

SCHEDULE 17
COMMUNICATIONS REQUIREMENTS

Part 1
Core Communications Requirements

Section A: Measuring Equipment

1. MEASUREMENT

The Measuring Equipment shall be capable of providing:

- 1.1 a continuous count of the number of vehicles per hour in each lane in each of the following two categories:
 - 1.1.1 HGVs; and
 - 1.1.2 Other Vehicles;

2. MEASUREMENT LIMITS OF ACCURACY

The Measuring Equipment shall be capable of measuring to the following accuracy:

- 2.1 the count of the number of vehicles in each category and in each lane shall not differ from the true count by more than 3% of the true count, as established by the verification process, at the 95% confidence level.
- 2.2 the count of the total number of vehicles in each lane shall not differ from the true count by more than 1% of the true count, as established by the verification process, at the 95% confidence level.
- 2.3 The annual counts shall not be biased to under-recording or over-recording. If necessary an annual adjustment shall be made to achieve this.
- 2.4 If the accuracy of the vehicle category comprising the minority flow fails the required level of accuracy then, provided that the level of accuracy of the majority vehicle category is at least as good as that required for all vehicles and provided that the number of count errors for the minority vehicle category is less than 10 during the verification period, then the verification result shall be acceptable.

3. AVAILABILITY

The Measuring Equipment at each Measurement Point shall operate in accordance with paragraph 1 above and within the limits of accuracy set out in paragraph 2 above for not less than 99 per cent of the time during every six month period.

4. TRANSMISSION OF DATA

Data from the Measuring Equipment shall be transmittable by public service telephone network in a format compatible with that from time to time required pursuant to paragraph 2.1 of Part 2 of Schedule 14 (Reports).

5. AVOIDANCE OF TAMPERING

The Measuring Equipment shall include adequate devices to prevent persons tampering or interfering with it.

6. VERIFICATION

The Verification of the Measuring Equipment shall:

- 6.1 be by a means that is completely independent of the Measuring Equipment;
- 6.2 provide a permanent record of Verification data collected;
- 6.3 provide an auditable record such that the Verification can be independently checked; and
- 6.4 provide sufficient breakdown of data to identify the area in respect of which action needs to be taken when results are unsatisfactory.

Section B: Traffic Census Equipment

Not used.

Section C: Traffic Control and Communications Systems

1. INTERPRETATION

The following terms shall, unless the context otherwise requires, have the following meanings:

"Control Centre" means the facility or facilities from which the police (or such other person as the Secretary of State may from time to time appoint) operate or will operate the Department's Systems and the DBFO Co's Systems.

"DBFO Co's Systems" means any Traffic Control and Communications Systems for the Project Road and includes any part of such systems.

"Department's Systems" means the Traffic Control and Communications Systems for motorways and trunk roads operated by or for the Secretary of State other than those serving the Project Road and includes any part of such systems.

"Interface" means a point of meeting and communication between two or more systems or maintenance and operational procedures.

"Traffic Control and Communications Systems" means a system or systems (and any part of a system) for one or more of the following:

- (a) emergency telephone and other communications facilities;
- (b) automated systems for traffic monitoring, incident detection and signalling;
- (c) closed circuit television camera surveillance;
- (d) motorway matrix signals;
- (e) variable message signs, including enhanced message signs;
- (f) fog detection;
- (g) wind monitoring; and
- (h) speed cameras.

2. GENERAL

2.1 The DBFO Co shall design, supply, install, test, commission and (subject to paragraph 6 below) maintain and operate Traffic Control and Communications Systems for the Project Road in a manner and to a standard as will:

- 2.1.1 enable the Secretary of State to provide an acceptably safe highway in respect of its condition (structural safety) and use (road safety);
- 2.1.2 enable the Secretary of State to fulfill his statutory and common law obligations;

and, subject to paragraphs 2.1.1 and 2.1.2 above:

- 2.1.3 enable the Secretary of State to provide a level of highway service to the public not inferior to that provided on the trunk road and motorway network generally during construction or improvement works, taking account of Special Events;
- 2.1.4 enable the police, local authorities and others with statutory duties or functions in relation to the Project Road or adjoining roads to fulfill those duties and functions;
- 2.1.5 discharge the Secretary of State's liabilities in respect of the undertakings and commitments at Schedule 8 (Third Parties) or given in the course of obtaining any New Order, without creating or incurring any liability that would subsist beyond the Contract Period;
- 2.1.6 minimise the occurrence and adverse effects of accidents and ensure that all accidents and emergencies are responded to as quickly as possible;

- 2.1.7 minimise the risk of damage, destruction or disturbance to third party property;
 - 2.1.8 ensure that members of the public are treated with all due courtesy and consideration;
 - 2.1.9 provide a safe, clear and informative system of road signs;
 - 2.1.10 comply with any specified programme requirements, including for the completion of the New Road;
 - 2.1.11 enable standards of reliability, durability, accessibility, maintainability, quality control and assurance, and fitness for purpose appropriate to a highway of the character of the Project Road to be achieved throughout the Contract Period;
 - 2.1.12 comply with the Orders and any New Order;
 - 2.1.13 meet the environmental objectives detailed in the Environmental Statement(s), including the achievement of a high standard in the mitigation of adverse environmental effects; and
 - 2.1.14 achieve a high standard in the appearance and aesthetic quality of the Project Road and achieve integration of the Project Road with the character of the surrounding landscape through both sensitive design and sensitive management of all visible elements including those on the Existing Road.
- 2.2 Expressions defined in paragraph 4 of Part 1 of Schedule 4 (Core Construction Requirements) have the same meanings where used in this paragraph 2.

3. **TRANSPARENCY**

To the extent the DBFO Co's Systems interface with the Department's Systems, the DBFO Co shall ensure that the former are designed, supplied, installed, tested, commissioned, maintained and operated such that (without change to the Department's Systems or the procedures for their operation and maintenance) the physical, operation and maintenance boundaries of the two systems are not apparent to and cannot be discerned by the public, nor (except by deliberate investigation for that purpose) by operators or maintainers of each system. Operational logging, fault investigation and remedial facilities for the DBFO Co's Systems shall interface in the same manner with and shall not compromise those on the Department's Systems.

4. **NO INTERRUPTION TO DEPARTMENT'S SYSTEMS**

The design, supply, installation, testing, commissioning, maintenance and operation of the DBFO Co's Systems shall not result in any unscheduled interruption or adversely affect the continuing functioning of the Department's Systems or the Department's operations supporting them.

5. **LOGGING AND ANALYSIS**

Operational logging and analysis facilities for the Project Road shall be compatible with the systems and methods used by the Secretary of State to enable the investigation of logs following serious incidents and to provide data to meet the requirements of the Road Users' Charter and operational monitoring.

6. **OPERATION BY POLICE OR OTHERS**

Day to day operational control of the DBFO Co's Systems shall be carried out from the Control Centre for the Department's Systems by the police or such other person as the Secretary of State may from time to time appoint to operate the Department's Systems in accordance with the operating Codes of Practice from time to time agreed between the Secretary of State and the police or such other person. The DBFO Co shall as appropriate contribute to and generally comply with reasonable operational feed back and review procedures agreed between the Secretary of State and the police or such other person.

7. **TESTING AND CHANGES TO DEPARTMENT'S SYSTEMS**

All operational development and tests of the Department's Systems required in connection with the DBFO Co's Systems shall be conducted in accordance with the requirements of the Department's Nominee and the police (or other operator of the Department's Systems). The DBFO Co shall be responsible for providing at its own cost all changes to equipment in the existing Control Centre required in order to accommodate the DBFO Co's Systems or any subsequent changes to the DBFO Co's Systems.

8. **ISOLATION OF DBFO CO'S SYSTEMS**

If at any time a fault occurs in the DBFO Co's Systems or for any other reason they do not otherwise comply with the Communications Requirements (a "**fault**"), the Department's Nominee, or in case of urgency the police, may give notice requiring the DBFO Co to remedy the fault. If the fault has not been remedied within such period as in the opinion of the Department's Nominee is reasonable having regard to all the circumstances, or if in the opinion of the Department's Nominee or, in the case of urgency, the police, the trouble-free operation of the Department's Systems or any part of them may be jeopardised by the fault in the DBFO Co's Systems, the Secretary of State shall be entitled to by-pass and isolate the DBFO Co's Systems and continue to operate the Department's Systems in isolation therefrom, until such fault is remedied. During any such period of isolation of the DBFO Co's Systems, the Secretary of State shall procure such operation, if any, of the DBFO Co's Systems through the relevant Control Centre as may in the opinion of the police be safe and reasonable in all the circumstances, but the Secretary of State shall not otherwise be liable for failure to operate the DBFO Co's Systems.

9. **MAINTENANCE AND OPERATIONAL SUPPORT**

9.1 Maintenance and operational support arrangements for the DBFO Co's Systems shall be such that there is adequate contingency planning and provision to ensure a continued level of service during, and to contain the effects of, improbable but foreseeable events such as:

9.1.1 severe weather;

9.1.2 long term power loss;

- 9.1.3 industrial action;
- 9.1.4 default on the part of contractors employed by the DBFO Co, the Secretary of State or others; and
- 9.1.5 major equipment loss through lightning strike, fire, theft or other accidental loss or damage,

and to ensure a continued level of service during Special Events (as defined in paragraph 4 of Part 1 of Schedule 4 (Core Construction Requirements)).

- 9.2 The DBFO Co shall give reasonable advance notice to the Department's Nominee of the connection of the DBFO Co's Systems to, and disconnection of the DBFO Co's Systems from, the adjoining parts of the Department's Systems or the Control Centre for planned maintenance. All testing of the DBFO Co's Systems shall be carried out off-line.

10. **CORRECTION OF DEFECTS**

The DBFO Co shall make adequate provision for:

- 10.1 correction of any defect which results in the unplanned loss of emergency signalling and communications facilities;
- 10.2 correction of any defect which allows public access to live or operational communications equipment apparatus, connections or wiring; and
- 10.3 assessment and documentation of defects in order to take preventive actions.

11. **HOLYHEAD TRAFFIC CONTROL AND COMMUNICATIONS SYSTEMS**

The DBFO Co shall design, install, test, commission and maintain Traffic Control and Communications Systems, linked to the Control Centre, to control westbound traffic along the Project Road and traffic in and around Holyhead to facilitate the free movement of traffic at all times, including, without limitation, periods of ferry cancellations or other events preventing access to the port.

12. **STAND ALONE SYSTEM CONTROLLER**

The DBFO Co shall install in the Control Centre a stand alone system controller with a graphical user interface which shall operate the DBFO Co's Systems (other than the closed circuit television cameras) and which shall interface with the existing Philips FSK system installed in the Control Centre.

13. **TRAFFIC DATA INFORMATION**

Traffic data information from the DBFO Co's Systems must be electronically compatible and available for use by other systems in the Control Centre.

14. REAL TIME TRAFFIC DATA COLLECTION EQUIPMENT

- 14.1 The DBFO Co shall design, install, test, commission and maintain real time traffic data collection equipment linked to the Control Centre which shall detect queues, incidents, slow moving and stationary vehicles on the Project Road except:
- 14.1.1 where provided pursuant to paragraph 11 of Part 1 of this Schedule 17;
 - 14.1.2 on those parts of the Existing Road described in paragraphs 3 (A487) and 4 (A4080) of Part 1 of Schedule 3; and
 - 14.1.3 on the De-Trunked Segment.
- 14.2 The stand alone system controller shall display the speed of vehicles at each Real Time Traffic Data Collection Point (as defined in paragraph 3.1.1 of Section C of Part 2 of this Schedule 17) for the preceding one minute period.
- 14.3 The real time traffic data collection equipment shall measure the speed of each vehicle in each direction to an accuracy of plus or minus five per cent. for not less than 99 per cent of the time during every six month period running from 1st April to 30th September and 1st October to 31st March in each Contract Year.
- 14.4 The DBFO Co shall verify the accuracy of the real time traffic data collection equipment at least once in each Contract Year. Such verification shall:
- 14.4.1 be by a means that is completely independent of the real time traffic data collection equipment;
 - 14.4.2 provide a permanent record of verification data collected;
 - 14.4.3 provide an auditable record such that the verification can be independently checked; and
 - 14.4.4 provide sufficient breakdown of data to identify the area in respect of which action needs to be taken when results are unsatisfactory.

15. EMERGENCY TELEPHONES

The DBFO Co shall design, install, test, commission and maintain emergency telephones.

16. FREE TEXT VARIABLE MESSAGE SIGNS

- 16.1 The DBFO Co shall install, test, commission and maintain two free text variable message signs each linked to the Control Centre for each of:
- 16.1.1 the eastbound approach to Britannia Bridge; and
 - 16.1.2 the eastbound carriageway west of the Llandegai interchange.
- 16.2 The DBFO Co shall install, test, commission and maintain, one free text variable message sign linked to the Control Centre for each of:
- 16.2.1 the westbound carriageway of the A55 east of the Llandegai interchange; and

- 16.2.2 the westbound carriageway of the Existing Road between the Caernarfon Road interchange and the Treborth interchange.

17. CLOSED CIRCUIT TELEVISION ("CCTV") CAMERA SURVEILLANCE

- 17.1 The DBFO Co shall install, test, commission and maintain a CCTV camera which shall be linked to the Control Centre, to give clear perspective views of all interchange traffic movements at the interchange and to maximise views of the approaches to the interchange at each of:

17.1.1 the Treborth interchange, for the A55 and the A487; and

17.1.2 the Pant Lodge interchange, for the A55 and A5025.

- 17.2 The DBFO Co shall install, test, commission and maintain CCTV camera surveillance which shall be linked to the Control Centre, to give clear perspective views of traffic movements:

17.2.1 on Menai Bridge and the A487 and A5122 at Antelope Roundabout and the emergency telephones at each end of Menai Bridge; and

17.2.2 on the Project Road between the Kingsland roundabout (Black Bridge Roundabout) and the port entrance in Turkey Shore Road and to maximise views on the approaches to the Project Road from adjoining Local Authority Roads.

- 17.3 The DBFO Co shall ensure that the pictures produced by the CCTV cameras which are part of the DBFO Co's Systems shall be capable of being simultaneously selected and viewed at the Control Centre.

18. CABLES

- 18.1 The DBFO Co shall install, test, commission and maintain one fibre optic cable and one copper cable in ducts each of which shall run along both sides of the entire length of each of the New Road, the Llanfair PG By-pass and Britannia Bridge, each of which shall terminate in the transmission building east of Britannia Bridge.

- 18.2 At least twelve fibres in each fibre optic cable shall not be used by the DBFO Co and shall be available for use from time to time by the Secretary of State in such manner and for such purposes as he considers fit. For the avoidance of doubt, the DBFO Co shall maintain all fibres within each fibre optic cable.

- 18.3 The DBFO Co shall install and maintain transverse ducts at 500m intervals connected to the ducts referred to in paragraph 18.1 above.

19. ENVIRONMENT

Traffic Control and Communication Systems shall be tested, installed, commissioned, operated and maintained in such a manner as to minimise their impact on the environment, including, without limitation, their visual intrusion.

20. TRANSMISSION BUILDINGS

The DBFO Co shall consult with and take into account the requirements of the local planning authority with regard to any transmission buildings provided by the DBFO Co.

21. **CONTINUITY**

DBFO Co's System's shall provide continuous data and CCTV pictures during the Contract Period.

**SCHEDULE 17
COMMUNICATIONS REQUIREMENTS**

**Part 2
Communications Requirements**

Section A: Measuring Equipment

1. MEASURING EQUIPMENT

- 1.1 Vehicles shall be detected by means of sub-surface inductive loops and suitable automatic traffic counting equipment for counting vehicles detected by the loop array.
- 1.2 The loop array shall consist of loop pairs set a suitable distance apart to ensure the required level of accuracy against an enumerated count.
- 1.3 The loop configuration shall ensure that vehicles straddling lanes are counted only once.

2. INSTALLATION

Installation of loops shall comply with the MCHW, in particular:

- Volume 1 Specification for Highway Works, Clause 1218;
- Volume 2 the Notes for Guidance;
- Volume 3 Highway Construction Details, G series.

3. VERIFICATION

- 3.1 The Verification process shall be based on traffic flow data recorded by using video.
- 3.2 The recording of traffic flow at each Measurement Point ("MP") shall simultaneously include:
 - 3.2.1 the date and time of the traffic survey;
 - 3.2.2 the output from the Measuring Equipment giving the vehicle category; and
 - 3.2.3 pairs of markers positioned 5.2 metres apart on both sides of the Project Road and within the image of the cameras.

- 3.3 The vehicle by vehicle output from the Measuring Equipment being verified shall be overlaid into the video image in order to provide a record of the Measuring Equipment output synchronised to the video image of each vehicle.
- 3.4 The video image shall comprise two parts: a close view of the road from a high angle and a longitudinal view of approaching traffic.
- 3.5 Verifications shall be conducted between 7 am and 7 pm on a Working Day and shall be of such duration so as to ensure that a sufficient sample for statistical analysis to determine if the Measuring Equipment meets the accuracy requirements set out in Section A of Part 1 of this Schedule 17 is obtained. At least one verification in an annual period shall cover each of the morning peak, evening peak and inter-peak periods.

4. METHODOLOGY

- 4.1 For the purposes of correcting calculations in accordance with Clause 30.7.4.3 the methodology set out in this paragraph 4 shall apply.
- 4.2 Suspect or missing data for a MP shall be replaced (i.e. patched) on the basis of complete hours and shall be calculated separately for HGVs and Other Vehicles.
- 4.3 The patched traffic flow for each hour shall be calculated using a factor derived from accurately recorded flows at the MP and the two adjacent MPs. For the equivalent hour in each of the two weeks preceding and the two weeks following the week containing the suspect or missing data (i.e. week-1, week-2, week+1 and week+2), the following ratio shall be calculated:

$$\frac{\text{Flow at MP}(x)}{\text{Flow at MP}(x-1) + \text{Flow at MP}(x) + \text{Flow at MP}(x+1)}$$

- 4.4 The four ratios calculated shall be averaged to produce a factor which is then applied to the sum of the flows at the two adjacent MPs in week 0 in order to generate a patched flow at the MP:
- $$\text{Patched flow at MP}(x) = [\text{Flow at MP}(x-1) + \text{Flow at MP}(x+1)] \times \frac{\text{Factor}}{(1-\text{Factor})}$$
- 4.5 Where relevant data in any of the reference periods is either suspect or missing, then data shall be taken from the next preceding/following week with sound data. For example, if data in week-2 is missing for one of the MPs then data for week-3 shall be used for all three MPs.
- 4.6 When data for an adjacent MP is either suspect or missing in week 0, then that MP shall be ignored and data shall be taken from the next preceding/following MP with sound data.
- 4.7 For MP1, the adjacent MPs shall be taken as MP2 and MP3, for MP11, the adjacent MPs shall be taken as MP9 and MP10, for MP12, the adjacent MPs shall be taken as MP13 and MP14 and for MP14, the adjacent MPs shall be taken as MP12 and MP13.

Section B: Traffic Census Equipment

Not used.

Section C: Traffic Control and Communications Systems

1. GENERAL

- 1.1 The Traffic Control and Communications Systems shall be designed, installed, tested, commissioned and maintained in accordance with the terms of the documents listed in Annex 1 to this Section C (as such documents are amended under this Agreement).
- 1.2 **"IDRIS"** means Incident Detection for Road Informatics and Safety system jointly developed by WO and W.S. Atkins from the system on the existing A55.
- 1.3 **"Control Centre"** means The North Wales Traffic Control Centre at Morfa, Conwy and such other centre as may be notified to the DBFO Co by the Department's Nominee from time to time.
- 1.4 **"NMCS2"** means National Motorway Communications System, second generation.
- 1.5 If there is any conflict between the terms of this Part 2 of Schedule 17 and the provisions of Part 2 of Schedule 4 or Schedule 6, then in respect of any Operations in connection with the Project Facilities the provisions of this Part 2 of Schedule 17 shall prevail unless expressly stated otherwise.
- 1.6 Traffic data information to be available to use by other systems pursuant to paragraph 13 in Section C of Part 1 of this Schedule shall be in standard database file formats and Internet protocols as appropriate.
- 1.7 **Closed Circuit Television ("CCTV") Cameras**
 - 1.7.1 CCTV cameras shall provide colour images except at light levels below one lux.
 - 1.7.2 CCTV cameras shall be provided which have:
 - 1.7.2.1 full panoramic capabilities;
 - 1.7.2.2 no tilt restrictions;
 - 1.7.2.3 10:1 maximum zoom; and
 - 1.7.2.4 programmable masking for privacy as required by the Secretary of State from time to time.
 - 1.7.3 Where CCTV cameras are mounted on masts, the masts shall be between eight to ten metres high.
 - 1.7.4 The base band width of colour video signals shall be 5.5MHz.

1.8 Free Text Variable Message Signs

- 1.8.1 Free text variable message sign control shall be compatible with NMCS2.
- 1.8.2 Free text variable message signs shall have two lines of text, each with 12 characters.
- 1.8.3 Verge mounted signs shall be in the form of an offset tee with 56% of the sign enclosure on the carriageway side of the support.
- 1.8.4 Other than for gantry mounted signs, no part of the sign enclosure shall overhang the carriageway.
- 1.8.5 Individual corner lanterns shall be a fibre optic lamp assembly, with a 200mm (+10mm/-0mm) lantern lens.

2. HOLYHEAD TRAFFIC CONTROL AND COMMUNICATION SYSTEMS

- 2.1 The Traffic Control and Communications System to be designed, installed, tested, commissioned and maintained in accordance with paragraph 11 of Section C of Part 1 of this Schedule 17 shall include the systems in the following sub-paragraphs of this paragraph 2, which shall be automated so that the traffic can be automatically controlled so far as is reasonably practicable. A manual override shall also be provided.

2.2 CCTV surveillance of the traffic on the Project Road at:

- 2.2.1 the Pen-caledog junction (referred to in paragraph 2.2.1.3 in Annex 1 to Part 1 of Schedule 4);
- 2.2.2 the Ty Mawr junction (referred to in paragraph 2.2.1.9 in Annex 1 to Part 1 of Schedule 4);
- 2.2.3 for three kilometres of the westbound carriageway of the eastern approach to the junctions referred to in paragraphs 2.2.1 and 2.2.2 above; and
- 2.2.4 at the entrance to the port of Holyhead.
- 2.3 Not used.
- 2.4 Advance information signs, including free text variable message signs as appropriate, on the west bound carriageway of the Llanfair PG By-pass advising Users of traffic conditions and traffic management systems in operation ahead.
- 2.5 Advance direction signs, including free text variable message signs as appropriate, on the relevant approaches on the Project Road and Local Highway Authority Roads to the junctions referred to in paragraphs 2.2.1 and 2.2.2 above diverting traffic into holding lanes, traffic movement lanes, dedicated lanes or diversion routes.
- 2.6 Diversion signs, including free text variable message signs as appropriate, advising ferry and non-ferry port bound traffic and other non-ferry bound traffic of most suitable routes for their journey:

- 2.6.1 on the Project Road for three kilometres of the westbound carriageway of the eastern approaches to the junctions referred to in paragraphs 2.2.1 and 2.2.2 above; and
- 2.6.2 at the appropriate locations on adjoining roads maintained by the local highway authority.
- 2.7 Holding lane signs, including free text variable message signs as appropriate, creating, advising and directing Users into holding lanes for ferry traffic on the westbound carriageway of the Project Road.
- 2.8 Dedicated lane signs, including free text variable message signs as appropriate, dedicating lanes for ferry traffic, non-ferry port bound traffic and other non-ferry traffic, as appropriate, between the junction referred to in paragraph 2.2.2 above and the Kingsland roundabout (referred to in paragraph 2.2.1.10 in Annex 1 to Part 1 of Schedule 4) and east of the eastern approach to the junction referred to in paragraph 2.2.2 above.
- 2.9 Repeater signs, including free text variable message signs as appropriate, at appropriate locations on the Project Road for holding lanes, traffic movement lanes, dedicated lanes or diversion routes.
- 2.10 Automated system for traffic signalling pursuant to paragraph 2.2.6 in Annex 1 to Part 1 of Schedule 4.

3. **REAL TIME TRAFFIC DATA COLLECTION**

- 3.1 The real time traffic data collection equipment to be designed, installed, tested, commissioned and maintained pursuant to paragraph 14 of Section C of Part 1 of this Schedule shall use IDRIS, MIDAS or equivalent technology and shall, without limitation:
 - 3.1.1 collect traffic data at 500m intervals (each, a "**Real Time Traffic Collection Point**");
 - 3.1.2 monitor all lanes;
 - 3.1.3 measure mean speed of vehicles in each direction over one minute intervals each minute;
 - 3.1.4 count the number of vehicles over one minute intervals each minute.

4. **EMERGENCY TELEPHONES**

- 4.1 The emergency telephones to be designed, installed, tested, commissioned and maintained pursuant to paragraph 15 of Section C of Part 1 of this Schedule shall:
 - 4.1.1 be provided at the lay-bys required pursuant to paragraph 4 of Annex 15 to Part 2 of Schedule 4;
 - 4.1.2 be pre-programmed to call each of the RAC, the AA, Green Flag, Britannia Rescue and the Police, provided that the key pad on each emergency telephone shall be clearly marked with instructions on how to contact each of the above organisations. All pre-programmed telephone numbers shall be kept up to date at all times.

- 4.1.3 have two way call initiation to enable the operators of the organisations listed in paragraph 4.1.2 above to call back the emergency telephone user;
- 4.1.4 have three signs conforming with sign referenced 2713.1 in the Traffic Signs Provisions, one at the entrance of each lay-by, the second half a mile in advance of each lay-by and the third one mile in advance of each lay-by; and
- 4.1.5 have a concrete hard standing suitable for use by callers using the emergency telephones.

5. **OPERATION AND MAINTENANCE - EMERGENCY TELEPHONES**

Without prejudice to the generality of Schedule 6, the DBFO Co shall ensure that each emergency telephone, including the Samaritan phones at Britannia Bridge on the Project Road shall:

- 5.1.1 be tested at least every week;
- 5.1.2 be cleaned at least every six weeks, using an antiseptic cleaning agent on the handset and disinfectant, diluted as necessary, on the instrument and housing;
- 5.1.3 be repaired within three working days after the DBFO Co receives notification or otherwise becomes aware of a fault; and
- 5.1.4 work properly at least 99.8% of the time in respect of any period of three consecutive months.

6. **CABLES**

- 6.1 The fibre optic cable referred to in paragraphs 18.1 and 18.2 of Section C of Part 1 of this Schedule 17 shall be at least 24 fibre.
- 6.2 The copper cable referred to in paragraph 18.1 of Section C of Part 1 of this Schedule 17 shall be at least 30 pair.

Schedule 17

Part 2 Section C

Annex 1

1. INTERPRETATION

- 1.1 All references to "**Motorways**" in the following documents shall be deemed to be references to All Purpose Trunk Roads.
- 1.2 Documents with references pre-fixed "**W**" are published by the Welsh Office and those pre-fixed "**M**" or "**T**" are published by the Highways Agency.
- 1.3 The availability of other documents is as shown below.
- 1.4 A reference to any standard or specification in this Annex 1 shall be deemed to be a reference to the edition or version of the same current as at 18 September 1998 including any updates or revisions prior to such date unless a version is stated.

2. CCTV SURVEILLANCE SYSTEMS

WOEM 4000	Technical and Quality Control Requirements;
MCE 2014 (Version C)	CCTV Camera Housing, Mountings and Mounting Poles;
MCE 2015	CCTV Control and Transmission;
MCE 2051	Coaxial Cables for CCTV;
MCG 1060	Termination of Fibre Optic Cables used for CCTV Systems;
TR 2130	Environmental Tests for Motorway Communication Equipment;
TR 2135	Colour CCD Camera for Motorway Traffic Surveillance;
TRG 1068	Electromagnetic Compatibility Tests;
K.20	Resistibility of Telecommunication Switching Equipment to Overvoltages and Overcurrents (CCITT of the International Telecommunication Union).

3. FREE TEXT VARIABLE MESSAGE SIGNS

TRH 1642	Motorway Signals Mark 2 - Infrastructure Design Guide;
TR 2140	Motorway Signals Mark 2 - Requirements for Cantilever Structures;
TR 2045	NMCS2 - Standard Transponder;
TR 2067	NMCS2 - RS485 Communications - Electrical and Protocol;
TR 2070	NMCS2 - Message Control - Point to Point;
TR 2142	NMCS2 - Message Control - Message Sign Equipment;
TR 2141	Motorway Signals Mark 2 - Requirements for Signal Equipment.

The following two documents from Annex 1 as amended by Annex 2 of Part 2 of Schedule 4:

TD 33/90	The use of Variable Message Signs on All Purpose and Motorway Trunk Roads.
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TA 60/90 The Use of Variable Message Signs on All Purpose and Motorway Trunk Roads.

4. **TRAFFIC SIGNAL EQUIPMENT**

TR 0141	Specification for Microprocessor based Traffic Signal Controller
WO1P 1000	Specification for Installation of Inductive Loops for Vehicle Detection;
WOTD 1000	Specification for the Commissioning of Inductive Loops for Vehicles Detection;
WO10 1001	Specification for the Installation and Commissioning of Permanent Traffic Signal Equipment;
WOTR 1012	Specification for Inductive Loop Cable, Armoured Feeder Cables and Resin Compound for Sealing and Encapsulating Inductive Loop Equipment;
WOTR 1013	Specification for Supply of Permanent traffic Signalling Equipment.

5. **EMERGENCY TELEPHONES**

Emergency telephones on Trunk Roads in Wales, Volume 3 (Specification for Telephone Instrument and Housing)
(Disclosed Data Ref No. WO\025).

6. **TRANSMISSION BUILDINGS**

Drawing T1075.617/SW-TE/100	Ewloe Transmission Station Building Details) (Disclosed Data Ref No. M1\4003).
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7. **CABLES**

WOTR 4106	Supply of Motorway Communications System Infrastructure Cables
WOIP 4003	Installation of Cable and Equipment for a Motorway Communications System
WOTD 4003	Testing of Cable Infrastructure for a Motorway Communications System.
TR 2149	NMCS Non-Armoured Cables - Standard Materials and Procedures
TR 2150	NMCS Non-Armoured Copper Communications Cable
TR 2151	NMCS Non-Armoured Optical Fibre Communications Cable

BF300055.06