

North Yorkshire County Council

# Traffic Signal Asset Management Plan

Guidance for all stakeholders on the design, installation, adoption and maintenance of Traffic Signals in North Yorkshire

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## 1.0 Introduction

- 1.1 The purpose of this document is to outline North Yorkshire County Council's requirements for the installation and maintenance of traffic signals. The document is administered by the County Council's Traffic Engineering Team, referred to hereafter as The County's Traffic Team.

**This a dynamic document subject to periodic review. At present the document specifically relates to North Yorkshire County Council's traffic signals inventory.**

**All information in this current version is correct as of 22 December 2016.**

## 2.0 Overview

- 2.1 North Yorkshire is England's largest County by area. It is overwhelmingly rural and its population of over half a million people is widely scattered over 3,200 square miles. Larger centres of population include Harrogate, Northallerton, Ripon, Richmond, Skipton, Selby, and Scarborough and there are many historic market towns and attractive villages that are served by over 5,600 miles of public highway in 730 Parish Council areas. The County contains some of the finest landscape in the country including two stretches of Heritage Coast, the Yorkshire Dales National Park and the North York Moors National Park.
- 2.2 As part of North Yorkshire's Highway Maintenance Service, the County Council is responsible for the maintenance of 327 installations including 101 junctions, 196 crossings and 30 Variable message signs.

## 3.0 Maintenance and Improvements

- 3.1 **Maintenance:** The County Council endeavours to keep all traffic signals fully operational by undertaking proactive maintenance of all equipment. Every site is visited on an annual basis to undertake a detailed periodic inspection typical forms are provided in Appendix **A and B**. Maintenance policies and strategies should provide a cost effective solution to keeping the traffic signal network in safe working order.

Traffic signal maintenance is undertaken by Dynniq through a tendered maintenance contract that will run until March 2020.

- 3.2 **Remote Monitoring & Urban Traffic Control:** Many of the sites within North Yorkshire have some form of remote monitoring facility. North Yorkshire maintains an Urban Traffic Control system in Harrogate and Scarborough to monitor and report on operational conditions at 57 sites in Harrogate and 27 in Scarborough. Additional monitoring is undertaken by a combined Siemens Remote Monitoring System that monitors an additional 188 sites. The remaining 65 sites are not remotely monitored in any way.

This proactive monitoring and maintenance has helped reduce the number serious faults and allows a program of refurbishments and improvements to be maintained.

- 3.3 **Developments in Urban Traffic Control:** As stated above, many sites in North Yorkshire are either controlled via UTC or monitored via a Remote Monitoring System. NYCC uses the Siemens STRATOS system to undertake both of these functions. This is a modern and up-to-date system. As UTC software develops, NYCC will continue to work with Siemens and other providers to ensure that our system remains up to date. The NYCC Traffic team is working closely with Siemens to ensure that all of the functions of the current system are exploited as far as possible.

3.4 **Fault Management:** NYCC maintains a Fault Management System (Imtrac) which is used to monitor and update fault information on the traffic signal equipment. The Council prioritises traffic signal defects into Urgent 1, Urgent 2, Non Urgent and Deferred.

3.4.1 **Fault Types:** The fault types are defined as follows:

- **Urgent** – Safety critical faults which are capable of presenting a danger to road users such as: All equipment inoperable; equipment failing to change; equipment damaged or in a dangerous condition, regardless of the cause; defective equipment which is likely to cause excessive queues or abnormal traffic conditions; traffic signals showing multiple or ambiguous or conflicting indications; pedestrian phase inhibited; pedestrian push button unit not demanding; pedestrian push button presenting a permanent demand; audible and/or rotating tactile device not working; any other fault where the NYCC Authorised Officer considers the fault requires urgent attention. See below for the difference between Urgent 1 and Urgent 2.
- **Non Urgent** – All other faults.
- **Deferred** – Any fault (Urgent or Non-Urgent) to which an exemption is applied by NYCC, to allow the TSMC to attend beyond the normal timescales. This decision will be taken for operational reasons e.g. to prevent works being undertaken which will cause major disruption to traffic.

3.4.2 **Response Times:** The response times for the TSMC commence from the time of notification in the fault management system, and are as follows:

- **Urgent 1 (Urgent Faults reported between 0800 and 2200 Monday to Friday) – 3 hour response:** Urgent 1 faults will be attended within 3 hours, and permanent repairs effected to ensure equipment is fully operational within 16 hours of receipt of a fault notification.
- **Urgent 2 (Urgent Faults reported between 2200 and 0800 Monday to Friday, and 24 hours Saturday and Sunday) – 4 hour response:** Urgent 2 faults will be attended within 4 hours, and permanent repairs effected to ensure equipment is fully operational within 16 hours of receipt of a fault notification.
- **Non urgent – 8 hour response:** Non urgent faults will be attended within 8 hours, and permanent repairs effected to ensure equipment is fully operational within 16 hours of receipt of a fault notification. Note that Non Urgent faults are not expected to be attended overnight.
- Where the TSMC is unable to attend a particular fault within the agreed timescales, they will notify the Traffic Team and arrange to attend as soon as possible.

3.5 **Traffic Signal Maintenance Contractor Performance Monitoring:** The Traffic Signal Maintenance Contractor is subject to Key Performance Indicators as set out in the Traffic Signal Maintenance Contract. This requires the TSMC to attend and resolve more than 95% of urgent faults within the timescales set out above. Where this is not met a rebate is applied to the payment from NYCC to the TSMC as follows:

- **>=95% Urgent Faults Attended/Resolved Within the Agreed Timeframe:** 0% rebate.
- **>=85% AND <95% Urgent Faults Attended/Resolved Within the Agreed Timeframe:** 5% rebate.
- **<85% Urgent Faults Attended/Resolved Within the Agreed Timeframe:** 20% rebate.

3.6 **Responsibilities of the Traffic Signal Maintenance Contractor:** The Traffic Signal Maintenance Contractor (TSMC) services, maintains and repairs or replaces all aspects of the traffic signal controllers and remote housings, including re-entering of RAM data, resetting controller after power failure, maintenance of internal fuses, 'Auxiliary equipment' and cabling. The Contractor's certified component personnel will replace the Electricity Board's cut-out fuses subject to the Electricity Board's discretion. 'A full list of what is deemed Auxiliary equipment' is included in **Appendix C**. The TSMC services, maintains and repairs or replaces items of equipment associated with on street detection and all lamps and lamp connections including (replaced on a like for like basis, unless otherwise agreed with the Authorised Officer). A full list of equipment which the TSMC are responsible for maintaining is located in **Appendix D**. The Contractor identifies cable faults associated with street cables/pole cap top assemblies and notifies

NYCC of any action required to rectify any cable faults. The TSMC will rectify any cable faults due to loose/poor connections.

- 3.7 **Liaison with the Communications Provider:** The TSMC communicates directly with IDT, who operate the communications for NYCC's signals network, and have access to IDT's automatic remote monitoring to enable IDT/ the TSMC to notify NYCC automatically and remotely the performance of IDT supplied equipment. The Contractor on confirmation from an authorised officer will ensure any new IDT equipment is added to the system to keep IDT's technical staff automatically notified of the operational status of all deployed equipment. The TSMC shall respond to telephone and email requests for support from IDT promptly (within 2 working days) and work to diagnose and rectify the cause of the fault within 4 working days.
- 3.8 **Variable Message Signs:** The TSMC services, maintains and repairs or replaces all equipment associated with and to maintain the fully functional operation of all type of variable message signs. The TSMC services, maintains and repairs or replaces all equipment associated with the communications systems in place for Variable Message Sign's (VMS). NYCC will be responsible for the supply of sim cards.
- 3.9 **Annual Inspections/Periodic Inspections:** The TSMC carries out Periodic Inspections in accordance with the schedule issued by NYCC. It is the TSMC's responsibility to carry out these visits by the agreed dates. After the completion of an Inspection or Annual Electrical Safety Check at each individual installation the TSMC, within one week of the Electrical Safety Check and Inspection, supplies two copies of all Test Certificates to the Authorised Officer for their approval.
- 3.10 **Bulk Lamp Changing:** This takes place on an Annual basis – it is carried out at the same time as the period inspection and is therefore undertaken in line with the associated timetable.
- 3.11 **Refurbishment:** On an annual basis NYCC undertakes a sifting process to identify the sites most in need of refurbishment/improvement. NYCC uses a spread sheet that calculates on an annual basis the sites in most need of prioritisation. The Traffic Signal Refurbishment Prioritisation spread sheet uses a number of factors to determine the priority list. These are;
- Age of Signal Equipment;
  - Age of Ducting;
  - Whether the Site is Traffic Sensitive;
  - Whether the Site is Urban;
  - Whether the Site is Coastal;
  - Annual Fault Rate Compared to Other Sites of the Same Equipment Type, and;
  - Periodic Inspection Report.

The data is entered into the spread sheet and a priority list is created, from that list the top 15 sites are reviewed in detail to determine if they are a priority or whether the site is appropriate to be deferred for a year. At any one time NYCC have a running programme of 5 years where sites are examined on an annual basis to determine if they should form part of the £250k improvements program.

See **Appendix E** for an example of a Traffic Signal Refurbishment Prioritisation spread sheet with points allocated to each factor.

- 3.12 **Target Life of Equipment:** NYCC does not have a target or expected life-span for signals equipment, as the useable life will vary depending on many factors, including the location of equipment, type installed etc. The refurbishment programme is based on site condition following Periodic Inspections undertaken by the TSMC, and annual health checks by NYCC engineers. Sites close to the coast or in exposed locations may deteriorate more quickly, and so will need refurbishment more regularly. Historically it has been found that sites will be acceptable for 15 to 20 years, though some may become unreliable after as little as 10 years.

## 4.0 Signal Timings

4.1 **Health Checks and Timing Reviews:** NYCC signals engineers aim to undertake health checks of all traffic signal controlled sites in the county each year. The main part of these checks is to undertake a review of the timings that the signals operate, to ensure that they are still appropriate. It may be necessary to review timings in between health checks, for example if concerns are raised by members of the public, or if traffic flows change due to e.g. a new housing development.

4.2 **Urban vs Rural Areas:** While NYCC aims to check the timings at every site each year, it is sometimes necessary to prioritise site in traffic-critical locations (particularly busy urban areas) over those in quieter locations. Sites in urban areas are more likely to be sensitive to changes in traffic flows than rural sites as they are often closer to capacity.

## 5.0 Energy Conservation (Extra Low Voltage & LED)

5.1 There are increasing pressures on local authorities to make savings in energy consumption and service costs.

The current budget position has forced us to look closely at how we make best use of our resources to maintain those services that the public values most. Traffic signals are one service area in which many local authorities have made significant energy and cost savings. Our current energy costs for traffic signal provision in North Yorkshire are around £134,791 per year. The Council's energy reduction programme aims to reduce energy consumption through the introduction of Extra Low Voltage (ELV) traffic signals which operate up to 80% more efficiently than those more traditional traffic signals. A total of 81 (24.3%) sites have been converted to ELV.

## 6.0 Adoption of New Traffic Signal Equipment

6.1 **Inspection of New Equipment:** Every traffic signal installation, on completion, is inspected and tested. On completion, and at the request of the developer, the traffic signal installation is inspected by North Yorkshire County Council and if necessary the Traffic Signal Maintenance contractor. Adoption of the traffic signals will take place following the maintenance period (usually 12 months).

6.2 **Committed Sums:** Where traffic signal sites are installed by developers as part of the planning permission for a new development, NYCC will ask for a committed sum to cover the ongoing maintenance costs of the installation. The sum asked for as a default will be worth 15 years of maintenance costs, and also a sum to cover the refurbishment of the site after this 15 year period.

## 7.0 Design Requirements

7.1 NYCC's Traffic Engineering Team can undertake any traffic signal design. Developers can request a quotation for Design, or Design and Build, from the Team. Alternatively, an approved Consultant may be used to undertake the design. A list of approved consultants may also be obtained from the Team.

Where design is provided by an Approved Consultant the proposals for traffic signals must be submitted for the approval of North Yorkshire County Council's Traffic Team prior to the signals works commencing. The proposals must include the positions of all traffic signal equipment associated with the installation, cables and cable routes. An electronic copy of the proposals should be submitted for approval together with a copy of the design data showing proposed operation where appropriate. The approved drawings will be used on any subsequent inspections; therefore any changes made to the road or to the traffic signal layout must be resubmitted for approval.

## 8.0 Traffic Signal Specification

8.1 **General Specifications:** All equipment will be in accordance with all relevant standards and approvals. Traffic signal equipment will conform to the standards or their subsequent revisions enclosed in **Appendix F**. All equipment must meet current TOPAS Type Approval. All equipment, including cables, will be supplied by the signals contractor in a new and unused condition except insofar as it has been tested in the course of manufacture. Equipment of the most recent pattern and in current production

will be used. The TSMC will confirm in writing, upon request by NYCC, that the equipment being offered has type approval for use on public roads. NYCC reserves the right to request equipment of a particular type to be provided to meet the minimum standards and particular requirements of a given site.

8.2 **Electrical Design:** The electrical design, mechanical termination of the cables and electrical testing of the un-terminated cables will be carried out by the Traffic Signal Contractor (TSMC) in accordance with the appropriate electrical regulations.

8.3 **Working at Height:** The TSMC must provide to the NYCC a copy of their safe working procedures for working at height for all types of traffic signal poles to access the signal heads and cables during installation. The TSMC will be responsible for installing low-access traffic signal poles to allow cable terminations to be completed at ground level, since equipment can be mounted on the signal poles at ground level, with poles subsequently raised into position using a hoist.

## 9.0 Signal Poles & Retention Sockets

9.1 **Signal Pole Specification:** The signal poles and retention sockets will be installed by the TSMC. The NAL RS115 x 740mm Retaining Socket System (or a similar system to be approved by NYCC before the works commence) will be used, and installed with standard poles.

All signal poles will be low-access, aluminium or stainless-steel and be grey in colour, and will be supplied without slots cut into the base. Low-access poles will have a door for safe maintenance access. All traffic signal poles must be of the correct length for the retention socket specified.

9.2 **Signal Positioning:** Signal poles will be positioned so that the minimum horizontal clearance between the signal head assembly and the edge of the carriageway will be 0.60m (40mph roads) or 0.45m (30mph roads). The horizontal clearance between the signal post and the tactile paving and the signal post and the kerb must be 0.50m and 0.70m respectively. The sockets will be installed as set out on site, in the same positions as the poles marked on the drawings. If any set out positions are not achievable on excavation, then NYCC must be informed as soon as possible so that a new position can be agreed.

## 10.0 Signal Heads

10.1 **Signal Head Specification:** All signal heads will be ELV LED to the current DfT specification. The aspects on 4 and 5 aspect signal heads will be arranged vertically. The arrangement of signal heads which incorporate regulatory signs will be approved by NYCC before installation. The traffic signal poles will be supplied and be of such a length as to enable the centre of the amber lens to be sited not less than 2.4m, nor more than 3.1m above footway level with regards to "3 in line" signal heads. The amber lens of each vehicular aspect on any one approach will be at the same height above the carriageway level. The bottom of the signal head will be not less than 2.2m above footway level, or 2.4m where the signal head is adjacent to a cycle facility.

10.2 **Backing Boards:** Backing boards will be supplied by the TSMC and be fitted to all traffic signal head displays. All backing boards will have a 50mm border of retro-reflective material (white). The backing boards will be fitted using the correct number and type of fixings as specified by their manufacturer.

10.3 **Signal Head Alignment:** Primary signal heads will normally be directed at a point approximately 1.5m above the centre of the approach at a distance of approximately 50m from the stop-line. Final alignments will be agreed at the Site Acceptance Test (SAT). Secondary signal heads will be directed at a point approximately 1.5m above the centre of the approach at a distance of approximately 30 metres from the stop line. Final alignments will be agreed at the SAT.

10.4 **Site Acceptance Tests:** Until the signals are officially switched on the TSMC will ensure that all signal heads, including pedestrian aspects, are 'bagged off' such that all aspects can be fully tested without displaying any illuminated signals to vehicles or pedestrians.

## 11.0 Push-Button Demand Units

- 11.1 **Push Button Unit Specification:** Push Button Units (PBUs) should be mounted so that the top of the unit is 1.4m to 1.5m above the finished footway surface. PBUs will be angled (normally at 45 degrees) so that pedestrians standing at the kerbside can see the "WAIT" indicator. Unless otherwise specified, all PBUs and near side assemblies will be ELV and fitted with call indicators not exceeding 50 volts. All voltages present within the PBUs and nearside assemblies should be clearly identified with a securely fastened label.
- 11.2 **Tactile Units (Rotating Cones):** Tactile units will be of a type approved by NYCC. Guidance will be sought at the time of tender as to which types are currently acceptable. Tactile indicators will be fitted where shown on the latest drawings.
- 11.3 **Site Acceptance Tests:** During installation and up until time of commissioning, all installed push button units will be securely covered to indicate their un-commissioned state. Covers will be removed by the signals contractor at the time of the SAT with the approval of NYCC.

## 12.0 Above-Ground Detection

- 12.1 All above-ground detection will meet the requirements of the relevant specifications. Above-ground detectors will operate at a voltage not exceeding 24V.

## 13.0 Duct Systems, Cabling and Electricity Supply

- 13.1 **Cable Specifications:** Prior to commencement of installation, the TSMC, when requested, will supply to NYCC full details of all cables to be used. Only cables approved by the traffic signals manufacturer will be used. All cabling will have orange-coloured outer sheathing and will be laid in ducts. All signals cables will comply with the relevant requirements and will be of adequate size and rating to meet the electrical current carrying and voltage drop requirements and provide the necessary electrical protection to the system.

Cables will be continuous throughout their length from origin to destination and will not be jointed. Earthing arrangements for the controller, cabling and other equipment and enclosures will comply fully with the requirements,

- 13.2 **Ducting:** All cables will be run in ducts. All ducts and chambers will be installed by the TSMC. All ducts will be medium density polyethylene, smooth-bore inside and out, be orange in colour and be marked with the words 'Traffic Signals' at 1 metre intervals in white along their length. Both 50mm and 100mm diameter ducts may be used.
- 13.3 **Inspection and Access Chambers:** All inspection and access chambers are to be twin walled NAL 'STAKKABOX' type or equivalent approved by NYCC. These will be installed according to the manufacturer's chamber specification. Chambers will not be located where they impinge upon tactile paving.
- 13.4 **Earthing:** On completion of the earth continuity installation, the earth resistance will be tested by an approved method as stated in the appropriate regulations. The maximum acceptance earth resistance is 20 ohms.
- 13.5 **Electrical Checks:** The TSMC will check the integrity of the existing electricity feeder pillar and mains supply, and confirm that they are fit for purpose before commencing works on site. If not, the TSMC will provide a new feeder pillar and arrange for a new supply. The TSMC will inform NYCC if the existing pillar and supply are sub-standard.

## 14.0 Traffic Signal Controller

- 14.1 **Controller Specification:** The traffic signal controller will be supplied, installed and commissioned by the TSMC. The traffic signal controller will be fully ELV and compliant with the requirements set out in the relevant regulations. The TSMC will state the power consumption of the equipment and provide the lamp load calculations.



- 14.2 **Controller Cabinet:** The controller cabinet will, where possible, be located so that the detector fault manager (DFM) lamp may be readily seen from the road and such that all normal maintenance and checking can be readily carried out without encroachment on to the carriageway by equipment or personnel

The controller cabinet will provide a door pocket or similar to retain site paperwork, positioned away from all electrical terminals and equipment so far as is reasonably possible. The door pocket will contain all necessary handbooks relating to the controller (i.e. maintenance and handset commands and a waterproof staging diagram with clearly labelled road names, stages and phases).

The controller and ancillary cabinets will be fitted with device/devices to retain the controller doors securely in an open position. Two complete sets of keys will be provided to NYCC including 'T' bars/keys, for each cabinet.

- 14.3 **User Handbook:** An electronic copy of the user handbook will be supplied to NYCC for the controller. The documentation will include a full list of operator commands and their functions and details of the functions of all switches accessible to NYCC. This information will be presented to NYCC before the SAT.
- 14.4 **Signal Control EPROMS:** The TSMC will if necessary provide 2 consolidation EPROM's to be blown; tested, fitted and commissioned with information supplied for each controller once the installation has been commissioned.
- 14.5 **Detection to the Controller:** The controller will be supplied with sufficient channels of detection provided to allow for each loop to be monitored separately. The controller will have all detector units permanently labelled to indicate the detector name. Labelling will be on a section adjacent to the detector units within the controller, and will not be removable.
- 14.6 **Compatibility with Urban Traffic Control System:** The controller should be compatible with Siemens UTC /UTMC system as used by NYCC, and should have the latest issue of firmware installed. An Outstation Transmission Unit is to be installed into the new controller by the TSMC to connect the controller to this system. The Outstation Transmission Unit (OTU) should be supplied, fitted and configuration downloaded and all functions fully tested. The OTU should be connected to the control equipment so that an operator at the installation can communicate with it via the engineer's handset port. The TSMC should arrange for the OTU to be connected to the public subscriber telephone network, or by an alternative method of communication as approved by NYCC.
- 14.7 **Lamp Monitoring:** The controller should be fitted with an approved lamp-monitoring device. The TSMC should include for the supply and fitting of an approved red lamp-monitoring device.
- 14.8 **Signal Dimming:** The controller will have signal dimming operated from a photo-electric cell. A separate fuse or circuit breaker will be provided for the photo-electric cell.

## 15.0 Electricity Company Service Connections and Fault Repairs

- 15.1 North Yorkshire is serviced by three Distribution Network Operators (DNO), these are Northern Powergrid (Northern), Northern Powergrid (Yorkshire) and Electricity North West. Where possible, all traffic signals will have a direct supply from the DNO's underground low voltage cable network.
- 15.2 Each DNO has its own Service Level Agreement with local authorities although in general terms, each operator strives to undertake new service connections within 35 days and defect repairs within 24 days.

## 16.0 Completion of the Works

- 16.1 Upon completion of the traffic signal works the TSMC will complete and submit to NYCC the Construction Certificate and the Inspection and Test Certificate provided within the Electrical Test Results Schedule, or using the TSMC's own documentation where agreed. A copy of this documentation is to be provided to NYCC. A pre-switch-on inspection will be undertaken by NYCC. Any defects identified

in this inspection will be rectified by the TSMC prior to switching on the traffic signals. This inspection may or may not coincide with the SAT.

## **17.0 Commissioning**

**17.1 General Commissioning Information:** The commissioning of the signals installation will be carried out by the TSMC in the presence of representatives of the Overseeing Organisation and NYCC. NYCC must be informed as soon as possible if the agreed commissioning date or time has to be cancelled and re-arranged.

**17.2 Commissioning Tests:** Commissioning tests are as follows:

A successful Factory Acceptance Test (FAT) of the controller before site installation to ensure that the controller conforms to the current specification. This test will be carried out on the actual controller to be installed at the site and will be attended by representatives from NYCC and the Overseeing Organisation.

- An inspection of the site layout, location of equipment, and traffic signs and road markings, to ensure compliance with the requirements of the specifications and drawings.
- Electrical tests to demonstrate compliance with electrical requirements. The relevant forms and acceptance certification must be included. The TSMC will carry out earth loop impedance and any other necessary electrical safety checks prior to the final commissioning date and be able to provide Take Over and Electrical Test Certificates on the date of the Site Acceptance Test (SAT).
- A successful SAT to demonstrate satisfactory and safe signal operation and control, including correct site installation, and will be attended by the Overseeing Organisation, NYCC, and NYCC's traffic signal term maintenance contractor.

**17.3 Timescales:** The Civil Engineering Contractor will give a minimum of 7 working days' notice of all the above tests to NYCC to allow sufficient time to witness the tests. The site will be inspected by NYCC a minimum of 7 working days prior to the SAT to confirm the site layout, equipment location, traffic signs, street lighting and road markings for compliance with the requirements of the specification and drawings. The TSMC must seek the agreement of NYCC if any items of work will be outstanding at the time of the SAT. The whole of the installation will be thoroughly tested by the TSMC at least 3 working days prior to the SAT being carried out.

**17.4 Site Works:** Commissioning of the traffic signal installation will not be undertaken until all works at the site, including carriageway surfacing, pedestrian guard-railing and road markings etc., are complete. In particular, the traffic signals installation will be totally complete and tested as far possible by the TSMC prior to NYCC attending for commissioning.

**17.5 Site Takeover:** Until such time as the installation 'Take-over' certificate is signed, the TSMC will be responsible for the testing of all equipment and cable supplied. The TSMC will also be responsible for any faults that occur with the equipment; however any work to make good damage caused to the equipment by third parties will be agreed with the Overseeing Organisation. The site may be temporarily taken over NYCC as safe to operate. However this does not absolve the TSMC of his responsibilities to complete the works to the full satisfaction of NYCC.

It should be noted that in addition to maintenance responsibilities, liability for any traffic signal equipment will not be accepted by NYCC until final take over certificates have been signed and accepted.

## **18.0 Alterations/Modification**

**18.1** If the TSMC, at his own expense, proposes to modify the equipment, he will notify NYCC and request consent to the proposed modification. If the consent is given and the change is approved by NYCC, then the TSMC will carry out the work at a time convenient to NYCC. All modifications will be of a standard type-approved by the Department for Transport (DfT), equipment manufacturer and NYCC, using approved components. Within 10 days of any modification(s) being carried out, the TSMC will provide NYCC with the relevant updated documentation.

## **19.0 Damage to Traffic Signal Equipment**

- 19.1 If any part of the installation or associated equipment is damaged by some cause outside the control of the TSMC, then the TSMC may be required to undertake some work to make good such damage and agree a charge with NYCC. If such damage occurs as a result of negligence of the TSMC they will be responsible for making good such damage at no cost to NYCC.

## **20.0 Warranty**

- 20.1 A twelve month warranty will be provided, from the date of site acceptance of the equipment. Under warranty, the TSMC will replace or repair all parts found to be defective by reason of faulty design, materials or workmanship. The repaired, or replacement parts will be delivered and installed free of charge to the site location by the TSMC.

During the first twelve months of service, but excluding the first three months, the controller will not exceed more than three firmware or hardware related faults. Should the controller fail to perform to this service requirement, then the TSMC will replace it with another new controller of proven reliability meeting the same hardware and software specification of the original. A further twelve month warranty will then be given on the replacement controller.

## Appendix A

### Periodic Inspection Requirements

No	Facility	Cat 1	Cat 2
	<b>HOUSING</b>		
1	Check for any smell of gas on opening a cabinet. If gas is suspected of being present the Authorised Officer and the emergency Gas Service are notified immediately.	✓	
2	Obvious signs of damage, general mechanical and electrical condition. To include security of housing on root		✓
3	Condition of cabinet, door seals, locks and hinges. The locks turn bolts and hinges are to be lubricated, including police facility door. Locks and turn bolts are to be replaced if faulty or missing.	✓	
4	Accessibility of Equipment cabinet.		✓
5	Condition of sealing of base of cabinet		✓
	<b>CONTROLLER</b>		
6	Check that the fuse ratings are correct and fuse holders are serviceable.	✓	
7	Check the condition of the internal wiring/cable between units within the controller housing. This will include OTU's, MOVA units, RMU, LMU and so forth.		✓
8	Check the condition of the wiring/cable to external Equipment such as street furniture etc.		✓
9	Physical condition of all earth bonding/connections, earth straps and wiring, including any cable glands.	✓	
10	Check earth loop impedance at source.	✓	
11	Non-UTC installations check current mode of operation. UTC installations check fall-back mode.		✓
12	Operation of red lamp monitoring circuit. (This will include the removal of one red lamp to check the operation of the RLM).	✓	
13	Operation of LMU's where fitted. (This will include the removal of one lamp to check the unit.)	✓	
14	Operation of all vehicle and pedestrian detector units, including SCOOT and counting Equipment etc and push button units.	✓	
15	Operation of speed discrimination (or speed assessment) Equipment. (This will include the use of Soundmark Test Equipment where appropriate.)	✓	
16	Detector Fault monitor circuit and DFM lamp is operational.	✓	
17	Check local links to/from other signal controllers or control Equipment are operational.	✓	
18	Interrogate the controller fault log for microprocessor controllers.		

No	Facility	Cat 1	Cat 2
19	For microprocessor controllers: Check that the time of day clock, day of week and week number is correct (adjust if required). Download <b>ALL</b> settings and timings that are capable of being altered via the handset port.		✓
20	For non-microprocessor controllers: Check all intergreen, minimum greens and maximum greens, using a stopwatch.	✓	
21	All indicator lamps.	✓	
22	Check that all switches are operational and functional	✓	
23	Not used.		
24	Check that the following documentation is present: Controller Specification TR2500, NYCC specification, RAM data sheet, cable diagram, scale drawing and log book.		✓
25	Check internally for any signs of vermin to include snakes		
	<b>TRAFFIC SIGNAL EQUIPMENT</b>		
26	Correct operation and appearance of all optical Equipment including all 'wait' lamps, illumination of regulatory signs and (if fitted) variable message signs. Check suitable hoods fitted to appropriate heads	✓	
26	Signals correctly aligned with visual check of optical performance taking in to consideration alignments required for road safety conditions related to specific site conditions.		✓
27	Whether signals or signs are obscured by trees, lamp columns or other signs on all approaches from a distance of 150 meters minimum.		✓
28	Signal lamp dimming operation.	✓	
29	Operation of audible and tactile warning units.	✓	
30	Physical condition of poles where the deterioration of the pole has made the pole unsafe due to perforation of the pole. The signal pole is securely rooted in the footway. The covering of the pole is in such poor condition as to expose large areas of the pole. Check to ensure all grommet's are fitted – replace if required		✓
31	Physical condition of brackets, to ensure that excessive corrosion is not present.		✓
32	Physical condition of pole caps, to ensure that they are firmly seated on the pole and correctly attached to pole.	✓	
33	Inspect the condition of the terminal blocks in the pole cap assembly and spray the assembly water/moisture repellent spray suitable for electrical installations. Condition of earth connections and wiring to poles.	✓	

No	Facility	Cat 1	Cat 2
34	Physical condition of signal heads, backing boards, hoods, including white edge strips, to ensure that they are firmly attached and are in good condition.		✓
35	Physical condition of push button units and detector housings, including the lubrication of turn bolts. Check for moisture within unit		✓
36	Physical condition of regulatory signs to ensure that the sign is legible and has not been defaced. Check trays for signs of corrosion		✓
37	Check that all above ground detector(s) are aligned correctly are operational and all the cables are securely plugged in to the units/signal heads and clean faces.	✓	
38	Physical condition of detector loops, feeders, slots and their sealing.		✓
39	Physical condition of carriageway markings.		✓
40	Electrical Safety Inspection: Verification that the protective measures for safety at the installation is effective and in accordance with BS7671: 1992 and the Electricity at Work Regulation (1989) at the time of the inspection.	✓	

Category 1: Failure of this test/check/facility requires immediate rectification or remedial action by the Contractor

Category 2: Failure of this test/check/facility requires the Contractor to notify the Authorised Officer

(NB – Poles and brackets should only be reported when in the opinion of the Contractor they are likely to present a hazard to the general public prior to the next inspection.

Any reportable issue identified should be recorded on the appropriate form and should be accompanied by a digital photo

# Appendix B

## North Yorkshire County Council Traffic Signal Inspection Report

SITE NUMBER:	
ADDRESS:	
DATE:	
ENGINEER:	

CONTROLLER HOUSING:	
SERIAL NO	
CONTROLLER TYPE	
CONTROLLER FUNCTIONS	

Controller operation and equipment				
Ref	Item Description	Pass	Fail	Comments
1	Gas			
2	Cabinet			
3	Locks			
4	Accessibility			
5	Base seal			
6	Power Supply/Fuse			
7	Internal Wiring			
8	External Wiring			
9	Earth Bonding			
10	ELI @ Source			
11	Operation			
12	OUT/OMU			
13	LMU			
14	Detector S/P Buttons			
15	SDE/SDA			
16	DFM Operational			
17	Local Links			
18	Fault Log			
19	Down Load Timings			
20	Measure Timings			
21	Indicators			
22	Switches			

Physical Condition				
Ref	Item Description	Pass	Fail	Comments
1	Poles			
2	Brackets			
3	Signal heads			
4	Top Caps			
5	Above ground detection			
6	Photo electric cell			
7	Push buttons and pedestrian equipment			
8	Controller cabinet			
9	Feeder pillar			

Additional Items				
Ref	Item Description	Pass	Fail	Comments
1	Road markings			
2	Tactile paving			
3	Associated signage			
4	Vehicle detection			
5	Electrical safety inspection			

Additional comments

I certify that this inspection document (together with the timing information) is a true record of the condition and operation of the traffic signal installation at the time of recording.

Signature: ..... Print Name: .....

Date: ..... Time On Site: ..... Time Off Site: .....

## **Appendix C**

### **Auxiliary Equipment**

- Outstation Transmission Units (OTU) including SCOOT detector packs, lamp monitoring units (LMU), associated backplanes and lead assemblies; re-tuning of detector packs and re-setting of LMU data/values
- Outstation Monitoring Units (OMU), associated backplanes and lead assemblies, re-setting of OMU data/values
- Lamp Monitoring Units (LMU), associated backplanes and lead assemblies; re-setting of LMU data/values
- Red lamp monitoring Units, associated backplanes and lead assemblies; re-setting of data/values
- Microprocessor Optimised Vehicle Actuation (MOVA) units, associated backplanes and lead assemblies
- Integral OTU/OMU/LMU/MOVA/red lamp monitoring equipment; re-setting of data/values
- Detector packs and associated backplanes and lead assemblies including speed, uni-directional, count, etc. re-tuning of detector packs
- Speed assessors, sound mark interfaces
- Auxiliary mains filter units
- Auxiliary power supplies
- Auxiliary modems
- Auxiliary extra low voltage transformers
- Resetting of fault logs, including 'Brown Outs'.
- Reporting and liaison with electricity supply company regarding mains failures and noisy supplies.



## **Appendix D**

### **Equipment to be Maintained and Repaired by TSMC**

- Above ground detector units and associated lead assemblies.
- Push button units including micro switches, beepers and rotary cones.
- Remote detector pods, detector packs, associated backplanes and lead assemblies; re-tuning of detector packs.
- Solar cells, holders and associated lead assemblies.
- Identification only of detector faults associated with loops/loop feeder cables and the notification to the Engineer of any action required to rectify the loop/loop feeder fault.
- Resetting of fault logs
- Halogen signal lamps and lamp holders (including re-setting of Red Lamp Monitoring equipment).
- DFM lamps and lamp holders.
- Box sign tubes/lamps (including starters and chokes)/low energy lamps.
- WAIT lamps (all voltages/wattages) and lamp holders.
- Remote lamp indicators, lamp holders and bezels (e.g. hurry or wig-wag mimics etc).
- Halogen lamp transformers and associated lead assemblies.
- Diachronic lamps for fibre optic aspects.
- ELV wait lamp transformers.

## Appendix E

### Traffic Signal Refurbishment Prioritisation Spreadsheet

	Site reference NY	Signals first installed	Age Factors			Location Factors			Condition Factors		Total
			Controller commission date	Age of signal equipment	Age of ducting	Traffic sensitive	Urban	Coastal	Annual fault rate (above average for site type)	Periodic inspection report	
1	NY6-137-J		16	16	16	0	0	0	12	1	61
2	NY3-012-P	01/01/1986	16	16	16	0	2	2	1	1	54
3	NY3-007-P	01/01/1984	16	16	16	0	2	2	0	1	53
4	NY3-026-S	01/01/1994	16	16	16	0	2	2	0	1	53
5	NY3-031-S		16	16	16	0	2	2	0	1	53
6	NY3-021-J	01/01/1990	16	16	16	0	0	2	0	1	51
7	NY1-004-J	Feb-82	11	11	16	0	0	0	5	1	44
8	NY3-018-J	01/01/1990	2	16	16	2	2	2	1	1	42
9	NY3-017-J	01/01/1990	2	16	16	2	2	2	0	1	41
10	NY3-027-J	01/01/1990	1	16	16	2	2	2	1	1	41
11	NY3-048-J	1987	1	16	16	2	2	2	1	1	41
12	NY6-004-J	06/01/2009	1	11	16	2	2	0	8	1	41
13	NY6-011-J	09/12/2004	4	16	16	2	2	0	0	1	41
14	NY3-001-J	01/01/1991	1	16	16	2	2	2	0	1	40
15	NY3-004-J	01/01/1992	1	16	16	2	2	2	0	1	40
16	NY3-009-P	01/01/1976	1	16	16	0	2	2	1	1	39
17	NY3-019-P	01/01/1989	1	16	16	0	2	2	1	1	39
18	NY3-024-J	01/01/1993	0	16	16	2	2	2	0	1	39
19	NY6-062-P	01/10/2002	16	4	16	0	0	0	2	1	39
20	NY3-010-P	01/01/1976	1	16	16	0	2	2	0	1	38
21	NY3-020-P	01/01/1990	1	16	16	0	2	2	0	1	38
22	NY3-013-P	01/01/1986	0	16	16	0	2	2	0	1	37
23	NY6-007-J	09/03/2006	2	11	16	2	2	0	2	1	36
24	NY6-053-PE	25/02/2008	1	16	16	0	0	0	1	1	35
25	NY6-071-J	24/08/2005	2	16	16	0	0	0	0	1	35
26	NY6-123-J	Feb-96	11	11	11	0	0	0	1	1	35
27	NY6-124-J	Feb-96	11	11	11	0	0	0	1	1	35
28	NY1-005-J	Apr-98	11	11	11	0	0	0	0	1	34
29	NY6-001-J	10/05/2002	4	4	4	2	2	0	17	1	34
30	NY6-065-J	21/11/1997	11	11	11	0	0	0	0	1	34

Age	Points
0 to 3	0
4 to 6	1
7 to 9	2
10 to 12	4
13 to 15	7
16 to 18	11
19 to 21	16

Fault Rate	Points
0 to 2	1
3 to 4	2
5 to 6	3
7 to 8	5
9 to 10	8
11 to 12	12
13 to 14	17

All Yes/No Questions	Points
Yes	2
No	0

Periodic Condition Report	Points
Very Good	0
Good	0
Ok	1
Poor	3
Very Poor	6

## **Appendix F**

### **Traffic Signal Standards**

- EN12368 'Traffic Control Equipment';
- LTN 01/95 'The Assessment of Pedestrian Crossings';
- LTN 02/95 'The Design of Pedestrian Crossings';
- LTN 01/98 'The Installation of Traffic Signals and Associated Equipment';
- LTN 01/08 'Traffic Management and StreetTSMCape';
- TA 35/06 'All Purpose Trunk Roads: MOVA System of Traffic Control at Signals';
- TA 84/06 'Code of Practice for Traffic Control and Information Systems for All Purpose Roads';
- TA 86/03 'Layout of Large Traffic Signal Controlled Junctions';
- TD 24/97 'All Purpose Trunk Roads: Inspection and Maintenance of Traffic Signals and Associated Equipment';
- TD 50/04 'The Geometric Layout of Signal-Controlled Junctions and Signalised Roundabouts';
- TAL 01/02 'The Installation of Puffin Pedestrian Crossings';
- TAL 01/06 'General Principles of Traffic Control by Light Signals';
- TAL 02/03 'Signal Control at Junctions on High Speed Roads';
- TAL 05/05 'Pedestrian Facilities at Signal Controlled Junctions';
- TR 0102 'Standard Traffic Signals';
- TR 2500 'Specification for Traffic Signal Controllers';
- TR 2031 'Armoured Feeder Cable for Inductive Loop Systems';
- MCH 1540 'Specification for the installation of Detector Loops on Motorways and All Purpose Roads';
- MCH 1542 'Guidelines for the Installation guide for MOVA';
- MCHW Vol 3 'Manual of Contract Documents for Highway Works, Volume 3, G series drawings for detector loops'.

## Appendix G

### Glossary

- **DFM** – Detector Fault Management: A facility in traffic signal controllers to allow the signals to monitor themselves for faults and report back to a control centre.
- **DfT** – Department for Transport: The government department responsible for transport matters in England.
- **DNO** – Distribution Network Operator: Companies licensed to distribute electricity in Great Britain.
- **ELV** – Extra-Low Voltage: Signal equipment using an electricity supply of less than 50V AC or 120V DC.
- **EPROM** – Erasable Programmable Read Only Memory. The chip that contains all the information required to control the traffic signals at one particular junction.
- **FAT** – Factory Acceptance Testing: Tests performed by a vendor before a system or equipment is moved to its destination site.
- **IDT** – Company responsible for the communications to NYCC’s traffic signals in Scarborough.
- **LED** – Light Emitting Diode: A form of lighting which is highly efficient and reliable.
- **NAL** – NAL Ltd: A company which provides retention sockets for highways infrastructure.
- **NYCC** – North Yorkshire County Council: The Highway Authority for the County of North Yorkshire.
- **OO** – Overseeing Organisation: The organisation with overall responsibility for the delivery of a project. In most traffic signal cases this is NYCC.
- **OTU** – Outstation Transmission Unit: A modem in the traffic signal controller which translates the incoming information and commands from the UTC server and replies with the status of the signal junction.
- **PBU** – Push Button Unit: A unit to register demand for pedestrians to cross a road, and communicate this demand to the traffic signal controller.
- **PI** – Periodic Inspection: Checks undertaken on a regular basis (usually yearly) by the TSMC on all elements of a traffic signal installation, to verify correct function.
- **SAT** – Site Acceptance Test: The testing stage where the customer verifies that a system or equipment works as required when installed on site.
- **TSMC** – Traffic Signals Maintenance Contractor – The contractor appointed by NYCC to maintain the council’s traffic signal equipment. This is currently Dynniq.
- **TOPAS** – Traffic Open Products & Standards Ltd – A new body formed to oversee the promotion, maintenance and use of technical procurement standards.
- **UTC** – Urban Traffic Control: The method of coordinating traffic signals in a network by the use of timing plans loaded on a central computer.
- **UTMC** – Urban Traffic Management & Control: Systems designed to allow the different applications used within modern traffic management systems to communicate and share information with each other
- **VMS** – Variable Message Sign: An electronic traffic sign used on the road network to provide information to road users.

## Traffic Signal Asset Management Plan Equality Impact Assessment Screening Document

<b>Initial equality impact assessment screening form</b> (As of October 2015 this form replaces 'Record of decision not to carry out an EIA')  <b>This form records an equality screening process to determine the relevance of equality to a proposal, and a decision whether or not a full EIA would be appropriate or proportionate.</b>			
<b>Directorate</b>	Business & Environmental Services		
<b>Service area</b>	Highways & Transportation		
<b>Proposal being screened</b>	Traffic Signals Asset Management Plan		
<b>Officer(s) carrying out screening</b>	James Smith – Team Leader, Traffic Engineering		
<b>What are you proposing to do?</b>	To introduce a Traffic Signal Asset Management Plan, to summarise all existing County Council traffic signals Policies and Practices in one place.		
<b>Why are you proposing this? What are the desired outcomes?</b>	To ensure that the County Council has a clear and consistent approach to traffic signal maintenance services that demonstrates compliance with national standards and maximises the efficient use of resources.		
<b>Does the proposal involve a significant commitment or removal of resources?</b> Please give details.	No, the proposed asset management plan is in line with existing practice, simply summarising this practice into one document, and is not expected to impact upon staff, nor on the levels of service received by the public.		
<b>Is there likely to be an adverse impact on people with any of the following protected characteristics as defined by the Equality Act 2010, or NYCC's additional agreed characteristics?</b> As part of this assessment, please consider the following questions: <ul style="list-style-type: none"> <li>To what extent is this service used by particular groups of people with protected characteristics?</li> <li>Does the proposal relate to functions that previous consultation has identified as important?</li> <li>Do different groups have different needs or experiences in the area the proposal relates to?</li> </ul> <b>If for any characteristic it is considered that there is likely to be a significant adverse impact or you have ticked 'Don't know/no info available', then a full EIA should be carried out where this is proportionate. You are advised to speak to your Equality rep for advice if you are in any doubt.</b>			
<b>Protected characteristic</b>	<b>Yes</b>	<b>No</b>	<b>Don't know/No info available</b>
Age		✓	
Disability		✓	
Sex (Gender)		✓	
Race		✓	
Sexual orientation		✓	
Gender reassignment		✓	
Religion or belief		✓	
Pregnancy or maternity		✓	
Marriage or civil partnership		✓	
<b>NYCC additional characteristic</b>			

## Appendix B

People in rural areas		✓	
People on a low income		✓	
Carer (unpaid family or friend)		✓	
<b>Does the proposal relate to an area where there are known inequalities/probable impacts</b> (e.g. disabled people's access to public transport)? Please give details.	No, the proposed asset management plan will not adversely alter the way that traffic signals are managed in a way that would impact on any group with protected characteristics.		
<b>Will the proposal have a significant effect on how other organisations operate? (e.g. partners, funding criteria, etc.). Do any of these organisations support people with protected characteristics?</b> Please explain why you have reached this conclusion.	No, the proposals do not have a direct impact on other organisations. North Yorkshire County Council is solely responsible for the provision of traffic signal equipment in the county. The asset management plan will be implemented in such a way that there will be no impact upon current contractual arrangements.		
<b>Decision (Please tick one option)</b>	EIA not relevant or proportionate:	✓	Continue to full EIA:
<b>Reason for decision</b>	The proposed Asset Management Plan does not materially alter the way that traffic signal maintenance is conducted in North Yorkshire. This plan simply draws together disparate guidance and contractual information into a simple to understand reference document. There will be no impact on traffic signal maintenance provision, and therefore no negative impact on people with protected characteristics.		
<b>Signed (Assistant Director or equivalent)</b>	Barrie Mason		
<b>Date</b>	13/01/2017		