



Specification for Highway Works

Series 1200 Appendix 12 / 5

Client: SWARCO UK & Ireland

23/04/2023

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INTRODUCTION AND SCOPE

This specification fulfils the role of Appendix 12/5 and should be included in Series 1200 of the Manual for Contractors Highway Works.

This specification details the work required to construct, supply, install and commission the traffic signal related works which form part of the

Howes Lane, north of Middleton Stoney Road, Bicester

scheme and ensure that all the equipment is fully operational. Unless stated otherwise the work undertaken shall comply fully with the latest standards as detailed in the Highways Works Specification and/or the Traffic Signs Manual, Chapter 6. Where differences arise between the content of this Appendix and any referenced specifications/documents, the contents of this appendix shall be followed.

The work required as part of this contract is:

- All necessary civil engineering works
- Traffic Signals Ducting
- Traffic Signals Works
- Traffic Management Works
- Electrical Supply Works
- Communications Works
- Testing Services
- Validation Services

This document shall be read by all key parties who are involved with the installation, testing and commissioning of the traffic signal equipment.

The junction is located within the jurisdiction of

Oxfordshire County Council

and is maintained by

Oxfordshire County Council

The reference to 'Overseeing Organisation' in this specification is the Local Highway Authority who has responsibility for the junction.

The reference to 'Traffic Signal Engineer' in this specification is the nominated Traffic Signal Engineer of the Local Highway Authority or their appointed representative. Contact Details shown below:

Contact details to be provided

CONTRACTOR RESPONSIBILITIES

Principal Designer

The Principal Designer shall be responsible for authorising any design changes that may become desirable or necessary during the construction phase(s). This will normally involve or be delegated to specialist Traffic Signal Designers, who should be consulted on matters outside the competency of the Principal Contractor. The Principal Designer for this scheme is:

Albion Land

and can be contacted via:

Darrell Webb
Darrell.webb@swarco.com

Principal Contractor

The appointed Principal Contractor shall be responsible for the overall installation of the scheme, the programming and co-ordination of all installation activities, including the arrangement of traffic management. Should any changes to the design or specification be required or desired during construction, the Principal Contractor shall liaise with the Principal Designer to ensure the proposed changes are suitable.

The Principal Contractor shall appoint the Traffic Signals Contractor listed to undertake the works specified in the Appendix to this document.

The Principal Contractor shall appoint Third Party Contractors to undertake the works specified in the Appendix to this document, unless they can demonstrate that the Principal Contractor already has the required staff, skills and competency. If specified below, the Principal Contractor shall appoint the Supplier identified, as the Third Party Contractor for the relevant service.

A copy of the proposed civil works and signal installation programme shall be presented to the Overseeing Organisation and their Traffic Signal Engineer (or representative) at a pre-construction meeting. The installation programme shall include the duration of all areas of works, including Factory Acceptance Test (FAT), Site Acceptance Test (SAT) and Commissioning.

The Principal Contractor shall be responsible for all safe working methods whilst on site. The Principal Contractor shall adhere to all relevant regulations, including Chapter 8 of the current Traffic Signs Manual, The Electricity at Work Regulations 1989, HSG47 "Avoiding Danger from Underground Services" as well as any site-specific rules or instructions.

The Principal Contractor shall co-ordinate with the Traffic Signal Contractor to arrange all necessary traffic management in accordance with the requirements of chapter 8 of "The Traffic Signs Manual - Road Works & Temporary Situations" (2009) Parts 1 & 2, to carry out all necessary works under this contract.

The Principal Contractor for this scheme is

To be determined by this tender

Traffic Signals Contractor

The Traffic Signal Contractor shall be the appointed organisation responsible for the provision, installation and commissioning of the traffic signal installation and all associated works as defined within this specification.

The Traffic Signals Contractor shall be approved to BS EN 9002 QAS 3433/287 or QSS 015. Evidence of certification should be provided on request by any party.

The Traffic Signals Contractor for this scheme is

SWARCO UK & Ireland

who can be contacted at:

Darrell Webb
Darrell.webb@swarco.com

The signal equipment layout that is shown on the signal design drawings in Appendix A shall be installed in accordance with the Design Manual for Roads and Bridges, Traffic Signs Manual, Chapter 6 and this specification. The signals equipment shall function in the manner specified in Appendix B and be registered and certified in accordance with relevant TOPAS specifications.

The Traffic Signal Contractor shall ensure that all staff involved in the installation have been fully made aware of all relevant specifications and have the information and equipment necessary to comply fully with all the requirements. The Traffic Signal Contractor must ensure that all staff involved in the installation attend the site induction.

Third Party Contractor(s)

Third Party Contractors may be appointed to undertake specialist roles on behalf of the Local Highway Authority and/or Principal Contractor. They shall be responsible for the (relevant) works outlined in the Appendix to this document.

Third Party Contractors for this scheme are:

*Chris Kennett Consulting Limited,
to be appointed by the Principal Contractor and can be contacted at
Samantha Kennett
Samantha@chriskennett.consulting
0331 336 316*

Third Party Contractors shall engage and liaise with the Principal Contractor and shall ensure all staff involved in the scheme have been fully made aware of all relevant specifications and have the information and equipment necessary to comply fully with all the requirements. If instructed by the Principal Contractor, they shall attend site induction.

DESIGN WORKS

All traffic signal design works shall comply with the requirements specified in the Design Manual for Roads and Bridges / Traffic Signs Manual Chapter 6, and local standards issued by the Overseeing Authority.

TRAFFIC SIGNAL EQUIPMENT

Traffic Signal Controller

The Traffic Signal Controller shall conform to TOPAS 2500B. Output to all on-street-equipment shall be Extra Low Voltage (<50v) unless explicitly stated elsewhere in the Traffic Signals Design.

The Controller shall be fitted with an S18 main cabinet door lock, 900 Manual Panel keylock, "T" compression locks on the main door, and two sets of keys for each. An A5 maintenance log book shall be provided in a suitable document holder, built into the cabinet. All IP communications enabled equipment shall be connected to the site communications media via appropriate network switches / hubs, power supplies and suitable Ethernet cables. A spare port shall be available for Engineer Handset use.

All cabinets shall be installed on an NAL Controller Root. Installation shall be in accordance with the manufacturer's instructions.

The Controller shall only be installed once a suitable power supply is available.

The Controller shall be fitted with a main door stay, Manual Panel and Detector Fault Monitoring light. The DFM light shall be clearly visible from outside of the cabinet, with all cabinet doors closed.

All cabinets shall be installed in a way that allows all doors to be fully opened.

The finished installation of the Controller Root(s) shall effectively prevent the ingress of animals, moisture and gases.

The Controller Cabinet and any other Miscellaneous Equipment Cabinets shall be of a colour specified in the Detailed Design, with sufficient internal space for all equipment required by the design and specifications. Equipment within cabinets shall generally be mounted securely in equipment racking within a swing-frame, except for cable terminations, which shall be secured against the cabinet walls. Incoming cabling shall be secured to castellation bars, fixed to the cabinet.

The installation of the Controller shall be neat and tidy. All cables shall be securely routed and tied back. All equipment shall be secured. Terminations, sockets and other connectors shall be likewise be secured. All spare cores shall be taped or capped and shall be routed so as not to interfere or block other equipment. Cabling shall be long enough to reach secured termination blocks and shall not be extended by crimping or other means. Cabling from street, including feeder cables, shall not be terminated directly to equipment within the swing-frame.

The Controller Cabinet and any Miscellaneous Equipment Cabinets shall be labelled with site and cabinet references in accordance with local standards and conventions. This will normally be using self adhesive white lettering on the cabinet-side facing the main carriageway.

Lamp monitoring, including Red Lamp Monitoring, and DFM functionality, shall be provided in accordance with the Controller Specification. At pedestrian crossings, where no controller specification is provided, red lamp monitoring shall be provided, operating in accordance with TOPAS2500B and shall result in the site switching off on second red lamp failure on an approach.

The controller shall be configured in accordance with the Controller Specification where provided, or otherwise in accordance with TSM Chapter 6 and the crossing timings provided. Junction configurations and hardware shall be proven in advance by means of a Factory Acceptance Test. All sites shall be subject to a Site Acceptance Test, before being switched on.

The Traffic Signal Contractor shall provide training for any new software, firmware or hardware not previously used within the Local Highway Authority's area.

Traffic Signal Poles

Unless the design specifically requires a different material and finish, poles shall be either hot-dipped galvanized steel, finished in a coloured plastic powder coating, or may be aluminium with a similar finish. The colour shall be as identified on the design. Galvanisation of steel poles shall be in accordance with BS729: 1971.

All signal poles shall be supplied without pre-drilled holes for pedestrian push buttons, but should be drilled on site to meet the requirements of the design.

The colour of poles and pole caps shall match the controller cabinet colour.

All heads on each approach are to be mounted at the same height to the centre of the amber, regardless of the type of pole, or arrangement of aspects. This may mean using non-standard brackets to compensate for swan-neck poles of 4-in-line heads. Regardless of the heads, poles and brackets used, a minimum clearance of 2.1m above footways or unmade verge and 2.4m above cycleways must be achieved.

Stub and short poles shall be supplied with welded pole caps and be earth-bonded via a brass stud tapped into the push button unit.

The poles shall fit within an RS115 pole socket, however they may widen locally above ground level.

Tall poles between 6-8m in length are to be wide based (168mm) and have welded top caps, complete with access door and fitted backing board. Terminations shall be accessible through the access door and shall be protected against condensation and running water .

All signal poles shall be mounted in NAL pole retention sockets (or similar if agreed by Overseeing Organisation). The Pole retention socket and its foundation is to be designed and installed as per the manufacturer's guidelines. The top of the socket is to be level with the finished level of the footway. The Traffic Signal Contractor is to supply the appropriate length signal pole and cable entry system.

Traffic Signal and Far-Side Pedestrian Heads

All signal heads and aspects shall be designed in accordance with BS EN 12368
All signal heads shall be ELV LED. The size, appearance and optical performance of all signal heads is to comply with the requirements of the Traffic Signs, Regulations and General Directions (TSRGD) 2016, BS 7987 (HD 638) and all relevant TOPAS 25** Series specifications for the equipment being installed.

All vehicle signals shall be fitted with primary, secondary or tunnel hoods as shown on the signal design drawing. The Traffic Signal Contractor shall be responsible for ensuring all signal equipment (including backings boards, visors and tunnel hoods) is installed achieving a minimum of 0.45m lateral clearance between the kerb edge and the equipment.

All heads shall be installed on poles, with the bottom of the signal head/bracket assembly mounted between 2.1 and 2.55 metres above ground level. All traffic signal heads on an approach shall be mounted on the same horizontal plane through the amber aspects.

Signal head mounting brackets are to be protected with an appropriate plastic coating or catalytic paint, or be manufactured from a non-ferrous material in a dark grey or black colour.

Brackets should be sufficiently long enough to provide at least 125 degree rotational adjustment movement on each traffic signal head where several are mounted on one pole. If a signal head is shown on the design drawing as being bracket mounted, a bracket is to be installed to allow for the signal head to be offset from the pole as specified.

Traffic signal heads shall be supplied and installed with backing boards (unless otherwise specified) that have been factory treated with BS EN 12899-1: 2001 Class 1 retro-reflective white borders.

Flexible tubing (Copex type), is to be installed to protect the external wiring between each signal head and pole. This tubing shall be fixed securely to the back of the signal head using a nylon or plastic gland. The length of this tubing should be sufficiently long enough to ensure that it remains within the pole to accommodate the signal head being flexed in all weathers.

No transformer or power supplies (for tactile devices, pedestrian detectors or audible/tactile equipment) shall be fitted in any traffic signal head.

All erected signal heads that have not been commissioned are to be covered at the end of each day of installation. The Traffic Signal Contractor is to provide durable waterproof orange coloured covers for this purpose. During the installation period the Traffic Signal Contractor will be responsible for the maintenance of the covers and their fitting.

Signal lamp dimming to 27.5V ELV shall be provided. A Photo Electric Control Unit (PE cell) shall be mounted on top of the signal head with the least effect from artificial light sources. Ideally this should be on the signal head closest to the controller and in a location that makes it easy to be serviced. Failure of the solar switch shall cause the signals to assume the 'bright' condition. Refer to the signal design drawing for details of which pole the PECU is to be installed.

Nearside Demand and Display Units

All nearside demand (push button) units, demand and display units and display-only units are to be ELV with a maximum voltage rating of 48V. All units fitted with a push button shall also be fitted with a wait lamp showing a steady red or deep orange demand indication.

Nearside pedestrian demand units are to comply with TOPAS 2511A 'Performance Specification for Nearside Signal and Demand Units'. All Cycle/Equestrian/Pedestrian aspects shall be LED design and fitted with 3M masks or other equivalent means of limiting phantom effects.

The demand unit shall be mounted between 1.0 and 1.1 metres above the pavement to the centre of the push button.

Where separate demand units and display units are used, a gap of approximately 150mm is to be provided between the top of the demand unit and the bottom of the display unit.

At sites where additional high level repeater display units are specified, these are to be located above the 'primary' nearside display. Refer to the detailed design to determine if these units are to be narrow field of view.

Audible devices shall comply with TOPAS 2509 'Performance Specification for Audible Equipment for use at Pedestrian Crossings'. Tactile devices shall comply with TOPAS 2508 'Performance Specification for Tactile Equipment for use at a Pedestrian Crossing' and have its own separate power supply.

UTC and MOVA

Where specified, MOVA and UTC equipment shall be demonstrated to be fully functional and to work in accordance with the documentation issued by the 'manufacturer' (TRL for MOVA, Siemens or SWARCO for UTC). Additionally, industry good practice and local specifications shall be followed as best fits the requirements of the site.

All UTC equipment shall be compatible and made to work with the Local Highway Authority's existing UTC System, including configuration of static routes and firewalls, if necessary. The Traffic Signal Contractor shall liaise with the Local Highway Authority to determine the requirements.

The UTC and/or MOVA functionality shall be provided within the main controller cabinet and may be integral or provided as additional hardware. If provided as additional hardware, it shall be considered to be part of the Controller and subject to the same requirements.

All UTC/MOVA equipment shall follow the UTMC2 UG405 protocol.

UTC and MOVA facilities shall include configuration of the hardware to enable those facilities and all necessary licenses for the site in perpetuity. Configuration of the hardware shall include allocation of hardware inputs and outputs.

MOVA Facilities (where required) shall be MOVA 8 or above.

Installation of UTC is to include supply, installation and configuration of all necessary communications routers and other interfaces and devices, as required to provide the functionality described in the Detailed Design and Specifications.

Detection Requirements

Above Ground Detection (AGD)

Above Ground Vehicle Detection is to comply with the latest issue of TOPAS 2505 'Performance Specification for Above Ground Vehicle Detector Systems for use at Permanent Traffic Signal Installations'.

Above ground pedestrian detection is to comply with the latest issue of TOPAS 2506A "Performance Specification for Above Ground On-Crossing Pedestrian Detection Systems" and TOPAS 2507A "Performance Specification for Kerbside Detection Systems for use with Nearside Signals and Demand Units.

The supporting bracket for above ground detectors shall normally be mounted on top of a signal aspect bracket. The supporting bracket shall allow for the vertical and horizontal adjustment of the above ground detectors. When set in final position the detector should be able to be locked in that position.

The mounting method of the detector should ensure that other signal equipment, such as a backing board, does not obscure the field of detection. The above ground detector is to be secured by means of an anti-theft fixing.

Cables for the above ground detectors are to be neatly secured to the top signal bracket using tie-wraps.

Plug and socket cable connections are to be supplied for termination purposes. They are to be fitted to the stop of the signal head assembly, enabling easy removal of the detector units

Refer to the Detailed Design drawing for exact above ground detector requirements.

Service Duct Requirements

The ducting and access chambers are shown on the signal design drawing and are to be installed in accordance with Appendix 5/2 'Traffic Signals Service Duct Specification'.

Testing

Testing and Putting Into Service

The Principal Contractor shall make arrangement and cover all necessary costs to ensure the safe and independent testing of traffic signal equipment as it is being put into service by the Traffic Signal Contractor.

Testing and validation works may be provided by the Traffic Signal Engineer, on written agreement with that Local Authority. Otherwise, the Principal Contractor shall provide a competent person(s), independent of the Traffic Signal Contractor, to undertake the following works. Where the following paragraphs refer to the Traffic Signal Engineer, this would apply to either the Traffic Signal Engineer of the Local Authority, or whoever else undertakes the works.

Factory Acceptance Test (FAT)

An FAT is not required.

Signal Installation Electrical Test

The Traffic Signal Contractor is to carry out Earth Leakage Impedance tests using appropriate test equipment, at each pole, controller cabinet and termination cabinet. These tests are to comply with BS 7671 'Requirements for electrical installation'.

A 'Signal Installation Electrical Test Certificate' is to be completed by the Traffic Signal Contractor and handed to the Traffic Signal Engineer at commissioning. The Traffic Signal Contractor is to notify the Traffic Signal Engineer in writing of any precautions that are required to safeguard the control equipment during the test process. A list of these precautions is to be left in the controller following commissioning.

Site Acceptance Test (SAT)

Commissioning of any traffic signal installation shall only be undertaken when all works at the installation, including surfacing, pedestrian guard railing and road marking activities are complete.

If requested by the Traffic Signal Engineer the Traffic Signal Contractor is to provide one set of Traffic Signal Controller keys prior to or at the SAT.

The Traffic Signal Contractor is to provide a SAT engineer to demonstrate to the Traffic Signal Engineer that the signal installation has been installed in accordance with all specification requirements. This includes such tests as safety checks i.e. Red Lamp Monitoring.

The Traffic Signal Contractor is to have carried out all pre-switch tests before confirming and inviting the Traffic Signal Engineer to attend the SAT.

The SAT will also include the commissioning of the fitted OMCU or OTU unit. The Traffic Signal Contractor is to provide the Traffic Signal Engineer with the OMCU Installation Details Certificate either prior to or during the SAT or follow up OMCU commissioning.

The SAT acceptance certificate/sheets are to be signed by both the Traffic Signal Contractor representative and the Traffic Signal Engineer. Detailed on this document will be a list of any outstanding items, which are to be addressed by the Principal Contractor within four weeks of switch on.

At commissioning the Traffic Signal Contractor is to complete and hand to the Traffic Signal Engineer the following documents: Inductive Loop Test Certificate, Cable Schematic, Signal Installation Electrical Test Certificate for all sites. For sites with OMCUs installed; OMCU installation Details Certificate. Without these documents the site will not be accepted by the Overseeing Organisation's Traffic Signal Engineer.

The Traffic Signal Contractor shall provide suitably competent and experienced personnel to set up the MOVA control facilities and to test and validate MOVA control operation in the presence of the Traffic Signal Engineer.

Validation shall include the optimisation of all relevant modes to ensure the traffic signals comply with the operational requirements of the Local Authority, including capacity, delay and safety considerations.

Following the successful commissioning, the Traffic Signal Contractor shall supply the Traffic Signals Engineer electronic details of the controller specific configuration data and shall retain sufficient records to provide replacements at reasonable cost, in the event of the EPROMS/configurations becoming damaged or requiring modification.

Equipment Handover and Warranty

Handover

All outstanding items are to be rectified within four weeks of switch on. After four weeks has expired the Traffic Signal Engineer reserves the right to employ the services of another signal company to complete outstanding work not resolved. Failure to complete outstanding items to the Traffic Signal Engineer's satisfaction will result in the 12-month warranty period being awarded to another signal company. Costs incurred when resolving outstanding work after the allocated timeframe, including the 12-month warranty period, shall be invoiced to the original Traffic Signal Contractor.

The traffic signals will only be accepted into maintenance of the Overseeing Organisation once all items have been completed to the satisfaction of the Traffic Signal Engineer. Until such time the Principal Contractor will be responsible for the signal equipment including the maintenance.

Warranty

The tender price shall include for the provision of 12 months warranty of all equipment supplied under this contract. The 12-month warranty period will not commence until all works (including outstanding items list) have been completed and signed by Traffic Signal Engineer. The warranty is to include for all necessary materials, labour, transport required to carry out these works and traffic management.

During the time period of site acceptance and handover the Traffic Signal Contractor shall comply with the Overseeing Organisation's current maintenance response times, which shall be as follows:-

- Urgent faults attendance within 2 contract hours
- Non-urgent faults attendance within 8 contract hours
- Full repair for both categories within 4 contract hours.
- Contract hours 08.00 - 18.00, Monday to Sunday including Bank Holidays.

An Urgent Fault is defined as:-

- All signals Unlit Signals failing to change
- Defective signals that are likely to cause excessive queues or danger and have caused abnormal traffic conditions requiring urgent attention
- Equipment damaged and in a dangerous condition
- Red Lamp failures

All faults will be reported by telephone or email by the Traffic Signal Engineer.

The Traffic Signal Contractor is to provide contact details for both during and outside office hours, together with the postal address of the proposed maintenance facility from which the service is to be provided. Should the response times not be adhered to, the Traffic Signal Engineer reserves the right to obtain quotes from other signal companies. The associated costs incurred shall be invoiced to the original Traffic Signal Contractor.

The warranty includes all of the on-site equipment provided by the Traffic Signal Contractor. Excluded from the warranty is the telecommunication connection facilities and the incoming power supply into the pillar up to excluding the cartridge fuse.

Prior to leaving site, the Traffic Signal Contractor is to inform the Traffic Signal Engineer by telephone (during office hours) of the following details:

- Time of arrival on site / time of leaving site
- Fault on arrival on site
- Works carried out

Upon return to the depot the Traffic Signal Contractor is to confirm by email, to both the Principal Contractor and Traffic Signal Engineer the details listed above.

Should six months have expired between commissioning and the formal site handover the Traffic Signal Contractor is to carry out Periodical Inspections (PI), in accordance with TD 24/97 "All-Purpose Trunk Roads Inspection and Maintenance of Traffic Signals and Associated Equipment". A PI will be required every six months until formal site handover.

Should 12 months have expired between commissioning and the formal site handover the Traffic Signal Contractor is to carry out the annual cleaning requirements detailed in TD 24/97.

The Traffic Signal Contractor is to invite the Overseeing Organisation's signal maintenance company to attend site at the SAT, to confirm that the installation is of a satisfactory standard. The Traffic Signal Contractor is to fund the site visit of the signal maintenance company of up to two persons. Any work required to ensure site is of a satisfactory standard shall be completed prior to hand over of the site.

Should there be conflicting views between the Traffic Signal Contractor and the signal maintenance company, the Traffic Signal Engineer's decision is final. The Traffic Signal Engineer reserves the right to employ the services of another signal company to complete outstanding work not completed at the time of takeover, after four weeks of the SAT. Any costs incurred to resolve such faults shall be invoiced to the original Traffic Signal Contractor.

A cost estimate is to be provided by the Traffic Signal Contractor for the supply of poles in barrels and associated works only if deemed necessary, to facilitate the installation of the new traffic signal installation. The Principal Contractor is to be responsible for the installation of any such system.

Timing Amendments - Revised Configurations

The Traffic Signal Contractor shall include in the cost estimate for the provision and installation of up three revised configurations within the twelve months warranty period for each controller provided under this contract. This shall incorporate any timing or configuration amendments deemed necessary by the Traffic Signal Engineer.

For every revised configuration the Traffic Signal Contractor shall provide an electronic copy of the configuration at least two weeks before FAT/SAT is scheduled to the Traffic Signal Engineer. Following successful commissioning of each revision, the Traffic Signal Contractor is to re-send the configuration electronically to the Traffic Signal Engineer.

Power Requirements

The site shall be supplied by a DNO single phase supply, of sufficient capacity for the equipment to be supplied. The Principal Contractor shall liaise with the Traffic Signal Contractor to determine the relevant information necessary and shall liaise with the DNO (or authorised contractor) to install a suitable supply.

Unless otherwise dictated by the DNO, the supply shall be unmetered. The Traffic Signal Contractor shall provide, via the Principal Contractor, to the DNO, Elexon codes and quantities for all installed equipment. Both the Principal and Traffic Signal Contractors shall work together to ensure that the installation electrical supply can be adopted by the Local Highway Authority.

All electrical work is to be undertaken in accordance with the latest edition of BS 7671.

The Traffic Signal Contractor shall design all site cabling, including the power supply feed from the feeder pillar to the controller, taking into consideration the specific power characteristics of the traffic signal equipment. Mains power supply power cable from the feeder pillar shall have a conductor size no less than 6mm² and an earth cable no less than 10mm².

APPENDIX A: TRAFFIC SIGNAL DESIGN DRAWINGS

Detailed Design, Howes Lane north of Middleton Stoney Road, 23-0462-001

APPENDIX B: CONTROLLER CONFIGURATION DATA

Controller Specification, 23-0462 Howes Lane Controller Spec

APPENDIX C: BILL ITEMS

Table 1. Cabinets and Enclosures

Item	Equipment	Location
1	Controller Cabinet	As shown on drawing 23-0462-001
2	Electrical Feeder Pillar	As shown on drawing 23-0462-001

Table 2. Third Party Statutory Undertakers Services

Item	Location	Description	Supplier (if known)
3	Electrical Feeder Pillar	Transfer existing Single Phase electricity supply.	
4	Controller Cabinet	4G Router, with appropriate sim card, pre-configured for Oxfordshire CC UTC System.	

Table 3. Works and Equipment Supplied by Principal Contractor

Item	Description
5	Clearance of existing site,
6	All Civil Engineering works, including groundworks, excavations, reinstatements, paving etc.
7	Supply and erection of permanent signs
8	Supply, erection and removal of temporary signs
9	Arrange supply of Third Party Statutory Undertakers Services
10	Supply and install NAL Controller Root
11	Contract and Project Management, including liaison with Contractors and Overseeing Organisation
12	Traffic Management
13	Supply and Install ducting and chambers.

Table 4. Works and Equipment Supplied by Traffic Signal Contractor

Item	Description
14	Design of Traffic Signal cabling
15	Supply and Install Traffic Signal equipment as per detailed design, including controller(s), termination cabinets, poles, heads, push button, detectors, etc
16	Supply and Install Electrical Isolation Equipment into Electricity Supply Pillar and connection to controller
17	Supply and Install UG405 OTU / MOVA 8 facility and associated communication equipment
18	Facilitate Site Acceptance Test (SAT)

Table 5. Third Party Traffic Signal Services

Item	Description	Supplier (if known)
19	Undertake Site Acceptance Test (SAT)	Chris Kennett Consulting Limited
20	Undertake Validation of MOVA	