SERIES NG 1500
HIGHWAY COMMUNICATIONS

Contents

NATIONAL ALTERATIONS OF THE OVERSEEING ORGANISATIONS OF SCOTLAND, WALES AND NORTHERN IRELAND

Contract specific Additional Requirements (A) and Substitute Requirements (R) may be included for contracts where the Overseeing Organisation is not Highways England (or its successor). Where required, these will be issued by:

Scotland

Transport Scotland, 8th Floor, Buchanan House, 58 Port Dundas Road, Glasgow, G4 0HF.

Wales

The Welsh Government, Transport Department, Cathays Park, Cardiff, CF10 3NQ.

Northern Ireland

Director of Engineering, The Department for Infrastructure, Clarence Court, 10 – 18 Adelaide Street, Belfast BT2 8GB.

The Overseeing Organisation may also issue an initial list of Alternative Requirements/Departures.

HIGHWAY COMMUNICATIONS

NG 1501 (02/17) Introduction

1 (02/17) The communications system includes telephones, highway signals, message signs, closed circuit television (CCTV), detector systems and the associated power supplies and control systems. The Overseeing Organisation should be consulted during the design and preparation of contract documents.

2 (02/17) In highway construction and upgrades of highway communications systems on existing highways, the installation of ducts, chambers, cables, cabinets, signal posts, telephones and detector loops (or alternative detector systems) will normally be the responsibility of the Contractor. The scope and responsibilities for the new works associated with the above items should be clearly described in contract specific Appendix 15/1.

3 (02/17) The Contractor is normally responsible for the power supplies. Contract specific Appendix 15/1 should define the party who has responsibility for the provision of power at each site. The agreement of timescales for the provision of a power supply with the electricity supplier, and the interface cabinets erected should allow for sufficient time to ensure that completion dates of the system are met. Power supplies to cabinets and other equipment should be available at the time of installation.

4 (02/17) The information contained within these Notes for Guidance, with the exception of the Appendices, are for guidance and information only and do not form any requirement upon the compiler.

5 (02/17) The compiler should also refer to TD 72 (DMRB 9.3.1) and the role of the designer in developing contract specific requirements that will be contained in the contract specific Appendices.

6 (02/17) The compiler should identify and schedule all items to be delivered by the Overseeing Organisation and others to ensure that the Contractor is in a position to confirm and receive these items in accordance with a schedule and/or programme.

7 (02/17) The compiler should note that there is not a one-to-one mapping of notes for guidance against individual references to Appendices within the 1500 series. The compiler therefore needs to consider the relevance of each reference and use the check-list below to identify the inclusion of content within the relevant Appendix.

8 (02/17) In respect of contract specific systems and equipment to be supplied under the Contract, compiler should seek guidance from the Overseeing Organisation in respect of any contract specific logistic and support requirements that should be applied.

NG 1502 (02/17) General Requirements

1 (02/17) The requirements of the Telecommunications Services Provider should be included in contract specific Appendix 15/3.

Details of the scope of supply and agreement with the Telecommunications Services Provider in respect of the procurement and provision of telecommunications services to be provided should be included in contract specific Appendix 15/1.

2 (02/17) The communications installation should be installed and tested successfully to allow adequate time for system commissioning. The date for completion of the highway communications infrastructure, including any period for satisfactory handover of communications infrastructure to the Telecommunications Service Provider, should be specified in contract specific Appendix 1/13 to allow sufficient time for the Telecommunications Services Provider to commission the telecommunications system. System commissioning, including installation of associated electronic equipment will normally be carried out on behalf of the Overseeing Organisation. Contract specific Appendix 15/1 should identify if the Contractor is responsible for any aspects of system commissioning, including installation of associated electronic equipment.

3 (02/17) If a contract contains sectional completions it may be necessary to make provision in contract specific Appendix 15/1 for the appropriate part or parts of the system to be completed by the appropriate dates, which should be included in contract specific Appendix 1/13. All programme requirements, timescales and notice periods should be outlined within the contract specific Appendix 1/13.

4 (02/17) It should be noted that Highways England has developed a metal theft risk assessment process along with a metal theft toolkit that provides a range of solutions to mitigate against the rise of metal theft – Major Project Instruction MPI-21-012014: requirement and guidance for new schemes to perform a metal theft risk assessment. Risk assessments should address any specific security requirements of the Telecommunications Services Provider as detailed in contract specific Appendix 15/3.

NG 1504 (02/17) **Site Records**

1 (02/17) 'As-built' drawings should include inserts to a larger scale where layouts are complex, these should be produced from records. Where additional information is required on the record drawings this should be recorded in contract specific Appendix 15/1. The Telecommunication Services Provider's requirements for any additional information on the record drawings should be recorded in contract specific Appendix 15/3.

2 (02/17) Evidence that test equipment is within its valid calibration period could be the date of the last calibration.

3 (02/17) Changes to the configuration or safeguarding of the highway communications network should meet the operational and maintenance requirements of specification MCH 1349.

4 (02/17) Suitable datum points for position measurements could be the kerb or fence line as for example may be specified for as-built communications drawings. Consideration should be given to any datum points in BIM.

NG 1505 (02/17) **Provision of Cabinets, Cables and Ancillary Items**

1 (02/17) Cabinets, cables, telephones, and signal posts together with other electrical equipment will be procured as per the requirement of the contract specific Appendix 15/1. This should outline the number, type and requirements of equipment that is to be procured, requirements for its delivery and storage. The programme of delivery should be agreed between the Contractor and the Overseeing Organisation. The Overseeing Organisation should be informed of any deviations or modifications required. The equipment should be checked upon receipt, recorded and adequately stored by the Contractor. Contract specific Appendix 15/1 should also identify which items of equipment require dry, heated or secure storage.

The programme should contain items required to be delivered by the Telecommunications Services Provider where such items may be required to be installed by the Contractor on behalf of the Telecommunications Service Provider. Additionally, reference should be made in respect to any handling and storage requirements of the Telecommunications Service Provider that may be contained in contract specific Appendix 15/3 for these items.

NG 1506 (02/17) **Cables**

1 (02/17) Cables will be supplied by the Contractor as specified in contract specific Appendix 15/1. The manufacturer's quality inspection certificate for each drum of cable should be checked before it is installed. Cables will generally be supplied to TRH 2583 however other types of cable that the Contractor is required to supply, which should be in accordance with applicable EU Legislation, may be specified in contract specific Appendix 15/1.

NG 1507 (02/17) **Cable Installation**

1 (02/17) All communications infrastructure, cabling and equipment should be sited within the highway boundary. The design of the relative positions of ducts, cables, drains, environmental barriers, safety fences, tree planting areas, signs and lighting columns should prevent subsequent construction or maintenance operations damaging the cables.

2 (02/17) With respect to the installation of cables, the Contractor should be made aware of the effects of temperature on specified cables and related manufacturer's instructions when installing cables. The flexibility of the cables might be impaired by the temperature and incorrect handling under such conditions can lead to failure.

3 (02/17) A length of cable (at least 7.5 m) should be coiled in each jointing chamber. This is to enable jointing and testing processes to be carried out within a vehicle or tent.

4 (02/17) The Overseeing Organisation or Telecommunications Services Provider (as appropriate) will witness the installation of all cables unless specified otherwise in contract specific Appendix 15/1.

5 (02/17) For long cable lengths a suitable lubricant should be used.

6 (02/17) Where practicable, provision should be made for an additional length of all armoured communications cables, where the cable exceeds 50 m in length, at the site of each terminal cabinet to allow for future re-terminations.

7 (02/17) Minor sheath repairs to armoured communications cable may be permitted where authorised by the Overseeing Organisation or Telecommunications Services Provider in accordance with any stated requirements in contract specific Appendix 15/3 as appropriate.

8 (02/17) A draw cord attached to a cable and pulled through a duct with the cable is likely to twist around the cable prejudicing future cable pulling operations. Alternative installation methods that leave a draw cord free within the duct should be used. The use of rods to introduce draw cords is discouraged because of the possibility of damage to cables already installed.

9 (02/17) Telecommunications Services Provider may have further requirements that influence the laying of longitudinal cables. Contract specific Appendix 15/1 should state any precedence of such requirements.

NG 1508 (02/17) **Installation of Cabinets and Signal Posts**

1 (02/17) Hardstanding areas are required to form platforms adjoining cabinets and gantry bases for maintenance purposes. Easy access should be available to the cabinets as heavy testing equipment needs to be carried to them in all weather conditions. Where appropriate, steps should be provided, and crossings should be provided over ditches. In some cases it may be necessary to site cabinets on a slope thus involving the construction of suitable platforms and/or retaining structures with appropriate edge protection to prevent falls from height. All such details should be included in contract specific Appendix 15/1.

2 (02/17) For maintenance and safety purposes an appropriate layout of cabinets in groups should be adopted. The layout to be adopted should be detailed in contract specific Appendix 15/1 and, where necessary, on the drawings.

3 (02/17) The numbers of ducts entering cabinet plinth shall be described in contract specific Appendix 15/2.

NG 1509 (02/17) **Gantries for Highway Signals**

1 (02/17) Sign/signal gantries need to comply with the SHW Series 1200. Details of traffic signs including variable message signs and individual lane signals installed on gantries should be included in contract specific Appendix 12/1.

2 (02/17) Details of cables and electrical equipment including power supply requirements should be included in contract specific Appendix 15/1.

NG 1510 (02/17) **Installation of Telephones**

1 (02/17) The type of telephone installation should be specified for each location in contract specific Appendix 15/1. Best practice installation drawings may be used for this purpose.

2 (02/17) In the interests of safety telephones which have not been commissioned and are, therefore, not available for use should be covered with bags that clearly state "Not in Use" and do not cover the solar panels. Contract specific Appendix 15/1 should show if these bags will not be available on loan from the Overseeing Organisation.

3 (02/17) The preferred method of installation for the Type 354 telephone is using the pre-fabricated concrete plinth because they involve rapid installation with minimal excavation and low risk of disruption to services. The large plinth area also provides a hardstanding area for users, including those in a wheelchair.

The cable pit moulding should align with the incoming duct. Any spare cable should be retained in the cable pit moulding. A Cable Joint Enclosure (CJE Type 15T) should - be installed when joining a broken or damaged cable.

NG 1512 (02/17) **Installation of Ancillary Items**

1 (02/17) Distributive and protective devices should be specified in contract specific Appendix 15/1 and may include fused cut-outs, distribution boxes, miniature circuit breakers and/or residual current devices (RCDs), the rating, characteristics and breaking capacity having been determined by the designer in accordance with the requirements of BS7671. Contract specific Appendix 15/1 should show clearly which equipment is provided by the Overseeing Organisation and which items the Contractor is to supply.

2 (02/17) Termination boxes and termination frames should usually be installed by the Telecommunications Services Provider. In exceptional circumstances the Contractor may be required to install these items as described in contract specific Appendix 15/1.

3 (02/17) For portal or cantilever signal gantries isolation for power and connection box should be mounted as described in contract specific Appendix 15/1. For post mounted signals distributors 9902 will usually be mounted on to the baseboards of posts 75. Note that for some signals there is a Distributor Type 9902(ATM) variant and the installation of this variant should be identified in contract specific Appendix 15/1. Other variants should also be described in contract specific Appendix 15/1. Where a signal is to be installed onto a pair of posts 75 the location of ancillary items should be identified in contract specific Appendix 15/1.

4 (02/17) Layout plans and equipment wiring within cabinets may be described in contract specific Appendix 15/1.

5 (02/17) At transmission station sites the Telecommunications Services Provider will normally install ancillary items and internal wiring into cable marshalling cabinets unless stated otherwise in contract specific Appendix 15/1.

NG 1513 (02/17) **Jointing and Termination of Multi-pair Communications Cables**

1 (02/17) The Telecommunications Services Provider will normally be responsible for jointing and terminating multi-pair communications cables, but if described in contract specific Appendix 15/1 the Contractor may be required to complete some or all of these activities. It will also be necessary to identify the locations of Cable Joint Enclosures (CJE) to be installed by the Telecommunications Services Provider within chambers, in order for the Contractor to comply with the requirements of the Telecommunications Services Provider, in particular avoiding installing power cable reduction joints within those chambers.

2 (02/17) The Telecommunications Services Provider may require that cable joints of a type other than Cable Joint Enclosures (CJE) or Above Ground Joints (AGJ) are to be installed; these requirements should be described in contract specific Appendix 15/1. The type of cable joint and installation requirements should be agreed with the Telecommunications Services Provider.

NG 1515 (02/17) **Termination of Optical Fibre Communication Cables**

1 (02/17) The Telecommunications Services Provider is usually responsible for terminating optical fibre cables; where the Contractor is required to terminate optical fibre cables this should be specified in contract specific Appendix 15/1.

NG 1516 (02/17) **Termination and Jointing of Power Supply Cables for Communications**

1 (02/17) The requirements for termination of power supply cables should be fully detailed on the drawings and cross-referenced in contract specific Appendix 15/1.

2 (02/17) Where it is not physically possible to terminate cables larger than 25 mm^2 within many cabinets, it is necessary to joint the cable to a short length of 10 mm^2 or 25 mm^2 cable just outside the cabinet. The smaller cable is then terminated within the cabinet. The location of all such joints should be clearly marked on the drawings and referenced in contract specific Appendix 15/1. The cable size used for the reduction tail may be critical in order to comply with the power cable design calculations and hence the cable size should be clearly identified on the drawings or in contract specific Appendix 15/1. Non-standard cabinets may be designed to accommodate cables larger than 25 mm^2 and when appropriate this should be identified in contract specific Appendix 15/1.

3 (02/17) Typically in power supply cables for communications, acceptance should not be given for more than one joint in any one cable between terminations, or where the combined length of the two cables to be jointed is less than 70 metres.

4 (02/17) Where joints are used, joint markers should be provided and these should be accurately recorded on the record drawings.

NG 1517 (02/17) **Earthing, Bonding and Lightning Protection**

1 (02/17) The provisions of Clause 1517 are to cover the internal earthing and bonding of the system. In some areas the requirements of the electricity supplier or the results of testing may require additional earth(s) to be provided and these requirements should be incorporated in the design. Specific requirements for earthing and bonding are to be detailed in contract specific Appendix 15/1.

NG 1518 (02/17) **Cable Testing**

1 (02/17) Details of cable tests, frequency, reporting etc are to be shown in contract specific Appendix 1/5.

2 (02/17) Where cables do not comply with the specifications listed in Clause 1506 the Overseeing Organisation should be consulted about testing requirements.

3 (02/17) The cable sections upon which tests are to be carried out should be stated in contract specific Appendix 15/1. They may be shown on a cable drawing.

NG 1519 (02/17) **Labelling and Numbering**

1 (02/17) Details of the Telecommunications Services Provider's Service Delivery Points, responsibilities for labelling.

NG 1521 (02/17) **Removal and Re-Siting of Existing Equipment**

1 (02/17) Existing cables which are no longer required should be removed, unless explicitly permitted to remain as per the requirements of the SHW Series 1500 or contract specific Appendix 15/1, where to do so will not result in consequential damage to the existing in-service cables in order to prevent interference with the operation of the communications system.

2 (02/17) Decommissioning of telecommunications services and removal of any Telecommunication Services Provider's equipment will normally be undertaken by the Telecommunication Services Provider. Details of the Telecommunication Services Provider's decommissioning activities should be included in contract specific Appendix 15/1. The notice periods that the Contractor should give to Telecommunications Services Provider should be included in contract specific Appendix 15/3.

3 (02/17) The compiler should seek the details in respect of the requirements from the Overseeing Organisation regarding the return, distribution or disposal of items of equipment and cable/cable drums etc.

NG 1522 (02/17) Enforcement and other Systems

1 (02/17) When installing systems within close proximity of radio masts consideration should be given to possible Electromagnetic Compatibility & Electromagnetic Interference.

NG 1523 (02/17) Detector Systems

1 (02/17) This Clause covers the installation of the loops and cabinets and also detector systems using alternative technologies. Loop installations should be detailed in contract specific Appendix 15/1. The requirements for other detector systems should be fully described in contract specific Appendix 15/1.

2 (02/17) Inductive loops should have a minimum clearance of 50 mm above road reinforcement and slots should be at least one metre in the lateral plane from any ferrous objects such as metal reinforcement bars, chamber covers etc. Also, in concrete road surface, slots should not be cut less than 1.5 metre from transverse joints between adjacent concrete sections.

3 (02/17) Where supplied by the Overseeing Organisation, the Contractor should make arrangements with the Overseeing Organisation well in advance for the delivery of sufficient cabinets and plinths for the complete installation.

4 (02/17) The location and type of loop configuration should be shown on suitable drawings after consideration has been given to the effect of any slab reinforcement in the concrete. Sufficient ducts should be included to accommodate the number of feeders required at a particular location.

5 (02/17) The Overseeing Organisation should advise on the use of cold poured epoxy resin compounds. Where hot poured sealants are used, the pouring temperature should be such that it does not cause any damage to the detector loop insulations. The cable manufacturer and Overseeing Organisation/maintainer should be consulted for the sealants suitability.

NG 1524 (02/17) Trial Pits

1 (02/17) The method of excavation of trial pits (by hand or other means) and the locations should be described in contract specific Appendix 15/1.

NG 1525 (02/17) Safeguarding the Existing Motorway Communications Network

1 (02/17) The requirements of the Telecommunications Services Provider for implementing measures to safeguard continuity of the existing highway communications network should be included in contract specific Appendix 15/3. Contract specific Appendix 15/3 should also include the notice periods for the Contractor to give the Telecommunications Services Provider to implement these measures and any other temporary communications services to be provided by the Telecommunications Services Provider. Any provisional agreements in respect of network bypass cables shall be scheduled in contract specific Appendix 15/1.

2 (02/17) Details of the telecommunications services to be suspended (de-activated pending activation at a later date), re-located or removed by the Telecommunications Services Provider should be scheduled against location and equipment type in contract specific Appendix 15/1. This schedule should also contain details of telecommunications services to be maintained using temporary arrangements to be implemented by the Telecommunications Services Provider.

The notice periods that the Contractor should give the Telecommunications Services Provider for service suspension, re-location, service removal and the implementation of temporary communications arrangements should be included in contract specific Appendix 15/3.

3 (02/17) If any element of highway communications equipment is to be kept operational, arrangements for its maintenance through the Overseeing Organisation and the Telecommunications Services Provider should be taken into account in the scheme design and specification for the works. The Service Delivery Points (SDPs) and equipment to be maintained and their operational, protection, access and maintenance requirements should be identified in contract specific Appendix 15/1.

4 (02/17) Where there is a Telecommunications Services Provider, they will provide telecommunications bypasses to provide continuity of service in circumstances where the works disrupt the existing telecommunications services. The Telecommunications Services Provider's requirements in respect of telecommunications bypasses should be included in contract specific Appendix 15/3.

5 (02/17) Where there is a Telecommunications Services Provider, they will need to visit the works area to monitor work by the Contractors that is in close proximity to assets maintained by the Telecommunications Services Provider and for cable tracing activities. The Contractor is responsible for arranging these visits. The notice periods that the Contractor needs to comply with should be included in contract specific Appendix 15/3.

NG 1526 (02/17) The Inspection and Testing of Electrical Installations

1 (02/17) The Contractor should issue copies of electrical test certificates to installers and maintainers as appropriate, prior to the installers or maintainers performing any work on the installed power supply at the site. Appendix 15/1 should set out the requirements and timescales for the delivery of electrical test certificates to various parties prior to the completion of their works. The timescales in respect of the Telecommunications Services Provider for receipt of this information prior to the start of the Telecommunications Services Provider's installation activities shall reference the information contained in contract specific Appendix 15/3.

NG 1527 (02/17) Cable Installation at Transmission Stations

1 (02/17) Work in transmission station buildings and transmission cabinets will normally be carried out by the Telecommunications Services Provider. Any work to be undertaken by the Contractor inside transmission station buildings and transmission cabinets, such as cable installation and termination, should be fully detailed in contract specific Appendix 15/1 following agreement to the work by the Telecommunications Services Provider.

2 (02/17) The requirements that the Telecommunications Services Provider has for the Contractor to access transmission stations and transmission cabinets to perform work should be detailed in contract specific Appendix 15/3.

NG 1528 (02/17) Modifications to Equipment and Circuitry associated with Existing Cabinets

1 (02/17) The requirements for modifications to existing cabinets should be fully detailed on the drawings and cross referenced in contract specific Appendix 15/1.

2 (02/17) Any requirements placed upon the Contractor by the Telecommunications Services Provider for work to be undertaken by the Telecommunications Services Provider on operational circuitry should be included in contract specific Appendix 15/3.

NG 1529 (02/17) **Temporary Emergency Telephones**

1 (02/17) The need for Temporary Emergency Telephones should be dictated by the Contractor's programme of works. Consideration should be given to providing a temporary CCTV System for monitoring traffic as an alternative to Temporary Emergency Telephones as described in Clause 1529.

2 (02/17) The location of Temporary Emergency Telephones should be clear to motorists such that motorists cannot be put into a situation where the nearest visible Emergency Telephone can only be reached by crossing either live traffic lanes or the works.

3 (02/17) The changes to the telephone network and its maintenance arrangements should be documented in accordance with specification MCH 1349.

NG 1530 (02/17) **Cable Ducts General**

1 (02/17) Ducts should be scheduled in contract specific Appendix 15/2. Attention should be paid to the material to be used for ducts installed permanently above ground (including their exposure to UV, weathering, impact and retention arrangements) such as those installed on gantries.

2 (02/17) The minimum diameter of longitudinal communications ducts should take into account the number and type of sub ducts to be installed.

3 (02/17) For ducted infrastructure that is to be handed over to the Telecommunications Services Provider for installation and maintenance the compiler has the option to use either the Overseeing Organisation's requirements for the provision and installation of ducts or the Telecommunications Services Provider's requirements as an alternative. In either case the Overseeing Organisation and the Telecommunications Services Provider should be consulted before finalising the requirements. The detailed requirements should be as specified in contract specific Appendix 15/2 with information obtained from the Telecommunications Services Provider as appropriate. For all longitudinal ducts the specified requirements should be consistent throughout a scheme. For extensions to local ducts and interrupted ducts the requirements should be specified so as to maintain compatibility with the installed ducting.

NG 1531 (02/17) **Installation of Ducts General**

1 (02/17) Bedding material for ducts should be readily obtainable since a wide grading envelope (tolerance) is permitted including most gradings. It needs to flow readily and compact uniformly, thus a low coefficient of uniformity is necessary.

2 (02/17) A distinction should be made between the requirements of bedding, haunching and surrounding and those of backfilling. The former comprise all operations of trench fill up to a level typically 300 mm or as detailed in the duct manufacturer's written specification above the top of the barrel of the pipe. Backfilling constitutes the remaining operations up to ground level in verges and open ground and up to formation or sub-formation level under carriageways or hardened verges. Work above formation level constitutes construction or reinstatement of the pavement.

3 (02/17) One method of protecting ducts against mechanical damage from subsequent operations after construction of the pipeline and where remedial measures due to over excavation are required could be adding a concrete surround. Protection of existing ducts where necessary may take the form of concrete arch or slab above the pipe.

4 (02/17) When specifying additional or alternative duct installation requirements such requirements should ensure that the performance and integrity of the duct network are maintained to at least the same levels as specified elsewhere within the Series 1500 and in particular any effects of vehicle wheel loading upon the duct network, including wheel loading from wayward vehicles. In specifying additional or alternative requirements the compiler should take into account any impact of the loss of integrity of the duct network and any cables therein, in particular the impact of the loss of longitudinal communications services.

5 (02/17) The choice of duct installation method to be used should take account of existing local ground conditions and should be detailed in contract specific Appendix 15/2.

NG 1532 (02/17) Chambers for Highway Communications Cables

1 (02/17) Plastic proprietary chambers need a concrete bed and surround unless local geotechnical conditions allow the designer to reduce or eliminate that requirement. The internal dimensions of the chamber shall be as specified in contract specific Appendix 15/1 and where these chambers are to be handed over to the Telecommunications Service Provider for future maintenance then these dimensions should be determined in consultation with the Telecommunications Service Provider.

2 (02/17) The requirement for cover lifters should be determined in accordance with the manual handling directive. The chamber cover lifter should be safe and fit for use. To facilitate its safe use, regard should be paid to the available hardstanding area around the chamber to accommodate any lifting equipment and for personnel access to the chamber.

3 (02/17) Typical dimensions for hard standings around chamber covers for safe working and lifting of covers should be 700 mm upstream and downstream and 250 mm left and right of the cover.

4 (02/17) Type A chamber typical internal size and usage:

(i) 1300 mm(L) x 850 mm(W) x 900 mm(D).

(ii) Pulling longitudinal cables.

(iii) Pulling large power cables.

(iv) To accommodate a change of direction or level in longitudinal cables.

(v) Housing longitudinal cable CJEs.

(vi) At sites with longitudinal AGJs.

(vii) To accommodate re-make / jointing cable loops that permit cable jointing within longitudinal CJEs to be performed externally to the chamber.

(viii) To accommodate the bending radius of larger power cables (conductor sizes of greater than 50 mm² CSA) where the chamber is used to re-direct the power cable (i.e. it does not pass through at the same level and in the same direction).

(ix) Housing power cable joints where power cables have conductor sizes of greater than 50 mm².

(x) At sites with cabinets that connect with longitudinal and/or multiple local communications plus power cables.

(xi) At interfaces between longitudinal ducting and cross carriageway ducts (CCD).

(xii) Where the depth of a chamber is more than the maximum depth of a type B chamber.

5 (02/17) Type B chamber typical internal size and usage:

(i) 750 mm(L) x 675 mm(W) x 900 mm(D).

(ii) Pulling local cables.

(iii) To accommodate a change of direction or level in local cables.

(iv) To intercept the longitudinal duct run to provide access to the local ducts therein.

(v) Housing local CJEs.

(vi) To accommodate re-make / jointing cable loops that permit cable jointing within local CJEs to be performed externally to the chamber.

(vii) Housing small power cable joints.

(viii) At sites with cabinets that connect with local communications plus power cables.

(ix) At central reserve signal sites where access is required to CCDs.

(x) At groups of cabinets with interconnected cabling.

(xi) At sites requiring a cable transition arrangement to a post or mast.

6 (02/17) Type C chamber typical internal size and usage:

(i) 600 mm(L) x 450 mm(W) x 550 mm(D).

(ii) Pulling local cables.

(iii) To accommodate a change of direction in local cables.

(iv) To accommodate loop feeder cable joints.

(v) At individual cabinet sites where only a low number of smaller diameter local cables are present.

(vi) At sites requiring a cable transition arrangement to a post or mast.

7 (02/17) Type D chamber typical internal size and usage:

(i) 2700 mm(L) x 675 mm(W) x 900 mm(D).

(ii) Marshalling chamber for use with transmission stations.

(iii) Pulling longitudinal and local cables.

(iv) Storage of re-make loops or sufficient cable to reach to the identified location for a temporary transmission station.

8 (02/17) Type E chamber typical internal size and usage:

(i) 400 mm(L) x 400 mm(W) x 550 mm(D).

(ii) Routeing of loop feeder and inductive loop cables.

(iii) Jointing of loop feeder and inductive loop cables.

(iv) At sites requiring a cable transition arrangement to a post or mast.

NG 1533 (02/17) Proving and Testing of Ducts

1 (02/17) The air test should be carried out on complete duct lengths i.e. from chamber to chamber.

NG 1534 (02/17) Closed Circuit Television

1 (02/17) The Contractor will be responsible for the provision of camera masts, chambers, cabinets and ancillary items that will be described in contract specific Appendix 15/1.

NG 1535 (02/17) Provision of Telecommunications Services

1 (02/17) The requirements set out in contract specific Appendix 15/3 are in addition to the requirements of the 1500 series. Where there is a conflict between the contract specific Appendix 15/3 and MCHW Volume 1, then contract specific Appendix 15/3 should take precedence.

2 (02/17) Contract specific Appendix 15/3 should detail all requirements of the Telecommunications Services Providers that a designer and Contractor would need to be aware of.

3 (02/17) Contract specific Appendix 15/3 should contain the requirements of all Telecommunications Services Providers that are involved in, or impacted by, the works.

4 (02/17) If no Telecommunications Services Providers are involved in, or impacted by, the works then contract specific Appendix 15/3 should be identified as not used or reviewed for relevance if/where a Contractor is acting in the capacity of a Telecommunications Services Provider.

5 (02/17) Contract specific Appendix 15/3 should include references to existing contracted Telecommunications Services Provider specifications and drawings as necessary.

6 (02/17) Contract specific Appendix 15/3 should reflect current guidance and documentation available from the Telecommunications Services Provider. Where a populated copy of contract specific Appendix 15/3 is available from the Telecommunications Services Provider, this should be used.

7 (02/17) The Telecommunications Services Provider's requirements for the Contractor to liaise with the Telecommunications Services Provider. Include details of the procedures to be followed.

8 (02/17) Details of interface agreements that are required with the Telecommunications Services Provider. This should include:

(i) contact details;

(ii) forms of communication to be used (email, phone, etc.);

(iii) procedures to follow should issues need to be escalated.

9 (02/17) A schedule of the Telecommunications Services Provider's standard activities with their normal durations. Include details of any constraints that are imposed on the programme by the Telecommunications Services Provider, for example the maximum quantity of longitudinal cable that can be laid per week is (x)km.

10 (02/17) The arrangements for meetings between the Contractor and the Telecommunications Services Provider. Include:

(i) who is responsible for organising meetings;

(ii) who is responsible for producing minutes;

(iii) the deadline for production of minutes.

11 (02/17) Instructions and notices that a Contractor needs to issue to the Telecommunications Services Provider. Include those required for new or changed telecommunication services, or for the Telecommunications Services Provider to attend site. Detail the mobilisation periods required by the Telecommunications Services Provider.

12 (02/17) Requirements that the Telecommunications Services Provider has for access to site, including for inspection of works and installation activities.

13 (02/17) Any requirements from the Telecommunications Services Provider in respect of procedures for accessing Telecommunications Services Provider managed locations that the Contractor should comply with. This includes access to transmission stations and transmission cabinets to perform their work (note this applies where the Telecommunications Services Provider has granted permission for the Contractor to gain access, as recorded in contract specific Appendix 15/1).

14 (02/17) The processes by which it is agreed with the Telecommunications Services Provider which party is responsible for the provision of temporary traffic management and making road space bookings. Include details of notice periods required by the Telecommunications Services Provider.

15 (02/17) In respect of the location of existing buried services and infrastructure, the Telecommunications Services Provider's requirements for how they should be detected, confirmed, marked on the ground and protected.

16 (02/17) The procedures that the Contractor should follow to arrange for the Telecommunications Services Provider to locate services. Include the notice periods that the Contractor is required to give the Telecommunications Services Provider for the Telecommunications Services Provider to attend site for cable tracing and refinement of previous cable traces.

17 (02/17) The Telecommunications Services Provider's requirements upon the Contractor when the Contractor is excavating in close proximity to telecommunications services. Include the notice periods that the Contractor is required to give the Telecommunications Services Provider for the Telecommunications Services Provider to attend site to monitor the Contractor's works.

18 (02/17) The Telecommunications Services Provider's requirements for the physical protection of temporary cables, including bypass cables.

19 (02/17) The requirements that the Telecommunications Services Provider places on the Contractor for the Contractor to set out works that are: to be completed by the Telecommunications Services Provider, or to be handed over to the Telecommunications Services Provider.

20 (02/17) The process to agree with the Telecommunications Services Provider any changes to the Telecommunications Services that are required (i.e. changes to those detailed in contract specific Appendix 15/1). Include how such changes are recorded.

21 (02/17) An outline of the processes for design, covering outline design, detailed design, design changes, departures and any re-measured items (those with an extra-over rate). Provide references to any additional design documentation.

22 (02/17) The requirements on the Contractor in respect of the design, including design proving, for cables installed across gantries by the Telecommunications Services Provider.

23 (02/17) The process that the Contractor should follow to provide confirmations (authorisations) to the Telecommunications Services Provider following suitable instructions and notices. This should include confirmations to proceed with installation of telecommunication services, activation of services, deactivation of services, etc. Consider the triggering of payments to the Telecommunications Services Provider. Include information on the notice period required for each step in the delivery of services by the Telecommunications Services Provider. Requirements for measures to maintain service continuity.

24 (02/17) Details of the Telecommunications Services Provider's Service Delivery Points, responsibilities for provision.

25 (02/17) The steps involved in the provision of new services by the Telecommunications Services Provider and the removal of old services. Include information on cable pulling, cable termination and equipment provision. Include the notice periods required to be given by the Contractor to the Telecommunications Services Provider.

26 (02/17) For network bypass cables:

(i) The design process and involvement of the designer and Contractor.

(ii) The notice periods that the Contractor is required to give the Telecommunications Services Provider for installation and removal.

(iii) The process for cutting over from existing network cables to the network bypass cables.

(iv) The impact of cutting over to the network bypass cables.

(v) The options and processes for keeping operational any existing services along the length of the network bypass cable.

27 (02/17) The requirements that the Telecommunications Services Provider has for access to install, maintain and remove network bypass cables.

28 (02/17) The circumstances under which the Telecommunications Services Provider is responsible for the installation of cabling for temporary emergency telephones and the related processes when this is the case.

29 (02/17) For circumstances where the Contractor is required to terminate cables into cabinets containing operational circuitry, the Telecommunications Service Provider's requirements for notification and attendance at each site to oversee all work within the cabinet for which the Telecommunications Services Provider is responsible.

30 (02/17) The requirements on the Contractor where the Telecommunications Services Provider is undertaking work on operational circuitry, including connections and disconnections from the live communications network.

31 (02/17) The Telecommunications Services Provider's requirements for the construction of infrastructure including ducts, sub-ducts, chambers and cabinet bases. Include information on security requirements.

32 (02/17) The Telecommunications Services Provider's requirements when existing ducts are interrupted or extended.

33 (02/17) Any specific requirements that the Telecommunications Services Provider has for ducts and sub-ducts. Include information on: methods for sealing ducts (e.g. duct plug), and arrangements for cables over gantries.

34 (02/17) Requirements for cable pulling pits at intermediate locations along sacrificial ducts.

35 (02/17) Any specific requirements that the Telecommunications Services Provider has for the spacing of cabinets. Note that references to cabinet layout drawings should be included in contract specific Appendix 15/1.

36 (02/17) Details of the Telecommunications Services Provider's requirements for cabinets, including:

(i) The environment (heating, air conditioning, etc.).

(ii) Security.

(iii) Internal space.

(iv) Equipment layouts.

Note that such requirements would apply where the Telecommunications Services Provider takes responsibility for the cabinet following handover or has equipment installed within the cabinet.

37 (02/17) Data on the electrical power requirements and heat output of telecommunications equipment from the Telecommunications Services Provider.

38 (02/17) Any requirements that the Telecommunications Services Provider has for the Contractor to install certain cables prior to the installation of cables by the Telecommunications Services Provider.

39 (02/17) Any design rules that either limit the Telecommunications Services Provider's use of armoured communications cables, or impact the location of Service Delivery Points.

40 (02/17) The requirements on the Contractor for the identification of the Overseeing Organisation's cables. Note that this would apply to locations where the Overseeing Organisation's cables are terminated into cabinets, or locations, that the Telecommunications Services Provider is solely responsible for maintaining.

41 (02/17) The requirements of the Telecommunications Services Provider in respect of activities that should be completed prior to the Telecommunications Services Provider undertaking inspection and testing.

42 (02/17) Any specific requirements that the Telecommunications Services Provider has for proving the viability of ducts (duct proving), including cleaning, brushing and jetting existing ducts.

43 (02/17) Notice periods that the Contractor should give the Telecommunications Services Provider for inspection and test witnessing activities that the Telecommunications Services Provider is required to undertake.

44 (02/17) Requirements that the Telecommunications Services Provider has for reports to be produced by the Contractor following the inspection of works by the Telecommunications Services Provider and witnessing of tests by the Telecommunications Services Provider.

45 (02/17) Any specific requirements that the Telecommunications Services Provider has for the testing of ducts. Include requirements in respect of the reporting of results by the Contractor to the Telecommunications Services Provider.

46 (02/17) Any specific requirements that the Telecommunications Services Provider has for electrical tests. Include requirements in respect of the reporting of results by the Contractor to the Telecommunications Services Provider.

47 (02/17) Details of the process used to deal with snagging and remedial works. Include escalation means and methods to ensure timely rectification and delivery to meet objectives.

48 (02/17) The process by which the Telecommunications Services Provider will notify the Contractor that the ordered telecommunication services are operational and performing as specified. Include detail of processes if services are found to be either not performing correctly or are faulty in some other respect.

49 (02/17) The processes for handling faults during the Contractor's commissioning of technology assets that use the telecommunication services. The processes should cover the period up to the Contractor handing over assets to the Overseeing Organisation's Technology Maintenance Service Provider. Include information on the reporting of fault status from the Telecommunications Services Provider to the Contractor.

50 (02/17) The Telecommunications Services Provider's requirements in respect of the Contractor compiling records, drawings and other information at the end of the works for handover to the Telecommunications Services Provider.

51 (02/17) Any specific requirements that the Telecommunications Services Provider has for information that is to be present on the site record drawings.

52 (02/17) Notification and attendance on site for the Contractor.

NG TEMPLATE CHECKLIST FOR CONTRACT SPECIFIC APPENDIX 15/1: HIGHWAY COMMUNICATIONS

[Notes to compiler for contract specific Appendix 15/1:]

1 (02/17) In addition to the items referenced the compiler may include additional requirements within the relevant contract specific Appendix.

2 (02/17) The compiler should set out the scope and responsibilities for the provision of communications services within contract specific Appendix 15/1. Where a Telecommunications Services Provider is appointed to provide telecommunications services or telecommunications services plus communications infrastructure then the contract specific requirements of the Telecommunications Services Provider should be set out in contract specific Appendix 15/3. In the case that the Contractor provides the telecommunications services, contract specific Appendix 15/3 is not required and the compiler should set out the contract specific requirements within contract specific Appendix 15/1 and contract specific Appendix 15/2 and through Additional Requirements (AR) and Substitute Requirements (SR) clauses added to the MCHW, Volume 1, 1500 series.

3 (02/17) Contract specific Appendix 15/1 should be specific for each scheme and provide all the information which a tenderer requires. Contract specific Appendix 15/1 should include references to any other specifications and drawings as necessary.

4 (02/17) The compiler should reference any best practice drawings used, including issue numbers.

5 (02/17) The compiler should tick the non-shaded box to indicate that a response has been provided in the contract specific Appendix 15/1.

Series 1500 Clause No.	Sub Clause No.	Mandatory	Optional
1501 Introduction	7		
	7(i)		
	7(ii)		
	7(iii)		
	8		
	8(i)		
1502 General Requirements	1		
	1(i)		
	1(iii)		
	4		
	6		
1504 Site Records	1		
	1(ii)(l)		
	2		
1505 Provision of Cabinets, Cables and Ancillary Items	1		
	2		
	2(i)		
	2(ii)		
	3		
	5		
1506 Cables	1		
	2		

Series 1500 Clause No.	Sub Clause No.	Mandatory	Optional
1507 Cable Installation	1		
	9		
	16		
	16(i)		
	16(ii)		
	16(iii)		
	29		
1508 Installation of Cabinets and Signal Posts	1		
	1(i)		
	1(ii)		
	5		
	6		
	7		
	8		
1509 Gantries for Motorway Signals	1		
1510 Installation of Telephones	1		
	5		
	9		
1512 Installation of Ancillary Items	1		
	2		
	3		
	4		
	5		
1513 Jointing and Termination of Multi-pair Communications Cables	1		
	2		
	2(i)		
	8		
	9		
	11		
1514 Cable Connectors	3		
1515 Termination of Optical Fibre Communication Cables -General	1		
1516 Termination and Jointing of Power Supply Cables for Communications	1		
	2		
	3		
	3(i)		
	7		
	8		
1517 Earthing, Bonding and Lightning Protection	1		
	5		
	6		
1518 Cable Testing	2		
1519 Labelling and Numbering	1		
	2		
	5		
	6		

Series 1500 Clause No.	Sub Clause No.	Mandatory	Optional
1521 Removal and Re-Siting of Existing Equipment	1		
	1(i)		
	2		
	2(i)		
	5		
1522 Enforcement and Other Systems	2		
	3		
1523 Detector Systems	1		
	2		
	4		
1524 Trial Pits	1		
1525 Safeguarding the Existing Highway Communications Network	1		
	2		
1526 The Inspection and Testing of Electrical Installations	4		
1527 Cable Installation at Transmission Stations	2		
1528 Modifications to Equipment and Circuitry associated with Existing Cabinets	1		
	4		
1529 Temporary Emergency Telephones	1		
	2		
	2(i)		
1534 Closed Circuit Television	1		
	2		
	3		
1535 Provision of the Telecommunications Services	1		
	2		
	3(iii)		
1536 Electricity Connections	1		

NG TEMPLATE CHECKLIST FOR CONTRACT SPECIFIC APPENDIX 15/2: CABLE DUCT REQUIREMENTS

[Notes for the compiler for contract specific Appendix 15/2:]

1 (02/17) In addition to the items referenced the compiler may include additional requirements within the relevant contract specific Appendix.

2 (02/17) Contract specific Appendix 15/2 should be specific for each scheme and provide all the information which a tenderer requires. Contract specific Appendix 15/2 should include references to any other specifications and drawings as necessary.

3 (02/17) The compiler should reference any best practice drawings used, including issue numbers.

4 (02/17) The compiler should tick the non-shaded box to indicate that a response has been provided in contract specific Appendix 15/2.

1500 Series Clause No.	Sub Clause No.	Mandatory	Optional
1507 Cable Installation	1		
	4		
	4(iii)		
	15		
	17		
	19		
	22		
	23		
1508 Installation of Cabinets and Signal Posts	4		
1516 Termination and Jointing of Power Supply Cables and Communications	4		
1521 Removal and Re-Siting of Existing Equipment	6		
	6(i)		
	7		
1530 Cable Ducts General	1		
	2		
	4		
	7		
	12		
	12(i)		
	16		
1531 Installation of Ducts General	1		
	6(ii)		
	7		
	10		
	14		
1532 Chambers for Highway Communications Cables	1		
	5		
	6		
	7		
	8		

1500 Series Clause No.	Sub Clause No.	Mandatory	Optional
	8(i)		
	9		
	10		
	10(i)		
	10(ii)		
	12		
	16		
	18		
	21		
	29		
	30		
1535 Provision of the Telecommunications Services	2		

NG TEMPLATE CHECKLIST AND SAMPLE TABLES FOR CONTRACT SPECIFIC APPENDIX 15/3: REQUIREMENTS OF THE TELECOMMUNICATIONS SERVICES PROVIDER

[Notes for the compiler for contract specific Appendix 15/3:]

1 (02/17) In addition to the items referenced the compiler may include additional requirements within the relevant contract specific Appendix.

2 (02/17) The compiler should obtain all necessary information from the Telecommunications Services Provider for the completion of contract specific Appendix 15/3. The compiler should note that a Telecommunications Services Provider may have been appointed by the Overseeing Organisation to provide telecommunications services on a term basis or in respect of a number of schemes. The Telecommunications Services Provider may therefore retain an contract specific Appendix 15/3 that has previously been compiled and approved by the Overseeing Organisation that is specific to the contract arrangements between the Overseeing Organisation and the Telecommunications Services Provider. In this case the compiler should obtain the latest approved version of the contract specific Appendix 15/3 relating to the Telecommunications Services Provider's contract with the Overseeing Organisation.

3 (02/17) Any amendments to a pre-existing contract specific Appendix 15/3 proposed by the compiler and have the potential to cause a variation to the contract with the Telecommunications Services Provider. Such amendments should be agreed in advance with the Telecommunications Services Provider and guidance should be sought from those responsible within the Overseeing Organisation for the technical and commercial management of the contract between the Overseeing Organisation and the Telecommunications Services Provider when considering the implementation of any amendments to a pre-existing contract specific Appendix 15/3.

4 (02/17) The compiler should discuss with the National Roads Telecommunications Service team their requirements when compiling the response.

5 (02/17) Contract specific Appendix 15/3 should be specific for each scheme and provide all the information which a tenderer requires. Contract specific Appendix 15/3 should include references to any other specifications and drawings as necessary.

6 (02/17) The compiler should reference any best practice drawings used, including issue numbers.

7 (02/17) It should be noted that some clauses will have an additional template table that will require completing.

8 (02/17) The compiler should tick the non-shaded box to indicate that a response has been provided in contract specific contract specific Appendix 15/3.

1500 Series Clause No.	Sub Clause No.	Mandatory	Optional
1502 General Requirements	1(ii)		
	1(iv)		
	2(x)		
	3		
	3(xi)		
	4		
	4(i)		
	4(ii)		
	5		
1504 Site Records	1(i)		
	1(ii)		

1500 Series Clause No.	Sub Clause No.	Mandatory	Optional
	1(ii)l		
1507 Cable Installation	4(i)		
	4(ii)		
	11		
	14		
	16		
	17		
	18		
	23		
	27		
1508 Installation of Cabinets and Signal Posts	1		
1513 Jointing and Termination of Multi-pair Communications Cables	8		
	8(i)		
	9		
1517 Earthing, Bonding and Lightning Protection	8		
1518 Cable Testing	7		
1519 Labelling and Numbering	3		
	14		
1521 Removal and Re-Siting of Existing Equipment	1(i)		
	3		
1525 Safeguarding the Existing Highway Communications Network	1		
	2		
	4		
	7		
	8		
1526 The Inspection and Testing of Electrical Installations	1		
1527 Cable Installation at Transmission Stations	2		
1528 Modifications to Equipment and Circuitry associated with Existing Cabinets	4		
1529 Temporary Emergency Telephones	3		
	4		
1530 Cable Ducts General	2(iii)		
	14		
1531 Installation of Ducts General	3		
	12		
	14		
1532 Chambers for Highway Communications Cables	1		
	9		
	15		
	22		
1533 Proving and Testing of Ducts	6		
1535 Provision of the Telecommunications Services	2		
	3		