



COMHAIRLE | CLARE
CONTAE AN CHLÁIR | COUNTY COUNCIL

FRAMEWORK FOR PAVEMENT AND ASSOCIATED MINOR WORKS

SPECIMEN VOLUME A – WORKS REQUIREMENTS - BOOK 1

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Roinn na Bóithre agus Taistil
An Stiúrthóireacht Forbairt Fhisiceach

Áras Contae an Chláir, Bóthar Nua, Inis, Co. an Chláir, V95 DXP2

Roads and Transportation Department
Physical Development Directorate

Áras Contae an Chláir, New Road, Ennis, Co. Clare, V95 DXP2

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TABLE OF CONTENTS

Preamble to the Specification.....	1
APPENDIX 0/1 - Contract Specific Additional, Substitute and Cancelled Clauses, Tables and Figures included in the Contract.....	3
APPENDIX 0/2 – Contract Specific Minor Alterations to Existing Clauses, Tables and Figures Included in the Contract	10
APPENDIX 0/3 - List of Numbered Appendices Referred to in the Specification and Included in the Contract	11
APPENDIX 0/4 - List of Drawings included in the Contract.....	21
Appendix 1/1 – Accommodation and Equipment for the Employer’s Representative	21
Appendix 1/2 – Vehicles for the Employer’s Representative	21
Appendix 1/3 – Communications Systems for the Employers Personnel.....	21
Appendix 1/4 – Standards, Quality Assurance Schemes, Agrément Certificates and Other Approvals	21
Appendix 1/5 - Testing to be carried out by the Contractor	22
APPENDIX 1/6 - Supply and Delivery of Samples to the Employer’s Representative	0
APPENDIX 1/7 - Site Extent and Limitations on Use	1
APPENDIX 1/9 - Control of Noise and Vibration	4
APPENDIX 1/10 – Information Boards	5
APPENDIX 1/12 – Setting Out and Existing Ground Levels	6
APPENDIX 1/13 - Programme of Works.....	7
APPENDIX 1/14 - Monthly Statements	10
APPENDIX 1/15 – Accommodation Works.....	11
APPENDIX 1/16 - Privately and Publicly Owned Services and Supplies	12
APPENDIX 1/17 - Traffic Safety and Management.....	14
APPENDIX 1/18 – Temporary Diversions for Traffic	22
APPENDIX 1/19 - Routing of Vehicles	23
APPENDIX 1/20 – Recovery Vehicles for Breakdown.....	25
APPENDIX 1/22 – Progress Photographs	26
APPENDIX 1/23 - Substances Hazardous to Health	27
APPENDIX 1/24 - Quality Management Schemes.....	28
APPENDIX 1/25 - Product Certification Schemes.....	30
APPENDIX 1/26 – Product Certification Schemes.....	32
APPENDIX 1/27 Site Meetings	33
APPENDIX 1/29 Completion of Works	33
APPENDIX 1/30 Protection of the Works.....	33

Framework for Pavement and Associated Minor Works

Specimen Volume A – Works Requirements - Book 1

APPENDIX 1/60 - As Built Records Drawings	34
APPENDIX 2/1 - List of Buildings, etc, to be Demolished	35
APPENDIX 2/2 – Filling of trenches and Pipes	36
APPENDIX 2/3 - Retention of Materials arising from Site Clearance.....	37
APPENDIX 2/5 - Hazardous Materials	37
APPENDIX 5/1 – Drainage Requirements	38
APPENDIX 6/1 – Requirements for Acceptability and Testing etc. of Earthworks Materials	39
APPENDIX 6/1 – Requirements for Dealing With Class U2 Unacceptable Material	40
APPENDIX 7/1 - Permitted Pavement Options	41
APPENDIX 7/2 – Excavation and Reinstatement of Existing Surfaces	43
APPENDIX 7/4 - Bituminous Sprays.....	44
APPENDIX 7/5 - Road Pavements: TII Construction Details.....	45
APPENDIX 7/9 - Cold-Milling (planning) of bituminous bound flexible pavement.....	46
APPENDIX 7/10 – Management of Materials Arising from Roadworks	47
APPENDIX 12/3 - Traffic Signs: Road Markings and Studs.....	48
APPENDIX 27/1 – Watermains, Utilities and Accommodation Works.....	54

PREAMBLE TO THE SPECIFICATION

1. The Specification referred to in the Contract shall be the Specification for Works (SPW) in TII Publications (Standards) published by TII as a collective group of documents under the Construction and Commissioning activity within the online TII Publications system (<http://www.tiipublications.ie/>), current 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 SPW the Numbered Appendices shall always prevail.
6. Any reference in the Contract to a part of the SPW or Appendix shall be deemed to refer to the corresponding Substitute part of the SPW or Appendix listed in Appendix 0/1 or 0/2.
7. Where a part of the SPW is altered, any original Table/Figure referred to in the part of the SPW shall apply unless the Table/Figure is also altered. Where a Table/Figure is altered, any reference in a part of the SPW to the original Table/Figure shall apply to the altered Table/Figure.
8. Where a part of the SPW 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 SPW that is not used shall be deemed not to apply.
10. References in the SPW to “NRA Road Construction Details” shall be taken to refer to Standard Construction Details (SCD) in TII Publications (Standards) published by TII as a collective group of documents under the Construction and Commissioning activity within the online TII Publications system (<http://www.tiipublications.ie/>), current on the date 10 working days prior to the tender returns date or, if applicable, the extended tender returns date.

Specimen Volume A – Works Requirements - Book 1

11. Text shown in grey highlight applies only to Contracts where the applicable Conditions of Contract is the Public Works Contract for Civil Engineering Works Designed by the Employer, the Public Works Contract for Minor Building and Civil Engineering Works Designed by the Employer.
12. Text shown in square brackets immediately following text shown in grey highlight, if any, is deemed to replace the text in grey highlight for Contracts where the applicable Conditions of Contract is the Public Works Contract for Civil Engineering Work Designed by the Contractor.
13. Throughout the SPW and Appendices to the SPW, the following interpretations shall apply:
 - “UK Department of Transport” shall mean “UK Highways Agency”
 - “Base Course” shall mean “Binder Course”
 - “Roadbase” shall mean “Base”
 - “Wearing Course” shall mean “Surface Course”
 - “UK Department of Transport” shall mean “UK Highways Agency”

NOTE:

Due to the specialised nature of much of the work in the Contract, the prescribed format of Appendices to the SPW has not been followed precisely, and specific construction details have in general been identified on the drawings.

Should the Contractor consider that there is a lack of clarity in any respect, he is reminded of his obligation to bring it to the notice of the Employer’s Representative.

APPENDIX 0/1 - CONTRACT SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTACT

(i) List of Additional Clauses, Tables and Figures

Clause No.	Title
104.11 AR	International and National Standards
105.8 AR	Storage of Materials
116.6 AR	Existing Services
125.3 AR	Temporary Services
126.5 AR	Delivery of Materials
126.6 AR	Road Sweeping and Cleaning
126.7 AR	Delivery Vehicles
127.2 AR	Safety, Health and Welfare at Work
127.3 AR	Project Supervisor for Construction Stage (PSCS)
127.4 AR	Safety File
128.2 AR	Public Liaison
129.1 AR	Emergency Services
130.3 AR	Offensive Fumes
132.3 AR	Dust Control
134.2 AR	Protection of Existing Structures
137.0 AR	Failure of Contractor to Carry out any Reasonable Order or Instruction of the Employer's Representative or to Properly Complete any Section of the Works
138 AR	Enclosure of Site
139 AR	Checking of Drawings
140 AR	Access
141 AR	Contractor should visit the Site
160 AR	As-Built Record Drawings
171 AR	Protection of Watercourses from Pollution
173 AR	Cleanliness on Completion
701.3 AR	Use of Surfaces by Traffic and Construction Plant

(ii) List of Substitute Clauses, Tables and Figures

Clause No.	Title
117.1 SR	Traffic Safety and Management

(iii) List of Cancelled Clauses, Tables and Figures

Clause No.	Title
None	None

Where a Clause in the Specification relates to works goods or materials which are not required for the Works it shall be deemed not to apply.

(iv) Additional Clauses, Tables and Figures

Clause No.	Title and Written Text
AR 104.11	International and National Standards Nothing stated in this Specification is to be construed as discriminating against products and materials manufactured or supplied from any of the Member States of the European Community. Where items to an Irish Standard Specification, or British Standard Specification, or any other standard specification of a Member state of the European Union are called for, this requirement shall be read as including items to a relevant international standard, or the relevant national standard of any Member of the European Union, which provides an equivalent guarantee of safety and suitability.
AR 105.8	Storage of Materials The Contractor shall store all materials in a tidy manner, separating different materials and protecting them from dirt, physical damage, rain, frost and snow, reaction with other materials, marking or staining, micro-organisms, mildew, vermin and fungus. All materials shall be handled and stored in accordance with manufacturers' and suppliers' recommendations. The Contractor shall arrange to store only the limited amount of materials on site for works in progress. Remaining materials shall be stored off site and only be brought to site when required for incorporation in the Works.
AR 116.6	Existing Services The Contractor shall ascertain the exact positions of underground and overhead services in any given area prior to undertaking work in that area and take all precautions for the protection of same. He shall make good any damage resulting from his operations and shall indemnify the Employer against any claim for damages to ducts, drains, sewers, mains, cables both underground and overhead, water pipes, fittings, boxes or other property caused by his operations. His prices are to include for all protective, repair and/or other necessary work due to the presence of the services.
AR 125.3	Temporary Services The Contractor shall provide all temporary services such as water supply, power and the like where necessary for the proper execution of the works.
AR 126.5	Delivery of Materials Attention is drawn to the damage caused to bridges and road pavements by overloaded vehicles. The Contractor shall ensure that vehicles used to deliver materials to Local Authority sites, or to remove excavated materials, comply with the gross vehicle weights prescribed in the Road Traffic (Construction, Equipment and Use of Vehicles, Amendment Regulations), 1992 (S.I. 352 of 1992). Owners of vehicles engaged by the Contractor for the delivery and removal of materials should be notified in advance that where the vehicle and its load exceed the permitted gross vehicle weight the materials will not be accepted. In addition there shall be full compliance with the planning laws in relation to any proposed use of land as temporary quarries for the duration of the Works.
AR 126.6	Cleaning of Roads The Contractor shall be responsible for maintaining all roads and footpaths used by members of the public in a clean condition. He shall also take every precaution to prevent dirt, mud or other material being dropped or spread by traffic associated with the Works on roads in public use, or on roads being part of the Works which are made available for public use by the Contractor, whether such traffic is the Contractor's own vehicles, his sub-contractor's or his suppliers', or vehicles hired by

Specimen Volume A – Works Requirements - Book 1

	any of the above and shall clean up any such spillages promptly. If the Contractor fails to take adequate precautions or to clean the roads or footpaths in good time, the Employer's Representative may deduct from the Contractor's account the cost of road cleaning operations carried out by the Employer.
AR 127.2	Safety, Health and Welfare at Work The following sub-clauses are intended to remind the Contractor of the various Statutory Regulations and responsibilities to be accounted for in carrying out the works:- a) The provisions of S.I. 504 of the Safety, Health and Welfare at Work (Construction) Regulations 2013, will apply to this Contract. The work is also subject to the provisions of Factories Act 1955, the Safety in Industry Act 1980 and the most recent Safety, Health and Welfare at Work Act 2005. The tenderer is to examine the site and the information supplied regarding the nature and extent of the proposed works, so as to be satisfied as to what is required to be done to fulfill the duties of Project Supervisor for Construction Stage and also what measures are required to be taken to meet the requirements of the Regulations in the execution of the works including compliance with the Health and Safety Plan. All costs arising in respect of these matters are to be included in the tender figure. The client will not be liable for any such costs which are reasonably foreseeable and which are not so included. It shall be noted that where the Contractor or any Sub-Contractor carries out any design (as defined in the Regulations), the duties set out in Article 5 of the Regulations apply. The competence of any tenderer to carry out the duties of the Project Supervisor (Construction Stage) will be considered in the valuation of tenders. b) Notification of work on construction sites: The Health and Safety Authority must be notified of any building operation (including demolition or maintenance work) or work of civil engineering construction (including road works) where the work is to take six weeks or more. Use Form AF2 for this purpose. c) Accidents, Dangerous Occurrences and Ill Health: The Health and Safety Authority must be notified if: (i) A person dies as a result of an accident caused by or connected with the work on site. (ii) A listed dangerous occurrence takes place because of or in connection with the work (e.g. the collapse, overturning or failure of a crane or any other lifting appliance). (iii) A person is prevented from working for more than three days as a result of any injury or illness caused by an accident at work. (iv) A person at work is affected by a specified disease under the Notification of Industrial Disease Regulations 1956. The form for reporting any of the above is Form I.R1. d) Safety Officer: Every contractor who carries out building operations or works of engineering construction and normally employs a total of 21 or more workers must specifically appoint, in writing, one or more people to act as Safety Officer(s). Small contractors may engage the services of an outside Safety Officer who may work for a safety group or specialist safety company. e) Duties: The Safety Officer will advise the Contractor/Employer on how to comply with the law and will regularly supervise site work to see that it is carried out safely. The Safety Officer must be sufficiently experienced in the type of work being done, be suitably qualified and have enough time and authority to carry out his duties properly. f) Safety Statement: Each Employer and self employed person must prepare a suitable written safety statement. The purpose of the statement is to identify all foreseeable risks and to outline how these are to be eliminated and minimised. The statement must also name those with responsibility for safety. The terms of the statement must be brought to the attention of employees and others who may be affected by it. g) Welfare: Every Contractor on site must ensure that adequate welfare facilities are available for his employees. These should include as a minimum: (i) Adequate washing facilities (ii) Adequate toilets

Specimen Volume A – Works Requirements - Book 1

	(iii) Drying sheds, huts, rooms or other accommodation for sheltering during bad weather, storing clothes and taking meals (including tables and chairs, facilities for boiling water and a supply of drinking water). h) First Aid: Every Employer and self employed person on site must ensure that adequate first aid is available. It is sensible for all contractors to make arrangements with the main contractor to provide first aid (if possible). First aid arrangements will vary with the degree of risk on the site but should usually include as a minimum: (i) Adequately stocked first aid box(es) (ii) A person who holds a current certificate in first aid, though for small sites it is sufficient to appoint a person to take charge of the first aid box and any situation where serious injury or major illness occurs (responsibilities should include phoning for an ambulance). (iii) Information for workers on site about first aid arrangements, including the location of first aid boxes and the nearest telephone. i) Exclusion of Children and Others from Work areas: A fence should be erected to enclose the site or any part of it that may give rise to danger. The fence should be at least 2 metres high and of anti-intruder type and should: (i) Protect the public from dangers of excavations (including shallow ones filled with water), holes or openings and badly stacked materials. (ii) Prevent tampering with vehicles and plant, electricity supplies, gas cylinders and hazardous chemicals. (iii) Prevent access to scaffolds which are left unattended, e.g. by removing all ladders at ground level. j) Watching, Lighting and Protection of the Public: The contractor shall provide for the protection of the works and adjacent property and for the protection and convenience of the public, adjacent owners, and occupiers including all necessary watching, lighting, erection and maintenance of barriers, guard rails warning notices and for all necessary precautions required by the Employer's Representative. Safe pedestrian passage shall be maintained at all times. While footpaths are being worked upon, alternative pedestrian routing shall be provided in a safe manner. These alternative routes should be protected from vehicular and site traffic by use of heras fencing or similar approved and should be adequately illuminated at nighttime. Temporary ramps shall be installed at all steps up or down at kerbs. These ramps may be constructed of wood or delay set macadam. All of the requirements of control of the Traffic Signs Manual shall be fulfilled.
AR 128.2	Public Liaison The Contractor is required to participate with Clare County Council in their endeavours to promote a pro-active public liaison approach. The Contractor shall establish and maintain liaison with the local businesses and residents. The purpose of the liaison will be to understand the needs of the business and residents and to provide for their various requirements in conjunction with the construction works, such as deliveries, car parking, 24 hour access, emergency ambulance access etc. The Contractor shall be obliged to comply with these requirements on a basis of co-operation. The Contractor shall provide the necessary resources in manpower and materials, including signage, letter drops, personal contact etc. to meet these needs. The Contractor shall monitor, on an on-going basis, the effects of construction activities on dwellings, offices, hospitals, churches, shops, hotels etc. and will immediately endeavour to resolve any problems with regard to access, noise, dust, safety, odours or site cleanliness. The Contractor shall if requested by the Employers Representative arrange meetings with residents, traders, traders groups, businesses, business groups and representatives of Clare County Council and An Garda Siochana to ensure full and adequate liaison in relation to the progress of the contract works.
AR 130.3	Offensive Fumes Clare County Council will fully implement all statutory regulations in relation to exhaust emissions from plant. All vehicles and mechanical plant used on the Works

Specimen Volume A – Works Requirements - Book 1

	shall be fitted out and operated to ensure that excessive dust emissions are not generated. Any plant emitting offensive fumes will be stopped immediately. No claims will be entertained for aforementioned stoppages.
AR 132.3	Dust Control The Contractor shall employ the best practical means to limit and control dust emissions produced by his construction operations and he shall indemnify the Employer against all claims for damage or nuisance arising from his operations. This shall include (i) Limiting the operational capacity and speed of vehicles and machinery, continuous operation of water spraying equipment and any other measures deemed necessary to control dust emissions to within specified limits. (ii) Removal from the works any item of equipment which, in the opinion of the Employers Representative, is creating a dust nuisance. (iii) Continuously spraying earthworks operations and haul routes in dry conditions with water. Clare County Council will insist on the Contractor maintaining a water sprayer on site in such conditions. (iv) Organising operations with regard to the positioning of plant and the location of haul routes, etc. so as to minimise dust emissions to adjacent properties (v) Arrange that any necessary on-site cutting of new paving materials on site shall be by wet-cutting mechanical plant. Dry-cutting of new paving materials on site will not be permitted unless otherwise authorised by the Employers Representative. The Contractor shall ensure that at all properties outside the site boundaries, the dust emissions arising from his activities shall not result in a daily average concentration in excess of 150 microgrammes of suspended particulate per cubic metre of air above background level or shall not result in an absolute daily average concentration in excess of 250 microgrammes of suspended particulate per cubic metre of air, whichever is the lesser value. The measurement of suspended particulate shall be by the method described in Annex III, Part B to Council Directive No.80/779/EEC. Air Quality monitoring stations shall be established at a number of locations throughout the Works, which shall be decided upon by the Employers Representative.
AR 134.2	Protection of Structures The Contractor shall take all necessary precautions to safeguard existing buildings and works from damage due to construction activity, plant operations, ground water movement, ground movement and settlement, vibration and all other activities associated with the execution of the Contract. He shall make all necessary records (photographic or otherwise) of existing structures and properties that could be

Specimen Volume A – Works Requirements - Book 1

	affected by the works, prior to the commencement of the works, independently of progress photographs required by the Employers Representative.
AR 137	Failure of the Contractor to carry out any reasonable order or instruction of the Employer's Representative or to complete properly any section of the works. In the event of the Contractor failing to carry out any reasonable order or instruction of the Employer's Representative or of not properly completing any section of the work, the Employer's Representative may have the work done and deduct the cost of doing so from any payment due to the Contractor. Such action of the Employer's Representative shall not vitiate the Contract.
AR 138	Enclosure of Site The Contractor shall take adequate precautions to prevent trespass on adjoining property by employees, sub-contractors and / or their employees. The Contractor shall restrict his activities and site usage to the areas of works as approved by the Employer's Representative.
AR 139	Checking of Drawings The Contractor shall be responsible for checking all drawings, schedules and details of the works. In the event of any discrepancy being found between such drawings, schedules and details or if the Contractor considers that additional drawings or information are required, then in either case the Contractor shall report such discrepancy to the Employers Representative for instruction, or apply for such detail drawings or information at least 21 days before the works concerned is to be executed.
AR 140	Access It is a requirement of the Contract that access for the public to businesses, houses and any other property will be maintained at all times. The Contractor shall be required to maintain traffic flow at all times on the road. He shall at all times, take proper precautions to ensure that his site operations have a minimum effect on existing traffic flow and that safe operating condition are prioritised. In addition access to/from all adjoining dwellings must be maintained at all times.
AR 141	Contractor should visit the Site In accordance with the Contract, the Contractor is deemed to have visited the site of the proposed works and ascertained all local conditions and restrictions likely to affect the execution of the Works. He should acquaint himself generally with the layout and note particularly any features or irregularities of surfaces or site conditions which could not be clearly shown or delineated on plans. For the avoidance of doubt it should be noted that service connections to individual premises are generally not shown on any drawing but nevertheless their presence will be regarded as foreseeable to an experienced contractor. The Contractor should, in addition, carry out any investigation necessary as will enable him to fully appreciate and estimate for the works involved in the Contract, as extra payments

Specimen Volume A – Works Requirements - Book 1

	will not be allowed for any difficulties due to site conditions encountered in constructing the scheme in accordance with the plans.
AR 1211.17	Road markings – Removal Of The removal of thermoplastic or other road markings shall be completely and efficiently accomplished so that no damage is caused to the existing road surface except in so far as a slight difference in texture will be tolerated between the area of pavement underneath the removed markings and the rest of the pavement.
AR142	Waste Management The Contractor shall exercise due care in the handling and disposal of any potentially contaminating material. Appropriate site management control shall be demonstrated at all times to minimise the potential for pollution of the environment. The Contractor shall maintain detailed records and receipts for all movements of waste materials from site for inspection by the Employers Representatives

APPENDIX 0/2 – CONTRACT SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT

Clause No.	Alterations to be made
601.2.(i)	Delete 'material which does not comply with the permitted constituents and material properties of Table 6/1 and Appendix 6/1 for acceptable material'. Insert 'For the purposes of the Contract all material excavated from the Site shall be deemed to be unacceptable'.
702.1	Delete 'determined from one edge of the pavement surface', insert 'determined from the centreline of the carriageway surface'.

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:

Symbol	Responsibility
E	Employer compiles
C	Contractor to compile and submit to the Employer's Representative
E/C	Employer partially compiles and Contractor completes and submits to the Employer's Representative
T/C	Tenderer compiles and returns with his Tender. Post award of Contract the Contractor reviews and submits to the Employer's Representative.
(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 Notes for Guidance on the Specification for Works (GSW), 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 SPW 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.

Framework for Pavement and Associated Minor Works

Specimen Volume A – Works Requirements - Book 1

List 'A' - List of Numbered Appendices referred to in the Specification for Road Works with those not adopted marked 'Not Used'.

VOL. A BOOK NO.	COMPLETED BY	APPENDIX	TITLE
			INTRODUCTION
1	E	0/1	Contract-Specific Additional, Substitute and Cancelled Clauses, Tables and Figures Included in the Contract
1	E	0/2	Contract-Specific Minor Alterations to Existing Clauses and Tables Included in the Contract
1	E	0/3	List of Numbered Appendices Referred to in the Specification and Included in the Contract
1	E	0/4	List of Drawings Included in the Contract Requirements
			PRELIMINARIES
Not Used	Not Used	1/1	Accommodation and Equipment for the Employer's Representative
Not Used	Not Used	1/2	Vehicles for the Employer's Personnel
Not Used	Not Used	1/3	Communication System for the Employer's Personnel
Not Used	Not Used	1/4	Working and Fabrication Drawings
1	E	1/5	Testing to be Carried out by the Contractor
1	E	1/6	Supply and Delivery of Samples to the Employer's Representative
1	E	1/7	Site Extent and Limitations on Use
Not Used	Not Used	1/8	Operatives for the Employer's Representative
1	E	1/9	Control of Noise and Vibration
Not Used	Not Used	1/10	Structures to be Designed by the Contractor
Not Used	Not Used	1/11	Structural Elements and Other Features to be Designed by the Contractor
1	E	1/12	Setting Out and Existing Ground Levels
1	E	1/13	Programme of Design and Execution and Completion of the Works
1	E	1/14	Monthly Statements
1	E	1/15	Accommodation Works
1	E	1/16	Privately and Publicly Owned Services and Supplies

Specimen Volume A – Works Requirements - Book 1

VOL. A BOOK NO.	COMPLETED BY	APPENDIX	TITLE
1	E	1/17	Traffic Safety and Management
1	E	1/18	Temporary Diversions for Traffic
1	E	1/19	Routeing of Vehicles
1	E	1/20	Recovery Vehicles for Breakdowns
Not Used	Not Used	1/21	Information Boards
1	E	1/22	Progress Photographs
1	E	1/23	Substances Hazardous to Health
1	E	1/24	Quality Management Schemes
1	E	1/25	Product Certification Schemes
1	E	1/26	NSAI Agrément Certificates
1	E	1/27	Site Meetings
			SITE CLEARANCE
Not Used	Not Used	2/1	List of Buildings, etc, to be Demolished
1	E	2/2	Filling of Trenches & Pipes
1	E	2/3	Retention of Material Arising from Site Clearance
Not Used	Not Used	2/4	Explosives and Blasting
1	E	2/5	Hazardous Materials
			FENCING AND ENVIROMENTAL NOISE BARRIERS
Not Used	Not Used	3/1	Fencing, Gates and Stiles
Not Used	Not Used	3/2	Fencing: NRA Road Construction Details
			ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN)
Not Used	Not Used	4/1	Safety Barriers
Not Used	Not Used	4/2	Pedestrian Restraint Systems
Not Used	Not Used	4/3	Safety Barriers Terminals
Not Used	Not Used	4/4	Safety Barriers Maintenance
Not Used	Not Used	4/5	Anti-Glare Screens
Not Used	Not Used	4/6	Safety Barriers: NRA Road Construction Details
Not Used	Not Used	4/7	Vehicle Parapet Systems

Specimen Volume A – Works Requirements - Book 1

VOL. A BOOK NO.	COMPLETED BY	APPENDIX	TITLE
			DRAINAGE AND SERVICE DUCTS
1	E	5/1	Drainage Requirements
Not Used	Not Used	5/2	Service Duct Requirements
1	E	5/3	Surface Water Channels and Drainage Channel Blocks
Not Used	Not Used	5/4	Fin Drains and Narrow Filter Drains and Geotextiles for Filter Drains
Not Used	Not Used	5/5	Combined Drainage and Kerb Systems
Not Used	Not Used	5/6	Linear Drainage Channel Systems
Not Used	Not Used	5/7	Drainage and Service Ducts: TII Road Construction Details
Not Used	Not Used	5/8	Thermoplastics Structural Wall Pipes and Fittings
Not Used	Not Used	5/9	Attenuation
			EARTHWORKS
1	E	6/1	Requirements for Acceptability & Testing of Earthworks Materials
1	E	6/2	Requirements for Dealing with Class U2 Unacceptable Material
1	E	6/3	Requirements for Excavation, Deposition, Compaction (other than Dynamic Compaction)
Not Used	Not Used	6/4	Not Used
Not Used	Not Used	6/5	Geotextiles Used to Separate Earthworks Materials
Not Used	Not Used	6/6	Fill to Structures and Fill above Structural Foundations
Not Used	Not Used	6/7	Sub-formation & Capping & Preparation & Surface Treatment of Formation
Not Used	Not Used	6/8	Topsoiling, Grass Seeding and Turfing
Not Used	Not Used	6/9	Earthwork Environmental Bunds, Landscape Areas, Screening Mounds, Strengthened Embankments
Not Used	Not Used	6/10	Ground Anchorage, Crib Walling and Gabions
Not Used	Not Used	6/11	Swallow Holes and Other Naturally Occurring Cavities and Disused Mine Workings
Not Used	Not Used	6/12	Instrumentation and Monitoring
Not Used	Not Used	6/13	Ground Improvement

Specimen Volume A – Works Requirements - Book 1

VOL. A BOOK NO.	COMPLETED BY	APPENDIX	TITLE
			ROAD PAVEMENTS – GENERAL
1	E	7/1	Permitted Pavement Options
1	E	7/2	Excavation and Reinstatement of Existing Surfaces
1	E	7/3	Surface Dressing Product (End Performance)
1	E	7/4	Bituminous Sprays
1	E	7/5	Road Pavements: TII Road Construction Details
Not Used	Not Used	7/6	Breaking up or Perforation of Existing Pavement
Not Used	Not Used	7/7	Not Used
Not Used	Not Used	7/8	Not Used
1	E	7/9	Cold-milling (Planing) of Bituminous Bound Flexible Pavement
Not Used	Not Used	7/10	Microsurfacing
Not Used	Not Used	7/11	High Friction Surfacing
Not Used	Not Used	7/12	Low Energy Bound Mixtures
Not Used	Not Used	7/21	Recipe Surface Dressing
			KERBS, FOOTWAYS AND PAVED AREAS
Not Used	Not Used	11/1	Kerbs, Footways and Paved Areas
Not Used	Not Used	11/2	Access Steps
Not Used	Not Used	11/3	Kerbs, Footways and Paved Areas: TII Road Construction Details
			TRAFFIC SIGNS
Not Used	Not Used	12/1	Traffic Signs: General
Not Used	Not Used	12/2	Traffic Signs: Reflective Markers
1	E	12/3	Traffic Signs: Road Markings and Studs
Not Used	Not Used	12/4	Traffic Signs: Cones, Cylinders, FTD's and Other Traffic Delineators
Not Used	Not Used	12/5	Traffic Signs: Traffic Signals
Not Used	Not Used	12/6	Traffic Signs: Special Sign Requirements on Gantries
Not Used	Not Used	12/7	Traffic Signs: Preparation and Finish of Metal and Other Surfaces

Specimen Volume A – Works Requirements - Book 1

VOL. A BOOK NO.	COMPLETED BY	APPENDIX	TITLE
			ROAD LIGHTING COLUMNS AND BRACKETS
Not Used	Not Used	13/1	Information to be Provided by the Designer for the Road Lighting Works when Specifying Lighting Columns and Brackets
Not Used	Not Used	13/2	Column and Bracket Data Sheets 1 & 2
Not Used	Not Used	13/3	Instructions for Completion of Column and Bracket Data Sheets
Not Used	Not Used	13/4	Certification for Lighting Columns
Not Used	Not Used	13/5	Road Lighting Columns and Brackets: TII Road Construction Details
			ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS
Not Used	Not Used	14/1	Site Records
Not Used	Not Used	14/2	Location of Lighting Units and Feeder Pillars
Not Used	Not Used	14/3	Temporary Lighting
Not Used	Not Used	14/4	Electrical Equipment for Road Lighting
Not Used	Not Used	14/5	Electrical Equipment for Traffic Signs
Not Used	Not Used	14/6	Preparation and Finish of Metal and Other Surfaces
			MOTORWAY COMMUNICATIONS
Not Used	Not Used	15/1	Motorway Communications
			PILING AND EMBEDDED RETAINING WALLS
Not Used	Not Used	16/1	General Requirements for Piling and Embedded Retaining Walls
Not Used	Not Used	16/2	Precast Reinforced and Prestressed Concrete Piles and Precast Reinforced Concrete Segmental Piles
Not Used	Not Used	16/3	Bored Cast-in-Place Piles
Not Used	Not Used	16/4	Bored Piles Constructed Using Continuous Flight Augers and Concrete or Grout Injection Through Hollow Auger Stems
Not Used	Not Used	16/5	Driven Cast-in-Place Piles
Not Used	Not Used	16/6	Steel Bearing Piles
Not Used	Not Used	16/7	Reduction of Friction on Piles

VOL. A BOOK NO.	COMPLETED BY	APPENDIX	TITLE
Not Used	Not Used	16/8	Non-Destructive Methods for Testing Piles
Not Used	Not Used	16/9	Static Testing of Piles
Not Used	Not Used	16/10	Diaphragm Walls
Not Used	Not Used	16/11	Hard/Hard Secant Pile Walls
Not Used	Not Used	16/12	Hard/Soft Secant Pile Walls
Not Used	Not Used	16/13	Contiguous Bored Pile Walls
Not Used	Not Used	16/14	King Post Walls
Not Used	Not Used	16/15	Steel Sheet Piles
Not Used	Not Used	16/16	Integrity Testing of Wall Elements
Not Used	Not Used	16/17	Instrumentation for Piles and Embedded Walls
Not Used	Not Used	16/18	Support Fluid
			STRUCTURAL CONCRETE
Not Used	Not Used	17/1	Concrete – Classification of Mixes
Not Used	Not Used	17/2	Concrete – Impregnation and Coating Schedule
Not Used	Not Used	17/3	Concrete – Surface Finishes
Not Used	Not Used	17/4	Concrete – General
			STRUCTURAL STEELWORK
Not Used	Not Used	18/1	Requirements for Structural Steelwork
			PROTECTION OF STEELWORK AGAINST CORROSION
Not Used	Not Used	19/1	(Specification for Road Works) Sheet No. Form BE/P1 (New Works) Paint System Sheet
Not Used	Not Used	19/2	(New Works) Requirements for Other Work
Not Used	Not Used	19/3	(Specification for Road Works) Form BE/P2 Paint Data Sheet
Not Used	Not Used	19/3*	(Specification for Road Works) Form BE/P3 Paint Sample List: Sheet 1
Not Used	Not Used	19/3*	(Specification for Road Works) Form BE/P3 Paint Sample List: Sheet 2

Specimen Volume A – Works Requirements - Book 1

VOL. A BOOK NO.	COMPLETED BY	APPENDIX	TITLE
Not Used	Not Used	19/5	(Specification for Road Works) Form BE/PE1 (Maintenance) Paint System Sheet 1
Not Used	Not Used	19/6	(Specification for Road Works) Form BE/P1 (Maintenance) Paint System Sheet 2
Not Used	Not Used	19/7	(Maintenance) Requirements for Other Work
Not Used	Not Used	19/8	(Maintenance) General Requirements
			WATERPROOFING FOR CONCRETE STRUCTURES
Not Used	Not Used	20/1	Form PWS Proprietary Waterproofing System Data Sheet (1991 & Annex 'A')
Not Used	Not Used	20/2	Waterproofing for Concrete Structures
			BRIDGE BEARING
Not Used	Not Used	21/1	Bridge Bearing Schedule
			BRIDGE EXPANSION JOINTS AND SEALING OF GAPS
Not Used	Not Used	23/1	Bridge Deck Expansion Joint Schedule
Not Used	Not Used	23/2	Sealing of Gaps Schedule (other than in Bridge deck expansion joints)
			BRICKWORK, BLOCKWORK AND STONEMWORK
Not Used	Not Used	24/1	Brickwork, Blockwork and Stonework
Not Used	Not Used	24/2	Brickwork, Blockwork and Stonework: NRA Road Construction Details
			SPECIAL STRUCTURES
Not Used	Not Used	25/1	Requirements for Corrugated Steel Buried Structures
Not Used	Not Used	25/2	Requirements for Reinforced Soil and Anchored Earth Structures
Not Used	Not Used	25/3	Requirements for Reinforced Clay Brickwork Retaining Walls of Pocket Type and Grouted Cavity Construction Structures
			MISCELLANEOUS
Not Used	Not Used	26/1	Ancillary Concrete
Not Used	Not Used	26/2	Bedding Mortar
Not Used	Not Used	26/3	Cored Thermoplastic Node Markers

VOL. A BOOK NO.	COMPLETED BY	APPENDIX	TITLE
			WATERMAINS, UTILITIES AND ACCOMMODATION WORKS
Not Used	Not Used	27/1	Watermains, Utilities and Accommodation Works
Not Used	Not Used	27/2	Watermains: TII Road Construction Details
			TRENCHLESS INSTALLATION OF ROAD DRAINAGE & SERVICE DUCTS
Not Used	Not Used	28/1	Trenchless and Minimum Dig Techniques
			CCTV SURVEY OF ROAD DRAINAGE SYSTEMS
Not Used	Not Used	29/1	CCTV Survey of Road Drainage Systems

Table 0/3.1 List A - Numbered Appendices Referred to in the Specification and Included in the Contract

List 'B' - List of Contract-Specific Numbered Appendices Devised for the Contract

APPENDIX	TITLE	USED
1/27	Site Meetings	Yes
1/28	Completion of Works	Yes
1/29	Protection of the Works	Yes
1/60	As-Built Record Drawings	Yes

Table 0/3.2 List B - Numbered Appendices Referred to in the Specification and Included in the Contract

APPENDIX 0/4 - LIST OF DRAWINGS INCLUDED IN THE CONTRACT

Contract specific drawings supplied to each Tenderer

Drawing No.	Title
1	Specimen Works Requirements Drawing – Volume A

The TII Standard Construction Details contain the following Drawings brought into the Contract by reference. Unless otherwise stated below the whole drawing is brought into the Contract.

Drawing No.	Title

APPENDIX 1/1 – ACCOMMODATION AND EQUIPMENT FOR THE EMPLOYER’S REPRESENTATIVE

Not Used

APPENDIX 1/2 – VEHICLES FOR THE EMPLOYER’S REPRESENTATIVE

Not Used

APPENDIX 1/3 – COMMUNICATIONS SYSTEMS FOR THE EMPLOYERS PERSONNEL

Not Used

APPENDIX 1/4 – STANDARDS, QUALITY ASSURANCE SCHEMES, AGRÉMENT CERTIFICATES AND OTHER APPROVALS

APPENDIX 1/5 - TESTING TO BE CARRIED OUT BY THE CONTRACTOR

1. The table on the following pages stipulates 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 Employers Representative on completion of testing.
2. Tests carried out by the Contractor to demonstrate compliance with the Specification shall be carried out by a laboratory approved by the Employers Representative.
3. 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 105.5).
4. (IL) indicates that an INAB test report or certificate is required.
5. (IAB) indicates that an Irish Agrément Board Certificate, or British Agrément Board Certificate, is required.
6. Unless otherwise shown in this Appendix tests for work or materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.
7. Unless otherwise shown in this Appendix test certificates for works, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the Work.
8. All testing shall, unless otherwise stated, be completed before the date of substantial completion.
9. The Contractor shall carry out additional testing as and when instructed by the Employers Representative.

Table 1/5.1 Testing to be carried out by the Contractor

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 800					
804	Granular material Type B	Grading	1 per 300 tonnes		
		Liquid Limit (IL)			
		OMC/mc (IL)	1 per source and then monthly		
		10% fines value(IL)			
		Flakiness index (IL)			
		Soundness(IL)	1 per source		
		Water absorption(IL)			
Series 900					
901 925 938 942	Aggregates for bituminous mixtures				
		Determination of resistance to fragmentation – Las Angeles Coefficient (IL)	Monthly		
		Determination of percentage of crushed and broken surfaces in course aggregate particles(IL)	Monthly		
		Magnesium Sulphate Test (IL)	1 per 2 years		
		Determination of particle density and water absorption (IL)	2 per year		
		Determination of particle size distribution (mass passing 0.063mm sieve) (IL)	Monthly		Washing and sieving method to be used

Framework for Pavement and Associated Minor Works
Specimen Volume A – Works Requirements - Book 1

		Determination of particle shape of aggregates - Flakiness index (IL)	Monthly		
		Determination of Polished stone value (PSV) (IL)	2 per year per source		
		Determination of resistance to surface abrasion – (AAV) (IL)	2 per year per source		
	Binders for bituminous materials	Penetration(IL)	1 per 750 tonnes		
		Softening point(IL)	1 per 750 tonnes		
		Other IS EN/BS Tests	As required		
903 to 914, 916, 925, 930, 932 to 934	Bituminous Mixtures	Determination of particle size distribution (IL)	1 per 75 tonnes* (min 2 per day)		
		Binder content (IL)			
911	Rolled asphalt Surface Course (design mix)	Stability value	1 per contract		
		Flow value			
		Density			
915 925	Coated chippings	Determination of resistance to fragmentation – Las Angeles Coefficient (IL)	Monthly		
		Determination of particle size distribution (IL)	1 per 75 tonnes		
		Binder content (IL)	1 per 75 tonnes		

[More Frequent tests/samples should be scheduled for modified binders]

Framework for Pavement and Associated Minor Works
Specimen Volume A – Works Requirements - Book 1

		Determination of particle shape of aggregates - Flakiness index (IL)	Monthly		
		Determination of Polished stone value (PSV) (IL)	2 per year per source		
		Determination of resistance to surface abrasion – (AAV) (IL)	2 per year per source		
		Hot sand test (IL)	<i>[As required]</i>		
918					
	Slurry sealing	Site control tests / Tests specified in clause 918	As required in clause 918		
919	Surface Dressing	Aggregates / Other IS EN / BS Tests	<i>[As required]</i>		As required in IAT Guidelines
		Binder / Penetration (IL)	1 per 750 tonnes		[More frequent tests/samples should be scheduled for modified binders]
		Binder / Softening point (IL)	1 per 750 tonnes		
		Binder / Other IS EN / BS Tests	<i>[As required]</i>		As required in IAT Guidelines
		Rate of spread of binder / Test specified in IAT publication "Guidelines for Surface Dressing in Ireland"	Daily		

Framework for Pavement and Associated Minor Works
Specimen Volume A – Works Requirements - Book 1

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900 (Continued)					
920	Bituminous sprays				
		Binder / Tests as specified for surface dressing binder	As required for surface dressing binder		As per IAT guidelines
		Blinding material / Determination of particle size distribution (IL)	1 per contract		
		Blinding material / Rate of application	Daily		
921	Surface texture of bituminous Surface Course	Texture depth (TRRL mini texture meter) (IL)	[As required]		
		Texture depth (Volumetric Patch Technique)	1 per 1000m or complete carriageway where less		
924	Resin-based high skid resistant surface treatment				
		Aggregate / Determination of polished stone value (PSV) (IL) (Manufacturer's test)	1 per source		
		Aggregate / Determination of particle size distribution (IL)	1 per source		
		Binder / Rate of spread	as required		
		Cured binder / Tensile strength	2 per 1000 m² / shift		
		Cured binder / Elongation			
901 929	Compacted bituminous material	Percentage refusal density test (IL)	As required in BS 4987 : part 2 Clause 901 - 20 and Clause 929		

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1200					
1201	Permanent traffic signs		Required		Certification that the traffic sign is capable of passing the tests in "Certification scheme, Specification, and Guidance for the Construction of Traffic Signs - TS4" and the specified parts of BS 873 is required
1211	Thermoplastic road marking materials	Tests specified in the Standard / Specification given in Appendix 12/2			
1213	Flat traffic delineators	Tests specified in Clause 1213	Required		Certification that FTD's have been tested and comply with Clause 1213 is required

Notes:

1. 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 105.40).
2. (IL) indicates that a ILAB test report or certificate is required.
3. Unless otherwise shown in this appendix test for work, goods and materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.
4. Unless otherwise shown in this Appendix test certificates for work, goods and materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.

Table 1/5.2 Testing to be carried out by the Contractor

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 800					
801 802 804 805 806 807 808 809	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	[Where Required] [See NG 808]
		Oxidisable sulphides (OS) content (IL)	1 per 200m3 for each source (min of 5 total per source)*		
	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)*		[Where Required] [See NG 809]
		Oxidisable sulfides (OS) content (IL)	1 per 200m3 for each source (min of 5 total per source)*		
	Unbound mixtures	Grading and fines content	1 per 1000 tonnes or minimum of 2 per day*		[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]
		Flakiness index (IL)	1 per week*		
		Los Angeles Coefficient (IL)	2 per year*		
		Methylene Blue (IL)	1 per week*		
		Water absorption (IL)	[As Required]		[See NG 801.10]

Framework for Pavement and Associated Minor Works
Specimen Volume A – Works Requirements - Book 1

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
801 802 804 805 806 807 808 809 (Contd)	Types A, B, C & D granular material Types B, C, D & E granular material Types A & C granular material Type C granular material Type A granular material	Magnesium Sulphate Soundness (IL))	1 per 2 years*	Required	[Where Required] [Declared values from the factory production control system operated by the producer to be provided - see Annex D of IS EN 13285]
		OMC (IL)	2 per year*		
		Moisture Content	1 per 1000 tonnes or minimum of 2 per day*		
		Liquid Limit (IL)	1 per week*		
		CBR (IL)	1 per week*		
		Density (IL)	2 per year*		
		Percentage of crushed or broken particles and of totally rounded particles in coarse aggregates	1 per month*		
		Plasticity index (IL)	1 per week*		
810 821 822 823 824 825 826	Cement Bound Mixtures	Water soluble sulphate (WS) content (IL)	1 per 200m3 for each source (min of 5 total per source)*	Required	[See NG 808 & 820]
		Oxidisable sulphides (OS) content (IL)	1 per 200m3 for each source (min of 5 total per source)*		[See NG 808 & 820]
		Tests for control and checking of HBM	Tests specified in Table 8/15 and Table 8/16		[See NG 825]
		Coefficient of linear expansion (IL)	[As required]		[See Clause 819]

Framework for Pavement and Associated Minor Works
Specimen Volume A – Works Requirements - Book 1

		Tests for laboratory mixture design	As specified in Clause 826		[See NG 826]
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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 Tables 15	As per Type Test report applicable to the Contract	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									
6					Bituminous mixtures	Requirements per Tables 1, 2, 4, 5, 7, 8, 10, 11 & 14	As per Type Test report applicable to the Contract		
7.2									
7.3									
8.1									
8.4									
8.6									
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)*						

Framework for Pavement and Associated Minor Works
Specimen Volume A – Works Requirements - Book 1

		High friction surfacing – binders	Requirements per Table 23a	1 test per property per source (source approval)*		
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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			
		Reclaimed asphalt	Requirements per Tables 13a & 13b	As per Type Test report applicable to the Contract		

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
3	Product Composition					
4						
5			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
6			Binder content (IL)			
8.1						

Framework for Pavement and Associated Minor Works
Specimen Volume A – Works Requirements - Book 1

						the Employer's Representative to enable subsequent test results to be compared.
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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		

Framework for Pavement and Associated Minor Works
Specimen Volume A – Works Requirements - Book 1

		Bituminous mixtures – Containing >10% reclaimed asphalt	Recovered penetration (IL)	As required per Series 900	Required	
			Recovered softening point (IL)			
			Indirect tensile strength (IL)			
Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
			Moisture induced sensitivity test conditioning (IL)			Requirement is to make available to 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.

Framework for Pavement and Associated Minor Works
Specimen Volume A – Works Requirements - Book 1

			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 taken from the wheel tracks.
			Stiffness (IL)	1 pair of cores every 1,000 linear metres laid per running lane		Cores taken from the wheel tracks.

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
		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 -	10 over 50 metres lane	Required	Refer to Series 900 for

Framework for Pavement and Associated Minor Works
Specimen Volume A – Works Requirements - Book 1

			Volumetric Patch (IL)	length		requirements regarding minimum test coverage.
		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.

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
			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.
		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 binder	As required per Series 900		
			Accuracy of spread of binder			

Framework for Pavement and Associated Minor Works
Specimen Volume A – Works Requirements - Book 1

			Rate of spread of chipping			
			Accuracy of spread of chipping			

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
			Volumetric patch (IL)	10 over 50 metres lane length	Required	Refer to Series 900 for requirements regarding minimum test coverage.
		High friction surfacing	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.

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	

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1200					
1202	Permanent traffic signs	Test specified in the Standard/Specification given in Clause 1202		Required	I.S. EN 12899-4 Factory Production Control procedures apply.
1213	Permanent traffic cones and traffic cylinders	Part 7 of I.S. EN 13422		Required	Quality management and product certification schemes apply
1216	Thermoplastic road marking materials	Tested for the requirements of the specification in accordance with I.S. EN 1436 initially on application and as detailed during the guarantee period.		Required	Quality management and product certification schemes apply.
1217	Retroreflecting road studs	Test specified in the Standard/ Specification given in Clause 1217		Required	Quality management and product certification schemes apply

APPENDIX 1/6 - SUPPLY AND DELIVERY OF SAMPLES TO THE EMPLOYER'S REPRESENTATIVE

1. As soon as possible after the Contract has been awarded, the Contractor shall submit to the Employer's Representative a list of suppliers from whom he proposes to purchase the material necessary for the execution of the Works. Each supplier must be willing to admit the Employer's Representative or his representative to his premises during ordinary working hours for the purpose of obtaining samples of the materials in question. Alternatively, if required by the Employers Representative, the Contractor shall deliver the samples of the materials to the Employers Representative. Samples shall be taken in accordance with the relevant Standard where applicable. Materials subsequently supplied shall conform with any specified tolerances to the quality of samples, which have been approved by the Employers Representative.
2. The following samples shall be delivered to the Employers Representative's site office at the outset of the Contract. No work shall commence with these materials until they have been approved, by the Employers Representative, in writing:

Sample Description	Sample Size	Delivery Location	

Notes:

- a) Samples 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).
- b) 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 Work.
- c) Unless otherwise scheduled under Clause 2602 samples of concrete complying with that Clause are not required.

APPENDIX 1/7 - SITE EXTENT AND LIMITATIONS ON USE

1. Extent of the Site

The extent of the Site shall include inter alia:

- (i) The Area Provided by the Employer as shown on Drawing No.'s Specimen Drawing listed in Appendix 0/4 of the Specification
- (ii) Areas required for traffic management measures by the Contractor in compliance with Clauses 1/17 and 1/18 of the Specification.

2. Limitations on the Use of the Site

- i. Where public roads are included within the extent of the Site, the Contractor shall maintain adequate traffic routes across, within and through the Site, in accordance with Appendix 1/17 & Appendix 1/18 of the Specification.
- ii. The Contractor is limited in the use of public roads (national and regional only) as a means of access to the Site as stated in Appendix 1/19.
- iii. The Site shall be used solely for the execution of the Works.
- iv. The Contractors attention is drawn to Appendix 1/9 of the Specification concerning limitations on noise and vibration.
- v. The normal permitted working hours on the Site shall be Monday to Friday between 0700 and 1900 hours and Saturday between 0830 and 1630 hours with no working on Sundays and Public Holidays, unless otherwise stated to comply with traffic management restrictions in Appendices 1/17, 1/18 and 1/19. Exceptionally, the Employer's Representative's consent for work outside these hours may be given after necessary consultation and written approval. A minimum of 14 days notice shall be required from the Contractor when seeking such consent. Where work is thus permitted on Sundays or Public Holidays, it shall only be carried out between the hours of 0900 hrs and 1600hrs. The Contractor's attention is drawn to the proximity of existing dwellings to the Site and hence the control of noise and vibration as per Appendix 1/9, is of paramount importance.
- vi. The Contractor shall not use areas of land with a temporary right of access for any purpose other than the execution and completion of the Works. The Contractor shall minimize the area of land occupied to that which is essential for the safe execution and completion of such part of the Works. The Contractor shall reinstate all areas of land which have been temporarily occupied to the satisfaction of the affected landowner, occupier and the relevant Authorities. Utilities Service

Providers and Private utility Services and other companies.

- vii. The Contractor shall ensure that no damage is caused to existing buildings or services due to the delivery of materials or the execution of Works.
- viii. Accommodation Works shall be executed and completed as soon as possible so that inconvenience to the property owners and occupiers shall be minimized.
- ix. The Contractor shall provide and maintain at all times suitable temporary access (vehicular and pedestrian) to lands and property affected by the execution and completion of the Works having regard to the use of the lands and property.
- x. The contractor must give a minimum of 72 hours advance notice to property owners where scheduled Works have the effect of limiting access to properties. A written record of this advance notice must be provided to the Employers Representative prior to commencement of these Works.
- xi. Prior to entering parcels of land not acquired in their entirety, the Contractor shall erect suitable temporary/permanent fencing taking into account the requirements of adjacent land usage.
- xii. Notwithstanding the other provisions of the Contract the Contractor shall not have exclusive use of the Site and shall be aware that third parties shall be operating within the extent of the Site. Without limiting the previous sentence, those areas defined in Appendix 1/13 of the Specification and within this Appendix 1/7 shall not be for the sole use of the Contractor.
- xiii. Works shall not be carried out in watercourses between the 16th September and the 14th May unless otherwise approved by the Employer's Representative.
- xiv. The Contractor shall maintain flow in watercourses, streams and rivers during the construction of the Works and any temporary drainage Works must be equal in capacity to the existing or proposed drainage infrastructure, whichever is the greater. Flows must be maintained without flooding to adjacent property.
- xv. The Contractor shall liaise with the OPW in advance of any Works impacting on watercourses that require a diversion of the watercourse.

3. Licences

It is the responsibility of the Contractor to obtain all licences, permits, permissions etc. required for the disposal of surplus material in accordance with Planning, Waste and all other relevant legislation.

4. Additional Particular Limitations on Certain Lands

The Contractor shall note the following:

In the event of the programme of works the programme of works extending beyond the date permitted in the contract Clare Council may dictate the order of the works by location in order to meet expenditure deadlines or for any other reason.

5. Traffic Management

Refer to the Design Process Traffic Management Plan and the Preliminary Safety and Health Plan for traffic management limitations.

APPENDIX 1/9 - CONTROL OF NOISE AND VIBRATION

CONTROL OF NOISE

1. The normal working hours within the Site shall be Monday to Friday between 0700 hrs and 1900 hrs and Saturday between 0830 hrs and 1630 hrs, with no working on Sundays or Public Holidays, except where otherwise stated in Appendices 1/17, 1/18 and 1/19 to comply with traffic management restrictions. Where work is thus permitted on Sundays or Public Holidays, it shall only be carried out between the hours of 0900 hrs and 1600hrs. Exceptionally, the consent of the Employer's Representative outside these hours may be given after any necessary consultation. Fourteen days notice is required from the Contractor when seeking such consent.
2. The Contractor shall employ the best practical means to minimise noise produced by his operations including plant maintenance and shall comply with the recommendations in BS5228 (Code of Practice for Noise and Vibration Control on Construction and Open Sites).
3. All vehicles and mechanical plant used on the Works shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order for the duration of the works in compliance with BS 5228. Machines in intermittent use shall be shut down in the periods between Works or throttled down to a minimum. The Contractor shall remove from the Works any item of plant, which in the opinion of the Employer's Representative is ineffectively silenced. All compressors shall be "sound reduced" models fitted with properly lined and sealed acoustic covers shall be kept closed whenever the machines are in use and all ancillary pneumatic percussion tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers. Pumps and mechanical static plant shall be enclosed by acoustic shields or screens.
4. Any plant such as generators and pumps which is required to work outside the hours of 0800 hrs to 1800 hrs shall be surrounded by an acoustic enclosure to the approval of the Employer's Representative which shall restrict the noise level to not less than 5 db (A) Leq (1 Hr.), and a maximum noise level of 55 db(A) must not be exceeded unless the existing ambient noise levels are higher. In such cases the ambient noise levels may be exceeded by 5 db(A).
5. The Contractor shall organise his operations with regard to the positioning of plant and the location of hauls routes etc. so as to minimise construction noise to adjacent properties.

6. The Contractor shall ensure that at all properties outside the Site boundaries the sound levels arising from his activities do not exceed the following values, except for five occurrences per hour when up to 85 dB(A) will be allowed for not more than 15 seconds for each occurrence:

Period	Hours	Ambient Sound Level LAeg – db(A)	Maximum Sound Level db(A)
Monday to Friday	08:00 - 18:00	65	70
Saturday	08:30 – 16:30	50	55

At all other times the sound level of 50 db (A) Leq (1 Hr.) and a maximum noise level of 55 db(A) must not be exceeded unless the existing ambient noise levels are higher. In such cases the ambient noise levels may be exceeded by 5 db(A).

Maximum sound level is the highest value indicated on a sound level meter which meets the requirements of EN 61672:2

CONTROL OF VIBRATION

7. The Contractor shall take note of the proximity of dwellings and structures adjacent to the Works and shall select appropriate compaction plant and methods so as to avoid any damage to structures.
8. Vibration generated by the Contractor's activities shall not adversely affect the structural and serviceability of any building or structure outside the site boundary. In addition, the maximum permitted peak particle velocity generated by the construction of the Works shall be 5mm/second measured at the building closest to the operations being carried out.
9. The Contractor shall employ the best practical means to minimize vibration produced by his activities, including plant selection and maintenance, in accordance with Cl.109 of CC-SPW-00100
10. Compliance with the requirements in this Works Requirements and the Specification with respect to noise, vibration and the control of dust and mud shall not relieve the Contractor of his obligations to Third Parties with regards to nuisance caused.

APPENDIX 1/10 – INFORMATION BOARDS

1. 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

APPENDIX 1/12 – SETTING OUT AND EXISTING GROUND LEVELS

1. Prior to commencing construction the Contractor shall set out centre lines and offset lines in sufficient detail to ensure that the work is fully compatible with existing features and any proposed constructions. The centre lines of the Works shall be perfectly coordinated with and shall be continuous with the centre lines of the adjacent Works or existing roads. The Contractor shall, when instructed by the Employer's Representative, make any adjustments necessary to satisfy these requirements.
2. The Contractor shall, prior to the commencement of any carriageway widening, footway/kerbing or overlay Works, agree in writing with the Employer's Representative the existing ground levels, the existing vertical geometric alignment design parameters (gradients, vertical curve lengths and cross falls) and any remedial measures to surface irregularities.
3. The Design Finished Road Levels for the Scheme will be provided to the successful tenderer prior to the commencement of construction on-site.
4. Setting out of finished road levels shall be the sole responsibility of the Contractor.
5. All levels are to Ordnance Survey Ireland Malin Head datum.

APPENDIX 1/13 - PROGRAMME OF WORKS

1. The Contractor shall provide the programme in accordance with Clause 4.9 of the conditions and in accordance with the specific requirements of this Appendix 1/13.
2. The Contractor shall provide the programme in the form of a bar chart, produced as a result of a "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, each of which shall be given a short title. All events shall be numbered and annotated with earliest and latest event dates. The critical path analysis referred to above shall be provided to the Employer's Representative in hard format and also in intelligible digital-source format using recognised programming software agreed with the Employer's Representative e.g. "Primavera" or "MS Project".
3. In producing this programme, the contractor must take into account all the constraints noted in the Preliminary Safety and Health Plan and below.

Schedule of Stated Constraints

This list of Constraints is not exhaustive and all others suggested or implied by the Contract Documents or considered prudent by the Contractor following his inspection of the site shall be taken into account by him formulating his tender and contract programme:

In accordance with Clause 9.1.1 of the Conditions of Contract the Starting date Notice period to be given to the employer is reduced from 15 days to 1 day. The starting date therefore shall also be 1 day after the Contract Date.

- i. Normal working hours are defined in Appendix 1/9.
 - (a) Works other than pumping from excavations, watching and emergency works necessary for the safety of the works shall not be executed outside normal working hours.
 - (b) Should the Contractor wish to work outside normal working hours, permission must be obtained from the Employer's Representative. The Employers Representative may approve particular times for work outside normal hours and reserves the right to withdraw his approval to all or any particular time.
- ii. Access to all business and other premises to be accommodated at all times, including out of hours deliveries, refuse collections etc. The Contractor shall take all necessary measures to minimise the impact of his activities on the businesses in the locality and shall meet and liaise with the business representatives to agree the extent of that impact.
- iii. Peak hour traffic is defined as all weekdays between 08:00 and 09:30 and 16:30 to 18:00 hours. The Contractor is required to factor this into the programme and ensure that traffic delay is minimised during these times. One-way shuttle systems shall not be operated during peak hours.

- iv. Constraints imposed by the extensive Traffic Management Measures required to facilitate the construction of the Works and the necessity for liaison and the obtaining of permissions with respect to all traffic management proposals.
- v. Constraints imposed by Appendix 1/17;
- vi. Working around privately and publicly owned services and supplies. Constraints imposed by Appendix 1/16.
- vii. Traffic safety and management including notice requirements and restrictions arising from the use of substances hazardous to health.
- viii. Provision of environmental protection prior to the main construction operation.
- ix. Trials and demonstrations in advance of main construction.
- x. Approvals by the Employer's Representative of domestic sub-contractor nominations.
- xi. Compliance with Planning, Environmental and other legislation. The Contractor must apply for a Waste Management License.
- xii. Constraints imposed by complying with Appendix 1/9 Noise and Vibration control.
- xiii. Constraints imposed by the phasing of the Works including the Limitations of the Use of the Site set out in Appendix 1/7.
- xiv. Setting up and agreeing the level and location of all permanent markers.
- xv. Constraints imposed on the planning and programming of the Works and methods of construction through working with live services and the programming in conjunction with the relevant statutory authorities as outlined in Clause 116 of the Specification and Appendix 1/16.
- xvi. Constraints and programming with relevant utilities for both temporary and permanent above and below ground utility connections. Constraints imposed by Appendix 1/16.
- xvii. Constraints imposed on construction activities due to maintenance at all times of any right of way through or across the Works, the maintenance of access to properties, businesses and other lands, including access for services and supplies and the maintenance of pedestrian/cyclist movements through the Site.
- xviii. Constraints due to in-situ testing as required by the Contract Specification. Constraints imposed by Appendix 1/5.
- xix. Constraints imposed through working on or adjacent to a live carriageway.
- xx. All Works activity, including lighting systems should take account of bat activity.

4 The level of detail should be not less than the following:

- i. Roadworks - in lengths and for each carriageway:
 - a) Site Clearance
 - b) Excavation of unsuitable material
 - c) Drainage
 - d) Cold Milling (Planing)
 - e) Sub-Base
 - f) Regulating Layer
 - g) Base Course
 - h) Binder Course
 - i) Surface Course
 - j) Road marking Lines and studs
 - k) Accommodation Works
- ii. Major privately and publicly owned services and supplies
- iii. Traffic management measures including operation of Site accesses, plant crossings and temporary diversions of traffic
- iv. Accommodation Works
- v. The Contractor shall also provide the Employer's Representative with fortnightly marked up copies of the contemporary (bar chart) programme showing percentage complete in relation to all activities

APPENDIX 1/14 - MONTHLY STATEMENTS

- 1.** The monthly statements submitted to the Employer's Representative in accordance with Clause 11.1 of the Public Works Contract by the Contractor shall, whenever dealing with matters covered by the Pricing Document, be set out under Part and Section headings similar to those in the Pricing Document and shall separately identify each item and specify quantity, unit rate and value.
- 2.** Items not described in the Pricing Document but appropriate for inclusion as measured by work shall be shown at the end of the relevant section or under section heading as appropriate indicating quantity, unit rate and value.
- 3.** In respect of all other matters referred to in Clause 11.1 the Contractor shall separately show in the statement quantities, units and rates of goods and/or materials and also details of any other matters to which the Contractor considers himself/herself entitled.
- 4.** The Contractor shall copy to or allow the Employer's Representative to inspect invoices and copy for goods or materials included in the statement pursuant to Clause 11.2. The detail of submitted monthly statements shall sufficiently describe the nature of the Work such that the Employer's Representative may readily identify it on Site without undue reference to the Contractor

APPENDIX 1/15 – ACCOMMODATION WORKS

1. Accommodation works are to be completed in accordance with Contract Drawings.
2. The Contractor shall complete the Accommodation Works in an expeditious manner and within the time stated for the completion of the works. The Contractor shall give the Engineer at least ten days' notice of the date on which he intends to start Accommodation Works.
3. The Contractor shall take precautions to avoid damage to land and property outside of the Area provided by the Employer. On completion of the Accommodation Works, the Contractor shall, at his own cost, repair and make good to the satisfaction of the Employer's Representative any such damage resulting from both temporary occupation of land necessary for carrying out of the work and gaining access to the location of the Accommodation Works. All unauthorised work carried out by the Contractor outside the area provided by the Employer shall be at the Contractor's own expense and with the written approval of the landowner concerned.
4. The Contractor shall take all necessary precautions to safeguard all existing buildings and works from damage by construction activity, plant operation, ground movement and settlement, and all other activities associated with the execution of the Contract. The Contractor shall make all necessary records (photographic or otherwise) of existing structures and other properties that could be affected by execution of the works prior to the commencement of construction.
5. The Contractor shall ensure that where his Works cause any existing access or gate to be blocked, alternative access shall be provided to the satisfaction of the Employer's Representative and the affected landowner and at no extra cost to the Contract.
6. Before commencing work on Accommodation Works for each individual landowner, the Contractor, in conjunction with the Employer's Representative or his representative shall visit and confirm with each landowner the precise extent and location of all specified and unspecified Works. The Contractor shall also allow for such changes in landowner Accommodation Works, as changing circumstances on the Contract require.
7. Any land drains or services which are impacted shall be reinstated by the Contractor.
8. The area between the edge of new pavement and any existing domestic entrance will be finished in **bituminous surface course macadam** in accordance with Appendix 7/1 and the drawings, unless specified otherwise.
9. The area between the edge of new pavement and any existing agricultural entrance will be finished in **granular material** in accordance with Appendix 7/1 and the drawings, unless specified otherwise.

APPENDIX 1/16 - PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES

1. Details of preliminary arrangements that have been made with Statutory Undertakers and others for the alteration of services affected by the Works are listed in this Appendix.
2. No arrangements have been made in respect of temporary alteration or temporary protection 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
3. The Contractor shall make arrangements with the Statutory Undertakers and others concerned, for the co-ordination of his work with all work, which 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.
4. 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 Work.
5. The Contractor shall include in his tender for measures for the locating of, support and full protection of pipes, cables and other apparatus during the Works and ensure that the Employer's Representative is informed of all arrangements he makes with owners of privately owned services, Statutory Undertakers and Public Authorities as appropriate and for ensuring that no existing mains and services are interrupted without the written consent from the appropriate Authority. The Contractor shall also confirm the location of existing services in advance of the Works.
6. The Contractor shall include in his tender for contacting and making arrangements, with the Statutory Undertakers, Private Utilities and Public Authorities concerned and for phasing into his Programme of Works all work (temporary or permanent) which needs to be carried out by the Statutory Undertakers, Private Utilities and Public Authorities or their contractors concurrently with the Works. Compliance with the periods of notice given in the Appendix does not relieve the Contractor of his obligations. Whenever possible this liaison shall be conducted by meetings convened by the Contractor who shall arrange for the Employer's Representative to be in attendance. The Contractor shall send to the Employer's Representative a copy of the minutes of any such meeting within 24 hours of the meeting. If a meeting is not called but the liaison with the Statutory Undertakers, Private Utilities, Public Authorities or others is by letter, fax, e-mail or telephone the Contractor shall send to the Employer's Representative, within 24 hours of any such liaison a copy of the letter, fax, e-mail or a record of the telephone conversation. It is essential that the Contractor shall keep the Employer's Representative informed of all arrangements agreed with the Statutory Undertakers and Public Authorities concerned.
7. The sequence in which the Contractor proposes to carry out the Works will require

temporary arrangements for the protection of and/or diversion of publicly and privately owned services or supplies prior to the permanent arrangements being implemented. The Employer's Representative shall not issue any instruction to the Contractor with regard to civil works relating to such temporary arrangements for publicly or privately owned services or supplies. Under the Contract this work shall be regarded as temporary works and as such, the costs incurred are deemed to be included within the Contract Sum.

8. It is the Contractor's responsibility to ensure that Statutory Undertakers, Private Utilities, Public Authorities or their contractors are organised in advance to be on Site to carry out their works and that adequate time for their works is allowed for in the Contractor's Programme of Works
9. In addition to the requirements in Clause 116.2 of the Specification, the Contractor is responsible for liaising with and obtaining a copy of any special requirements or Codes of Practice used by the Statutory Undertakers, Private Utilities and Public Authorities. The Contractor shall carry out all Works required in accordance with these special requirements and Codes of Practice.
10. 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 diversion of private services affected by the Works.
11. Disconnected apparatus shall be removed by the Contractor only with the prior consent of the Authority concerned.
12. The Contractor shall satisfy himself as to the exact location of all services, supplies and otherwise prior to carrying out work in any part of the Site. No warranty or representation is given by the Employer as to the accuracy or completeness of any such information. The Employer shall be under no liability for any error, misstatement or omission, and none of such information shall constitute a contract or part of a contract between the Employer and the Contractor and shall not create a duty of care by the Employer to the Contractor.
13. The names, addresses and telephone numbers of the authorities serving in the locality are listed below:

Authorities, Utilities, Service Providers and Private Utility Services	Known Service Location
Electricity Supply Board (ESB)	Several underground ducts and overhead lines along the Scheme length
EIR (Eircom)	Several underground ducts and overhead lines along the Scheme length
Uisce Eireann	Several watermains located along the Scheme length.

APPENDIX 1/17 - TRAFFIC SAFETY AND MANAGEMENT

Traffic Safety and Management Requirements

1. The Contractor shall be responsible for the planning, implementation, maintenance and removal of traffic safety and management measures required in order to facilitate the Works. All such measures shall be in accordance with Chapter 8 of the Department of Transport (DoT) Traffic Signs Manual, Clause 117 of the Specification and this Appendix 1/17.
2. The design and implementation of Traffic Safety and Management Measures shall be carried out by a competent Traffic Safety and Control Officer (TSCO) appointed by the Contractor. The TSCO shall hold a valid Signing, Lighting & Guarding at Roadworks Construction Skills certificate and have a minimum of 5 years' experience in the installation and management of temporary traffic management.
3. Work shall be completed during the normal working hours specified in Appendix 1/7.
4. The national, regional and local roads shall remain open to vehicular traffic at all times.
5. The Contractor shall allow for marshalling of buses and HGVs through the Works Area as required.
6. The Contractor shall assist the Gardai in moving wide/abnormal loads through the Works by modifying the signing/coning as necessary. Signs/cones so moved shall be replaced immediately the abnormal loads have passed through the Works.
7. The TTM Plan shall provide provisions for the safe escort of emergency vehicles through the Works.
8. The Contractor shall notify all adjacent properties impacted by the Works to ensure residents are informed of any disruptions.
9. Flagmen shall be used to provide variable 'green' time commensurate with actual demand at all times during working hours. Outside working hours, temporary traffic signals may be considered, subject to a risk assessment. The Contractor's proposals together with the risk assessment shall be submitted to the Employer's Representative in accordance with Clause 4.7 of the Conditions of Contract. The maximum distance between the flagmen/temporary traffic lights shall be 500m.
10. It is a requirement for a VMS system to be used as part of the TTM Plan to provide advance notice of traffic restrictions that will apply for the Works. The Contractor shall include in his price for this Contract for the provision of 2 No. portable VMSs. The Contractor must also erect the VMS system 1 week in advance of the Works to notify road users of the Works and their duration.
11. The VMS shall be provided for the duration of the Works.

12. Messages and text to be displayed on the portable VMS in both English and Irish and shall be agreed with the Employer's Representative. Typically, messages relating to the type of works, the time of the works (commencement and finishing) and messages specific to the various traffic management phases shall be illustrated. The message shall be displayed at a minimum text size in accordance with the requirements of the Traffic Signs Manual. The Contractor shall maintain all signs in a clean condition before, during and after the execution of the works.
13. The Contractor shall phase the construction of any work which affects the public traffic in a manner acceptable to the Roads Authority, the Garda Síochána, and the Employer's Representative. At least six weeks prior to carrying out any Works which will affect public traffic, the Contractor shall consult with the Roads Authority and the Gardaí.
14. Without prejudice to the Conditions, at least 10 Working Days prior to the commencement of Works the Contractor shall prepare and submit to the Employer's Representative a Detailed Traffic Management Plan, which has the prior agreement of ClareCounty Council and An Garda Síochána, showing the sequence of construction, within the programme constraints of Appendix 1/13, and including the following information as a minimum:
 - a. Phasing of the Works
 - b. Drawings showing the Contractor's proposed traffic management layout, including:
 - i. Geometric design
 - ii. Position of traffic signals
 - iii. Width of lanes
 - iv. Working areas and safety zones
 - v. Crossovers
 - vi. Running lane for emergency vehicles
 - vii. Location for emergency vehicles
 - viii. Access and exit locations for construction traffic
 - ix. Access to properties
 - c. Timing of operations
 - d. The names and contact details of the selected Traffic Safety and Control Officer and his/hers nominated deputies
15. The Contractor shall provide telephone numbers of a minimum of 3 employees who can be contacted by the Gardaí and/or Employers Representative, both during and outside normal working hours, and who shall be responsible for initiating whatever action shall reasonably be required in respect of maintenance of the traffic management system and/or in the event of an emergency.
16. Drawings showing the Contractor's detailed Traffic Management plans shall be to a scale not less than 1:1000, supplemented by drawings at 1:500 or 1:250 scales as necessary.
17. The Contractor shall install temporary lighting at locations where, due to traffic management measures or for any other reasons arising from the Works, the safety of the public may be compromised. The Contractor shall ensure that the temporary lighting shall comply with Section 8.3.8 of Chapter 8 of the DoT Traffic Signs Manual.

18. 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 the Lane or Carriageway Occupation.
19. Where traffic flows will be affected, the Contractor shall provide sufficient advance warning to the Local Authority so that advertisements can be placed in the press. The ultimate traffic authority is An Garda Síochána and any traffic management proposals will require their approval. Liaison with Gardaí can be through the Kilrush or Ennis stations or as directed by An Garda Síochána through other stations depending on the works location. Liaison with Traffic Gardaí shall be through the following offices:
 - Ennistymon, Ennis, Killaloe or Kilrush Garda Station
20. The Employer's Representative shall have the power to specify phased construction of the Works, to facilitate traffic movements. The transport of materials to and from the working sites shall be carried out at such times and by such routes as to minimise disruption to traffic.
21. The Contractor shall comply with the requirements of the Gardaí, and shall make adequate enquiries at all appropriate times regarding their requirements.
22. All drivers including those delivering plant and materials must be given clear instructions regarding the traffic arrangements applicable at any particular time.
23. The Contractor shall be responsible for maintaining the running traffic carriageway and any pedestrian routes adjacent to the Works in a clean and safe condition at all times. These routes shall be properly segregated and protected from trafficked lanes and construction activities.
24. Heavy Goods Vehicles used on Site by the Contractor, his Sub-Contractors or suppliers must be fitted with an audible reversing warning device.
25. Suitable locations shall be agreed with the Gardaí and bus service operators (including school buses) for temporary bus stops where existing facilities are affected by the Works.
26. The cross-section and alignment characteristics of the Local Roads that are linked to the site are such that these Local Roads are unsuitable to cater for diverted National Road traffic. The diversion of National Road traffic onto Local Roads is therefore prohibited. Road closures will not be permitted and claims arising from same will not be entertained.
27. Where necessary, the Contractor shall employ temporary safety barrier systems to delineate and segregate the trafficked lanes from the Contractor's working area during construction. Water ballasted interlocking barriers or similar approved shall be used to control the flow and direction of traffic as necessary at junctions and accesses.
28. Temporary road markings shall not be used on permanent asphalt wearing course.

Traffic Management Plan

29. Tenderers shall provide a draft Temporary Traffic Management Plan (TTMP) prior to appointment.
30. The successful Tenderer shall agree the Finalised TTMP with the Employers Representative, the Garda Síochána and the Employer prior to the Contract Date.
31. The TMP shall be designed by a competent Designer and shall comply with all of the requirements of the current version of Chapter 8 of the "Traffic Signs Manual" published by the DTTAS and Temporary Traffic Management Design Guidance and Temporary Traffic Management Operations Guidance 2019 shall be fulfilled. Any additional requirements stated in the Specification for the Works to construct the Scheme shall also be complied with.
32. Treatment of DBM Surfaces – By Construction Section
33. Where the contractor proposes to delay final road markings by more than 2 days, as an interim safety measure, temporary reflective studs shall be placed at 15m centres along the centre line (white) and edge lines (yellow) prior to the road being opened to normal traffic. This is not a separately measurable item. Prior to fully opening the construction section of road to traffic, the Health and Safety Co-ordinator Construction Stage shall verify that the works have been completed satisfactorily. Only upon the instruction of the Health and Safety Co-ordinator Construction Stage shall the Contractor remove all traffic control measures and open the section of road to traffic. If for any reason it is not possible to provide a finished road surface to the construction section of road by the end of the working day, then the one way shuttle system shall remain in place and speed control vehicles shall be used to control maximum speeds to 50km/h. This may result in overnight or weekend working. Completing construction sections should result in apparent roadworks and associated cones extending no further than 500m at any time. Signage for the purpose of temporary traffic management, must be both adequate and clear during day and night such that there is no confusion regarding expected driver behaviour, expected driver location on carriageway, access arrangements and route directions. Where temporary ramps are formed at the ends of pavement runs, adequate advance warning signs must be in place. Particular attention must be given to such signage where ramps are in place during hours of darkness.
34. Without prejudice to the General Conditions of Contract, the Contractor shall, within two weeks prior to commencement of any works which will affect public traffic, submit to the Employer's Representative a the finalised TTMP for each Traffic Management Phase, which shall have been previously agreed in writing with Clare County Council, An Garda Síochána and the Emergency Services. The TTMP shall show the sequence of construction, within the programme constraints of Appendix 1/13, and the Contract and including the following information as a minimum:
 - a. Phasing of works at each location;
 - b. Method Statements detailing traffic management plan and drawings showing traffic management layout (min. scale of 1:1000 @ A1, details at 1:50 @ A1) including the following as appropriate:
 - c. Geometric design, Width of lanes etc;

- d. Extent of existing trafficked road being interfered with;
- e. Locations and width of alternative traffic lanes;
- f. Position of Flag Men/Traffic Signals if applicable;
- g. Working Areas;
- h. Safety zones;
- i. Duration of interference with traffic flow for each phase;
- j. Access and exit locations to work areas for construction personnel and traffic;
- k. Provision for emergency services;
- l. Access and exit location for residents, businesses and other users;
- m. Timing of Operations;
- n. Sequence of Construction;
- o. Temporary Road Lighting;
- p. All temporary traffic signs, cones, barriers and traffic control signals necessary for the safe direction and control of public traffic;
- q. Temporary and Permanent Signage;
- r. Extent of lane closures;
- s. Location of Contractor's store for all traffic management equipment required for the traffic management operation;
- t. Taking up and reinstatement of road studs and markings;
- u. Existing and proposed permanent road studs and markings;
- v. Existing and proposed temporary road studs and markings;
- w. Location of emergency and breakdown services;
- x. Where no road markings and studs are in place during construction, lanes should be delineated by cones and Steady State Lamps to delineate edge of travel through the works at night.
- y. Any other relevant traffic management measures proposed;

Maintenance Requirements

35. The Contractor shall, in accordance with Clause 117, be responsible for the maintenance of all public roads, Site access roads and temporary diversions along the Works until issue of the Certificate of Substantial Completion. In addition, maintenance of public roads, including cleaning and sweeping, outside the Site boundary may be necessary resulting from spillage or contamination of roads by construction traffic coming to/from the Site.
36. Provisions shall be put in place by the Contractor to ensure that full time maintenance and patrolling of the traffic management system is provided at all times at night, at weekends and at all times outside of the Contractor's working hours. Daily Inspection Sheets must be provided to the ER.
37. The Contractor shall maintain arrangements whereby he can quickly call out personnel outside the normal working hours to carry out 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.
38. 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, 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.
39. The Contractor shall ensure that all signs, cones, barriers, delineators and bollards used in connection with the Works shall be cleaned regularly, or as necessary. The Contractor shall ensure that all reflective patches and sleeves on cones or other delineators are replaced at regular intervals or as necessary.

Site Vehicles, Personnel and Plant

40. Contractor's Plant or Contractor's and Employer's Personnel's vehicles shall observe speed limits imposed in working areas of the Site.
41. Temporary Site speed limit signs are to be erected as appropriate, or as directed by the Employer's Representative.
42. No vehicles are permitted to drive against the normal flow or to face oncoming traffic, except when agreed in advance by the Employer's Representative for the performance of essential operations.
43. All vehicles and plant engaged in the Works, or entering/exiting the working areas shall have roof mounted amber flashing lamp, as required by sub-clause 117.14 of the Specification. The lamp shall be used in the circumstances stated in sub-clause 117.14, or as instructed by the Employer's Representative, his representative or An Garda Síochána. Hazard warning lights shall not be used as an alternative to the roof mounted amber flashing lamp.

Notice Requirements

44. Notice required by the Employer's Representative for him to review and comment on: -
- a. Amending or making traffic orders: 20 working days.
 - b. Authorising of non-prescribed signs: 10 working days.
 - c. Authorising temporary traffic signals: 10 working days.
 - d. Moving signs to be compatible with the state of the Works as described in Sub-Clause 117.11: 10 working days.
 - e. Road opening licences: 5 working days
 - f. Lane closures: 10 working days

Minimum Provisions for Vehicular Traffic

45. In off peak traffic hours, the use of temporary shuttle working with stop/go flag men may be permitted in situations where minimum lane widths cannot be achieved subject to the approval of the Employer's Representative, Án Garda Síochána and Clare County Council. One-way shuttle systems shall comply Temporary Traffic Management Design Guidance and Temporary Traffic Management Operations Guidance 2019 published by the DTTAS. When shuttle working is in place, a minimum lane-width of 3.0m must be maintained.
46. One-way shuttle systems shall not be operated during peak hours. For the purposes of this Appendix, peak hours are defined as all weekdays between 08:00 and 09:30 and 16:30 to 18:00 hours.
47. The one-way shuttle system shall be designed to operate on the basis of a maximum time delay per vehicle of 6 minutes. If unacceptable traffic congestion disruption occurs, or where queuing traffic affects the operation of another junction, the shuttle working is to be removed forthwith and an alternative method employed.
48. Before implementing a one-way shuttle system, the Contractor must first obtain the necessary consents and detailed traffic management plan approvals (including management of pedestrians) from the Local Authority, the TII and An Garda Síochána.
49. The Contractor shall ensure that traffic-control is manually operated when directed by the Employer's Representative to reduce queue lengths.
50. The Contractor shall notify local and national radio stations of the commencement and duration of the proposed traffic management Works.
51. At all times when one-way shuttle working is in operation during Contractor's working hours, a sufficient number of suitable operatives are to be in attendance solely for traffic management duties. In addition, each junction shall be individually manned via STOP/GO control during Contractor's working hours in order to ensure safety at each junction when one-way shuttle working is in operation.

Other Signage

52. The Contractor shall allow for 2 No. variable message signs (VMS's) as detailed below and in accordance with Chapter 8 paragraph 3.4 of the Traffic Signs Manual:
- A VMS shall be provided on both approaches to the Works Area. These VMS's must be in place 1 week before Works commence and remain in place for the duration of the Works. The VMS signs will advise motorists of the upcoming works and associated delays. The location of the VMS's must be agreed on Site with the Employer's Representative and Clare County Council.
53. Significant advance warning signage is also required in addition to all other required warning signage on the National Road approaches to the Works to ensure drivers are alerted to the hazard ahead for a distance of at least 2 km in advance of same. This signage shall be in accordance with the relevant sections of the current version of the Traffic Signs Manual.
54. Roads including footpaths, cycle tracks and other traffic routes, described above or listed in Appendix 1/19 are the responsibility of Clare County Council.

Roads, Private Roads and Other Ways Affected by the Works

55. The surrounding Local Roads are unsuitable to receive diverted National Road traffic. The Contractor shall erect signage on all Local Roads at their junction with the works advising motorists that the Local Roads are for local access only. Local Roads are not to be used for construction traffic

Description	Predicted 24 Hour AADT	Existing Speed Limit	Types of Traffic Control	Special Facilities
Specimen Drawing	3000	80kph	Temporary Shuttle working with STOP / GO Flagmen and Convoy	1. Local access to be maintained at all times 2. All Roads are to be always kept open to traffic unless specified or agreed otherwise. 3. Provisions shall be put in place by the Contractor to ensure that full time maintenance and patrolling of the traffic management system is provided at all times at night, at weekends and at all times outside of the Contractor's working hours.

APPENDIX 1/18 – TEMPORARY DIVERSIONS FOR TRAFFIC

Temporary Diversions for Traffic Specified by the Employer's Representative

1. No suitable diversion routes are available to facilitate the Temporary Diversion of traffic. Diversion routes would be excessively long and the Local Roads are generally in poor condition with a geometry unsuitable to receive National/Regional road traffic.

APPENDIX 1/19 - ROUTING OF VEHICLES

The use of Permanent Works by Construction Traffic

1. The finished pavement forming part of the Works may be used to carry construction traffic only when measures submitted to the Employer's Representative have been taken to protect them from damage.
2. Subject and without prejudice to the Conditions, the Contractor shall submit his proposals at least one week before it is proposed to use any of the pavement forming part of the Works to carry construction traffic. The proposal shall include supporting calculations, details of any loadings, proposed protective measures, and any other information required by the Employer's Representative in order to fully assess the proposal. The proposals shall not be implemented by the Contractor without the prior written consent of the Employer's Representative.
3. The consent of the Employer's Representative to proposals to use pavement forming part of the permanent works for construction traffic shall not relieve the Contractor of his responsibilities under the Contract.

Permitted Access Routes To and From Site

4. The Contractor shall comply with these restrictions on the routing of vehicles under the control of the Contractor, his sub-contractors and suppliers when planning and programming the Works.
5. The Contractor shall provide, erect and maintain such traffic signs, lamps, barriers, and the like, complying with Clause 117 of the Specification as may be required to ensure the observance of the requirements and restrictions detailed in this Appendix 1/19.
6. The Contractor shall restrict the movement of Contractor's equipment and materials to and from the Site to permitted access routes eg national and regional road network only.
7. The Contractor, his sub-contractors and suppliers shall use only the permitted access routes for all purposes in connection with the Works (including import of acceptable and disposal of unacceptable materials) unless otherwise agreed in writing by the Employer's Representative.
8. Permitted access routes to and from the Site shall be via the national and regional road network. Construction generated traffic is not permitted on Local Roads.
9. The Contractor shall provide the Employer's Representative and the local An Garda Siochana with a 24hour emergency contact number, and shall respond immediately to the requests of the Employer's Representative and/or An Garda Siochana.
10. The Contractor is deemed to have inspected and examined the Site and its surroundings at Tender Stage and to have satisfied himself as to the nature and means of access to the Site. In the event of the Contractor not being satisfied with the Permitted Access Routes to and from the Site, the Contractor is obliged under the Contract to provide for all expenses and

charges for temporary wayleaves required by the Contractor in connection with access to the Site.

Prohibited Access Routes

11. The Contractor, his Subcontractors and suppliers shall use only the permitted Access Routes as given in Clause 5 above, for all purposes in connection with the Works (including the import of acceptable and disposal of unacceptable materials).

Emergency Vehicle Routes

12. Where lane closures are in place, the Contractor shall devise a strategy such that Emergency Vehicles can traverse through the Works area without delay. These arrangements shall be communicated to the Emergency Services prior to the Works, and appropriate means shall be provided for rapid clearing of the route from obstruction by construction vehicles, machinery and materials.
13. The Contractor shall take care to avoid damage to roads, grass margins, and other surfaces within or outside of the authorised sites, and shall be liable for the cost of repairing, to the satisfaction of the Employer's Representative and the owner, all such damage caused by his operations. The Contractor shall take precautions to prevent spillage of diesel fuel or other solvents. 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. Any damage so caused shall be made good by the Contractor at his own expense.
14. The Contractor shall comply with the maximum legal permissible loads for public roads in Ireland and where requested by the Employer's Representative, the Contractor shall provide evidence of compliance with regard to delivery of material to site.
15. The Contractor shall, where he proposes to move machinery and plant across public roads, seek the consent of the Road Authority (Clare County Council) and the Employer's Representative. In seeking consent the Contractor shall submit details of the layout of the crossing, and all proposed signing, safety equipment and controls proposed.

General Use and Cleaning of Public Roads

16. The Contractor shall take every precaution to prevent dirt, mud or other material being dropped or spread by traffic associated with the works on roads being part of the works, which are made available for public use by the Contractor, whether such traffic is the Contractor's own vehicles, his sub-contractors or his suppliers or vehicles hired by any of the above. The Contractor shall clean roadways of any such dirt, mud or other materials which may be spilt or spread by traffic travelling to or from the site in connection with the works, whether such traffic belongs to the Contractor, his sub-contractors or his suppliers. The Contractor shall employ a road suction sweeper to clean all public roads within a distance of 500m of his operations. Such cleaning operations shall be carried out notwithstanding road cleaning work being carried out by the Employer or other Contractors to the Employer.

APPENDIX 1/20 – RECOVERY VEHICLES FOR BREAKDOWN

1. At all times when a public road has been restricted in width due to the execution and completion of the Works, the Contractor shall be responsible for the removal of shed loads and vehicles that are stationary due to mechanical breakdowns, accident damage or have been abandoned in the trafficked road.
2. The Contractor shall accept the instructions of the Employer's Representative or the Gardaí in connection with this service but generally shall be required to remove the obstruction clear of the completed Works, such that the running carriageway is cleared in the shortest possible time.
3. Should the Gardaí be unavailable then the driver's consent shall be obtained prior to such removal.
4. The Contractor shall make no charge for this recovery service to the owner or driver of the recovered vehicle.
5. If a vehicle cannot be moved immediately and, in the opinion of the Employer's Representative and Gardaí, the traffic flows are heavy enough to justify such action; traffic shall be directed onto an emergency route by the Contractor.
6. The Contractor shall arrange for all recovery vehicles used during the Works to be inspected for roadworthiness and a copy of each report shall be provided for the Employer's Representative. Each person manning the vehicle shall have a valid license to operate the vehicle.

APPENDIX 1/22 – PROGRESS PHOTOGRAPHS

1. Prior to commencement of construction work the Contractor shall have photographs to record the condition of all adjacent buildings, facades, boundary walls, roads, footpaths, road signage, junction definition posts, Vehicle Restraint System, utilities covers, gullies etc. which could be affected by the works, taken by an approved professional photographer. The dates and locations of each photograph shall be clearly identified and recorded by the Contractor. One set of colour prints and an electronic copy shall be delivered to the Employers Representative with an electronic copy retained by the photographer for production at a later date.
2. The Contractor shall be required to have progress and record photographs taken for each section of the works. The Contractor shall supply an electronic copy of each photograph to the Employers Representative. These will consist of the following;
 - a. Minimum of (6) pictures of each phase prior to commencement,
 - b. Minimum of (40) pictures within each phase of planning and pavement overlay operation

APPENDIX 1/23 - SUBSTANCES HAZARDOUS TO HEALTH

1. The Contractor shall be required to provide temporary screening of sufficient construction to protect the public from substances potentially hazardous to health which are being used by the Contractor, or are a result of the works.
2. Once erected, the screening shall reduce the concentrations of these substances within the air to levels which are below European Union guidelines and in accordance with the 2010 Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2011. Any monitoring necessary shall be the responsibility of the Contractor.
3. The following list details materials which may require particular precautions:-
 - a. Bituminous Materials
 - b. Cement Dust
 - c. Concrete Dust
 - d. Earthworks Dust
 - e. Sealants.
4. This list is not fully comprehensive and further materials will fall within the scope of this requirement. The Contractor shall submit to the Employer's Representative his proposals for complying with the above requirements 7 days in advance of the use of any potentially hazardous material.
5. All work shall be carried out with due regard to the Safety, Health and Welfare at Work (Construction) Regulations 2013 or any subsequent relevant legislation.
6. The Contractor shall provide the Employer's Representative with a copy of his Safety Statement and shall revise it as necessary in the 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.
7. The Contractor shall take particular care in dealing with any existing asbestos cement watermain during the course of the Works particularly during handling/ removal and disposal and shall take due account of the requirements of the following documents:
 - a. S.I. No. 386, the Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations, 2006 – 2010
 - b. HSA guidelines on material containing asbestos and HSA information sheet
8. The Contractor shall give the Employer's Representative not less than 14 days' notice of his intention to commence work using or generating any of the materials identified in UK DMRB Departmental Advice Note SA 8/94 Use of Substances Hazardous to Health in Highway Construction. Such notice shall include details of the proposed measures to ensure that the recommendations for the protection of the public given in SA 8/94 are met. Compliance with this Appendix does not relieve the Contractor of his statutory duties to protect members of the public from exposure to substances hazardous to health.

APPENDIX 1/24 - QUALITY MANAGEMENT SCHEMES

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

a. Description: Application of Road Markings

Certification bodies: (to the approval of TII)

Specification: Road marking materials shall be in accordance with the 1200 Series of the Specification and shall be manufactured to comply with all of the appropriate requirements of one of the following British Standards:

BS 3262 Hot-applied thermoplastic road marking materials, Part 2: Specification for road performance;

BS EN 1436 Road marking materials. Road marking performance for road users

BS EN 1871 Road marking materials. Physical properties;

BS 6088 Specification for solid glass beads for use with road marking compounds and for other industrial uses.

BS EN 1790 Specification for permanent preformed road markings

PD 6518 Prefabricated temporary road marking materials for use at road works.

Note: The manufacture of road marking materials to BS 3262, BS EN 1436, BS EN 1871 and BS EN 1790 shall be subject to product certification requirements (refer to Appendix 1/25 – Marked Schemes).

b. Description: Traffic Sign Manufacture

Certification bodies: (to the approval of TII)

Specification: Signs to TS 4 and to Series 1200 of the Specification.

c. Description: Supply of Geotextiles

Certification bodies: (to the approval of TII)

Specification: Geotextiles shall comply with Series 600 of the Specification.

d. Description: Production of Asphalt Mixes

Certification bodies:	(to the approval of TII)
Specification:	The supply of asphalt shall comply with the Specification, in particular the 900 Series and the relevant Clauses of Series 1100 and the following British Standards.
BS 594	Hot rolled asphalt for roads and other paved areas Part 1. Specification for constituent materials and asphalt mixtures.
BS 598	Sampling and examination of bituminous mixtures for roads and other paved areas Part 100. Methods for sampling for analysis Part 101. Methods for preparatory treatment of samples for analysis. Part 102. Analytical test methods. Part 103. Method for the recovery of soluble bitumen for examination.
BS 4987	Coated macadam for roads and other paved areas Part 1. Specification for constituent materials and for mixtures.

e. Description: Temporary Traffic Management

Certification bodies:	(to the approval of TII)
Specification:	Traffic Management shall be in accordance with the 100 Series of the Specification and Chapter 8 of the Traffic Signs Manual. <i>Note: This scheme requires training on an approved course. all traffic management operatives are required to carry a registration card indicating what types of traffic management they have been trained to carry out</i>

f. Description: Supply and Application of Surface Dressing to Road Surfaces

Certification bodies:	(to the approval of TII)
Specification:	Surface Dressing shall be in accordance with the 900 Series of the Specification and Drawings referred to in the Contract

APPENDIX 1/25 - PRODUCT CERTIFICATION SCHEMES

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

- a. **Marked Schemes**

Kitemark or Irish Standard Mark (ISM)

Certification Bodies	British Standards Institute 389 Chiswick High Road London W4 4AL, UK	or	The Certification & Inspection Dept National Standards Authority of Ireland Enterprise Ireland, Glasnevin Dublin 9
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Standard	Title	Specification Series
S.R. 21	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	800
S.R 17	Guidance on the use of I.S. EN 13043:2002, Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas	800
EN 13108-1	Bituminous Mixtures - Material Specifications Asphalt Concrete	900
EN 13108-5	Bituminous Mixtures - Material Specifications - Stone Mastic Asphalt	900
EN 13108-20	Bituminous Mixtures - Material Specifications – Type Testing	900
EN 13108-21	Bituminous Mixtures - Material Specifications – Factory Production Control	900
EN 12591	Bitumen and bituminous binders - Specifications for paving grade bitumen	900
EN 14023	Bitumen and bituminous binders - Specification framework for polymer modified bitumen	900
EN 15381	Geotextiles and geotextile-related products – Characteristics required for use in pavements and asphalt overlays	900
EN 1790	Road marking materials - Preformed Road markings	1200
EN 1436	Road marking materials - Road marking performance for road users and test methods	1200
EN 1423	Road marking materials - Drop on materials - Glass beads, antiskid aggregates, and mixtures of the two	1200
EN 1424	Road marking materials - Premix glass beads	1200
EN 1463	Road marking materials - Retroreflecting road studs - Part: Initial performance requirements	1200
BS 3262	Hot-applied Thermoplastic Road Marking Materials	1200
BS 6044	Specification for Pavement Marking Paints	1200
BS 6088	Specification for solid glass beads for use with road marking compounds and for other industrial uses	1200
BS 7396	Temporary traffic cones and cylinders	1200

b. Non Marked Schemes

Ready Mixed Concrete

Certification Bodies

The Certification & Inspection Dept
National Standards Authority of
Ireland Enterprise Ireland, Glasnevin
Dublin 9

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

APPENDIX 1/26 – NSAI AGRÉMENT CERTIFICATES

1. The following shall be a list of types of work, goods or materials for which proprietary products shall be required to have either an Irish Agrément Board Roads Certificate or a British Board of Agrément Certificate or an appropriate European Alternative.

Description	Specification Clause
Binders, Binder Modifiers and Enhanced Binders	900
Bituminous Sprays	900
Prefabricated Temporary Road Marking Material	1200
Reflecting Road Studs	1200

2. Details of products conforming with the above requirements are listed in the Index of Current Publications which may be obtained from the Publications Department, Irish Agrément Board.
3. Where types of work, goods or material for which proprietary products are required to have an Irish Agrément Board Roads and Bridges Certificate, a British Agrément Board Certificate shall be acceptable.

Approved Body: Irish Agrément Board,
NSAI,
Glasnevin,
Dublin 9

4. 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 1/27 SITE MEETINGS

1. The Contractor shall ensure that the projects manager shall attend at least one site meeting every two weeks throughout the duration of the works. Site meetings shall be fixed at the discretion of the Employers Representative, as stated in Clause 4.15 of the Contract. The tenderer shall allow in his rates for attendance at these site meetings.

APPENDIX 1/29 COMPLETION OF WORKS

1. On completion of the Work the Contractor shall leave the site in an orderly manner as stated in Clause 7.10 of the Contract, to the satisfaction of the Engineer. Carriageway and footpath surfaces shall be thoroughly swept and free from mud and loose chippings. Boundary walls fences and adjacent properties shall be cleaned of any splashes or dirt which may be attributed to the work on the Contract and paintwork shall be touched up where it has been damaged due to the Contractor's activity. All pipelines and chambers shall be cleaned and flushed out. A certificate of substantial completion shall only be issued when the site has been left in a condition that is satisfactory to the Employers Representative.

APPENDIX 1/30 PROTECTION OF THE WORKS

1. The Contractor shall take all necessary precautions to safeguard all existing buildings and works from damage by construction activity, plant operation, ground water movement, ground movement and settlement and all other activities associated with the execution of the contract. The Contractor shall make all necessary records (photographic or otherwise) of existing structures and other properties that could be affected by execution of the works prior to the commencement of construction. The Contractor shall carefully protect all works and material from injury by weather.

APPENDIX 1/60 - As BUILT RECORDS DRAWINGS

1. All drawings submitted for formal review shall be provided in the following format, to be agreed with the Employer's Representative:
AutoCad DWG referenced to the ITM Grid Reference, format (2022 or greater).
2. The following standards shall also apply:
 - a. All CAD files shall be provided in an acceptable version of AutoCad .DWG format, along with any font, linestyle, block or other necessary definition.
 - b. Each transfer shall be fully documented to detail items such as level use cross-referenced files, necessary directory structure, etc.
 - c. Full details of the programs used to generate the DWG format file shall be attached for reference.
 - d. Data transfers shall be readable using equipment currently employed by the Employer. For small transfers this may take the form of cc: Mail attachments; for large transfers e.g. area completion, this may also be on CD format.
3. The Scheme Drawings to be provided as listed hereunder.
General arrangement drawings referenced to the to ITM Projection or maintenance reference system, to be confirmed with the Employer's Representative and shall cover:
 - a. horizontal alignment including land boundaries to a scale of 1:1000;
 - b. vertical alignment showing the final and original ground levels on the centre line of the road or new and existing surface levels where reconstructing an existing road, the drawings shall have all non-existing background information removed and the boundaries of the Road clearly shown in relation to side roads or other features.
 - 1. Series 700 – Pavement**
Drawings showing the following information:-
Plans giving extent of surfacing including type of materials, thicknesses and mix design for black top pavements and details of joints/mix design.
 - 2. Series 1200 - Road Markings and Traffic Signs**
Drawings showing the location and details including materials and foundations where applicable together with individual land plans shall be provided [where these may not be applicable the appropriate equivalent shall be substituted].
 - 3. Review Set of As-Built Drawings**
The Contractor shall provide, for review by the Employer's Representative, 1 No. hard copy A1 of 'As-built drawings within 4 weeks of Substantial Completion of the works and 1 No. soft copy in AutoCad 2022 Format and also in pdf Format.
 - 4. Final Set of As-Built Drawings**
Once the Employer's Representative has reviewed the submitted documents described in point 6 the Contractor shall incorporate the comments of the Employer's Representative and provide 1 No. A1 Final copy of the As-built drawings and 1 No. Digital copy in AutoCad 2022 and .pdf to the Employer's Representative on CD.

APPENDIX 2/1 - LIST OF BUILDINGS, ETC, TO BE DEMOLISHED

1. The Works will not require the demolition of existing buildings.
2. Site Clearance to be carried out by the Contractor.
3. All existing reflecting road studs on all schemes shall be taken up and disposed of off-site at an appropriately licensed tip provided by the Contractor.
4. Bituminous material to be planed out, removed to a licenced facility and disposed of in accordance with Drawings in accordance with Appendix 7/9.
5. Cleaning out and unblocking existing stormwater drainage gully chambers, carrier drains and outfall pipes to be carried out in accordance with Appendix 5/1.
6. The Contractor must prepare a Waste Management Plan which must be agreed with Clare County Council prior to Construction. Guidelines for preparing the Waste Management Plan and a Template for a Waste Management Plan are provided in in Appendix 3 of the Instructions to Tenders.

APPENDIX 2/2 – FILLING OF TRENCHES AND PIPES

1. Where the contractor disturbs any of the existing pipe or ducting network on site, reinstatement of same shall be carried out as specified below.
2. Reinstatement shall include the backfilling and reinstatement of all pipe trenches - from the top surface of the pea-gravel to the top surface of the adjacent ground or road level, in a suitably specified manner.
3. Backfilling of all trenches shall be carried out immediately after laying, jointing and surrounding of pipes with pea-gravel.
4. Reinstatement to the top surface of the trench shall be carried out on a temporary basis initially (after backfilling) with permanent restoration to all trenches laid through road carriageways, to be carried out by the Contractor, within 21 days of pipelaying - i.e. all road surfaces shall be fully reinstated (as specified) within 21 days of breaking out of original road carriageway surface.
5. Backfilling and reinstatement of trench surfaces shall be carried out in the following manner, as defined by trench location.
6. Where pipelines are laid in fields and/or grass roadside margins, the trench shall be backfilled from the top surface of the pea gravel upwards, with selected excavated material, compacted in layers not exceeding 300mm thickness. The top layer shall comprise "topsoil" free from stones of dimensions greater than 60mm and shall be of depth (thickness) equal to the original topsoil layer, prior to disturbance. All topsoil surfaces shall be levelled, appropriately prepared (with stones picked) and seeded with suitable grass seed. In the case of fields, the reinstated seeded area should be rolled not later than two weeks after seed sowing.
7. Trenches excavated in the road carriageway, through /across driveways, field entrances, footpaths or landscaped verges shall be immediately reinstated. The trench shall be backfilled from the top surface of the pipe surround upwards, with compacted cement bound material; lean mix or foamed concrete to their original surface status. In the case of concrete footpaths, 100mm thick concrete pavement shall be reinstated. In all cases where trenches are excavated through and across the road carriageway, the carriageway shall be pre-cut using a roadsaw. Minimum trench width cutting shall be 450mm. All road reinstatement shall correlate with the existing camber of the road carriageway. Joints shall be sealed with 100°C Hot Bitumen Binder or Cold Thixotropic Bitumen (50-70 PEN) in accordance with S.S. 594 prior to the application of bituminous materials.
8. All excavation, backfill and reinstatement works including the supply and installation of ducting for cable installation etc to be carried out by the Contractor.

APPENDIX 2/3 - RETENTION OF MATERIALS ARISING FROM SITE CLEARANCE

1. All chamber cover and frames within the extents of the works sites be taken up and removed off-site and stored until completion of the scheme when they must be reinstalled to the correct level.
2. Voids left by items that have been removed shall be backfilled immediately in accordance with the appropriate Clauses in the 600 series.

APPENDIX 2/5 - HAZARDOUS MATERIALS

1. The Contractor's attention is drawn to the Preliminary Safety and Health Plan. The Contractor must consider all risks highlighted within and take special note that this list of risks is non-exhaustive. The Contractor is expected to be competent in dealing with typically encountered commonplace hazards and these should be controlled by good management and good site practices. The Contractor must be aware of the Safety, Health and Welfare at Work (Construction) Regulations SI No 504 of 2013.
2. Appropriate measures must be taken to safeguard the health of the Contractor's operatives and the general public.
3. Hazardous materials arising from Site Clearance and/or excavations shall be disposed of only at licensed landfills, in accordance with Appendix 6/2 and any relevant legislation.
4. If asbestos material is encountered, a specialist qualified in the disposal of asbestos shall remove and dispose of such material safely in accordance with the general principles of Appendices 1/23 and 6/2.
5. Flammable or dangerous substances shall be locked away in clearly identified secure storage places.
6. Smoking shall be prohibited in all areas where gases or flammable liquids are stored or used.

APPENDIX 5/1 – DRAINAGE REQUIREMENTS

1. The location of drainage requirements are shown on the Contract Drawings.
2. All drainage infrastructure shall be in accordance with TII's specification CC-SPW-00500. Permitted
3. Existing verge cuts are to be recut to allow surface water from the carriageway to outfall into existing drains.
4. New verge cuts, if required, shall be provided in accordance with the drawings and in agreement with the Employer's Representative. Verge cuts are to be 1.5m wide and 2m in length. All watercuts are to be backfilled with CI505 material to the height of surrounding verge.
5. Gullies, if required, shall be precast concrete in accordance with CC-SCD-00510.
6. Gully gratings, if required, shall be D400 and in accordance with CC-SCD-00512.
7. Carrier pipes, if required, shall be 150mm in diameter.
8. Carrier pipe bedding, if required, shall be Type Z in accordance with CC-SCD-00521.
9. Carrier pipes, if required, shall have a minimum 600mm cover to the finished road surface.
10. All existing drainage gullies that are located within the site are to be altered by raising or lowering as appropriate to match the new finished road surface levels. All existing drainage gullies that are located within pavement inlay sites are to be protected during the works. All gullies are to be cleaned out and unblocked. All waste material removed from gullies to be disposed of off site by the Contractor. All covers and frames to comply with I.S. EN124.
11. Drainage outlets are to be inspected and unblocked if necessary. All waste material removed is to be disposed off site by the Contractor.

APPENDIX 6/1 – REQUIREMENTS FOR ACCEPTABILITY AND TESTING ETC. OF EARTHWORKS MATERIALS

1. Excavated topsoil shall be deemed to be Class 5A.
2. All other excavated materials (other than bituminous materials, see (iii) below) shall be deemed to be unacceptable Class U1 material and is to be disposed of in tips off site provided by the Contractor. All disposal sites shall have legitimate waste licences. A copy of the licence is to be provided to the Employer's Representative prior to the use of any particular disposal site.
3. The Contractor shall complete a Waste Management Plan for removal and disposal of all items in Appendix 2/1.
4. All waste material arising from the Works shall be dealt with in compliance with the relevant legislation and regulations including without limitation the Waste Management Acts, 1996–2011, the Environmental Protection Agency Acts, 1992–2011, Planning and Development Acts, 2000–2017, The Roads Acts, 1993–2015 and European Communities (Waste Directive) Regulations 2011 each as amended and supplemented and in force for the duration of the Works and the Contractor shall be deemed to have provided for and allowed for all costs associated with lawfully dealing with waste material in the Tender Sum. For the avoidance of doubt the Contractor shall prepare, and comply with the provisions of, a Waste Management Plan for the project as detailed in the guidelines contained in the TII Publication "GE-ENV-01101 - The Management of Waste from National Road Construction Projects
5. All bituminous materials shall be deemed to be unacceptable class U2 hazardous material and is to be disposed of in accordance with the relevant environmental guidelines and regulations.

APPENDIX 6/1 – REQUIREMENTS FOR DEALING WITH CLASS U2 UNACCEPTABLE MATERIAL

1. All excavated or milled bituminous materials shall be disposed of in accordance with the relevant environmental guidelines and regulations. Waste disposal sites or recycling facilities shall have legitimate waste licences. The Contractor shall allow in his general rates for compliance with these regulations and any costs incurred as a consequence of disposal of same materials.
2. For the purpose of the Contract, Unacceptable Material Class U2 shall be as defined in Clause 601.3 of the Specification.
3. In the event that the Contractor encounters or suspects the presence of any unacceptable material Class U2, work shall cease immediately, and the Employer's Representative shall be notified immediately. The Contractor shall make arrangements to have the material inspected by an approved Subcontractor, specialising in the identification, sampling and testing of such material.
4. A plan for dealing with unacceptable material Class U2 shall be provided prior to the commencement of construction.
5. Where this material is identified as Class U2, the Contractor shall make arrangements for this material to be excavated and removed off site by a specialist waste-disposal Contractor approved by the Employer's Representative. The material shall be disposed of at the properly licensed landfill site subject to the approval of the appropriate Waste Regulation Authority. No materials shall leave the site without the approval 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.

APPENDIX 7/1 - PERMITTED PAVEMENT OPTIONS

1. The pavement types outlined in this Appendix 7/1 are to be constructed at the locations specified in the Contract Drawings.
2. Material placed within 450mm of the designed final road surface shall not be frost susceptible.
3. Where required, the existing surface course shall be thoroughly removed by cold milling, including existing regulating courses prior to the new surface course being laid.
4. Typical pavement details are shown on drawings.
5. All joints shall be offset by at least 150mm from the parallel joints in the layer beneath
6. The freestanding edge to all layers shall be finished by using an edge compressing tool fitted to the roller to form a 45° or 60° angle
7. Transverse joints between new and existing pavement shall be constructed as per CC-SCD-00703.
8. Bituminous layers shall be laid in two or more layers where the bituminous layers thicknesses exceed the nominal layer thicknesses given in CC-SPW-00900
9. The Contractor shall provide the Employer's Representative with the DoP documents for all proposed materials and the associated CE Marking
10. Refer to drawings in Volume A: Book 2 Drawings for pavement construction extents, details and location of pavement types.

Pavement Type: ML-A

1	Location: As per Contract Drawings		Requirements
2	Grid for checking surface levels of pavement courses, if different from the requirements of CI 702.4:	Long. dim.: Trans. dim.:	10.0m 2.0m
3	Surface regularity (CI 702.7 and CI 702.8):	Category of Road Long. Reg: Trans. Reg:	A 300m 5m
4	Requirements for coarse aggregates - Polished Stone Value (PSV), Aggregate Abrasion Value (AAV) (Series 900 CI 3.2.2, 4.2.2, 5.2.2, 6.2.2, 8.4.1.1, 8.6.1.1):		Min PSV: 60 Max. AAV: 14
5	Requirements for pre-coated chippings - Polished Stone Value (PSV) for general use mixtures, PSV for mixtures for roundabouts, Aggregate Abrasion Value (AAV) (Series 900 CI 4.2.4):		N/A
6	Requirement for testing for Polished Stone value using the friction after polishing test (DN -PAV-03704 Clause 2.25)		No
7	Freezing and thawing (soundness) category if different from the requirements of (Series 900 Tables 1, 4, 7, 10 and 17):		In accordance with CC-SPW-00900
8	Compaction control and extraction of cores if different from the requirements of CC-SPW-00900 Cl. 10.1.9, 10.1.9.1, 10.1.9.2, 10.1.9.3, 10.1.9.4.):		In accordance with CC-SPW-00900
9	Requirements for monitoring resistance to permanent deformation of HRA (Series 900 Cl. 10.1.10.1)		N/A
10	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 (Series 900 CI 10.1.8):		Yes
11	Any tests additional to those required by IS EN 13108–20, IS EN 13108–21 or the relevant SRW (Series 900 CI 1.2 and 1.3):		No
12	Subbase material may be spread in more than one layer (CI802.4).		Yes

Pavement Type: ML-A

Pavement Cours	Specification	Clause	Mixture Designation/Material	Thickness (mm)
Surface Course	CC-SPW-00900	5.1.3		40
Binder Course	CC-SPW-00900	3.1.4		60
Total Thickness (mm)				100

Notes:

- A bond coat shall be applied to all bound surfaces receiving a bituminous pavement course.
- Material placed within 450mm of the designed final road surface shall not be frost susceptible.
- Geogrid shall comply with Cl. 8.3.2(ii) of CC-SPW-00900

APPENDIX 7/2 – EXCAVATION AND REINSTATEMENT OF EXISTING SURFACES

1. Dimensions for excavations shall be in accordance with Clause 706.1, CC-PAV-04007 and CC-SPW-00705
2. No excavations shall be left open overnight, unless agreed with the Employer's Representative
3. Locations of existing paved areas which are required to be trimmed, regulated and reinstated to match levels where new and existing pavements abut are located at side road junctions and at either end of the scheme, and their exact extent shall be agreed in writing with the Employer's Representative.
4. For typical details of transverse and longitudinal joints between new and existing pavements see drawing RCD/700/3 (CC-SCD-00703) RCD/700/4 (CC-SCD-00704).
5. The overbreak requirement in paved areas shall be mechanically cut to clean straight lines and shall be sufficient to remove all damaged and defaced surfacing.
6. The cut edges in flexible construction, including the exposed parts of kerbs below final pavement level and metalwork, shall be painted with 100 sec. cut back bitumen.
7. Excavations carried out on existing pavement areas not constructed as part of the Works shall comply with CC-PAV-04007

APPENDIX 7/4 - BITUMINOUS SPRAYS

1. A bituminous spray (bond coat) complying with Series 900 (CC-SPW-00900) Clause 10.1.4 shall be sprayed onto the planed surface and regulation layer, where applicable, prior to inlay and overlay of surface course.

Notes

- a. All surfaces shall be machine cleaned of all foreign matter, using high pressure jetting if required, prior to overlaying with any bituminous material.
- b. A Bituminous Spray (Bond Coat) shall be applied to all bituminous carriageway surfaces prior to overlaying with new bituminous materials.
- c. The specified rate of spread for bond coats shall be a minimum of 0.30kg/m² of residual binder.
- d. Application shall be carried out with a calibrated mechanical binder distributor.
- e. The Contractor shall ensure a quality management system in accordance with IS EN ISO 9001 is implemented for the application of bond coats. This shall include documented procedures for carrying out rate of spread and accuracy of spread tests in accordance with IS EN 12272-1. The Quality Plan shall detail methods to check the spraying equipment and to reconcile volume or mass used with areas treated and to visually assess accuracy of spread.
- f. Tests shall also be carried out whenever there is a change in binder source or the spraying system has been altered. The Contractor shall provide the Employer's Representative with the test results when requested.
- g. The emulsion shall not be allowed to collect in hollows and shall be allowed to break before the next course is laid. All kerbs, manholes, gullies, etc. shall be painted with bitumen emulsion up to finished road level only. All kerbs painted above finished road level shall be thoroughly cleaned with an approved solvent or replaced as directed by the Employers Representative.
- h. Trafficking of the bond coat shall not be permitted

APPENDIX 7/5 - ROAD PAVEMENTS: TII CONSTRUCTION DETAILS

TII SCD No.	Description
CC-SCD-00701	Free Pavement Edge Detail: Pavement Type 1B
CC-SCD-00703	Transverse Joint between New Construction and Existing Road
CC-SCD-00704	Longitudinal Joint between New Construction and Existing Road

APPENDIX 7/9 - COLD-MILLING (PLANNING) OF BITUMINOUS BOUND FLEXIBLE PAVEMENT

1. Cold milling of bituminous bound flexible pavement shall be carried out in accordance with Cl.2.1 of Series 900 (CC-SPW-00900).
2. In areas where cold-milling is used, they shall be cleaned and swept prior to bond coating for reinstatement.
3. Areas where the restoration of road camber is required, the existing pavement will be planed out to varying depths. The Area Engineer and/or Resident Engineer will mark out the pavement where planning is required. The pavement to be laid will comprise of regulation course to varying depths which will be overlaid with 40mm/45mm surface course. The proposed finished surface level must tie into adjacent bound and granular adjoining properties.
4. All material planed / milled is to be disposed of as unacceptable U1 material.

Notes

5. Refer to drawings in Volume A: Book 2 for pavement details.
6. Cold milling of the existing pavement is to be carried out using a fine-milling technique i.e. a tool spacing of maximum of 8mm.
7. Transverse joints between new road construction and existing roads shall be to TII CC-SCD-00703.
8. The surrounding bituminous pavement to all manhole and chamber covers shall be removed by hand to prevent any damage or displacement.
9. Any cold milled edge forming a permanent joint at surface course level shall be saw cut to the depth of the surface course layer.
10. Prior to commencement of cold-milling, the contractor shall carry out a sweep of the areas to locate any buried metalwork within the cold-milled layer. The sweep shall be carried out with suitable electronic detection equipment in accordance with Cl.10.1.1.1 of Series 900 (CC- SPW-00900). The Employer's Representative shall be informed within 6 hours of discovery of metalwork objects within the pavement to be cold milled.

APPENDINX 7/10 – MANAGEMENT OF MATERIALS ARISING FROM ROADWORKS

APPENDINX 12/3 - TRAFFIC SIGNS: ROAD MARKINGS AND STUDS

Road Markings

1. The requirements for road markings are shown on the Contract Drawings.
2. The Contractor is to survey all existing road markings in a suitable format prior to the commencement of the works and reinstate these lines and markings in the same position as before upon completion of the surfacing works unless instructed otherwise by the Employer.
3. The Contractor shall make available to the Employer's Representative for the duration of the Contract and for the purposes of measuring marking thickness:
 - a. A Micrometer suitable for measuring markings.
 - b. 5 number Steel Plates suitable for measuring markings.
4. The Contractor shall be responsible for the proper setting out of new road markings and will pre-mark all new road markings. Existing road markings to be redone by spraying and extruding shall be located on the same line as existing.
5. Permanent road markings shall consist of reflectorised thermoplastic road marking material in accordance with IS EN 1871. All white markings shall be reflectorised with glass beads in accordance with IS EN 1423 and IS EN 1424 by incorporation (apart from preformed markings) into the road marking mixture and to the wet surface of the marking.
6. It will be permissible to apply a Tack Coat to promote better adhesion of the marking. 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 Contractor shall submit a detailed Method Statement to the Employer's Representative if the application of a tack coat is proposed.
7. Drainage gaps shall be provided on all continuous markings where surface water crosses the marking. These gaps shall be no longer than 50mm, and shall be spaced at intervals not exceeding 5m.
8. Permanent road markings shall comply with the performance requirements of BS EN 1436 at the end of the Defects Period. During the Guarantee Period, all permanent road markings shall comply with the performance requirements for the Guarantee Period as outlined in this Specification.
9. Permanent road markings on National Roads shall have a minimum functional life as defined in BS EN 1436 of three years.

Guarantee Period

10. The minimum period of guarantee shall be for 3 years after completion of markings and shall apply to markings laid on all cement-bound and bituminous-bound road surfacings including surface dressings. The following properties of the markings are required to be covered by the guarantee:-

- a. Durability
- b. Reflectivity
- c. Skid Resistance
- d. Luminance Factor
- e. Chromaticity

11. The average value of the above properties shall be established for each line adequate to guarantee that all markings are correct. On application and during the period of guarantee, these properties, when measured in situ in an approved manner, shall not be less than the values stated below.

a. Durability:

At least 90 per cent of the marked areas shall contain a uniform coating of marking material through which the underlying surfacing has not penetrated. Discontinuities, due to wear, shall not be accepted in continuous lines and at least 75 per cent of each marked segment of a broken line shall remain intact.

b. Reflectivity:

$R4^a \geq 200 \text{ mcd/m}^2$. 1x, following application of longitudinal markings.

$RW3 \geq 50 \text{ mcd/m}^2$

$R3^a \geq 150 \text{ mcd/m}^2$. 1x, after 24 months following application.

$R2^a \geq 100 \text{ mcd/m}^2$. 1x, after 36 months following application.

when measured by the digital retroreflectometer LTL 2000 in accordance with Annex B of BS EN 1436:2007

c. Skid Resistance:

50 B.P.N, when measured by the British portable pendulum apparatus.

Or

$SRT > 50$, in accordance with Annex D of BS EN 1436:2007

For Transverse Yellow Bar Markings Class S5

$SRT > 65$, in accordance with Annex D of BS EN 1436:2007

d. Luminance Factor:

White Material...B4: ≥ 50

Yellow Material...B2: ≥ 30

When measured in accordance with Annex C of BS EN 1436:2007

e. Chromaticity:

Refer to results in Table 6 of BS EN 1436:2007; testing method is in Annex C.

Material Quality

12. The Contractor shall, when requested by the Employer's Representative, supply name(s) of the manufacturer(s) from whom it is intended to purchase thermoplastic material, glass beads, and road studs for use in the Works
13. The Contractor shall supply to the Employer's Representative, certification that the proposed materials and the method of application of markings to the road conform to the specification as outlined above. For this purpose, the Contractor shall obtain from an agency approved by the Employer's Representative, a report containing:
 - a. The certified analysis, from a laboratory with a current ISO Certificate for the specific purpose, of each grade of thermoplastic material the Contractor proposes to use, and
 - b. 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 Clare County Council. (In the event that a company has an 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 Clare County Council for verification.
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 Clare County Council before use. All costs associated with such certification(s) shall be borne by the Contractor.

Preparation

15. Prior to the application of road markings, the Contractor shall prepare the surface to ensure the road marking can achieve the three year performance guarantee. In any location where there is less than 0.6m of hard strip, the Contractor shall clear the hard strip of any debris or loose material from the road surface using a suction sweeper and/or an excavator to remove any encroaching road side verges before applying the road marking.

Application

16. Application of road markings shall be carried out in accordance with the following:
 - a. The Contractor shall ensure that the horizontal alignment of the applied marking is +/- 5mm and to the satisfaction of the Employer's Representative in respect of straightness of the line and the smoothness of curvature. The Contractor must, in advance of being awarded the Contract, satisfy the Employer's Representative as to his capability of carrying out the Works as and from the starting date of the Contract.
 - b. The Contractor shall apply new thermoplastic spray markings of no less than 1.5mm depth.

- c. The Contractor shall apply extruded and screeded thermoplastic marking of an application depth of $4 \pm 0.5\text{mm}$.
- d. The Contractor shall apply screeded thermoplastic bar markings (M115) of an application depth of not greater than 5mm in depth. The combined thickness of the bars and any superimposed marking must not exceed 6mm.
- e. Notwithstanding the requirements and tolerances in the Specification 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 and it shall be open to the Employer's Representative to reject such work. Excess spray and spray drift particularly where repetitive shall be treated similarly.
- f. The lines shall be laid in a smooth flowing alignment. Visible interruptions shall not be accepted. Line edges shall be clearly defined.
- g. The Contractor shall remove all loose debris following this work.
- h. In the case of reflectorised markings solid glass beads, 400 g/m² to 500 g/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).
- i. 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 solid glass bead content incorporated within the body of the mix for reflectorised markings.
- j. Where directed by the Employer's Representative, 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 a rate of 14 square metres to the litre. The solvent shall be allowed to evaporate before the thermoplastic is applied.
- k. The Contractor shall not carry out any work when the weather conditions or the road conditions (e.g. dampness, dust and 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 in the first place where such adverse weather conditions or road conditions exist. In addition, the Contractor shall remove loose debris, mud and all other materials likely to affect adhesion between the thermoplastic road marking material and the road surface. A mechanical suction

sweeper and/or an excavator shall be used to clean and prepare all roads, including side roads at junctions.

- l. All markings in this Contract shall be laid under guarantee and shall be applied to the thickness specified in the Contract.
- m. 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. Where lengths fall short of the specified length removal of the markings will be required.
- n. At junctions and crossroads where a continuous centre line is proposed on the mainline, the Contractor shall provide a minimum of 11m broken line consisting of 5no. 1m marks with 1m gaps.
- o. (o) At junctions and crossroads where a double line system is proposed on the mainline, the Contractor shall provide a minimum of 11m broken line consisting of 5no. 1m marks with 1m gaps.

Testing

- 17. The methods of testing shall be in accordance with BS EN 1436 or with those approved by the Employer's Representative. Notwithstanding the above Clare County Council 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.
- 18. The Contractor shall measure the values of the above properties on applied markings in accordance with the Appendix 1/5 of the specification. The tests shall be carried out in the presence of the Employer or his/her representative. Prior to undertaking the testing, the Contractor shall submit details of the sections randomly selected where testing shall be carried out. The test report shall detail site locations, road type description, weather condition, values recorded for all test results and there average result for each section. The report will also specify areas which do not comply with the requirements stated above. The Contractor shall specify the location of all test sections with reference to the TII's plate no.'s along the route. The report will include the Contractor and any sub-contractor who may have worked on that section.
- 19. At least five observations/measurements shall be taken to establish average values of the above properties for the representative length of road.
- 20. The Contractor shall make available samples in accordance with Appendix 1/6, on demand by the Employers Representative.
- 21. During the 3 year period of guarantee the Contractor shall be required to replace or renew markings which fail to comply with one or more of the minimum values of the marking properties listed above. Renewal of failed markings shall be carried out to the original specification for both scabbling and marking quality and depth. The guarantee period will

recommence on such renewal. All costs associated with this testing, replacement or renewal of markings during the period of guarantee shall be borne by the Contractor. Testing will be in accordance with Appendix 1/5.

22. The Contractor is to survey all existing road studs type and location in a suitable format prior to the commencement of the works. The Schedule below details the overall quantity of each road stud but not their exact location which the contractor will determine and record and also take instruction from the Employer as to their exact location.
23. Reflecting road studs shall be:
 - a. Type 1 (i) :reflecting, complying with EN 1463 2000. They shall be installed as recommended by the manufacturer and as approved by the Employer's Representative. The depressible insert shall be manufactured from rubber.

Road Stud Installation

24. Where complete Roads Studs are to be installed, including new housings, care must be taken to ensure no damage to existing detector loops in place.

Road Stud Spacing

25. Spacing of road studs shall be in accordance with the current version of the "Traffic Signs Manual" published by the Department of the Transport –Table 7.6.

Performance of Road Studs

26. Type 1 Studs must remain in place and retain at least 50% of their reflective face over the duration of the guarantee period. Road Studs shall be tested in accordance with Appendix 1/5. Road Studs failing the tests must be replaced within 3 weeks of notification by the Employer's Representative.

APPENDIX 27/1 – WATERMAINS, UTILITIES AND ACCOMMODATION WORKS

1. Accommodation Works are included in the scope of works for this Contract. Please refer to Appendix 7/1 for pavement construction details.
2. The Contractor shall not damage any existing publicly and privately owned services and shall exercise extreme care in working adjacent to all such services. The rights of the statutory authority and/or owner of each service shall be respected at all times.
3. Protection of Ironworks is required on all schemes. Ironworks may be required to be raised, lowered or maintained during the construction works.
4. The Contractor may remove to store all chamber covers for the duration of the works however chambers must be covered with suitable temporary or permanent covers prior to trafficking.
5. On completion of the works the Contractor must remove from store and reinstall chamber covers and frames along with any other items.