West Sussex County Council

Highways and Transport

Traffic Signal Installation Standards: Requirements for Installation of Permanent Traffic Signal Equipment in West Sussex (Issue 6)

Issue	Prepared by	Checked by	Date
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Issue 6 notes:

Changes to layout make the document compatible with accessibility requirements.

Contents

1. Introduction

1.1 The aim of this document is to provide a guide to enable promoters of schemes to prepare signal installations which address the specific requirements of West Sussex County Council.

1.2 Although this document is not in the form of an "Appendix 12/5:TRAFFIC SIGNS : TRAFFIC SIGNALS AND ASSOCIATED EQUIPMENT" scheme promoters should ensure that items covered within this document are replicated within any Appendix 12/5 that they produce for work on Traffic signals in West Sussex.

1.3 Traffic signals for both vehicle and pedestrians' control, in West Sussex are required to meet a number of standards in both function and installation. As a result, this guide should be read with reference to West Sussex County Council's standard detail drawings. The most relevant of which are contained within the appendix of this document.

1.4 The Design Manual for Roads and Bridges (DMRB) Volume 8 Section 0 TA 101 (formally TA84/06) shall apply throughout the design and installation cycle.

1.5 All designs and installations shall be subject to Safety Audit in accordance with the latest WSCC Safety Audit Policy. This shall include the completed Signal Controller Specification (TOPAS2500A forms). The completed and audited specification shall be signed and dated by the Engineer who carries out the Audit. The Original of all Audits shall be retained in the WSCC Traffic Signal section site file.

1.6 In Addition, where appropriate, modelling data from LinSig version 3 or higher shall be submitted in electronic format (.lsg files), to demonstrate the proposed signal arrangements can operate satisfactorily. This must include sufficient information to allow the design to be audited, and any assumptions used in the design, for example a pedestrian phase appearing once every other cycle, shall be fully documented and justified.

1.7 The installation of traffic signal equipment shall only be undertaken by a Contractor certificated to BS EN ISO 9000 or equivalent, and in line with the current edition of the IEE wiring regulations for electrical installations.

1.8 The Works contained in this appendix shall refer to the installation of traffic signals, Puffin crossings, Toucan crossings, Equestrian crossings, and Cycle facilities.

1.9 Installers shall at all times conform to Health and Safety at Work Acts, the Electricity at Work Regulations, the Construction Design & Maintenance Regulations, and all other relevant legislation. Installers shall also ensure that installation procedures conform to all relevant DfT advice notes and directives, especially signing and guarding shall conform to Chapter 8 of the Traffic Signs Manual.

1.10 All systems should be designed to minimise energy consumption and utilise ELV controllers and associated equipment. Where this is not possible written approval from WSCC Traffic Signals must be obtained.

1.11 Any deficiencies found in the design or in the operation of the equipment shall remain the responsibility of the promoter of the scheme for a period of 1 year from the date of the take-over of the site following a successful site commissioning or for a year following the date that the associated development is opened and the initial impact of the fill traffic and pedestrian flows are realised, whichever is the later. It is therefore the responsibility of the promoter to ensure that all data regardless of source is correct, and that the consequence of any imposed conditions are well documented and acknowledged.

2. Standards, Specifications, and Regulations

2.1 All works shall be undertaken in accordance with the following:

- EN 12368:2015
- IEE Regulations for Electrical Installations (current edition) BS7671:2018
- Current Department of the Environment, Transport, and the Regions (DfT) Specifications relating to traffic signals and associated equipment
- Design Manual for Roads and Bridges: Latest edition
- Current DfT Standards relating to traffic signals and associated equipment
- Current DfT Advice Notes relating to traffic signals and associated equipment
- The Traffic Signs Regulations and General Directions 2016 or later
- The Zebra, Pelican and Puffin Pedestrian Crossings Regulations and General Directions 1997
- DfT Local Transport Note 1/98 The Installation of Traffic Signals and Associated Equipment
- Traffic Open Products and Specifications 2500A
- The Traffic Signs Manual
- The Health and Safety at Work Act, 1974
- Electricity at Work Regulations 1989
- TA 101 Traffic Signalling Systems
- MCH 1815 A System Certification
- New Roads and Street Works Act (NRSWA) 1991
- Construction (Design Management) Regulations 2015
- Highways Act 1980
- Road Traffic Regulations Act 1984

3. Equipment

3.1 General

3.1.1 The Works shall be monitored using a Remote Monitoring system as specified by WSCC (currently telent RM). The monitoring equipment shall be supplied and installed by the WSCC traffic signal term maintenance provider and the costs for this shall be covered by the scheme contractor unless prior written agreement is obtained from West Sussex Traffic Signals Section. All other equipment shall be supplied by the Contractor.

3.1.2 The Contractor is to store, deliver to the Site at a time specified, install, test and commission the equipment associated with the Works unless otherwise agreed by West Sussex Traffic Signals Section.

3.1.3 All street furniture must comply with the appropriate Traffic Open Products and Specifications (TOPAS) number and in accordance with the latest standards. If it is proposed to use street furniture without approval, the supplier shall state the level of approval and what, if any conditions or limitations have been imposed on use or operation. Except with the prior written permission of WSCC traffic signals engineer the street furniture shall be supplied by the WSCC traffic signal term maintenance contractor.

3.1.4 Any traffic signals equipment, not supplied by the current WSCC traffic signal term maintenance contractor, will require the submission of evidence supporting TOPAS registration, prior to approval.

3.1.5 Signals installed on roads with a speed limit of 50mph plus shall use passively safe low access poles with a quick disconnect system.

3.1.6 Any equipment not to WSCC Traffic Signals Engineers approval identified up to the signing and acceptance of final Site Acceptance Certificates shall be replaced by the Contractor at their own expense.

3.1.7 With the exception of LED aspects all equipment, materials and workmanship shall be covered by a 12-month warranty by the Contractor which shall take effect from the date of the Site Acceptance Certificate. During this time the Contractor shall be responsible for rectifying any failure of equipment, materials, or workmanship, with the exception of lamp failures. At the Engineer's discretion, the Contractor shall at their own expense attend the site within 48 hours of notification and rectify the fault or replace/repair the faulty equipment and return it within 1 week.

3.1.8 All LED aspects shall be covered by a 6-year warranty by the contractor which shall take effect from the date of the Site Acceptance Certificate. During this time the Contractor shall be responsible for rectifying any failure. At the WSCC Traffic Signals Engineer's discretion, the Contractor shall at their own expense attend the site within 48 hours of notification and rectify the fault or replace/repair the faulty equipment and return it within 1 week.

3.1.9 All street furniture shall be set out at the positions shown on the drawings which shall be approved in advance by WSCC Traffic Signals

Engineer and in accordance with the Engineer's siting instructions. An Engineer from West Sussex Traffic Signals section shall confirm the position of all traffic signal street furniture and detection on site matches the drawing before the equipment is installed. Where engineering difficulties necessitate alternative positions, the Contractor shall inform the WSCC Traffic Signals Engineer and gain their consent prior to installing the furniture and provide amended drawings to show all new positions.

3.1.10 Unless otherwise specified, the installation of ducts, draw pits, controller base, pole retention sockets and the feeder pillar will be undertaken by the main civil engineering Contractor for the Works.

3.1.11 Signal dimming will be required and is to operate from a Photocell. The photocell shall be located as shown on the drawing or in a position furthest away from overhead lighting units.

3.2 Controller and Controller Functions

3.2.1 Except with the prior written permission of a WSCC traffic signals engineer, the controller shall be supplied by the WSCC Traffic Signal term maintenance contractor.

3.2.2 If the controller type supplied is new to WSCC then a full set of documentation and facilities offered for the training of Engineers from WSCC and their Maintenance Contractors shall be supplied free of charge.

3.2.3 If the controller type supplied has less than 5 units in WSCC then a full set of spares will be supplied.

3.2.4 The operation of traffic signal installations shall be in accordance with TOPAS 2500A.

3.2.5 The Controller shall be fitted as a minimum with a 20-amp double pole switch fuse.

3.2.6 The controller shall be constructed on a foundation all in accordance with the manufacturer's/supplier's recommendations. Excepting where the 'root' is an integral part of the controller cabinet, the controller base shall be levelled by the Civils contractor and stable prior to installation of the controller cabinet.

3.2.7 The controller base shall be sealed immediately after installation is completed and accepted. The installer shall accept responsibility for damage caused by failure to seal the equipment properly.

3.2.8 The Contractor shall provide the original configuration and 1 reconfiguration at the Engineer's request within 12 months of the issuing of the final Site Acceptance Certificate. The reconfiguration shall not result from a non-compliance at the Factory Release Test nor subsequently from the equipment failure.

3.2.9 Controllers are to be installed so that the DFM lamp may be readily seen from the carriageway and such that all normal maintenance and checking can be readily carried out without encroachment on the carriageway by equipment or personnel and with minimum obstruction to pedestrians.

3.2.10 Controllers mounted on a root-based plinth shall be sealed at base level and controllers mounted on a post shall be sealed just below the post access door. Following the termination of all signal cables the Contractor shall ensure there is a water and airtight seal.

3.2.11 Where a controller cabinet base seal has been broken for removal or installation of cables the water and airtight seal must be fully reinstated.

3.2.12 The Contractor shall ensure that a separate 50mm diameter duct for a telemetry connection has been provided before sealing the base. The duct shall link between the main controller pit and shall terminate above the final base seal level within the controller. The duct entry shall be sealed to prevent the ingress of moisture but the seal shall be removable to allow telemetry equipment to be installed subsequently.

3.2.13 The controller to be supplied shall meet TOPAS specification 2500A and all relevant appendices for traffic signal junctions, Puffin crossings, Toucan crossings and cycle facilities.

3.2.14 The controller shall include a Master Time Clock System (MTCS) to permit the use of alternative maximum timings, fixed time plans, etc.

3.2.15 The controller shall have a backup power supply for all detector commands, timing details and MTCS.

3.2.16 Manual push buttons shall be labelled to indicate the stage number/letter by means of silk-screening or adhesive label.

3.2.17 Where practical a scheme drawing shall be laminated and attached to the inside door of the controller.

3.2.18 Where practical the MOVA link diagram shall be laminated and attached to the inside door of the controller.

3.2.19 A staging diagram should be provided on the inside of the manual panel door, with clearly labelled stages and phases, by means of silk-screening or adhesive label.

3.2.20 The controller shall include a 3U equipment rack(s) with sufficient void space to accommodate an Outstation Monitoring Unit, Outstation Transmission Unit and/or a camera surveillance unit as specified in the WSCC specification. The minimum void space within the 3U equipment rack shall be 300mm wide by 300mm deep for each module stated above. The Contractor should satisfy himself that the controller contains adequate void space within the rack to accommodate the stated modules prior to tendering. Subsequent failure to meet this requirement shall result in the Contractor replacing the controller cabinet, and internal hardware, as necessary, and undertaking all remedial works at his own expense.

3.2.21 Two 13-amp 3 pin electricity sockets to BS 1363 shall be provided inside the controller cabinet, protected by a residual current device of maximum rating 30mA residual current. The sockets shall be marked for maintenance use only and be connected via a dual lockable isolator switch to the controller mains.

3.2.22 Provision shall be available within the controller to supply two devices via a separately fused auxiliary supply.

3.2.23 On sites where bus priority is to be installed (VIX) a separate power supply controlled via a dedicated RCD is required.

3.2.24 Sufficient terminals and termination points are required at the controller to accommodate all Neutral and Earth connections.

3.2.25 Two complete sets of keys to all parts of the apparatus, including 'T' bars, as required, shall be provided at the time of commissioning.

3.2.26 The controller access door(s) shall be fitted with a door stay.

3.2.27 A suitable fixed facility to store controller documentation & drawings shall be provided within the cabinet, where this is not a welded plate on the inside of the door approval should be sought for it from WSCC.

3.2.28 The Controller cabinet shall have front and rear opening doors or a swing frame in order to provide access to the rear of the equipment.

3.2.29 The controller shall include a location at which to securely fix a telemetry termination unit.

3.2.30 All controllers will be installed with a micro switch that detects when both the controller door & manual panel are opened. This will be reported back through the Remote Monitoring system as an alert and must be capable of being reset once the appropriate door has been closed.

3.2.31 Unless there is significant justification, on safety grounds, for the revertive stage within the staging plan to be All-Red, all signal controllers will revert to the road which has the highest volume of traffic.

3.2.32 Any detection which requires power-cycling to enable communication, i.e. Wi-Fi, must be wired via a dedicated momentary switch.

3.2.33 Where practical a drawing identifying the detection pack layout shall be laminated and attached to the inside door of the controller.

3.2.34 Manual Panel LED's shall be labelled to indicate their usage by means of silk-screening or adhesive label.

3.3 Signal Heads General

3.3.1 Except with the prior written permission of WSCC traffic signals engineer, the signal heads and aspects shall be supplied by the WSCC Traffic Signal term maintenance contractor.

3.3.2 If the signal heads or aspects are used in less than 5 sites within WSCC then spare for each head and aspect used on the design will be supplied.

3.3.3 The lowest part of any signal head assembly including brackets shall have a minimum clearance above the finished ground level of 2.1m, unless the signal head is located within a cycleway then the minimum clearance must be 2.4m.

3.3.4 All entry points into signal heads for cables shall have a secure and permanent watertight seal.

3.3.5 Backing boards shall be securely attached to all vehicular signal heads. The composite head including any additional signs shall be bordered on the front by a high intensity white retroreflective tape between 45mm and 55mm wide.

3.3.6 There shall be a minimum clearance of 450mm between the edge of the signal head and the edge of the carriageway for roads where the 85th% speed is <50mph. Where the 85th% is >50mph, this clearance shall be a minimum of 800mm. Where the minimum clearance cannot be achieved the Contractor shall notify WSCC Traffic Signals immediately.

3.3.7 Puffin/Toucan/Equestrian crossings, unless otherwise shown on the design, all vehicle signal head cowls shall be Primary, to maximise the angle of view of the optics.

3.3.8 The Contractor shall align all signal heads in accordance with the Contract drawing and as required by WSCC Traffic Signals Engineer at the site commissioning.

3.3.9 All vehicular signal aspects shall include cowls. The primary signal shall include cut away cowls and the secondary heads shall include full length cowls. In addition, where specified, the Contractor shall supply and install louvered cowls.

3.3.10 Adjustable horizontally louvred cowls designed to reduce the driver's visibility to the aspect shall only be used on the amber and green aspects of the primary or secondary signals. The angle of the slats shall be capable of being adjusted on site by the Contractor to the Engineer's requirements. The cowl shall be a minimum of 300mm long and include a minimum of 5 slats.

3.3.11 Fixed vertically louvred cowls designed to reduce the driver's visibility to the opposing secondary aspect can be used on all the aspects of the secondary signals. The cowl shall be a minimum of 500mm long and include a minimum of 3 slats.

3.3.12 Where signal heads include additional filter or right turn arrow signals or box signs the configurations shall be as specified in the signal head schedule on the Contract drawing.

3.3.13 All signal aspects shall be monitored Central Light Source (CLS)-type extra low voltage (ELV) LED's with a minimum 6-year warranty, unless otherwise agreed and written approval obtained from WSCC Traffic Signals Engineer. (ELV = 50 Volts maximum)

3.3.14 The Contractor shall be responsible for installing LED vehicular signal heads on overhead mast arms and tall signal poles (exceeding 4 metres length) including the hiring of lifting equipment and traffic management.

3.3.15 Where two signal heads (twin) are positioned adjacent to each other on the same signal pole the Contractor shall ensure the structural stability of signal pole and provide a base plate where necessary.

3.4 Pedestrian Near Side Signal Heads

3.4.1 Near side pedestrian aspects and combined units shall meet TOPAS 2511A and shall comply with the Zebra, Pelican and Puffin Pedestrian Crossings Regulations and General Directions 1997 Schedule 3 Part I.

3.4.2 To reduce the risk of 'see through', narrow field of view display units to be installed as standard on dual crossings and signalised junctions. Deviation from this standard will need justification and written agreement from WSCC Traffic Signal Engineer.

3.4.3 The lowest part of any high-level additional repeater unit shall have a minimum clearance of 1.95m above the finished ground level.

3.5 Pedestrian Demand Units

3.5.1 All Pedestrian Demand Units, shall meet TOPAS 2511A and shall comply with the Zebra, Pelican and Puffin Pedestrian Crossing Regulations and General Directions 1997 Schedule 3 Part I.

3.5.2 Push button units shall include both an audible and tactile device unless specified elsewhere in the Contract or if an audible device cannot be fitted for safety reasons then just a tactile device need be supplied. The facility shall exist to inhibit the audible signal between 22:00 and 07:00 each day or at any other times as required by the Engineer.

3.5.3 Pedestrian push button units shall be positioned in accordance with the orientation shown on the Contract drawing.

3.5.4 All entry points into pedestrian demand units for cables shall have a secure and watertight seal.

3.5.5 Push-button units shall not contain cables carrying mains or any other low voltage.

3.5.6 The centre of all pedestrian push button units shall be positioned between 1.0 and 1.1 metres above the finished ground level. The push button units shall be securely fixed to the signal pole so that no movement occurs.

3.5.7 Where tactile devices are to be installed in pedestrian push-button units as specified on the drawing, they shall be of a type approved by the Engineer.

3.6 Low Level Signal Heads for Cyclists

3.6.1 The lowest part of any signal head assembly including brackets shall have a minimum clearance of 1.2m above the finished ground level.

3.6.2 The positioning of the low-level signal head shall be so that a cyclist waiting at any location within the Advanced Cycle Stop Line (ACSL) can clearly see the aspects.

3.6.3 All entry points into cycle signal heads for cables shall have a secure and watertight seal.

3.6.4 All cycle signals shall be fitted with primary or secondary cowls and shall be fitted with anti-phantom screens and hoods.

3.7 Additional Signs

3.7.1 Internally illuminated 'box' signs shall be provided as specified on the drawing. The configuration shall be as specified on the drawing signal head schedule.

3.7.2 The lowest part of the signal head assembly including any additional signs and brackets shall be as per stated in section 3.3.3.

3.7.3 Regulatory signs on signal heads shall comply with BS 873: Part 5: 1983 "Specification for Internally Illuminated Signs and External Lighting Luminaires".

3.7.4 Regulatory signs on signal heads shall be individually fused within the head.

3.7.5 Green arrows and regulatory signs which are side mounted on signal heads shall be secured, after alignment, with stay bars.

3.7.6 There shall be a minimum lateral clearance as per stated in section 3.3.6.

3.7.7 Backing boards shall be securely attached to all additional signs to form a composite signal head.

3.8 Traffic Signal Poles

3.8.1 All traffic signal poles shall be installed using the NAL pole retention system or a similar system that has WSCC approval that allows the pole to be removed following a knockdown. The pole retention system is to have at least two bolts to securely fix the pole in place, to reduce the risk of rotation. See Standard drawing in Appendix D for installation.

3.8.2 All traffic signal poles that are not installed in a retention socket shall have a slot to provide cable entry access and shall be installed in a pole box.

3.8.3 All poles are to be set to ensure that the centre of the amber is between 2.4 and 4.0 metres above finished ground level.

3.8.4 All traffic signal poles shall be galvanised prior to the application of a grey plastic coating unless otherwise specified by WSCC for specific locations. Poles shall not be supplied with pre-drilled holes for push buttons. Holes shall be drilled on site as required and shall be treated with a suitable zinc rich paint or other suitable rust inhibiting paint as agreed by the Engineer.

3.8.5 Stub poles shall be of a one-piece, welded top, construction and shall be galvanised prior to the application of a grey plastic coating.

3.8.6 Signal head extension brackets ('D' type) shall be galvanised prior to the application of a black final coating. Brackets shall only be used where specified (in position and length) on the relevant site drawings or following approval of the WSCC traffic signals engineer.

3.8.7 Signal head mounting brackets ('L' type) shall be galvanised prior to the application of a black final coating. All brackets shall be long enough to provide sufficient rotational movement to allow correct alignment of heads, with a minimum movement of 120 degrees.

3.8.8 Responsibility for checking the vertical alignment of signal posts rests with the Contractor who shall also ensure that there is adequate stability before fitting signal heads. The Contractor shall notify the Engineer immediately if any signal poles fail to satisfy the aforementioned requirements.

3.8.9 Where necessary to achieve the correct location for the pedestrian push buttons and achieve not less than 500mm clearance to the side of the signal head/heads, formed swan neck signal poles shall be used, welded cranked type will not be accepted. Consideration to matching other poles for cosmetic reasons shall be made.

3.8.10 Location of poles in relationship to the tactile paving can be found on standard drawing in Appendix D. An exception to this would be permitted at Toucan crossings, where even on slow speed roads, pole centres can be located 800mm back from the kerb face to permit sufficient waiting space for cyclists.

3.8.11 All traffic signal poles must be of spigot low access design. An example of this can be supplied on request.

3.8.12 The orientation of the low-level access door must be considered to achieve maximum visibility of approaching traffic whilst achieving a clear area to work within.

3.9 Vehicle Detection

3.9.1 Unless otherwise specified all detector packs shall be housed within the controller cabinet.

3.9.2 Detection shall be supplied as 2- or 4-channel detection cards. System D, MOVA or speed loops are not to be mixed on the same detector card.

3.9.3 All new loop detector cards shall be of automatic self-tuning multi-channel microprocessor type and shall be fully type-approved and in accordance with the latest issue of TOPAS 2512B.

3.9.4 System D and Stop line detector loops are shown schematically on the relevant site drawings and shall be cut to the standard configuration shown on the attached drawing: "Standard Detail for the Configuration of Loop Detectors". The location of detector loops shall conform with the latest issue of MCE 108C "Siting of Inductive Loops for Vehicle Detecting Equipment at Permanent Road Traffic Signal Installations", incorporating all released amendments.

3.9.5 Special facility loops e.g. SCOOT, MOVA, Call/Cancel, presence or red-light camera loops or where specific conditions require, shall be sited under the instruction of the WSCC traffic signals engineer. Where this is necessary, the position and size of loops shall be set out on site by the Engineer with the Contractor in attendance prior to slot cutting work commencing.

3.9.6 Where the use of Microwave Vehicle Detectors and infra-red detectors are specified these shall comply with TOPAS 2505A. The use of the above ground detection shall be in accordance with the manufacturer's instructions. The alignment of all pedestrian above ground detection shall be set up as required by the Engineer at the site commissioning.

3.9.7 Subject to the prior approval of WSCC the use of suitable wireless linking equipment may be considered where there would be practical difficulties with the installation or maintenance of hard-wired links or loops.

3.9.8 Subject to the prior approval of WSCC the use of a suitable camera detection system may be considered where there would be a cost benefit or there are practical difficulties with the installation or maintenance of the loops.

3.9.9 During Site Acceptance Testing, a record must be obtained of any configurable detectors and the data left within the controller. As part of the commissioning of any above ground vehicle detection used for MOVA, WSCC require survey discs to be installed in the carriageway at the appropriate distance from stop lines for each loop.

3.10 Pedestrian Detection

3.10.1 Kerbside and On Crossing detection of pedestrians are now standard on all WSCC sites. The type of detection shall be agreed with WSCC and supplied as per the relevant site drawing.

3.10.2 All above ground pedestrian detection must comply to TOPAS 2506A & TOPAS 2507A.

3.10.3 Requirements for test and configuration equipment for programmable devices shall again be agreed with WSCC and the appropriate number of test units supplied. Any relevant training shall be part of the training requirements.

4. Loop Detection Installation

4.1 All detector channels shall be labelled to indicate the detector name. The label shall be waterproof and marked adjacent to the detector channel.

4.2 Loop feeder cables shall be kept clear of main switch and maintenance sockets within the cabinet.

4.3 The standard dimension for the width of the loop slots shall be 10.0mm (+1mm/-0mm). The formula for the overall depth of the slots shall be 50+7n mm (+10mm/-0mm), where 'n' is the number of layers of cable in the slot. In general, the depth shall allow for 50mm of cover above the uppermost cable in the slot.

4.4 Where a surface comprises black top overlaying concrete, the installer shall ensure that all loops are laid within one material, subject to a minimum cover which may be discussed with WSCC traffic signals engineer.

4.5 Slot cuts between adjacent 'System D' loops (where required) shall be made along the centre line of single carriageways or the offside of dual carriageways (not along the gutter edge).

4.6 Detector loops are to be connected via individual pairs of feeder cables or where agreed with WSCC twin pairs.

4.7 No feeder cable shall be jointed unless it is to connect a detector loop.

4.8 All joints shall be made using a reusable joints system conforming to IP68 Cat 1 (BS EN60529) and in accordance with the manufacturer's instructions and recommendations.

4.9 Detector feeder cables shall be jointed to the detector loop within the specially provided connection chamber in the footway/verge. No additional joints between the detector loop and detector unit shall be permitted unless agreed with the Engineer prior to commencement of works. Individual cores shall be jointed by means of insulated crimp connectors using a ratchet type of crimping tool and staggered to avoid the possibility of any short circuits. The joint shall be waterproof and able to withstand a vigorous "pull-test" of approximately 3kg.

4.10 Loop tails shall be cut directly back to the under-kerb ducting and cabled into the connection chamber. See standard drawing in Appendix D for under kerb installation. Slots through kerb edges are not acceptable and loops and loop tails so cut shall be re-cut and the kerbs replaced at no cost to WSCC.

4.11 Where partial excavation of the footway is required to access stub-duct ends, then the exposed loop tails shall be covered with resin and then bitumen in several layers as necessary, after sealing the end of the stub duct and prior to re- instatement of the footway with cold setting asphalt and sealing with hot pour bitumen.

4.12 Working Practice when Cutting Slots and Laying Loop Cable

- Slots shall be cut at least one metre from any ferrous objects or areas of poor surfacing unless otherwise approved by the Engineer.
- Slots shall be properly dried and cleared of all debris before laying loop or detector feeder cable and the slots shall be kept clean and dry before the backfill is complete.
- The depth of the slot shall be checked with a depth gauge along the whole length of the slot.
- All cable shall be dry before laying in slots.
- Sharp implements shall not be used to seat cable in slots.
- Where the corners of the slot are at an angle of less than 100 degrees then this angle shall be rounded with the use of a cold chisel or the corners of the loop shall be crosscut.
- After backfilling, which shall be hot pour bitumen, excessive spillages of bitumen shall be removed from the road surface and loose asphalt shall be swept clear of the road surface and disposed of off-site.
- The type of bitumen used shall not embrittle at temperatures above 5 degrees Celsius. The temperature of the 'kettle' shall be in accordance with the supplier's instructions.
- Loop cable shall conform with Departmental Specification TR2031.
- The Contractor shall be responsible for erecting, maintaining, and dismantling all Chapter 8 Traffic signing including traffic control required to complete the slot cutting. The method of traffic control is to be stated by the Engineer and may include the use of temporary traffic signals at the Contractor's own expense.
- Loop cable shall be taken through a length of orange colour plastic ducting marked Traffic Signals with a minimum diameter of 50mm

leading to a chamber situated in the footway/verge where the loop tails and detector feeder cables shall be jointed. The Contractor shall include for excavation (the minimum necessary) at the channel to access this duct and for reinstatement with bitumen (as used for sealing slots). The holes shall then be backfilled with hot rolled asphalt or cement. The depth of cover for the duct end at back of footway shall be 60mm. If practical constraints prevent this any alternative arrangement must be agreed with WSCC. (See standard drawing in Appendix D for under kerb installation details.)

- All slot cutting should be carried out only once the appropriate Chapter 8 signing and traffic control has been put in place.
- Where the bitumen backfill is below the road surface, the Contractor shall be responsible for topping up the bitumen backfill to achieve a level finish with the road surface. The Contractor shall be responsible for additional backfilling of the slots should the level of backfill fall below the road surface within 28 days of the issue of the Taking-Over Certificate.
- Where the contract drawing indicates the application of new special surfacing on the carriageway, the contractor shall complete all slot cutting and backfilling of cables in these areas prior to the application of the special surfacing.

5. Cabling

5.1 Pedestrian push button units and all other extra low voltage equipment on all LV installations are to be wired on a separate core cable(s) to the vehicle signal cables.

5.2 Cables shall be terminated in the controller at the appropriate terminal block and in the correct terminal position.

5.3 Detector feeder cables shall be terminated in an appropriate terminal block and "soft wired" to the correct labelled detector unit, using light gauge stranded wire, twisted in pairs.

5.4 With stranded conductors or with conductors having a diameter less than 2.5mm sq., a crimped pin or protective leaf shall be used in the terminal.

5.5 All labels shall be permanent and marked in ink.

5.6 Cable sheath and cable core identification is to be undertaken on all signal cables within the controller as per Appendix B.

5.7 Cable sheath identification only is to be undertaken on all signal cables, at the pole terminations as per Appendix B.

5.8 All loop feeders shall be labelled with the detector name or conductor function at both ends as near as is possible to the appropriate terminal or connection.

5.9 All loop conductor wire pairs shall be connected together with zip ties or similar and labelled as close to the point they enter the draw pit as possible.

5.10 All cables shall be armoured in multibanded steel and covered in an outer sheath of orange coloured PVC.

5.11 All Cables including loop feeder cables shall comply with or exceed the WSCC specification shown in Appendix A and comply with the requirements of B.S.505 as amended by TR0102.

5.12 Detector signals shall not be brought back on the same cable carrying the supply to Low Voltage signal heads.

5.13 The core provision shall provide not less than the greater of 25% or 4 spare cores overall to each pole.

5.14 Each signal pole shall be cabled directly to the controller. The looping of any cables between signal poles will not be accepted. ONLY in exceptional circumstances, as directed by the Engineer, will an alternative means of cabling be acceptable.

5.15 Unused cores at the controller shall be left for future expansion but isolated to ensure no earth loops can be created.

5.16 Unused cores between poles shall be connected to Earth.

5.17 Unused cores between the pole and the controller shall be connected to Earth.

5.18 Signal cables shall not pass through ducts or boxes used for any other service and no other services may utilise the traffic signals ducts or boxes.

5.19 Ducts shall be in accordance with National Joint Utilities Group (NJUG) Standards, Orange 100mm diameter with 'traffic signals' stamped at regular intervals.

5.20 A mixture of extra low voltage (ELV) and low voltage (LV) circuits in multicore cables is not acceptable in any circumstances.

5.21 Cables carrying 230v lamp power shall occupy separate ducts from cables carrying extra low voltage (push button/audible, detection etc.) although they will use the same chambers. This will not apply to the individual duct directly feeding each pole.

5.22 One duct shall be left empty on all road crossings.

5.23 Draw strings will be provided in all duct runs and to the pole tops by the main civil engineering contractor. The Contractor shall be responsible for ensuring that a drawstring is retained in each duct run and pole following the installation of the cables.

5.24 Pulling of cables will be the responsibility of the Contractor. All cabling shall be installed as shown on the relevant site drawing.

5.25 Cables shall not be bent to a radius of less than 12 times their diameter or less than a radius recommended by the manufacturer, whichever is the greater.

5.26 Low voltage and extra low voltage cables shall not be terminated in the same position in the pole tops.

5.27 Where possible all cable runs shall include 1 metre of slack cable in each draw pit, along the full length of the run.

6. Electricity Supply

6.1 The mains input shall be to a Haldo or equivalent pillar positioned close to the controller, in a location where the chance of impact by vehicles leaving the carriageway is minimised. The Mains Electricity supply shall incorporate a protective earth. The supply will be 230V 50Hz. (See standard drawing in Appendix D for installation details.)

6.2 The feeder pillar shall be a minimum size to ensure that the electrical apparatus can be installed. A typical size approximately 560mm high, by 250mm wide by 160mm thick above the ground, with an installation depth of approximately 250mm

6.3 Connection to the DNO supply must only be made by the DNO's authorised staff with a fuse rating between 16 and 40 amp (specific rating is determined by the DNO)

6.4 The traffic signals equipment must be protected by a lockable double pole safety isolator switch rated at 32-amp cut-out with a 25-amp fuse for a Traffic Signal junction, and 16-amp fuse for Pedestrian Crossings in accordance with BS 88 Part 2. (TOFCO DP1 or equivalent)

6.5 Traffic signals installation should not normally commence until the feeder pillar has been installed and connected.

7. Testing of Installed Cables and Marking of Cable Drawing

7.1 The Contractor shall supply to WSCC at the site commissioning the relevant electrical test certificates. The Contractor's failure to supply the test certificate will cause the switching on of the signals to be delayed until the certificate is produced. The Contractor shall be liable for all expenses involved with re-attending the subsequent site commissioning.

7.2 The electrical test certificates shall be in accordance with the format shown in Appendix A.

7.3 The Contractor shall notify WSCC prior to tests being undertaken so that the Engineer or his representative may be present to verify the tests.

7.4 The following tests shall be carried out:

- Series resistance of loop and feeder. The resistance shall not exceed 5 ohms.
- Impedance to earth of the armouring of every feeder cable and connecting cable before the armouring is bonded to earth. The reading shall not be less than 10 megaohms.
- Impedance to earth of cable armouring after the armouring has been connected to earth. The reading shall not exceed 0.5 ohms.
- Impedance to earth of loop and feeder conductors with both feeder conductors connected together, using at least 500 volts DC applied

for at least one minute. The cable shall be disconnected at both ends during the taking of this reading.

- Impedance to earth of connecting cable conductors with all conductors connected together, using at least 500 volts DC applied for at least one minute. The reading shall not be less than 10 megaohms. The cable shall be disconnected at both ends during the taking of this reading.

7.5 Any loop or feeder or connectable cable which fails any of the tests shall be replaced by the Contractor before the site is commissioned.

7.6 The Contractor shall reset the detector card power supply where necessary and shall observe and monitor the LED for the correct operation of each loop connected to the detector card. Any defects or malfunction shall be reported immediately to the WSCC. This work shall be carried out for all detectors which have been affected by the Works.

7.7 Measurement of linear meterage may be carried out with a measuring wheel that has been calibrated within the previous 12 months. WSCC shall have the right to check any measurement and request that any electrical test be repeated at the contractor's expense during commissioning.

8. Testing and Commissioning

8.1 The contractor shall translate the TOPAS 2500A specification into a controller configuration and give WSCC at least 10 days' notice of a simulated Configuration Acceptance Testing (CAT). The contractor will allow for WSCC attendance at those tests by the Engineer's representative or they will be conducted by a WSCC approved consultant. (For approved supplier list please see latest issue of WSCC Signal Design Standards.) The test will verify operation of the signals and will be conducted on an emulator to allow various scenarios to be tested.

8.2 On completion of the simulation test the Configuration Acceptance Test shall be documented on the WSCC forms shown in Appendix C

8.3 The Contractor shall give WSCC at least ten working days' notice of the controller(s) being ready for Factory Acceptance Testing (FAT) and shall allow for attendance at those tests by the Engineer's representative. The location of the acceptance test is to be at the contractor's premises.

8.4 The installer shall supply the WSCC traffic signals engineer with a copy of the controller specification prior to or at the above tests.

8.5 Suitable signal lamp mimics and means of simulating inputs shall be required and the test shall demonstrate compliance with the operational specification, including necessary green conflict monitoring. Any non-compliances identified by the Engineer shall be rectified by the Contractor at their own expense.

8.6 The Factory Acceptance Test shall be documented on the WSCC forms shown in Appendix C.

8.7 The Contractor shall supply suitable opaque signal head covers. The Contractor shall use these to completely cover all signal head assemblies including pedestrian heads and push-buttons that are not controlling traffic during installation. The covers shall only be removed by the Contractor when commissioning the signals.

8.8 The SCN of the site shall be displayed on the controller cabinet in characters approximately 50mm high (i.e. 3621). The method of application shall be approved by WSCC.

8.9 A fault reporting sticker should be displayed on the controller cabinet, beneath the SCN, detailing fault number and email address to contact.

8.10 All signal poles shall be numbered as specified on the design drawing or starting with the pole closest to the controller and proceeding in a clockwise direction around the facility.

8.11 On completion of the installation the site shall be left clean and tidy and all rubbish shall be removed.

8.12 After installation of the equipment, site testing shall be carried out by the Contractor prior to the commissioning in order to demonstrate compliance with the specification. The Contractor shall test the operation of all lamps, detectors, and push buttons. Only after the tests have proved satisfactory shall WSCC or their representative be asked to attend the installation in order that it may be commissioned. The Contractor shall supply all equipment necessary for testing purposes.

8.13 The Contractor shall give at least one-week advance notice to WSCC traffic signal section's traffic signal engineer to attend the commissioning tests. WSCC reserve the right to invite their maintenance contractor to attend the site commissioning.

8.14 The Site Acceptance Test shall be documented on the WSCC forms shown in Appendix C.

8.15 Any non-compliances identified by WSCC shall be resolved at the commissioning by the Contractor. If after taking all reasonable action the Contractor is unable to rectify the outstanding non-compliances and at the commissioning the Engineer considers that the non-compliances are such that the signal equipment cannot be switched on the Contractor shall re-attend the site to resolve the non-compliances immediately the following day and each day thereafter until the item is rectified. Where the non-compliances are not deemed by the Engineer to affect the switching on of the signal equipment and the Contractor has taken all reasonable measures at the commissioning, the outstanding non-compliance items must be resolved within 5 working days. All labour, plant and materials required to resolve the non-compliant items shall be undertaken at the Contractor's own expense.

8.16 Following a successful site commissioning the installation will be handed over to the Engineer's maintenance contractor. For a period of 12 months following adoption of signals works the WSCC maintenance provider shall be responsible for maintaining the site, in the event of a fault with any of the equipment, other than lamps, shall inform the Contractor of the faulty equipment and return for said equipment for

repair or replacement, or shall instruct the Contractor to attend the site and to rectify the fault.

8.17 In addition to any faults that occur following site acceptance the maintenance responsibilities and liability for any traffic signal equipment shall not be accepted by the Engineer until final Site Acceptance Certificates have been signed and accepted by WSCC. If during this period a fault develops, WSCC's maintenance provider shall attend the site, to rectify the fault at the Contractor's expense.

9. Documentation

9.1 The following documents are to be supplied by the Contractor and retained in the controller at commissioning:

- A Log Book
- A copy of the controller specification.

9.2 The Contractor shall supply to WSCC at the site commissioning the relevant electrical test certificates. The Contractor's failure to supply these test certificates will cause the switching on of the signals to be delayed until the certificate is produced. The Contractor shall be liable for all expenses involved with re-attending the subsequent site commissioning.

9.3 Within 30 days of the commissioning the contractor is to supply three "as built" cable and signal drawings. One shall be retained within the controller, the remaining two shall be sent to WSCC. The Contractor is in addition to supply the "as built" drawing in AutoCAD format.

9.4 Within 7 days of the commissioning the contractor is to supply an electronic PDF version of the specification and the relevant data files.

10. Connection to Remote Monitoring (RMS)

10.1 Unless specified otherwise by the Engineer in writing the installation will be connected to West Sussex County Council's Remote Monitoring System supplied by telent. The following requirements are to be met.

10.2 The preferred option is the installation of an integral OMU, therefore reducing wiring and ensuring direct communication with the controller. If this is not feasible a standard 3U rack is to be provided for an Outstation Monitoring Unit (OMU) to be fitted in the controller cabinet containing a 300mm wide by 300mm deep void space.

10.3 It is the Main Contractor's responsibility to arrange for an agreed communication connection to be installed and connected. This could be in the form of an ADSL line, GSM modem (sim card to be supplied by WSCC Traffic signals) or a telemetry line connected to the Public Switched Telephone Network to be fitted in the controller cabinet.

10.4 The OMU must report any identified fault back to the Instation.

10.5 The OMU must be linked to enable full interrogation of the controller via handset commands.

10.6 A separately fused supply shall be provided solely for use of the OTU/OMCU.

10.7 The OMU equipment shall be of a type approved by WSCC Traffic Signals Engineer to ensure compatibility with the Instation operating system.

10.8 The OMU shall be connected with phase indications in order, followed by phase wait lamps in order. The detectors shall be connected in the order in which they appear in the controller input.

11. Connection to Microprocessor Optimised Vehicle activation (MOVA)

11.1 Unless specified otherwise by WSCC Traffic Signals in writing the installation will be connected to MOVA and the following requirements are to be met.

11.2 An integral MOVA system shall be installed thus eliminating the need for separate detector wiring and ensuring direct communication with the controller. If this is not feasible written permission must be obtained from WSCC Traffic Signals and a standard 3U rack is to be provided for a MOVA/ Outstation Monitoring Unit to be fitted in the controller cabinet containing a 300mm wide by 300mm deep void space.

11.3 A UTC interface is provided inside the controller for MOVA control. The Contractor shall test the output of all UTC bits at the Site commissioning.

11.4 All controller detector inputs shall be capable of being remotely monitored. All control and reply bits shall be capable of being wired to the MOVA unit.

11.5 The manual panel shall include a 'computer on' LED which shall indicate when the controller is operating under MOVA control. The LED shall be labelled 'MOVA on-line'.

11.6 The MOVA equipment shall be of a type approved by the Engineer to ensure compatibility with the WSCC Site interrogation software and Instation operating system.

11.7 The latest version of the MOVA software shall be supplied, including all relevant licences to operate MOVA.

11.8 WSCC currently operate telent integral MOVA and Siemens MOVA via Gemini Units.

Appendix A

Cable Specification to BS 6346

a. Loop Cable

2.5mm^2 30/0.25 tinned annealed copper conductor, insulated with 0.8mm radial thickness of EPR and sheathed with 1.4mm radial thickness of PCP. Overall diameter 6.8mm (minimum), 7.2mm (maximum)

b. Feeder Cable

2.5mm^2 1/1.38 plain annealed circular copper conductor, steel wire armoured, 0.7mm radial polyethylene insulation, 2 or 4 cores with cores laid up with 5 turns per metre. The use of non-armoured feeder will only be accepted if prior written agreement has been obtained from WSCC traffic signals team.

c. Power Cable (low voltage or extra low voltage)

1.5mm^2, 8, 12, 16 or 20 core steel wire armoured, with orange PVC sheathing and colour coded cores according to requirements, noting the need for spare cores.

Colour Core	8 Core	12 Core	16 Core	20 Core
Black	X	X	X	X
Red	X	X	X	X
Blue	X	X	X	X
Brown	X	X	X	X
Green/Blue	X	X	X	X
White	X	X	X	X
Orange	X	X	X	X
Yellow	X	X	X	X
Red/White		X	X	X
Red/Blue		X	X	X
Violet		X	X	X
Grey		X	X	X
Brown/Red			X	X
Yellow/Red			X	X
Grey/Red			X	X
Black/Red			X	X
Violet/Red				X
Orange/Red				X
Green/Red				X
Blue/White				X

Appendix B

Test Certificate for Cabling and Equipment

Customer	Site No	Site Address	
Controller Type	Controller S/No	Engineer	Date
Config Number:		Firmware Number:	

Controller / Site Checks

	Fail	Pass		Fail	Pass		Fail	Pass		Fail	Pass
Power Supplies			Seals			Controller Case			Reg Signs		
Fuses			Base seal			Poles			Haldo		
Dimming			Earthing			Pole Tops			Road Markings		
Relays			Locks			Lanterns			Above Groung Det		
Detectors			Hinges			Brackets					
DFM			UTC			P/B Units					
Terminal Blocks			OUT			Tactiles					
Operation			LMU			Audio					
Drawings			OMU			Detector Housings					
Schedule			RCCB								

Loop Tests

Loop	RE	RS	Frequency	Setting	Loop	RE	RS	Frequency	Setting
AX									

Earth Loop Impedance Test

Equipment	Reading	Equipment	Reading
Cont.			
P1			

Comments	Further Action Required	Y	N

Appendix C

Specification for Cable and Cable Core Identification

This Schedule is issued to ensure that all cable and cable cores in traffic signal installations are identified by the same method and code.

1. Cable Identification

1.1 All cables entering any equipment housing shall be identified by a 'Pull-Tite' tag fixed around the inner sheath immediately above the Steel Wire Armouring (SWA) termination gland.

1.2 The tag shall be marked, using an approved waterproof, indelible, black marker pen, in the following manner:

a. Low Voltage Signal Cables

The tag shall be red and shall be clearly marked with the number of the pole, serviced by the cable.

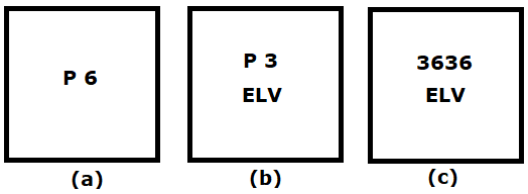
b. Extra Low Voltage Cables (Pedestrian Push Buttons, etc.)

The tag shall be yellow and shall be clearly marked with the pole number serviced by the cable; in addition, the letters ELV shall be added.

c. Extra Low Voltage Cables (Linking Cables)

The tag shall be yellow and shall be marked with the Site reference number of the linked equipment and in addition the letters ELV shall added.

Examples:



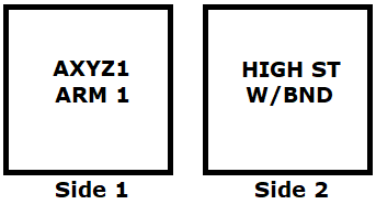
Note: The pole numbers referred to above are as shown on the contract drawing.

d. Loop Feeder Cables

The identification of these cables is as follows.

One side of the yellow tag shall be marked with the detector and arm designation - the other side shall be marked with the Street or Road name.

Example:



2. Cable Core Identification

2.1 There are two options regarding the identification of the individual cores.

2.2 Option 1 – This prevents the requirement for all individual cores to have identification markers applied. The cores are identified by the use of a standard colour code system which allocates a core colour to a function. The following table should be followed unless there is a site-specific reason for deviation. On completion of the installation a full wiring chart must be laminated and left in the controller.

Function	**Pole Cable Requirements**		
	2 x 16 Core Cables		**1 x 20 Core Cable**
Signal Neutral	Cable 1	Black	Black
Primary Signal Red	Cable 1	Brown	Brown
Primary Signal Amber	Cable 1	Yellow	Yellow
Primary Signal Green	Cable 1	Green/Blue	Green/Blue
Secondary Signal Red	Cable 1	Red	Brown/Red
Secondary Signal Amber	Cable 1	White	Yellow/Red
Secondary Signal Green	Cable 1	Blue	Grey/Red
Pedestrian Neutral	Cable 1	Black/Red	Black/Red
Pedestrian Red Man	Cable 1	Red/White	Red/White
Pedestrian Wait	Cable 1	Orange	Orange
Pedestrian Green Man	Cable 1	Red/Blue	Red/Blue
PE Cell Neutral	Cable 1	Violet	
PE Cell Live	Cable 1	Brown/Red	
PE Cell Switch	Cable 1	Yellow/Red	
Spare	Cable 1	Grey	Violet/Red
Spare	Cable 1	Grey/Red	Blue/White
Common	Cable 2	Blue	Blue
Push Button	Cable 2	White	White
Push Button	Cable 2	Brown	
24V	Cable 2	Red	Red
MVD	Cable 2	Brown/Red	
ONC	Cable 2	Yellow/Red	Orange/Red
Kerbside	Cable 2	Grey/Red	Green/Red
Bleep	Cable 2	Green/Blue	Violet
Bleep	Cable 2	Yellow	Grey
Spare	Cable 2	Black	
Spare	Cable 2	Black/Red	
Spare	Cable 2	Red/White	

Function	Pole Cable Requirements		
	2 x 16 Core Cables		1 x 20 Core Cable
Spare	Cable 2	Orange	
Spare	Cable 2	Red/Blue	
Spare	Cable 2	Violet	
Spare	Cable 2	Grey	

2.3 Option 2 - All individual cable cores in cables used in a traffic signal installation shall be identified using coloured PVC grip type markers with black lettering. The markers shall be positioned on the core adjacent to the termination point in such a way that they can be read easily.

2.3.1 Three types of identification marker shall be used:

a. Numbered markers indicating poles numbers. These will be colour coded in accordance with the international resistor colour code, as per the table below. The number shall indicate the pole fed by that cable i.e. the next pole to which the cable runs.

Number	Marker Colour
0	Black
1	Brown
2	Red
3	Orange
4	Yellow
5	Green
6	Blue
7	Violet
8	Slate (Grey)
9	White
10	Made from 2 markers Brown and Black

b. Legend markers indicating the function of the core. The marker will be coloured Red for Low Voltage Cables and Yellow for Extra Low Voltage Cables. See below table of functions to be marked on the marker.

RED	AMBER	GREEN	I G/A
F G/A	WAIT	G/MAN	R/MAN
SIGN	PE/L	PE/N	PE/SW
SIG/N	SIGN/N	BLEEP	TACT
COMM	INHIB	LINK	T/O
ONC	KSD	IRD	A/RED
MVD	24V	SIG N	PED N
PB	MOVA DET	SL DET	SPARE

Any functions not covered by the above are to be written on blank markers with a permanent marker.

c. White lettered markers indicating the phase of the core.

2.3.2 The colours, numbers, function, letters, and arrangement of the markers on the cables shall be as follows.

a. The following arrangement shall be used for all cables in the controller and for all cables leaving a signal pole.

Example	1st Marker (Pole)	2nd Marker (Function)	3rd Marker (Phase)
For ELV leaving the controller to Pole 16 and connected to Phase C, MVD detector	1 (Brown) 6 (Blue)	MVD (Yellow)	C (White)
For LV leaving the controller to Pole 8 and connected to Phase A, Primary red signal	8 (Slate)	Red (Red)	A (White)

b. The following arrangement shall be used for all cables arriving at a signal pole or equipment housing.

Example	1st Marker (Function)	2nd Marker (Phase)
For ELV leaving the controller at Pole 16 and connected to Phase C, MVD detector	MVD (Yellow)	C (White)
For LV leaving the controller at Pole 8 and connected to Phase A, Primary red signal	Red (Red)	A (White)

Appendix D

Test Certificates

West Sussex County Council have a series of standard documents that can be used for controller configuration tests, Factory testing or site acceptance testing. These can be requested by contacting the Traffic Signals team by emailing traffic.signals@westsussex.gov.uk.

Appendix E

Standard Detail Drawings

West Sussex County Council has a series of standard detail drawings to be adhered to unless otherwise specified. These are listed in the table below and copies can be requested by contacting the Traffic Signals team by emailing traffic.signals@westsussex.gov.uk.

Drawing Number	Details
WSCC-SD1-0500-051	Traffic Signals Controller Manhole, Cable & Junction Pit Under Kerb Loop Connection
WSCC-SD1-0500-052	Typical Section Through Traffic Signals Access Chamber Box and Kerb Loop Connection (1)
WSCC-SD1-0500-053	Typical Section Through Traffic Signals Access Chamber Box and Kerb Loop Connection (2)
WSCC-SD1-0500-054	Traffic Signals Access Chamber Box Type C1
WSCC-SD1-0500-055	Traffic Signals Access Chamber Box Type C2
WSCC-SD1-0500-056	Traffic Signals Access Chamber Box Type C3
WSCC-SD1-0500-057	Traffic Signals Access Chamber Box Type C4
WSCC-SD1-0500-058	Traffic Signals Access Chamber Box Type C5
WSCC-SD1-1200-011	Traffic Signals Controller & Feeder Pillar Installation Details
WSCC-SD1-1200-012	Traffic Signals Pole Retention Socket Installation Details
WSCC-SD1-1200-013	Traffic Signals Controlled Pedestrian Crossing Signal and Push Button Pole Location
WSCC-SD1-1400-001/1	Feeder Pillar Installation Details Sheet 1 of 3
WSCC-SD1-1400-001/2	Feeder Pillar Installation Details Sheet 2 of 3
WSCC-SD1-1400-001/3	Feeder Pillar Installation Details Sheet 3 of 3