature of the QA systems of the Producer's material suppliers.
2. Declaration of the Design Working Life.
3. Proposed binder and bond coat together along with any weather requirements specified by the binder manufacturer. [Series 900 Clause 7.3.1, 7.3.2.1, Appendix 7/11 sheet 1]
4. Proposed source of manufactured and/or natural aggregate(s), together with associated DoP and CE Marking, along with statement of properties including type, target grading, particle angularity, particle density, resistance to freezing and thawing – water absorption, PSV and AAV. [Series 900 Clause 7.3.2.2, Table 23a and Table 23b, Appendix 7/11 sheet 1]
5. A works proposal for each site or group of similar sites detailing the proposed method of executing the Works in accordance with the Specification. [Series 900 Clause 10.2.4.1] [The Producer will be expected to commit enough resources to carry out the proposed design; the type and age of the high friction surfacing should be detailed]
6. Proposals for reaction times for carrying out remedial measures where required, sweeping and site visits for monitoring purposes. [Series 900 Clause 10.2.4.7]
7. Contingency plans in the event of any breakdown of plant or failure of the high friction surfacing. [Series 900 Clause 10.2.4.7]
8. A prTAIT certificate with a statement of any previous applications on roads with similar characteristics and traffic category to that to be treated in the Contract, containing the data as specified. [Series 900 Clauses 7.3, 7.3.3, 7.3.4 and Appendix 7/11 sheet 3]
9. A statement of relevant experience and expertise, naming managers, supervisors and teams responsible for and allocated to the Contract.
10. For the performance specification, the results of any other tests or other data the Producer considers relevant. [Series 900 Clauses 7.3.3, 10.2.4.6, and NRA HD 300 Clause 5.31 (xiii)]
11. Proposals for product/system storage at and transport to site [Series 900 Clause 10.2.4.3]
12. Weather requirements for installation of high friction surfacing and contingency plans in the event of any adverse weather impacting the application of high friction surfacing. [Series 900 Clause 10.2.4.4]
13. Proposals for time period between completion of works and opening to live traffic. [Series 900 Clause 10.2.4.7]

SHEET 3: prTAIT Certificate: Information to be provided by the Contractor

The Contractor shall provide the prTAIT Certificate containing at least the following information with his tender:

1. Company Name and Address:
2. QA reference number and certifying body:
3. prTAIT reference number:
4. Location of prTAIT (road number, start and end points):
5. prTAIT family [NRA HD 301 Table 2C.1]:
6. Date of prTAIT:
7. Name of Notified Body which has certified the high friction surfacing product/system:
8. Proprietary Name (if applicable):
9. Description of product/system (method of application, binder type, aggregate grade, etc. For hot screeded thermoplastic, include measured indirect tensile strength):
10. Design procedure or method:
11. Storage and transportation requirements:
12. Rate and tolerance of spread of both binder and aggregate:
13. Macrottexture depth after eleven months and before thirteen months (as measured):
14. Visual assessment results after eleven months and before thirteen months:
15. Colour retention (if applicable):
16. Other optional claims as declared by the Producer (e.g. reduced tyre-road noise emission, ability to accommodate a variable substrate, skid resistance if greater than PSV and macrottexture would indicate, etc.)
17. Period for which the performance characteristics have been retained:
18. Time period between completion of works and opening to live traffic [Series 900 Clause 10.2.4.7]:
19. Constraints on application for the particular product/system:
 - a. Time of year:
 - b. Temperature (minimum/maximum, road/ambient):
 - c. Weather:
 - d. Variability of existing surface hardness or type:
 - e. Other as declared by the Producer:
20. Name and signature of company representative responsible for the prTAIT

APPENDIX 7/12: Low Energy Bound Mixtures

Not used

APPENDIX 7/13: Recipe Surface Dressing

Not used

APPENDIX 11/1: Kerbs, Footways and Paved Areas

General

1. The extents of all kerbing, footways, and paved areas are shown on the drawings.
2. All kerbing works shall be in accordance with the details shown on the Contract Drawings. The upstands of the kerbs shall comply with the requirements as shown on the drawing and details contained within the Contract Drawings.

Precast Kerbs

3. Prefabricated kerbs, channels, edgings and quadrants sizes are to be in accordance with the works requirement drawings.
4. Prefabricated concrete kerbs are to be in accordance with Clause 1101 of the TII specification for Roadworks.

In-Situ Concrete Kerbs

5. Kerbs shall be in situ concrete, grade C40/50, as detailed in CC-SCD-01102 unless otherwise specified.
6. The standard in situ concrete kerb height is flush with road level (0mm upstand) on the drawings.
7. Generally, in-situ concrete kerbs shall be extruded, constituted to the dimensions shown on the drawings where radius is $> 5\text{m}$. Where the kerb radius is $< 5\text{m}$, or where special treatment such as bevelling is required, the kerbs shall be shuttered in-situ to the same dimensions.
8. The use of precast concrete kerbs shall not be utilised unless otherwise agreed in writing with the Employer's Representative.

SHEET 1 – PAVEMENT TYPE – Footway

1	Location: As shown on the 0100, 0700 Series Drawings	General Requirement
2	Grid for checking surface levels of pavement courses, if different from the requirements of Cl. 702.4: Long dim: Trans dim:	N/A N/A
3	Category of Road Surface regularity (Cl. 702.7 and Cl. 702.8): Longitudinal Regularity: Transverse Regularity:	A Yes 20m
4	Requirements for coarse aggregates – Polished Stone Value (PSV), Aggregate Abrasion Value (AAV) (CC-SPW-00900, Cl. 3.2.2, 5.2.2, 6.2.2, 8.4.1.1, 8.6.1.1):	Minimum PSV = 65 Maximum AAV = 10
5	Requirements for pre-coated chippings – Polished Stone Value (PSV) for general use mixtures, PSV for mixtures for roundabouts, Aggregate Abrasion Value (AAV) (CC-SPW-00900, Cl. 4.2.4):	N/A
6	Requirement for the friction after polishing test (DN-PAV-03074, Cl. 2.26):	No
7	Freezing and thawing (soundness) category if different from the requirements (CC-SPW-00900, Tables 1, 4, 7, 10 and 17):	N/A
8	Compaction control and extraction of cores if different from the requirements (CC-SPW-00900, Cl. 10.1.9, 10.1.9.1, 10.1.9.2, 10.1.9.3, 10.1.9.4):	N/A
9	Sealant to be applied to the whole of any freestanding edge on the outside of the finished pavement on the low side of the camber (CC-SPW-00900, Cl. 10.1.8):	Yes
10	Any tests additional to those required by IS EN 13108–20, IS EN 13108–21 or the relevant SRW (CC-SPW-00900, Cl. 1.2, 1.3):	N/A
11	Whether sub-base material may be spread in more than one layer (Cl 802.4).	Yes

Permitted Pavement Type– Footway				
Pavement Course	Clause (Series 900)	Mixture Designation / Material	Thickness (mm)	Particular Requirements
Surface Course	4.1.3	HRA 30/14F SURF 40/60 DES IN ACCORDANCE WITH TII CC-SPW-00900 CL. 4.1.3	75mm	Resistance to polishing of chippings shall be minimum PSV = 65 Resistance to abrasion of chippings shall be maximum AAV = 14
Protection to waterproofing	N/A	IS EN 13108-4 recipe type F wearing course mixture designation 0/2	20mm	
Total Pavement Thickness (excluding sub-base and capping)			Varies	Maximum 80mm Minimum 65mm

APPENDIX 11/2: Access Steps

Not used.

APPENDIX 11/3: Kerbs, Footways and Paved Areas: TII Standard Construction Details

1. Refer to Appendix 0/4 and see <https://www.tiipublications.ie/downloads/SCD/Series-1100-SCDs-compiled-set.pdf>

APPENDIX 12/1: Traffic Signs: General

Temporary Traffic Signs

1. All temporary signs for road works shall comply with Chapter 8 – “Temporary Traffic Measures and Signs for Roadworks” of the Traffic Signs Manual (2010) as published by the Department of Transport.
2. Verges shall be levelled and vegetation trimmed or cleared to accommodate all temporary signs in an upright position and to achieve satisfactory visibility as required by the Traffic Signs Manual (2010). The Contractor shall maintain the verge accordingly for the duration of the temporary sign installations. Clearance of vegetation shall be kept to a minimum necessary to achieve the satisfactory visibility.
3. The Contractor shall be responsible for covering (in a manner accepted by the Employer’s Representative) and uncovering any existing signs which become inaccurate or misleading as a result of the introduction of any Traffic Management System. The material used to cover the signs shall be opaque. Hessian shall not be used for this purpose.
4. Where existing signage is in the way of the proposed works, these signs should stay in place for as long as possible to give time for new bases to be constructed. If this is not possible, temporary signage will need to be provided. This should be agreed with the Employer’s Representative before work commences.
5. Verges shall be levelled and vegetation trimmed or cleared to accommodate all re-erected signage in an upright position and to achieve satisfactory visibility. Clearance of vegetation shall be kept to a minimum necessary to achieve a satisfactory visibility.

APPENDIX 12/2: Traffic Signs: Reflective Markers

Not used

APPENDIX 12/3: Traffic Signs: Road Markings and Studs

Permanent Road Markings and Road Studs

1. All road markings and road studs shall conform in all respects with the Department of Transport's Traffic Signs Manual (2019).
2. The locations of road markings and road studs are shown on the Drawings.

Permanent Road Markings

3. For the application of road markings, the quality of the material and the workmanship shall comply with all relevant European Standards including, but not limited to:
 - (i) EN 1436: Road Marking Materials – Road Marking Performance for Road Users
 - (ii) EN 1423: Road Marking Materials – Drops on Materials: Glass Beads, Antiskid Aggregates, and Mixtures of the Two
 - (iii) EN 1424: Road Marking Materials – Premix Glass Beads
 - (iv) EN 1871: Road Marking Materials – Physical Properties
4. All carriageway markings shall be white or yellow as detailed, thermoplastic material reflectorised by the application of glass beads.
5. All thermoplastic markings shall be screed applied, or as agreed by the Employer's Representative.
6. The Contractor shall apply thermoplastic markings, either white or yellow, to the following thicknesses:
 - (i) The thickness of application shall be $4.25 \pm 0.25\text{mm}$ on road surfacing where the average texture depth is greater than or equal to 1.5mm.
 - (ii) The thickness of application shall be $2.75 \pm 0.25\text{mm}$ on road surfacing where the average texture depth is less than 1.5mm and on recovery work where the thickness of the existing marking is less than 1mm.
 - (iii) The thickness of application shall be $1.75 \pm 0.25\text{mm}$ for temporary markings, for marking lightly trafficked areas, as designated in this appendix, and for recovery work where the thickness of the existing markings is 1.0mm or greater.

The Contractor shall lay the appropriate thickness of marking following consultation with and as approved by the Employer's Representative.

7. Marking thicknesses shall be measured by using a suitable micrometer gauge, or callipers on samples of markings laid on steel plates placed beneath the application machine during the laying operations. The thickness laid on the plate shall be representative of the thickness of material laid on the road.
8. All markings shall be reflectorised by the application of glass beads to the surface of the marking material. Solid glass beads 400g/m² to 500 g/m² from the machine, shall be applied by pressure concurrently with the laying of the line with sufficient velocity to ensure retention in the surface of the line. The solid glass beads so sprayed shall give uniform cover and immediate reflectivity over the whole surface of the marking. On screed applied markings where pressure application is not practicable, gravity application will be permitted.
9. The Contractor shall note that the above mentioned solid glass beads which are to be applied to the surface of the markings are in addition to the minimum solid glass bead content specified for incorporation within the body of the mix for reflectorised markings.
10. If in the opinion of the Employer's Representative a tack coat is necessary to promote better adhesion, the Contractor shall apply a 50/50 blend of 70 pen. bitumen in a volatile solvent such as dichloromethane applied with a brush, roller or portable sprayer and spread at about 14 square metres to the litre. The solvent shall be allowed to evaporate before the thermoplastic is applied.
11. The Contractor shall not carry out any work when the weather conditions or the road conditions (e.g. dampness, dust, cold) are such that the quality of the work might be adversely affected. In particular, application of markings shall not be carried out when the road temperature is less than 5°C. Where the Employer's Representative is of the opinion that such adverse conditions exist, he/she may instruct the Contractor to suspend the work, but this shall not relieve the Contractor of the obligation to suspend the work where such adverse weather conditions or road conditions exist.
12. The Contractor shall ensure that the horizontal alignment of the applied marking is to the satisfaction of the Employer's Representative in respect of straightness of line and smoothness of curvature.
13. The Contractor shall supply to the Employer's Representative, certification that the materials and the method of application of markings to the road which the Contractor proposes to use, conforms to this specification. For this purpose the Contractor shall obtain from Transport Infrastructure Ireland or another approved agency, a report containing:
 - (i) The certified analysis, from a laboratory with current ISO Certificate, of each grade of thermoplastic material intended for use.

- (ii) The results of an examination of the application equipment the Contractor proposes to use, undertaken by a Company approved by Transport Infrastructure Ireland.
 - (iii) Certification that a minimum skid resistance of 55 (BPN) as measured by the British Portable Pendulum shall be achieved where required.
- 14. The submitted Report shall relate to certification carried out within the previous six months. Any subsequent change in the source of thermoplastic material or the method of application shall be certified as acceptable by Transport Infrastructure Ireland or another approved agency before use.
 - 15. Edge markings of cross-hatching are to be provided with 10mm - 25mm drainage gaps at 4m intervals.
 - 16. The continuous edge markings shall be provided with 10mm - 25mm drainage gaps at 20m intervals.
 - 17. All direction arrows and lettering shall have a skid resistance level of 55BPN.

Application of Thermoplastic Road Markings

- 18. The quality of the material and the workmanship shall comply with the requirements of BS 3262, Parts 1 and 3; Hot-Applied Thermoplastic road marking materials, together with all amendments to that specification, except where the following requirements differ from that standard.
- 19. The Contractor shall apply the markings, both white and yellow to the following thicknesses:
- 20. The thickness of application shall be $4 \pm 0.5\text{mm}$ on road surfacing whose average texture depth is greater than or equal to 1.5mm.

Testing

- 21. The thickness shall be measured by using a suitable micrometer gauge, or callipers on samples of markings laid on steel plates placed beneath the application machine during the laying operations. The thickness laid on the plate shall be representative of the thickness of material laid on the road.

Material

- 22. The Contractor shall lay the appropriate thickness of marking following consultation with and as approved by the Employer's Representative. All markings shall be reflectorised by the application of glass beads to the surface of the marking material. Solid glass beads 400g/m² to 500 g/m² from the machine, shall be applied by pressure concurrently with the laying of

the line with sufficient velocity to ensure retention in the surface of the line. The solid glass beads so sprayed shall give uniform cover and immediate reflectivity over the whole surface of the marking. (On screed applied markings where pressure application is not practicable, gravity application will be permitted).

23. The Contractor shall note that the above mentioned solid glass beads which are to be applied to the surface of the markings are in addition to the minimum solid glass bead content specified in Table 1 of BS 3262 for incorporation within the body of the mix for reflectorised markings.

Tack Coat

24. If in the opinion of the Employer's Representative a tack coat is necessary to promote better adhesion, the Contractor shall apply a 50/50 blend of 70 pen. bitumen in a volatile solvent such as dichloromethane applied with a brush, roller or portable sprayer and spread at about 14 square metres to the litre. The solvent shall be allowed to evaporate before the thermoplastic is applied.

Weather Conditions

25. The Contractor shall not carry out any work when the weather conditions or the road conditions (e.g. dampness, dust, cold) are such that the quality of the work might be adversely affected. In particular, application of markings shall not be carried out when the road temperature is less than 5°C. Where the Employer's Representative is of the opinion that such adverse conditions exist, he/she may instruct the Contractor to suspend the work, but this shall not relieve the Contractor of the obligation to suspend the work where such adverse weather conditions or road conditions exist.

Alignment

26. The Contractor shall ensure that the horizontal alignment of the applied marking is to the satisfaction of the Employer's Representative in respect of straightness of line and smoothness of curvature.

Certification

27. The Contractor shall supply to the Employer's Representative, certification that the materials and the method of application of markings to the road which the Contractor proposes to use, conforms to this specification. For this purpose the Contractor shall obtain from The Environmental Research Unit or another approved agency, a report containing:
 - (i) a minimum skid resistance of 55 (BPN) as measured by the British Portable Pendulum shall be achieved where large areas of the road surface are covered with road workings and

braking is likely to occur

- (ii) certified analysis of each grade of thermoplastic material
- (iii) the results of an examination of the application equipment the Contractor proposes to use.

- 28. The submitted Report shall relate to certification carried out within the previous six months. Any subsequent change in the source of thermoplastic material or the method of application shall be certified as acceptable by The Environmental Research Unit or another approved agency before use.
- 29. The methods of testing shall be in accordance with British Standard 3262 unless otherwise agreed with the Employer's Representative.

Temporary Road Markings

- 30. Temporary white lines and other road markings laid on the permanent works carriageways shall only be used if approved by the Employer's Representative.
- 31. Temporary road markings shall be reflectorised and laid in accordance with this appendix.
- 32. Prefabricated materials will be acceptable for temporary lane lines but should not be used for lane arrows.

Removal or Concealment of Road Markings

- 33. Permanent Obliteration: Existing road markings to be permanently obliterated may be removed by sand blasting, scabbling, water jetting or by another approved method agreed with the Employer's Representative. The use of a thermal lance to burn off road markings shall only be permitted subject to the approval of the Employer's Representative. Obliteration of road markings using either bituminous or black paint is not permitted.
- 34. Temporary Obliteration: Where existing road markings are to be temporarily obliterated for traffic management or any other purpose, existing road markings shall be marked with similar approved black material or other colour as directed by the Employer's Representative, which shall be able to withstand the traffic load upon it for the required period. Upon removal of the black material or similar approved covering, the original markings are to be upgraded to the standard apparent before the temporary obliteration.

Performance Requirements

- 35. All Road Markings provided under the contract shall be thermoplastic materials complying with the following performance requirements of IS EN1436:2007+A1:2008. The application of preformed road markings is not permitted save with the express written approval of the Employers Representative.

- (i) Luminance: White Material Class $\square 4$: $\square \geq 50$ (Texture depth < 2mm) White Material Class B3: $\square \geq 40$ (Texture depth ≥ 2 mm) Yellow Material. Class B2: ≥ 30
- (ii) Retroreflectivity: White Material Class R2: $RL \geq 100$ Yellow Material. Class R1: $RL \geq 80$
- (iii) Skid Resistance: White Material Class S2: $SRT \geq 50$ Yellow Material. Class S2: $SRT \geq 50$
- (iv) Durability: In any 100m length of road marking (continuous or broken line) at least 90 per cent of the marked area shall contain a uniform coating of marking material through which the underlying surfacing has not penetrated. Discontinuities over the full width of line, due to wear, shall not be accepted in continuous lines. At least 75 per cent of each marked segment of a broken line shall remain intact.
- (v) Chromaticity: The colour of White material shall fall within the boundaries of the four sided figure as defined by the 'x' & 'y' coordinates of four corner points on the Chromaticity chart as set out below. The colour of Yellow material shall fall within the boundaries of the figure as defined by the 'x' & 'y' coordinates of the points on the Chromaticity chart as set out below.

The corner points of chromaticity regions on the CIE chromaticity diagram for white and yellow road markings shall be as set out below:

Colour		1	2	3	4
White	x	0.355	0.305	0.285	0.335
	y	0.355	0.305	0.325	0.375
Yellow	x	0.443	0.545	0.465	0.389
	y	0.399	0.455	0.535	0.431

Dimensions, Tolerances & Alignment

36. Road markings (lines, letters and symbols) shall be of the form and to the dimensions specified in the Road Traffic (Signs) Regulations and in the "Traffic Signs Manual 2019" [TSM] unless otherwise specified in the contract or by the Employers Representative. Where alternative dimensions are provided for in the Regulations and/or TSM these shall be specified in the contract or shall be as directed by the Employers Representative.

The dimensions of installed lines and markings shall meet the following tolerances:-

- (1) Line Width : Specified width +10% to -5%
- (2) Line Thickness : Minimum 2.5mm (maximum thickness shall not exceed 5mm in any case).
- (3) Line Length: (Segments up to 4m long) The average of any 10 consecutive

segments shall be between + or - 50mm of the specified length and no one segment within that 10 shall be less than the specified length by more than 75mm. Quantities for payment will make no allowance for any extra lengths. Where lengths fall short of the specified length removal and reinstatement of the markings will be required.

- (4) On newly constructed roads being marked for the first time, the lateral placing of the markings shall be within tolerances of $\pm 15\text{mm}$ of the design position as set out by the Contractor or as described in the scheme drawings.

37. The Contractor shall ensure that the horizontal alignment of the applied marking is to the requirements of the Employers Representative in respect of straightness of line and smoothness of curvature. The Contractor must, in advance of commencing performance of the contract, satisfy the Employers Representative as to his capability of carrying out the work to the preceding requirements.
38. Notwithstanding the requirements and tolerances in the specifications for line dimensions, the phenomenon of an excess flow or 'fishtailing' of material at the point where lines, particularly extruded lines, commence or terminate is undesirable. (This is more likely to occur in the laying of broken yellow or white lines). Where such phenomenon is identified, particularly where repetitive it shall be deemed not to comply with this specification and the Employers Representative may, at his sole discretion, reject such work. Excess spray and spray drift particularly where repetitive shall be treated similarly. The lines shall be laid in a smooth flowing alignment. Visible interruptions shall not be accepted. Line edges shall be clearly defined.

Performance Warranty

39. The Contractor warrants that all road markings laid under this contract shall meet the performance standards for Durability, Retroreflectivity, Luminance, Chromaticity and Skid Resistance of this specification for a minimum period of 2 years and the Contractor shall make good any deficiencies, which arise in that period at its sole expense. This requirement applies in addition to any general Period of Warranty stated in the Appendix to the Conditions of Contract.

Minimum Line Thickness

40. Notwithstanding the performance requirements of this specification the minimum thickness of markings laid under this contract shall be 2.5mm. This is a minimum value only and does not relieve the Contractor from any of its obligations under the contract. The Contractor shall be deemed to have visited the site of the works and made all tests and investigations of the road surfaces on site necessary to meet this requirement and to have fully included

for same in its tendered rates.

Drainage Gaps

41. At all continuous road markings and hatched areas gaps of 15-25mm shall be provided where required (and at a minimum of 15m intervals) to allow for the drainage of the pavement or road carriageway and to prevent water ponding on the road surface.

Reflectorisation

42. Unless otherwise directed by the Employers Representative, all markings shall be reflectorised by the application of glass beads to the surface of the marking material. In the case of reflectorised thermoplastic markings solid glass beads, 400g/m² to 500g/m², shall be applied by pressure concurrently with the laying of the line with sufficient velocity to ensure retention in the surface of the line. The solid glass beads so sprayed shall give uniform cover and immediate reflectivity over the whole surface of the marking. (On screed-applied markings where pressure application is not practicable, gravity application will be permitted). The solid glass beads, which are to be applied to the surface of the markings, are in addition to the minimum solid glass bead content specified for incorporation within the body of the mix for reflectorised markings.

Installation

43. It shall be permissible to apply a Tack Coat to promote better adhesion of the markings. This may particularly be the case in overlaying existing thermoplastic material with new material. The Tack Coat should be laid to the same width as the line being laid in so far as practicable. The application of a tack coat and its type shall be agreed with the Employers Representative in advance.
44. The Contractor shall not carry out any work when the weather conditions or the road conditions (e.g. dampness, dust, cold) are such that the quality of the work might be adversely affected. In particular, application of markings shall not be carried out when the road temperature is less than 5 degrees Celsius. When the Employers Representative is of the opinion that such adverse conditions exist, he/she may instruct the Contractor to suspend the work, but this shall not relieve the Contractor of its obligation to suspend the work in the first place where such adverse weather conditions or road conditions exist.
45. Prior to laying any markings the Contractor shall consult with the Employers Representative and agree full details of the work to be carried out and the hours/sequence of operations. The Contractor and Employers Representative (or its representative) shall meet on site to pre-mark line/symbol locations and to confirm details prior to installation,

e.g. whether lines are continuous or broken, length of line marks and gaps for broken lines, design and dimensions of arrows, letters or symbols; marking thicknesses; and

Method(s) of application.

46. The Contractor shall also agree with the Employers Representative on site at pre-marking stage, whether the road and weather conditions are such that the work can be successfully carried out during the periods proposed. Any such discussion/agreement shall not place any responsibility on the Employers Representative for any subsequent poor-quality work or work which does not comply with the specification. A decision in relation to the requirement for a tack coat may also be appropriate at this stage.

Material Testing & Quality Control

47. The Contractor shall submit to the Employers Representative the product name(s) and manufacturer(s) of the materials in proposes to use under the contract together with material data sheets and certification that the material and the method of application of markings to the road which the Contractor proposes to use, conforms to the specification. All materials and solid glass beads shall be obtained from manufacturers who operate Third Party Quality Assurance Schemes under ISO 9002, EN 29002
48. For the purpose of control, the thickness of line markings shall be measured by using a suitable micrometer gauge, or callipers, on samples of markings laid on steel plates placed beneath the application machine during the laying operations. The thickness laid on the plate shall be representative of the thickness of material laid on the road.
49. Certification that the material and the method of application of markings to the road which the Contractor proposes to use, conforms to the specifications outlined shall be submitted to the Employers Representative prior to the commencement of lining works. The Contractor shall be required to obtain from the National Roads Authority or another approved agency, a report containing:
- (1) The certified analysis, from a laboratory with current ISO Certificate (Copy of Cert. To be attached) for this specific purpose, of each grade of thermoplastic material the Contractor proposes to use and
 - (2) The results of an examination of the application equipment the Contractor proposes to use. This examination shall be carried out by a company approved to do so by the National roads Authority. (In the event that a Company has up to date ISO Certification for maintenance of road marking machinery and apparatus

including control devices this will be accepted as complying with this requirement on submission of such Certification to the National Roads Authority for verification.)

The submitted report shall relate to certification carried out within the previous six months. Any subsequent change in the source of thermoplastic material or the method of application shall be certified as acceptable by the National Roads Authority or another approved agency before use. All necessary costs associated with such certifications shall be borne by the Contractor. Notwithstanding the above the road authority may at any stage request independent analysis of the material and/or equipment. The costs in these circumstances shall be borne by the Contractor if the materials or equipment fail and by the authority in the event of full compliance.

APPENDIX 12/4: Traffic Signs: Cones, Cylinders, FTDs & Other Traffic Delineators

Not used

APPENDIX 12/5: Traffic Signs: Traffic Signal and Detector Loops

Not used

APPENDIX 12/6: Traffic Signs: Special Sign Requirements on Gantries

Not used

APPENDIX 12/7: Traffic Signs: Preparation and Finish of Metal and Other Surfaces

Not used

APPENDIX 12/10: Traffic Signs: Stop Signs

General

1. The Stop Sign shall be RUS 027 and shall be provided where shown on the Contract Drawings.
2. The Stop Sign shall be sited 1.5m in advance of the associated Stop Line, where practicable or a maximum of 6 m in order to maintain visibility on the left-hand side of the approaching road.
3. The Stop Sign shall be provided in association with the relevant Stop Line (RRM 017), where applicable.
4. The sign size shall be 750mm in accordance with TSM Chapter 5.
5. The sign shall be positioned to provide the required clear visibility distance on approach and shall not be obscured by other signs, structures, vegetation or street furniture.

APPENDIX 13/1: Road Lighting columns and brackets

General

1. The Contractor shall make provision for the design, supply and installation of all lighting, lighting columns, and brackets using columns, lanterns and lamps as specified within the contract drawings & this specification.
2. All alternative lighting, columns, brackets, lanterns and lamps as submitted by the Contractor shall to be in accordance with Cork County Council Exterior Lighting Design Requirements and with the requirements outlined within this appendix 13/1, 13/2, 13/3, 13/4 & 13/5
3. All alternative lighting columns, brackets, lanterns and lamps shall be submitted to the Employers Representative for aesthetic approval.
4. Data sheets in Appendix 13/2 are to be completed by the Contractor and enclosed with the Tender Submission.
5. The Manufacturer shall be quality assured to ISO 9001:2000. Proof of certification shall be provided to the Employer where required.

Lighting Product Specification

1. Luminaires shall be Philips BGP293 DX70 or equivalent approved
2. Lamps shall be LED-HB 5.2S 730 or equivalent approved with a flux of 14.50 klm
3. All Luminaires to have a maintenance factor of 0.79 with an $I_{max70,80,90}$ of either 325.1, 353.8, 0.0 cd/klm

Lighting Columns

- (i) The 7 No. columns to have a nominal height of 6m with a single arm projection of 2m.
- (ii) The lighting column shall be a proprietary mid-hinged type, complete with hinge arrangement, locking device, base components, bracket arm and luminaire fixings. The Contractor shall submit full design information, including hinge detail, maintenance access arrangement, locking details, lifting/hinging procedure and any special foundation or anchorage requirements, for acceptance.
- (iii) The projection arm for replacement lighting columns shall be curved. The curved arm shall be compatible with the proposed luminaire, column height, bracket tilt and loading requirements, and the full column/bracket arrangement shall comply with CC-SPW-01300, CC-GSW-01300 and DN-STR-03018.
- (iv) The terrain category is I (Open Sea), exposure coefficient ($C_e(z)$) is 3.07, topography factor (f) is 1.0 and reference wind velocity speed ($V_{ref,0}$) is 28 m/s in accordance with IS EN 40-3-1;
- (v) Column bases to be flange plates. The Contractor shall design the foundations, anchorages and attachment systems.
- (vi) Columns to have a single door opening of minimum size 600x115mm. Doors are to be positioned to face the carriageway.
- (vii) Columns are to be passive safe in accordance with (IS EN 12767) and DN-REQ-03040 Table 5.2 Performance class recommendations:

Speed class 50 / 70 / 100	Energy absorption class HE / LE / NE	Occupant safety Class A / B / C / D / E	Backfill Type S / R / X	Collapse mode SE / NS	Direction Class SD / BD / MD	Risk of root indentation 0 / 1
70	NE	NR	NR	NR	MD	0

APPENDIX 13/2: Typical column & bracket data sheets 1 & 2

Name of Manufacturer :	Column Reference No.	
	Revision No.	
	Date	

Name of Contract:

Part A: General

Column Nominal Height (m)

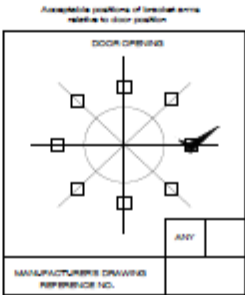
As per drawings

Column Material

Material Design Strength (N/mm²)

No. of door openings			
Door Opening size	Height (mm)		
	Width (mm)		
Cross-section of base compartment	Height (mm)	Width (mm)	Depth (mm)

Acceptable positions of bracket arms relative to door position:



Part B: Foundation Data

Planted Base	Planting Depth (m)	
--------------	--------------------	--

Diameter of concrete surround (if any)	Standard Soil Type Factor G		
	630	390	230

Flange Base	Bolt hole centres (mm)	Hole diameter (mm)	Design load/bolt (N)

Relevant forces and moments at ground level	
Line of action of Max. moment relating to door opening	

NOTE: For flange plates with slotted bores a diagram shall be included with this Data Sheet.

Part C:

Acceptable Lanterns

Post Top Columns

LANTERN: MAXIMUM CHARACTERISTICS			
		Lantern Max. Wt. (kg)	Rationalised Wind Factors (N/M ²) See BSEN 40-3-1: (2000) 587 N/M ²
			Maximum Windage Area (m ²) For RWF
Lantern Connection			
Diameter (mm)	Length (mm)		

Single Arm Bracket Column :

Lantern Lever Arm (mm)	
Due to Wt. of lantern	Due to windage on lantern

Bracket Projection (m)	Ref. No.	Drawing No.	Material		Fixing Angle	Lantern Connection		Lantern Max Wt. (kg)	Max Windage Area (m ²) for RWF
			Grade	Design Strength (N/mm)		Dia. (mm)	Length (mm)		

Double Arm Bracket Column :

Lantern Lever Arm (mm)	
Due to Wt. Of Lantern	Due to windage on lantern

Bracket Projection (m)	Ref. No.	Drawing No.	Material		Fixing Angle	Lantern Connection		Lantern Max Wt. (kg)	Max Windage Area (m^2) for RWF
			Grade	Design Strength (N/mm)		Dia. (mm)	Length (mm)		

Part D Certification

It is certified that the information given in this Data Sheet has been obtained in accordance with the requirements of the National Roads Authority Specification for Road Works Series 1300.

Signed on behalf of the Contractor..... Date

APPENDIX 13/3: Instructions for completion of column and bracket data sheets

General

1. When information is not required a dash shall be inserted in the appropriate boxes.
2. Where a data sheet is amended it shall be given a new revision number with a date.
3. The revision numbers shall be consecutive letters of the alphabet, commencing with 'A'.
4. The date of the revision shall agree with the date of the Contractor's signature.
5. The column or bracket material shall be material approved for use in the Contract.
6. The material design strength shall be the minimum specified in the design. Where more than one material is used values for all materials shall be given.
7. All relevant entries shall be made on the Data Sheet before the document is certified by the Contractor.

Column Data

1. The column nominal height shall be selected from Clause 2 or 3 of BS 5649:Part 2:1978 as appropriate.
2. The number of door openings shall agree with the manufacturer's drawing.
3. The cross-section of the base compartment shall be indicated by a dimensioned diagram/sketch.
4. The acceptable positions of bracket arms relative to the door position shall be indicated on the diagram.
5. Where all positions are acceptable the box noted "ANY" shall be ticked.
6. Where concrete is necessary around the planted base in accordance with sub-Clause 1305.3 and 1305.4 the minimum diameter shall be entered.
7. For flange bases all forces and moments used (or for use) in the design of foundations, anchorages and attachment systems shall be given.
8. The corrosion protection system used on the column when new shall be recorded. Where additional steel is provided for sacrificial purposes the amount shall be recorded.
9. The lantern lever arms, weight and maximum windage area quoted shall be based on the most adverse loading on the bracket when it is attached to any of the columns quoted in the compatible column sections.

APPENDIX 16/1 General Requirements for Piling and Embedded Retaining Walls

Not used

APPENDIX 17/1: Concrete – Classification Of Mixes

Structural concrete shall comply with the following Schedule. Mix designations for each specific structural element are detailed on the Contract Drawings. These mixes shall be supplied as design mixes in accordance with NRA BD57/10 and Series 1700 of the Specification, taking the most onerous requirements as appropriate.

	Lighting column Corbel
Mix reference	1
Ordinary or Special Concrete	O
Compressive Strength Class	C40/50
Exposure Classes	XC4, XA2, XD3, XF3, XS3
Min Cement Content incl. GGBS (kg/m ³)	400
Nominal maximum size of aggregate, in mm (D)	20
Max water / cement ratio	0.45
Max Cement Content (kg/m ³)	550
Density Class (for lightweight concrete)	N/A
Other (specify requirements)	N/A
Chloride Class	Cl 0,40
Type & Class of Cement	All cements in Tables NA.2 and NA.3
Minimum % if GGBS in total GGBS & PC combination	<35
Quality assurance requirements	Refer to Appendix 1/24 and / or 1/25 as appropriate
Rate of sampling intended by the purchaser for strength testing (for information)	See Clause 1707 of The Specification and App 1/5

APPENDIX 17/2: Concrete – Impregnation Schedule

Not used.

APPENDIX 17/3: Concrete – Surface Finishes

U ₁	=	unformed surfaces, unexposed, levelled to produce uniform surface
U ₃	=	unformed surfaces, in-situ concrete kerbs
U ₄	=	Applied to concrete abutment deck finish
U ₅	=	unformed surfaces, in-situ concrete footways
F ₁	=	All formed internal surfaces unexposed (no external requirements)
F ₂	=	Applied to all hidden wall faces
F ₄	=	Applied to all exposed wall faces

General

- 1 Permanently exposed concrete surfaces to Classes F2 finish, (or better), shall be protected from rust marks and stains of all kinds.
- 2 The following finishes are to be provided:
 - Buried unformed surfaces - U1
 - Buried surfaces - F1
 - Lighting column corbel – F4 / U4
- 3 A regular formwork joining pattern is required at all exposed surfaces.
- 4 All exposed concrete surfaces shall be of a uniform colour and subject to approval.
- 5 Formwork for curved concrete surfaces shall be achieved by smooth unbroken curved surface.

APPENDIX 17/4: Concrete – General

The requirements for the concrete shall be as stated in sub-clause 1701.1.

Reinforcement designations will be as BS8666: 2000. Typical reinforcement layout, bar size and spacing for each portion of the works are shown on the drawings. Minimum cover to steel reinforcement as shown on drawings. Stainless steel bars shall be grade 500 as per BS 6744.

Temporary Works

1. Temporary Works are required, the Contractor shall design, check, install, inspect and maintain all temporary supports necessary to undertake the concrete works safely and without adversely affecting the permanent structure. No debris from any part of the works can enter the water. Drilling or dowelling into the precast beams into the precast beams of the deck is not permitted.
2. The Temporary Works design shall include:
 - drawings, calculations and a design certificate;
 - sequence of installation, loading and removal;
 - limits on breakout extent and repair sequence;
 - inspection and hold points; and
 - technical approval requirements where applicable.

Painting of concrete

1. The areas to be painted shall comprise the exposed elevations of the bridge deck, abutments and wingwalls, as shown on the Drawings.
2. The concrete surface shall be thoroughly cleaned to remove all loose material, dust, laitance, curing compounds, release agents, oil, grease, graffiti, surface contamination and any other deleterious matter prior to the application of the paint system.
3. Surface preparation shall be carried out in accordance with the paint manufacturer's instructions and shall leave the substrate sound, clean, dry and suitable to receive the coating.
4. The paint system shall be a proprietary exterior coating suitable for application to concrete, with current certification acceptable to the Employer's Representative.
5. The paint system shall comprise a primer, undercoat and finish coat. The first coat shall be applied within the period permitted by the manufacturer's recommendations after surface preparation, and each subsequent coat shall be applied only after the preceding coat has achieved the required drying / curing condition and within the manufacturer's stated overcoating interval.
6. The finished paint system shall achieve the specified total dry film thickness in accordance with the manufacturer's recommendations.
7. The colour of the finish shall be RAL 7023 "Concrete Grey".
8. Any trial panels required by the Employer's Representative shall be prepared prior to full application, and the approved finish, texture and colour shall be replicated throughout the completed works.

Lighting column corbel

1. All embedded reinforcement, anchors or mechanical fixings shall be capable of resisting a minimum tensile load of 10 kN without failure.
2. Drilling and fixing of reinforcement to the corbel to the existing concrete edge beam shall be carried out strictly in accordance with the fixing manufacturer's approved installation instructions and the accepted anchorage details.
3. Prior to drilling, the Contractor shall verify the location of reinforcement and shall not cut, drill through, or otherwise compromise the existing reinforcement or the existing prestressed precast concrete beams.
4. Anchorages shall be installed in sound, clean and dry holes, tightened to the manufacturer's specified torque, and tested where required in accordance with the manufacturer's requirements.
5. The concrete surface of the elevation of the deck to be scabbled with a needle gun prior to pouring of concrete.

APPENDIX 20/2: Waterproofing Of Concrete Structures

1. The extent of the waterproofing works is given on the Drawings.
2. Waterproofing is to be re-applied on the bridge, waterproofing membranes are to be applied to the original concrete surface. The existing surfacing, raised verges and waterproofing layers are to be removed for the extents detailed on the Works Requirements Drawings.
3. Prior to application of the waterproofing membrane, surfaces shall be prepared as follows:
 - a. All areas to receive bridge deck waterproofing shall be clean, dry and free from all loose particles, laitance, dust, oil and other contaminants. All blowholes in concrete surfaces shall be cleared out, filled with approved non-shrink cementitious filler and the repair work properly cured before application of the waterproofing.
4. The bridge deck waterproofing system shall be spray applied, satisfy the requirements of DN-STR-03009 – Waterproofing and Surfacing Concrete Bridge Decks and shall be capable of being non-destructively tested and shall have a current NSAI Agrément Certificate or equivalent appropriate for use as a bridge waterproofing system.
5. Any repair to the deck or expansion joint surfaces following removal of the existing surfacing shall be repaired using rapid setting repair/ resurfacing mortar build-up material. It shall meet the minimum criteria as follows:
 - a. Have a minimum compressive strength of 20MPa after 24 hours and 50 MPa after 28 days
 - b. Have a minimum flexural strength of 5 MPa after 24 hours and 10 MPa after 28 days.
6. 20mm Asphalt sand additional protective layer (APL) be laid immediately after the waterproofing layer's bonding agent has set or cured. APL is required as an additional protective layer and shall comply with IS EN 13108-4 recipe type F wearing course mixture designation 0/2.
7. The minimum warranty for the waterproofing system is 50 years.

APPENDIX 23/1: Bridge Deck Expansion Joint Schedule

Bridge Name:	Proposed Joint and Movement details:	Drawing Number:	Other Details
Dinish Bridge	Expansion Joint x 24: Type 2 – Asphaltic Plug Joint, max long movement = 20mm	D870-OCSC-XX-XX-DR-C-0104	Subsurface drainage required
Note: Minimum longitudinal movement for all joints is 5mm. The ambient temperature for all joints is assumed to be 15 degrees at installation.			

APPENDIX 23/2: Sealing of Gaps Schedule

1. Where cold poured sealants are indicated on the Drawings for sealing of gaps or joints, they shall consist of gun applied two-part polysulphide complying with BS EN ISO 11600:2003+A1:2011.
2. Unless otherwise indicated on the Drawings, all gap joints sealers shall be backed with a suitable sized circular cross section rod of closed cell expanded polyethylene. Such rods shall be compressed and pushed into the joint prior to sealing.
3. Unless otherwise indicate on the Drawings, all joint fillers in gap joints shall consist of closed cell expanded polyethylene board of appropriate width.
4. Compression seals to be watertight, continuous, and highly resistant to weather and chemicals. Compression seals are to be designed to be in compression at all times.
5. Compression seals shall comply with DN-STR-03006 "Expansion Joints for Use in Highway Bridge Decks".

APPENDIX 23/3: Replacement of expansion joints

1. All bridge deck expansion joints shall be in accordance with DN-STR-03006 and shall have a current NSAI Agreement Certificate or equivalent.
2. Expansion joints to be replaced are indicated on the Contract Drawings.
3. The replacement product shall be issued to the Employer's Representative for review prior to use.
4. Generally, the replacements are to be like-for-like, any deviation from the existing joints or the contract drawings will require Employer's Representative approval.
5. Skid resistance of the joint is not to be less than 65 PSV.
6. The range of estimated movement to be accommodated for each of the structures is tabulated in Appendix 23/1.
7. The movement is estimated only and may vary based on ambient temperatures. An accurate measurement of the ambient temperature at each bridge shall be undertaken by the Contractor at the time of the works and the as built gaps at all joints verified. Note: This is only possible following opening up works at various locations.
8. All metal components shall be stainless steel or mild steel with factory applied protective coating.

APPENDIX 24/1: Brickwork, Blockwork and Stonework

Not used

APPENDIX 24/2: SCD's

Not used

APPENDIX 25/5: Structures to be Designed by the Contractor

Not used.

Appendix 55/1 Repair Product - Additional and Modified Requirements

1. Repair Methods and Product Classes

Repair reference / location	Structural element	Repair activity	Repair method in accordance with IS EN 1504-9	Product type	Required class
CR02 – CR07	Deck fascia	Localised patch repair	Principle 3 - Concrete restoration	Flowable repair concrete	R4
CR01	Abutment	Deep repair infill concrete	Principle 3 - Concrete restoration	Flowable repair concrete	R4

- All structural concrete repairs shall use a proprietary Class R4 repair product in accordance with IS EN 1504
- The proposed repair product shall satisfy the requirements of IS EN 1504-3 for the specified class.
- Cementitious repair products shall be Type CC or PCC in accordance with IS EN 1504-1.
- Resin-based products shall not be used where carbon-steel reinforcement is exposed.
- Microsilica shall not be used as a constituent material.
- Aggregates shall be natural and well graded.
- Any departure from the specified product, formulation or water addition shall be submitted for approval to the Employer's representative before use.
- Flowable Repair Product Requirements

Requirement	Value
Minimum flowability - high-flow product	750 mm
Minimum flowability - normal-flow product	450 mm
Minimum 28-day compressive strength	≥ 45 MPa
Early-strength requirement	≥ 25 MPa at 1 Day

Appendix 55/2 Additional Requirements for Reinforcement

Assessment and Replacement of Existing Reinforcement

- Existing reinforcement exposed during breakout shall be assessed for corrosion and section loss. Bars shall be treated as follows:

Condition	Required action
Sound bar with superficial corrosion	Clean in accordance with Clause 5505 and retain
Average section loss less than 10%	Retain, subject to Engineer's Representative approval
Average section loss equal to or greater than 10%	Cut out and replace, or supplement with new lapped reinforcement, as directed
Local pitting or severe section loss	Refer to the Engineer's Representative before repair placement
Damaged reinforcement caused by the Contractor	Replace at the Contractor's expense

- The Contractor shall not cut, weld, bend or otherwise alter reinforcement without approval from the Employer's representative.

Couplers and Welding

- Reinforcement shall be lapped wherever practicable. Mechanical couplers may not be used unless approved by the Engineer's Representative.
- Welding of reinforcement is not permitted, except unless approved by the Engineer's Representative. Where welding is permitted, the Contractor shall submit a welding procedure, welder qualifications, inspection regime and evidence that the proposed detail is suitable for the fatigue environment.

Appendix 55/3 Requirements for Execution of Concrete Repairs

Concrete Breakout Trials

1. A concrete breakout trial is not required.

Temporary Works

1. Temporary Works are required, the Contractor shall design, check, install, inspect and maintain all temporary supports necessary to undertake the repairs safely and without adversely affecting the permanent structure. No debris from any part of the works can enter the water. Drilling or dowelling into the precast beams into the precast beams of the deck is not permitted.
2. The Temporary Works design shall include:
 - drawings, calculations and a design certificate;
 - sequence of installation, loading and removal;
 - limits on breakout extent and repair sequence;
 - inspection and hold points; and
 - technical approval requirements where applicable.

Formwork and Surface Finish

1. Formwork shall provide a minimum finish of F4 in accordance with Clause 1708, unless a different finish is stated below.

Location / repair type	Required finish	Additional requirement
Formed vertical repairs	F4	Match line and profile of existing concrete No visible grout loss, honeycombing or voids
Hand-applied repair mortar	U2 minimum	Match adjacent

Viewing Panels

1. Clear viewing panels within formwork are not required.

Integrity and Adhesion Testing

1. The Contractor shall permit access to the Employer's Representative for inspection after striking formwork and before progressing to the next repair stage.

Appendix 55/4 Additional Requirements for Sprayed Concrete

Guniting render

1. Cracked, delaminated, debonded or otherwise defective Guniting render on reinforced concrete piers shall be removed back to sound substrate, taking care not to damage the existing concrete.
2. New Guniting render shall be a proprietary sprayed concrete or mortar product approved for use on reinforced concrete and shall be applied only by a specialist contractor experienced in sprayed concrete works. The material shall be installed strictly in accordance with the manufacturer's instructions and the accepted method statement.
3. The new Guniting render shall be applied to a minimum thickness of 30 mm. Where the repair is applied in more than one pass, each layer shall not exceed the manufacturer's stated maximum layer thickness, and the final surface shall be finished to the required line and level and cured in accordance with the approved system.
4. Mesh to be stainless steel welded, with a mesh size of 50 x 50 mm and a wire thickness of 1.6 mm

Formwork and Test Panels

1. The requirements of Clause 5507 shall apply.
2. Formwork shall comply with the requirements of Clause 1710 and IS EN 13670.
3. The Contractor shall take particular care with sealing of the formwork against existing concrete surfaces. Where the existing concrete surface is irregular, the Contractor shall submit his proposed method of sealing to the Employer's Representative for approval. The Contractor shall carry out such trials of its proposed method of sealing as may be required by the Employer's Representative.
4. Before the next repair in the repair sequence is commenced, the Contractor shall provide the Employer's Representative with access to each completed repair area for inspection after the formwork has been struck.

Performance Requirements

1. The sprayed material shall comply with the requirements of Clause 5510 and the following.
2. The tensile splitting strength at 28 days, determined in accordance with IS EN 12390-6, shall be greater than 2.4 N/mm².
3. The secant modulus of elasticity, determined in accordance with IS EN 13412, shall not exceed 34 GPa.
4. Percentage shrinkage determined in accordance IS EN 12617-4 shall be less than 0.07%.
5. The coefficient of thermal expansion shall be between $8 \times 10^{-6} / ^\circ\text{C}$ and $12 \times 10^{-6} / ^\circ\text{C}$.
6. The coefficient of chloride ion diffusion shall be determined in accordance with the method in IS EN 13396, and shall be less than $700 \times 10^{-15} \text{ m}^2/\text{s}$.

Appendix 55/5 Additional Requirements for Crack Injection

Not used.

Appendix 55/6 Requirements for Survey of Structure

Not used

Appendix 55/7 Additional Requirements for Galvanic Anodes

Not used.



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