Transport for Greater Manchester

Greater Manchester UTC Traffic Signal

Installation Guide



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1 Introduction

1.1 Purpose

1.1.1 The purpose of this document is to provide a consistent approach to the design and installation of traffic signals in Greater Manchester (GM).

1.1.2 The document currently only refers to traffic signal installation details required to be adhered to within GM. The intention is to extend the document to include the traffic signal design.

1.1.3 The guide will be within the framework of national regulations, standards and guidance which describe the principles of traffic signal design and Highways construction within the UK. These include Statutory Instruments, Department for Transport (DfT) specifications and Advice Notes (e.g. DMRB, TD, TA, TAL, LTN, etc.). However, these documents do not specify all elements of the design requirements and there is a need to consider locally adopted practice. As such, where national guidance allows flexibility and interpretation, this guide sets out the practice that shall be followed within GM.

1.1.4 The majority of traffic signals within Greater Manchester are the asset of the Greater Manchester Combined Authority (GMCA). Transport for Greater Manchester (TfGM) is responsible for their operation and maintenance. In addition, Highways England (HE) traffic signals within the Greater Manchester boundary of Areas 10 & 12 are maintained and operated by TfGM via a contract with HE until 2021.

1.1.5 TfGM's mission statement is "making travel easier in Greater Manchester". Traffic signals and associated equipment provide management of the conflicting traffic, trams, pedestrian and cyclist user demands. The role of TfGM Urban Traffic Control (UTC) is to manage the traffic signal network to regulate performance and ensure safe movement for all users of the highway network.

2 Design of UTC Infrastructure

2.1 Traffic Signal Ducting, Chambers and Pole Sockets

2.1.1 For traffic signal installations in GM the signal ducting and associated chambers for the traffic signal equipment is the asset of the GMCA (with exception of HE installations) and should be designed in accordance with this guide.

2.1.2 The traffic signal infrastructure should be designed so that any signal pole or signal cable can be replaced with minimal excavation or civil engineering works.

2.1.3 The traffic signal infrastructure shall solely be used for the traffic signal equipment and must not be shared with other utilities.

2.1.4 All new traffic signals installations are ELV and should not have LV cable in the same ducting as the ELV cable.

2.2 Number of Ducts

2.2.1 The configuration of signal ducts provided between chambers should be designed based on the maximum of six signal cables per 100mm duct, plus provision of an additional spare empty duct.

2.2.2 A minimum of two ducts shall be provided between inspection chambers unless the final section is to the pole retention socket or loop box.

2.3 Design of Chamber Layout

2.3.1 The size and configuration of signal chambers should be designed based on the number of ducts entering and leaving and but also the number of cables and the chamber's function. For example a chamber where several cables are required to be placed around a 90 degree turn or to house signal joints may need to be a greater size than would necessarily be designed simply from the number of ducts.

2.3.2 Signal chambers must not be located in the carriageway or where significant vehicle movements are expected. Chambers should not normally be located within areas of tactile paving, cycle routes or areas where the opening of the chamber would unnecessarily restrict user movement.

2.3.3 Signal chambers should have clear vertical access to allow unrestricted lifting of covers and where possible located away from the kerb edge and close traffic movements.

2.3.4 To allow for cabling at each pole a signal chamber should be provided within 5 metres of each pole retention socket.

2.3.5 The signal chamber adjacent to the controller (or termination cabinet) shall be at least 600mm x 600mm at junctions and 450mm x 600mm at pedestrian crossings. Short lengths of duct shall be provided in the direction of the controller position, the number of which shall be at least the number in the largest cluster entering the chamber, plus one extra.

2.3.6 Signal chambers shall be provided at all road crossings; at significant changes of depth or direction of ducting; within 5 metre of each signal pole; and at no greater than 40 metres separation.

2.4 Choice of Pole Sockets

2.4.1 The use of traffic signal pole retention sockets shall be required to minimise working at height and improve response following any road traffic incident or pole damage.

2.4.2 The design of signal pole locations should consider the function of the equipment to be mounted and is accessibility during maintenance (i.e. secure & level ground for safe positioning of ladders for working at height, maximise distance from traffic).

2.5 Design of Traffic Signal Controller Location

2.5.1 The traffic signal controller should be located such that as many of the signalised approaches are visible from that location.

2.5.2 The location should be selected to minimise a vehicle impact from any road traffic incident.

2.5.3 The controller location should not restrict pedestrian or cycle movements when the controller door is opened. Cabinets (with or without open door) should not obstruct pedestrian visibility to the signals or approaching traffic.

2.5.4 The controller must be within the local authority highway boundary and not sited on third party land.

2.5.5 The safety of the maintenance engineer accessing the cabinet should always be considered. Engineers are required to access any installation 24 hours a day and may have equipment, laptops, diagnostic equipment, etc making them or their vehicle potentially vulnerable. The controller should be able to be safely accessed by the engineer from an adjacent parked vehicle, ideally allocated in a maintenance layby (or side road, partially off carriageway, etc.) without inhibiting other users. Care should be given to avoid unnecessary restrictions from TROs, guard railing, formal cycle lanes and areas of soft verge. Additional paving to and around the controller should be provided to avoid trips and slips (especially if no lighting).

2.5.6 The protection of all cabinets from “minor” damage is essential. Where sited within soft verge paving should be provided to a width of at least 750mm around the controller to protect from overgrowth and impact from landscape maintenance vehicles. In areas near reversing vehicles (i.e. local parking or deliveries) additional protection should be given by way of street bollards or guard rail.

2.5.7 An additional cabinet(s) should be considered to reduce an excess the quantity of cables terminated in the controller. Additional cabinets are more likely to be required at larger sites where the number of larger signal cables into the controller exceeds thirty six. There may be a benefit from separating extensive number of feeder cables from the signal cables.

2.5.8 An adjacent mains pillar shall be required to provide the controller with a single phase mains supply through the national electrical distribution network. A check should be made to ensure there is a local DNO supply.

2.5.9 A controller located on a central island may be difficult to obtain a direct mains supply.

2.5.10 The location of the mains feeder pillar and any comms jointing post should also be considered. The pillars may be sited approximately 1 metre from the controller, usually at the back of footway in an inconspicuous place.

3 Installation of UTC Infrastructure

3.1 Traffic Signal Ducting, Chambers and Pole Sockets

3.1.1 The supply and installation of all the traffic signal infrastructure (signal poles, controller cabinet bases, mains pillars and jointing posts are free issued to site by TfGM) is normally undertaken by the third party contractor.

3.1.2 The signal ducting and installation works shall be subject to an inspection by TfGM before the installation of signal cable is approved by TfGM to commence. All the signal infrastructure is required to be completed before approval will be granted.

3.2 Specification and Installation of Ducts

3.2.1 All ducting shall be of smooth bore polyethylene, orange in colour, with the markings “Traffic Signals” printed at regular intervals of not more than five metres along its length. The nominal duct size shall be 100mm diameter with minimum wall thickness of 4mm. When laid the lettering shall be uppermost and have draw rope provided in each duct.

3.2.2 All lengths shall be fixed socketed at one end and be smooth bore across the push fitted socket joint.

3.2.3 Where ducting crosses the carriageway a cover of 750mm minimum from crown of duct to the finished surface is required, elsewhere in footways and central islands a 450mm cover is required. A cover of 1200mm to finished track level is required for under track Metrolink crossings.

3.2.4 Under footways and central reserves the ducts shall be laid with 150mm sand bed and surround. Under carriageways ducts shall be laid with 150mm ST2 concrete bed and surround.

3.2.5 All ducts shall terminate at either an inspection chamber or pole box. The ends of the ducts shall be trimmed to within 30mm of the inside wall of the box.

3.2.6 A minimum of one polypropylene draw rope with a breaking strain of 5.5 kN shall be provided within each duct. Both ends of the rope shall be made fast in the inspection chambers.

3.2.7 No existing ducting is to be re-used without written agreement of the UTC engineer.

3.3 Specification and Installation of Chambers – See Figure 1 & 2

3.3.1 The TfGM specification for footway chambers and frames is:

- Chambers to be constructed of twin walled high-density polyethylene with removable and pre formed circular duct apertures requiring no side cutting of the chamber and capable of withstanding vertical load in excess of 40 Tonnes.
- Frames shall be manufactured from galvanised steel with minimum wall thickness of 5mm and firmly bolted to the chamber. The frame/cover shall provide a minimum 85mm up-stand to eliminate the need for mortar surround in paved areas.
- Covers shall conform to EN124 with B125 or C250 loading and firmly bolted to the chamber. The composite cover must have minimum skid resistance of 80 and weigh less than 25kgs for safe manual handling.
- Covers are not normally required to have security fittings.

3.3.2 The installation of the chamber shall be of sufficient depth and number of units to ensure ducting enters the chamber horizontally via the sidewall at the horizontal and with the required minimum of depth of cover.

3.3.3 Chambers shall be either:

- 450mm x 450mm (i.e. Type A)
- 450mm x 600mm (i.e. Type B)
- 600mm x 600mm (i.e. Type C)
- 600mm x 900mm (i.e. Type D)
- 900mm x 900mm (i.e. Type E)
- 300mm x 450mm (i.e. Type LB - (Loop Box))
- 150mm x 150mm (i.e. Type CLB (Carriageway Loop Box) also known as an ILD) with 50mm duct to LB

3.3.4 LB and CLB chambers are provided for the vehicle detection loops to avoid slot cutting through the kerb edge. Special attention is required in areas of drainage kerbing to ensure compatibility of the kerb and loop access arrangements.

3.3.5 The CLB shall be approximately 150mm x 150mm ductile iron and installed in the carriageway close to the kerb edge. It shall have a single cover and be linked to the LB chamber by a 50mm duct laid underneath the kerb. All CLB shall be set away from any gullies, carriageway metal work or footway guard railing that may interfere with the slot cutting operation.

3.4 Product Specification and Installation of Signal Pole Retention Sockets – See Figure 3

3.4.1 Signal pole retention sockets shall be provided at all signal pole positions.

3.4.2 The socket shall be of cast steel or ductile iron with a secure locking plate or mechanism to prevent the traffic signal pole from rotation or removal unless released for maintenance purposes. The locking mechanism shall be standard key mechanism and not bespoke to that socket manufacturer.

3.4.3 The unit shall have smooth ductfoot bend to connect direct to the incoming traffic signal duct. The socket shall be rotated so access to the release mechanism shall be set on the side of the pole away from the carriageway so to give maximum safety whilst accessing the pole.

3.4.4 The sockets shall only be of depth suitable for use with the standard 3,700mm tall, 114mm diameter traffic signal poles as used by TfGM. The NAL RS115 retention socket with an Overall Depth (OD) of 450mm and a Pole Planting Depth (PPD) of 300mm is the preferred option and any alternative requires prior approval by TfGM

3.4.5 For selected locations, for example on bridge depths or where tall traffic signal poles are specified (i.e. over 5 metres) a different depth or diameter retention sockets may be required.

3.5 Installation of Traffic Signal Controller – See Figure 4

3.5.1 The contractor shall undertake the installation of the cabinet base(s). The TfGM signal contractor shall supply and deliver the base(s) to site.

3.5.2 Before installation of any ducting it is advisable that the contractor undertakes a trial excavation of the proposed controller location to ensure the site is clear of services (typical cabinet base size 300x600mm and depth 400mm). If the original location is unsuitable then the wider ducting layout may need to be redesigned by TfGM to accommodate the new position.

3.5.3 Where the controller is to be sited within a soft verge, paving should be provided to a width of at least 750mm around the controller.

3.6 Installation of Traffic Signal Equipment

3.6.1 The installation of signal equipment will be undertaken by TfGM signal contractor (Siemens).

3.6.2 The electrical specification is contained in Volume 6 of the TfGM/Siemens maintenance contact and is not detailed within this document.

4 On Site - Roles and Responsibilities

4.1 Liaison, Meetings

4.1.1 A pre-site meeting should be held and include client, site contractor, TfGM and if necessary TfGM's maintenance contractor (Siemens).

4.1.2 At the meeting it should be possible to identify the requirements of the signal installation programme; method of working; coordination of traffic management during slot cutting, temporary works, site contacts and generally who is responsible for each aspect of the scheme etc.

4.1.3 Approximately one week before the signal installation is due, TfGM's contractor shall undertake a site inspection of the ducts and chambers to ensure that the works have been completed to the installation standard.

4.1.4 The inspection should require the attendance of the client and site contractor to ensure remedial works are agreed and an action plan exists to ensure no delay to the start of cable installation. The action plan should be followed up by an email to site agent to confirm the actions required.

4.1.5 The traffic signals shall be commissioned by TfGM. The site contractor shall attend the commissioning and assist with temporary traffic management, removal of redundant equipment, etc. The site should be finished and fit for purpose; pedestrian routes should be trip hazard free and all road markings, stop lines and pedestrian studs laid.

4.1.6 If the scheme involves new signals or changes to the signal priority the site contractor should arrange for the appropriate advance warning signs to be installed immediately prior to commissioning.

4.1.7 On completion of the scheme as built drawings, showing the location of the signal related infrastructure, white lining and kerb positions should be provided to TfGM in AutoCAD format.

4.2 Temporary Signal Works – See Figure 5

4.2.1 The modification of any existing traffic signal equipment, including switching off signals temporarily, temporary poles and the removal of redundant equipment must be arranged through TfGM.

- The contractor shall give TfGM a minimum notice period of four weeks before commencing any works that affect the operation of any existing traffic signal controller (complex sites such as Metrolink installations will require up to eight week notice).

- The contractor shall give TfGM a minimum notice of two weeks for the placement of temporary poles and signals. For TfGM to undertake signal works at height **(importantly including any reactive fault maintenance during the construction period)** requires the signal pole to be secure in ground, or in the temporary situation securely housed in a NAL temporary block – See Figure 5). Ad-hoc barrel or temporary arrangements inhibit TfGM ability to maintain the signals and are NOT permitted. All plant and labour for manoeuvring the pole and temporary block shall be provided by the contractor unless agreed beforehand. The block is required to be placed on a secure level footing.
- The site contractor shall be responsible for the protection of any exposed cable and mobile or relocated signal poles arising from the temporary works. The pole in barrels must not be subsequently be moved without notifying TfGM as the signal timings for the installation may need to be adjusted on site.
- The site contractor shall normally provide any temporary signal control during the works period.

4.3 Site Clearance

4.3.1 TfGM will not be liable for the future maintenance of any redundant infrastructure; all redundant traffic signal related equipment and infrastructure (i.e. chambers, poles and pole sockets, etc.) should be removed or in-filled by the site contractor. TfGM will clearly identify any redundant infrastructure during the construction phase.

4.3.2 The site contractor shall be responsible for the removal and disposal of redundant signal equipment. It is important that any contractor working on redundant traffic signal equipment should observe the following:

- The redundant traffic signal controller will normally be removed by TfGM leaving the root to be excavated by the site contractor. No contractor should remove a redundant traffic signal controller unless an electrically qualified competent person is present to confirm that it is electrically safe and UTC have authorised the removal.
- No redundant traffic signal poles should be removed unless the redundant traffic signal controller has been removed beforehand. If signal poles must be removed for reasons of health and safety while the redundant traffic signal controller is still present then an electrically qualified competent person must be in attendance to confirm that the poles are electrically isolated such that removal is safe.

- If the contractor is in any doubt as to the electrical status of any traffic signal equipment then they should contact TfGM to arrange a site visit by an electrically qualified competent person before carrying out any work.

4.4 Hand Over

4.4.1 The future and on-going operation and maintenance of the traffic signals shall be undertaken by TfGM and the traffic signal maintenance agent Siemens.

4.4.2 To form part of the H&S file the contractor should provide an 'as-built' drawing to agreed format detailing the traffic signal infrastructure for the extent of works undertaken. The drawings shall incorporate the site plans provided for the works.

4.4.3 The drawings shall show:-

- Position of all traffic signal equipment with ducting layout and number of ducts provided.
- Road markings, including any ASL.
- Identified residual hazards.

4.4.4 TfGM will be responsible for adding the traffic signal equipment to the drawing, this shall include:

- Each pole should show the correct number and phase lettering.
- Cable Diagram showing all cable runs and type of cable in each run.
- Position of all loop detection, with critical loops (i.e. MOVA) showing the distance from stop line.
- Position of electricity and BT supply pillars.
- The solar cell.
- Stage diagram.
- Identification of any site peculiarities, (e.g. displaced mains supply).
- Special requirements apply to Metrolink sites.

4.4.5 The drawing shall form part of TfGM's Site H&S file by inclusion within the InView Fault Management System and storage at 2 Piccadilly Place.

5 Appendices

5.1 A – Generic Risk Assessment

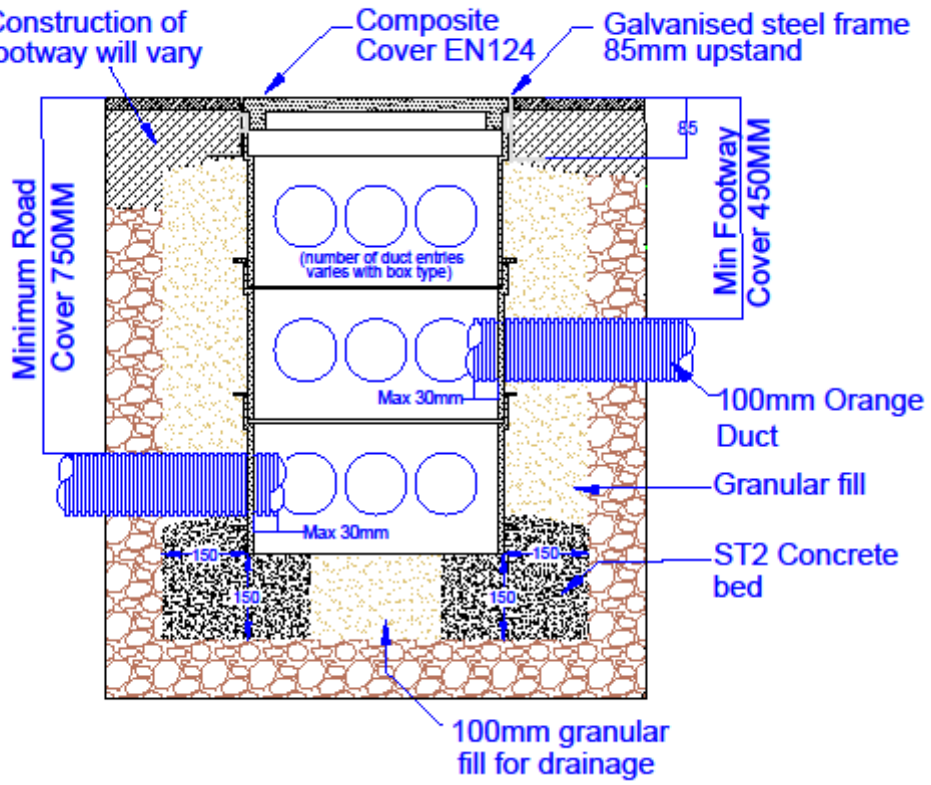
Applicable for sites that include general traffic, all purpose road, speed limit not greater than 40mph, moderate traffic / pedestrian flows, 4m poles, no structures.

TfGM: UTC Engineer Design Risk Assessment for New UTC Works						Matrix identifies risks relating to the design of UTC works at UTC site. Amber: Risk is managed by review policy. Red is UNACCEPTABLE risk.				
Risks 1.xx to 4.xx Generic Site; Considered to include those where general traffic, all purpose road, speed limit not greater than 40mph, moderate traffic / pedestrian flows, 4m poles, no structures.						H=3	3	6	9	>6: RISK Remains STOP!
						M=2	2	4	6	=6: Risk Managed
Risks 5.xx Non Generic Site: Need further RA to be undertaken by UTC Engineer.						L=1	1	2	3	<6: Low Risk
							L=1	M=2	H=3	
						Post-Mitigation				
Risk ID	Activity	Risk Description	Risk Source	Population at Risk	Mitigation / Action	Probability	Impact	Score	Action Owner	Review Policy
1.01	Installation & Maintenance	Electrocution	Signal equipment	Public, Contractor & Maintenance Contractor	Ensure use of ELV controller, equipment and all cabling for all new schemes and significant upgrades.	L	H	3	TfGM	n/a
1.02	Installation & Maintenance	Electrocution	Labour	Public, Contractor & Maintenance Contractor	Ensure use of Sector 8 accredited contractor. TfGM to undertake regular audit of Contractors procedures and processes.	M	H	6	TfGM	Regular TfGM audit
1.03	Installation & Maintenance	Trips & falls	Chambers, chamber lids	Public, Contractor & Maintenance Contractor	Where possible locate chambers away from pedestrian desire lines. Avoid placing chambers in narrow footways and cycle lanes. Provide room for temporary safety barriers and maintain safe passage on footway.	M	M	4	TfGM	Individual Scheme Approval at Central Design Board
1.04	Installation & Maintenance	Trips & falls	Undergrowth & trees	Contractor & Maintenance Contractor	Avoid locating controller or signal poles in areas liable to future overgrowth or where route to equipment is over rough ground, slippery conditions. Provide paved routes for maintenance especially when in unlit areas.	L	L	1	TfGM	Individual Scheme Approval at Central Design Board
1.05	Installation & Maintenance	Lifting	Chambers, chamber lids, cabling	Contractor & Maintenance Contractor	Where possible use of lightweight composite lids rather than concrete or in fill - ensure provision for use of suitable lifting equipment with no obstructions from guard railing, etc. Restrict duct runs to no greater than 40m. Restrict cable runs to no greater than 250m.	L	M	2	TfGM	Individual Scheme Approval at Central Design Board
1.06	Installation & Maintenance	Falls	Working at height (signal poles)	Contractor & Maintenance Contractor	Ensure Sector 8 accredited contractor with specific RA/MS for working with ladders. Ensure use of pole retention socket that provides opportunity to connect top cap assemby for new pole at ground level. Where possible locate poles away from obstructions (e.g. railing, lighting column). Ensure sufficient island widths for step ladder without extending into carriageway. Ensure flat and stable ground conditions - avoid areas of future overgrowth. Ensure no added height risk from poles adjacent to structures, embankments, etc.	M	M	4	TfGM / Siemens	Individual Scheme Approval at Central Design Board
1.07	Installation & Maintenance	Hit by falling object	Working at height (signal poles)	Public, Contractor & Maintenance Contractor	Where possible ensure footways are wide enough for safety barriers and safe passage of pedestrians outside working area.	L	L	1	TfGM / Siemens	Individual Scheme Approval at Central Design Board
1.08	Installation & Maintenance	Hit by Vehicle	Arrival at site & parking	Contractor & Maintenance Contractor	Provide safe parking and egress for maintenance vehicle. Avoid unnecessary guard rail restrictions.	L	H	3	TfGM / Siemens	Individual Scheme Approval at Central Design Board
1.09	Installation & Maintenance	Hit by Vehicle	Working at poles	Contractor & Maintenance Contractor	Ensure minimum 450mm clearance carriageway to signal head. Ensure sufficient island widths for step ladder without extending into carriageway.	L	H	3	TfGM / Siemens	Individual Scheme Approval at Central Design Board
1.10	Installation & Maintenance	RTA	Commissioning	Public, Contractor & Maintenance Contractor	Reduce period when no signals available. Undertake commissioning at quieter times - weekend, school holidays, etc. Consider temporary signals.	L	H	3	TfGM	n/a
1.11	Installation & Maintenance	Hit by Vehicle	Slot Cutting	Contractor & Maintenance Contractor	Reduce need for slot cutting by using loops only when necessary. Ensure loops can be cut with traffic management maintaining a safe traffic flow - minimise loops at island contraints. Avoid the need for TTRO to recut loops. Ensure suitable clearance of chamber from kerbline for when jointing.	M	H	6	TfGM	Individual Scheme Approval at Central Design Board
1.12	Installation & Maintenance	Hit by Vehicle	Slot Cutting	Contractor & Maintenance Contractor	Ensure use of Sector 8 accredited contractor. TfGM to undertake regular audit of Contractors procedures and processes.	L	H	3	TfGM / Siemens	Regular TfGM audit

2.01	Asset Availability	Controller Damage	Hit by vehicle	GMCA asset	Locate cabinets away from point vehicle likely to leave carriageway. Protect cabinets when near area where parking cars, delivery vehicles, etc	L	H	3	TfGM	Individual Scheme Approval at Central Design Board
2.02	Asset Availability	Pole Damage	Hit by vehicle	GMCA asset	Ensure use of pole retention socket designed to withstand RTA. Ensure all equipment minimum 450mm clearance from carriageway (Particular attention when located on radius).	M	M	4	TfGM	Individual Scheme Approval at Central Design Board
2.03	Asset Availability	Lamp failure	Equipment	GMCA asset	Ensure use of LED aspects and indicators.	L	L	1	TfGM	Individual Scheme Approval at Central Design Board
2.04	Asset Availability	Chamber / Ducting	Equipment	GMCA asset	Ensure use of TfGM ducting / chamber specification.	L	L	1	TfGM	
3.01	Site Operation	User misinterpretation	Layout	Public	Ensure signal layout in accordance with TfGM design specification. All designs to require staged approval of UTC Central Design Board before issue.	M	H	6	TfGM	Individual Scheme Approval at Central Design Board
3.02	Site Operation	Timings	Controller specification	Public	Before being issued for configuration, ensure controller specification designed and appropriately checked by UTC for safe staging and phasing. Ensure correct minimum greens & intergreens, mode of operation, detection, etc. Ensure operation checked on site after SAT for safe operation. UTC to complete UTC Design Check List at SAT.	M	H	6	TfGM	Individual specification / timings to be checked by competent engineer before issuing
3.03	Site Operation	All Out / Failure	Equipment failure	Public	Ensure controller has automatic means of reporting to TfGM Control Centre. Ensure site included on TfGM signal maintenance contract.	L	H	3	TfGM	n/a
4.01	Decommission equipment	Electrocution	Signal equipment	Contractor	Ensure competent electrical contractor present when removing equipment that may still be live.	L	H	3	TfGM	n/a
4.02	Decommission equipment	Trips	Chambers, chamber lids	Public, Contractor & Maintenance Contractor	Ensure removal / backfill of redundant chambers and lids.	L	L	1	TfGM	n/a
	Non Generic Conditions									
5.01	Metrolink Sites	Electrocution	Metrolink Asset	Public, Contractor & Maintenance Contractor	enter description here of mitigation actions taken.....adjust Probability or Impact to reduce Score	M	H	6	TfGM	These activities are not considered Generic. Additional RA should be undertaken by appropriate personnel.
5.02	Metrolink Sites	Hit by vehicle	Metrolink Asset	Public, Contractor & Maintenance Contractor	enter description here of mitigation actions taken.....adjust Probability or Impact to reduce Score	M	H	6	TfGM	These activities are not considered Generic. Additional RA should be undertaken by appropriate personnel.
5.03	Metrolink Sites	User misinterpretation	Metrolink Asset	Public, Contractor & Maintenance Contractor	enter description here of mitigation actions taken.....adjust Probability or Impact to reduce Score	M	H	6	TfGM	These activities are not considered Generic. Additional RA should be undertaken by appropriate personnel.
	Non Generic Conditions									
6.01	High Speed Roads	Hit by Vehicle	High vehicle speeds	Public, Contractor & Maintenance Contractor	enter description here of mitigation actions taken.....adjust Probability or Impact to reduce Score	M	H	6	TfGM	These activities are not considered Generic. Additional RA should be undertaken by appropriate personnel.
	Non Generic Conditions									
7.01	Structures, tall poles (>4m)	Working at height / maintenance	Structures	Public, Contractor & Maintenance Contractor	enter description here of mitigation actions taken.....adjust Probability or Impact to reduce Score	M	H	6	TfGM	These activities are not considered Generic. Additional RA should be undertaken by appropriate personnel.
	Non Generic Conditions									
8.01	Innovation	Various	Innovation	Public, Contractor & Maintenance Contractor	enter description here of mitigation actions taken.....adjust Probability or Impact to reduce Score	M	H	6	TfGM	These activities are not considered Generic. Additional RA should be undertaken by appropriate personnel.

5.2 B – Drawings

Inspection Chamber	FIG 1



1. The Chamber to be constructed of twin wall high density Polythlene with removable duct apertures and should withstand a 40 tonne vertical load.

2. The chamber frame should be 5mm galvanised steel with minimum 85mm upstand.

3. The composite cover will comply to EN124 with B125 or C250 loading and be firmly bolted to the chamber.

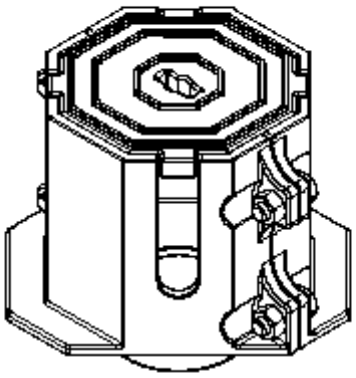
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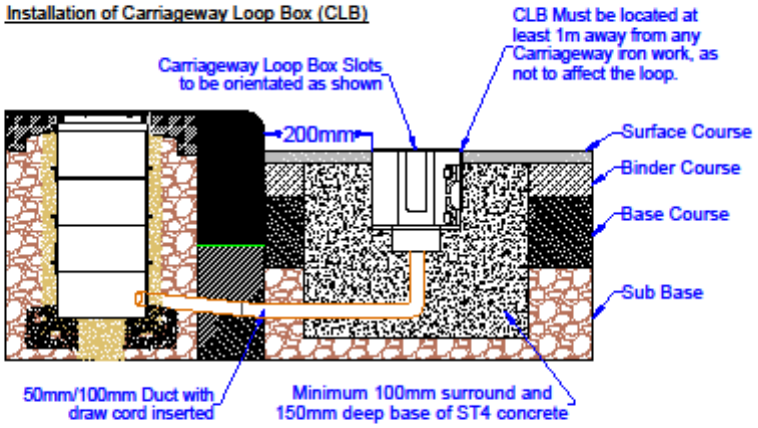
Transport for Greater Manchester
Urban Traffic Control
Tel: 0161-244 0999
email: XXXX@tfgm.com

Drawing No:	XXXXXX	Rev: A
Lead Section:	Infrastructure Design Group	
Date: 01/07/16		

Carriageway Loop Box

FIG 2





Notes:

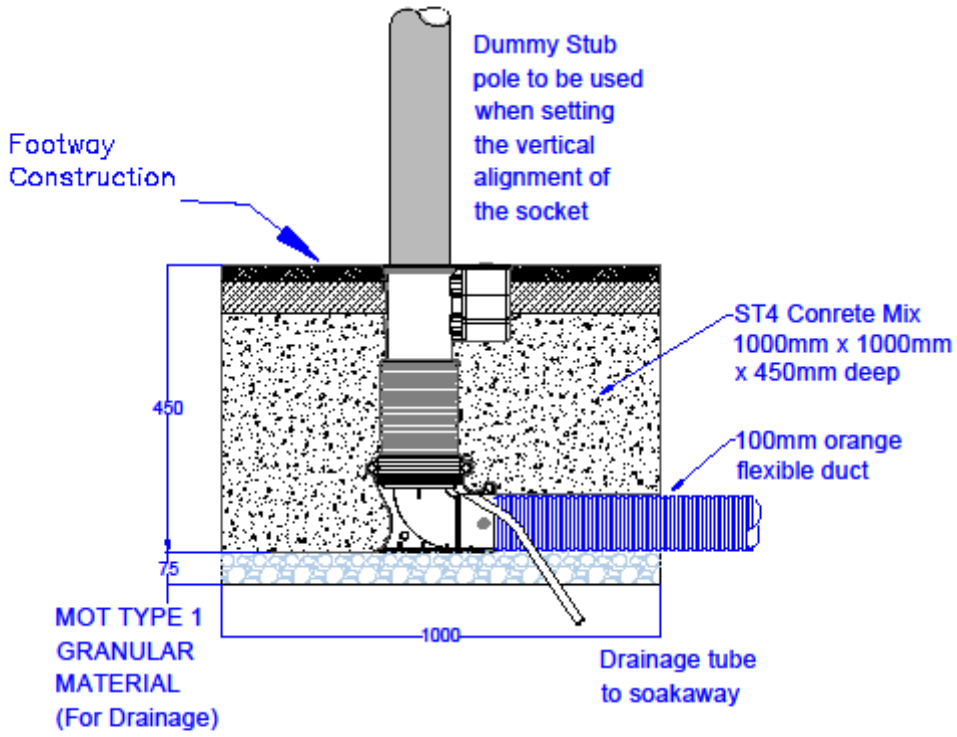
- All dimensions are approximate.
- All dimensions are in millimeters.
- Manufactured from ductile iron to BS2789.
- Loop must be suitable for carriageway installations with an EN124 D400 40 tonne load certified single cover.
- All entry points must be sealed if not in use.

Transport for Greater Manchester
Urban Traffic Control
Tel: 0161-244 9999
email: XXXX@tfgm.com

Drawing No:	XXXXXX	Rev: A
Lead Section:	Infrastructure Design Group	
Date: 01/07/16		

Pole Retention Socket

FIG 3



Pole Retention Sockets

A typical retention socket arrangement is shown and manufacturers requirements shall be ensued to fulfil this minimum standard.

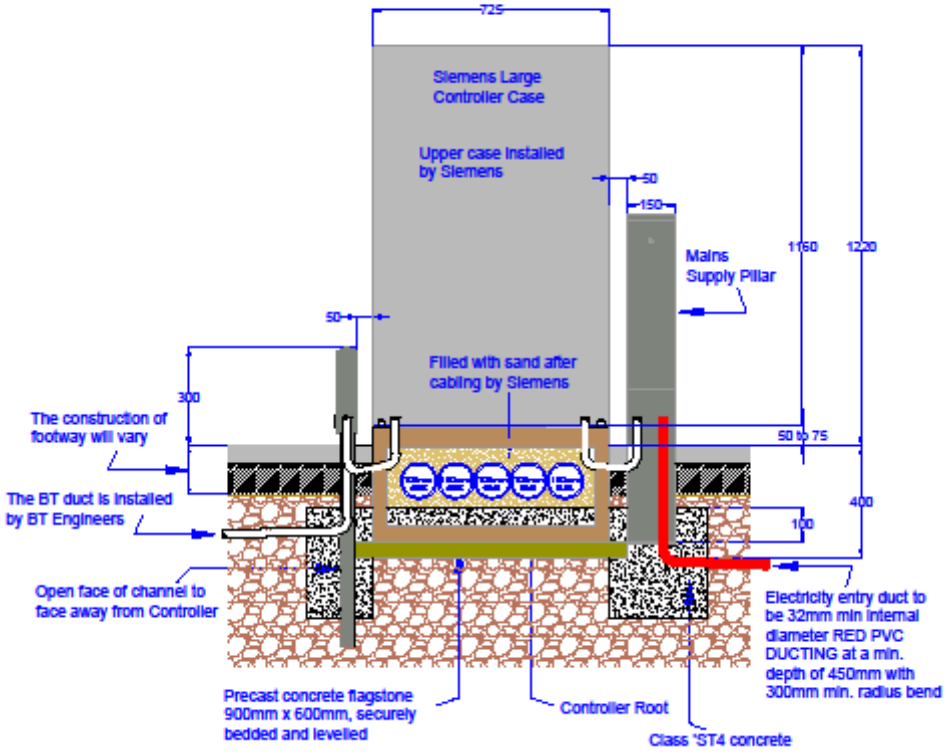
Retention sockets shall be purposely designed for housing 3.7m reduced length traffic signal poles. Unit shall be manufactured of ductile iron and have 360 degree swivel duckfoot or tee bend to allow 100mm duct entry from any direction without restricting orientation of top section.

Socket shall be capable of fitting in any surface conditions (i.e. bitmac, paving, grass, etc.).

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Controller Cabinet Base	FIG 4



1. A hole should be dug and a flagstone 900mm x 600mm embedded securley at the bottom.
2. If the controller is being installed on a slope, an allowance must be made to enable the door to clear.
3. The controller root should be placed in the centre of the flag with the top edge protruding 50mm to 70mm above the finished ground level.
4. It is essential that the stool is fitted the correct way round with the holes to the front. to allow adjustment when the outer case is installed.

Notes:

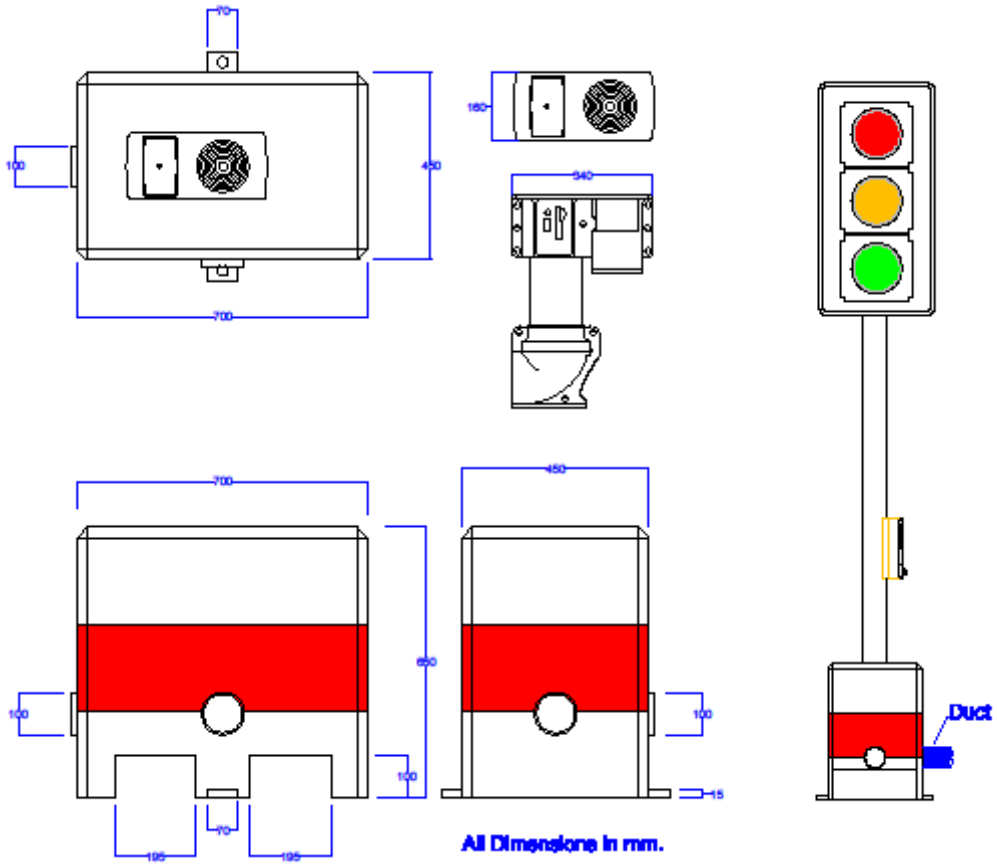
- All dimensions in millimetres
- Controller dimensions [Height 1160, Width 725, Depth 420]
- Remainder of excavation to be backfilled with excavated material suitably compacted.
- BT Jointing post and mains feeder pillar may be placed adjacent to one another.
- Mains supply pillar and associated ducting to be installed by civil contractor.

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Temporary Signal Block

FIG 5



All Dimensions in mm.

* The site contractor is responsible for the protection of any exposed cables.
* The pole in barrel should not be moved without notifying TfGM, as the signal timings may need adjusting.
* All posts are locked in position in the foundation with the retention socket system. This ensures that posts cannot be removed or rotated by unauthorised personal or windage.

Notes:

- The foundations are rectangular in shape to ensure maximum stability. They have two options of lifting available, two cast in lifting loops on top of the bases, and two forklift voids. This ensures the foundations can be easily transported to and around site.

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