

Waitrose, Goldington Road, Bedford
John Lewis Partnership



Siemens plc
Infrastructure & Cities Sector
Mobility & Logistics Division
Traffic Solutions
Consultancy Services,
Unit: C20,
Poplar Business Park,
Prestons Road,
London
E14 9RL

853814759 Technical Proposal

Scheme :	A428 Goldington Road, Bedford, Bedfordshire
Client :	John Lewis Partnership

Issue : 1-a

THIS DOCUMENT IS ELECTRONICALLY APPROVED

	Prepared By
Company/Dept.	Traffic Solutions, Siemens Mobility
Name	Neil Dayment
Function	Design Engineer
Date	22/12/2011
	Approved By
Company/Dept.	
Name	
Function	
Date	
COPYRIGHT STATEMENT The information contained herein is the property of Siemens plc. and is supplied without liability for errors or omissions. No part may be reproduced or used except as authorised by contract or other written permission. The copyright and the foregoing restriction on reproduction and use extend to all media in which the information may be embodied. Copyright © Siemens plc 2011 All Rights Reserved.	

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

Contents

1	Introduction	3
1.1	Purpose	3
1.2	Scope	3
1.3	Related Documents	3
1.4	Issue state and amendments	3
2	Site Description.....	4
2.1	Existing Site.....	4
2.2	Proposed Site.....	4
3	Design & Safety Considerations	6
4	Civil Engineering Requirements.....	8
4.1	Duct Network.....	8
4.2	Pavement Surface and Kerbing	9
4.3	Lining.....	9
4.4	Signing	9
4.5	Signal Equipment Installation	10
4.6	Signals Associated Civils Equipment	10
5	Electrical Requirements	11
6	Traffic Signal Requirements.....	12
6.1	Phasing & Staging.....	12
6.2	Detection	12
6.3	Timings.....	12
6.4	Communication	13
6.5	Signal Equipment	13
6.6	STREET LIGHTING AND SIGNAL DIMMING.....	14
7	Appendix A – Intergreen Calculations.....	15
8	Appendix B – Linsig Report	16

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

1 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to provide supporting information for the detailed traffic signal design for the new access road for the new proposed Waitrose store on Goldington Road, Bedford, Bedfordshire which has been commissioned by John Lewis Partnership.

1.2 SCOPE

This document is limited to the description of a traffic control system to be implemented at the above site and is restricted to the proposed control strategy and the equipment required.

1.3 RELATED DOCUMENTS

Document	Description of document
Drawing	853814759_D
TR2500 Specification	853814759_TR2500

1.4 ISSUE STATE AND AMENDMENTS

Issue State – Issue 1 Unapproved

Issue Number	Description of amendments
1	Original Issue

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

2 SITE DESCRIPTION

2.1 EXISTING SITE

The A428 Goldington Road is dual carriageway with a wide central reservation protected by crash barriers around the new proposed access road. Both east and west bound approaches are straight, flat and have very good carriageway visibility. Both approaches are subject to a 50mph speed limit. This limit is reduced to 30mph approximately 185m from the new access road on the west bound approach to the roundabout.

There is currently only one access (observed in use) approximately 250m to the east of the new access road. This No Through access is for a private dwelling and access to farmland to the south of Goldington Road.

On the eastbound carriageway (located between the roundabouts) is a small access road for Hatters Furnishings approximately 273m from the access, and Shuttleworth Road at approximately 108m. Shuttleworth Road is used for access to the industrial estates to the north of Goldington Road. It can also be accessed from Norse Road to the north east and access onto the A428 to the west.

There are footways of 2.9m (from rear to front of carriageway) to the north side only.

There is street lighting in place (approximately every 45m) on both sides of the carriageways extending to the roundabouts at both sides..

Bus stops are located on both sides of the A428 Goldington Road. One stop is located on the west bound approach just before the 30mph speed limit change, and another opposite on the other carriageway. A pedestrian cut-through is located in the central reserve. Another bus stop is located mid point between Shuttleworth Road and the new access road.

Various BT triple ducting pits were observed on site to the south side of Goldington Road.

2.2 PROPOSED SITE

This document is limited to the description of a traffic control system to be implemented at the above site and is restricted to the proposed control strategy and the equipment required.

The new proposed access road for the new Waitrose store is located on the westbound carriageway of the A428 Goldington Road.

The area for the new access road on the A428 Goldington Road is dual carriageway with large central reservation protected by crash barriers. The new store access road is proposed approximately 640m west of the roundabout on the A428, Castle Mill and Noise Road, and 385m east of the roundabout of the A428, Bury Walk and Riverfield Drive. The central reserve is to be amended to allow a right turn traffic movement into the access road

Version : 1-a
2011

Page 4 of 16

Date : 22 December

Use, duplication or disclosure of data contained on this sheet is subject to the restrictions on the title page of this document. Copyright © Siemens plc 2011 All Rights Reserved.

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

for the eastbound approach and to allow vehicles to exit east bound on the A428 from the new access road.

The existing 30mph speed limit on the A428 westbound (just before the roundabout on the west side) is to be extended to encompass the new junction; exact extents of this limit have not been supplied). The eastbound 50mph limit is also to be reduced to 30mph, again however exact extents of the limit has not been supplied.

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

3 DESIGN & SAFETY CONSIDERATIONS

The introduction of a new signalised junction and pedestrian crossing facilities on the A428 Goldington Road is part of highway improvement works near the new Waitrose access road. This technical proposal, associated drawing and TR2500 Specification / timings are based on the layout and requirements supplied by John Lewis Partnership.

As stated above the dual carriageway is subject to a 50mph speed limit and that vehicles were observed obeying the speed limit. Even with the reduction of the limit to 30mph it is likely that vehicles will be travelling higher than the new imposed limit. Until the new limit has been in place and a speed survey completed exact speeds for the new junction are unknown. The traffic signals design is based on a 30mph speed limit in place, following installation and the new speed limit being introduced a MOVA speed survey will be conducted to allow the final loop positions to be confirmed, therefore the MOVA loops and duct extents are indicative.

Considerations have been taken for the presence of high sided vehicles and their frequency using the junction. There are bus stops proposed in and around the junction which could reduce signals visibility when in use. Articulated lorries were observed in number on the A428 in both directions, as well as using Shuttleworth Road to access the industrial site to the north west of the new junction.

6m tall poles with high level repeater signals are proposed for both the primary traffic signals for the ahead phase and the right turn phase on the A428 east bound to provide adequate signal visibility. Two secondary traffic signals are proposed for the ahead lanes and one for the right turn lane in the new access road. Directional green arrows (ahead and right turn) are to be used to re-iterate carriageway and signal direction.

A "No U Turn" box sign is to be installed on traffic signals for the right turn movement to protect the middle pedestrian phase across the A428 westbound.

To increase traffic signal visibility on the A428 westbound approach a 6m pole with high level repeater traffic signal is to be installed as a second primary for this approach. This will provide adequate visibility when high sided vehicles are on this approach.

While the new access road is straight for much of its approach, it curves approximately 100 degrees for the left turn and approximately 90 degrees for the right turn within approximately 30m of the stop lines. Single near sided primary signals would not provide adequate traffic signal visibility for either approach, therefore second primary signals are proposed for both left and right phases. A closely associated secondary signal has been implemented for the left turn phase. Due to the junction and island geometry it is only possible to install a far sided secondary signal for the right turn phase. Directional green arrows are to be used to differentiate the separate signal phases. All box signs are to be mounted 4-in-line for clarity and to reduce carriageway clearance issues.

Near sided PUFFIN style crossings have been requested by the client at 2.4m widths. Three crossings provide pedestrian access from the south west side of the junction across to the north side. New footways have been proposed to cater for pedestrians on the south west side. No footways have been proposed on the south east side or on the new access road. New pedestrian "see through" style railings are proposed to guide pedestrians to the

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

crossing points. Kerb side detectors to monitor pedestrian demands and on-crossing detectors to monitor pedestrian carriageway areas are proposed for each crossing point.

Wherever possible traffic signal ducting chambers have been placed in soft ground to reduce the hazards / risks associated with maintenance and installation. Ducting and ducting chambers have where possible been situated to avoid services (both new and existing).

The south side of the carriageway is sloped slightly from the carriageway down to the flat grasslands to the south. Whilst this area will most probably be re-landscaped, ducting and ducting chambers have been located closer to the carriageway to enable easier and safe workings.

MOVA "IN" and "X" loops have been proposed at 90m and 45m respectively for both approaches on the A428 to account for the expected traffic speeds. Loops for the new access are proposed at 60m for the "IN", with the "X" loops at 20m and 22m respectively to catch vehicles as they enter the left of right turn lanes of the exit. These positions are indicative and will be confirmed following a MOVA speed survey.

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

4 CIVIL ENGINEERING REQUIREMENTS

4.1 DUCT NETWORK

Please refer to drawing number 853814759_D for ducting layout design. The ducting proposed is limited to that associated with the traffic signal installation.

All ducting and ducting chambers are to be installed as per Bedfordshire C.C guide-lines Appendix 12/5 and Appendix 12/70 documents.

It is proposed that a fully integrated duct network be provided. The network should comprise of rotationally moulded PVC boxes and fitted with a composite anti-skid cover. All traffic signal ducts within the network are to be 100mm dia high-density polyethylene ducting, orange in colour and labelled "Traffic Signals" at 1m intervals. 50mm dia ducts can be used at loop positions where under kerb ducts are used. 50mm dia black duct to be laid between the traffic signal controller and electricity supply pillar for mains electrical connection.

A duct box of the same construction as above (900mm x 600mm x 640mm) should be provided adjacent to the controller position. 6 ducts should be laid between the duct box and the controller base.

Carriageway ducting runs of 6 ducts are to be provided with 900mm x 600mm ducting chambers, whilst 4 duct runs are to be provided with 600mm x 600mm ducting chambers.

Slot cut loops are to be ducted via 50mm traffic signal ducting under kerb to the associated ducting chamber. Loops are to be terminated and jointed within these chambers.

Loop terminations and loop duct runs have been specified to aid loop maintenance at a later date.

All ducts shall be provided with a draw cord which shall be maintained on completion of the cable installation to enable future cable installation if required.

Ducting in the footway to be laid on a 50mm bed of sand with a minimum of 450mm cover or 600mm to invert. Ducting laid in the carriageway to be laid on a 50mm bed of sand with a minimum of 750mm of cover or 900mm to invert. Specified distances to extend from pavement finish level.

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

4.2 PAVEMENT SURFACE AND KERBING

The descriptions, observations and requirements as laid out in this section are limited to the civils requirements related to the traffic signal design. Detail designs of any civils requirements are outside the scope this report although standard detail drawings may be able to be provided where possible. Observations are only made on physical surface of the pavement. Tests to determine the structural integrity of the pavement have **not** been carried out.

Existing carriageway surfacing appears in good condition with only a few cracks and deterioration on Shuttleworth Road exit presumably from heavy goods vehicles.

Carriageways are to be built out in line with the new junction arrangements. New footways are to be installed to the north and the south west on Goldington Road.

It is recommended that a suitably high PSV value top wearing course for anti-skid purposes is applied extending 70m back from either stop line on A428 Goldington Road and 50m back from each stop line on the new access road. If standard / low value finishing course is applied it is recommended buff coloured high friction surfacing be applied to the carriageway at the same distance specified above.

Tactile paving should be provided in accordance to the DFT Tactile Paving guidelines. Paving should extend the full width of each pedestrian crossing point and be two slabs in depth from the kerb. Tactile paving installed on the extents of the carriageways shall extend in three slabs in width from the right side, to the rear of the footway.

4.3 LINING

The descriptions, observations and requirements as laid out in this section are limited to the lining requirements related to the traffic signal design. Detail designs of any lining requirements are outside the scope this report

All lines are to be laid in accordance with the Traffic Signs Manual, The Traffic Signs Regulations and General Directions 2002 and The Zebra, Pelican and PUFFIN Pedestrian Crossings Regulations and General Directions 1997.

4.4 SIGNING

The descriptions, observations and requirements as laid out in this section are limited to the signing requirements related to the traffic signal design. Detail designs of any signs requirements are outside the scope this report

Temporary 'New Traffic Signals Ahead' sign to diag 7014 should be mounted at a distance of 100m from each stopline on the A428 Goldington Road approach to the signals.

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

4.5 SIGNAL EQUIPMENT INSTALLATION

Please refer to drawing number 853814759_D for traffic signal layout design.

All traffic signals equipment are to be installed as per Bedfordshire C.C guide-lines Appendix 12/5 and Appendix 12/70 documents.

All traffic signal poles are to installed into NAL pole retention sockets. All poles to use RS114 sockets with duck foot, whilst 6m tall poles are to use RS168 to accommodate wider pole bases and cable terminations.

All pole positions are to be set out by the Customers Engineer on site.

All traffic signal works should comply with the local highway authority requirements.

4.6 SIGNALS ASSOCIATED CIVILS EQUIPMENT

Quantity	Item
4	Duct Box – 900mm x 600mm
9	Duct Box – 600mm x 600mm
12	Duct Box –450mm x 450mm
13	RS115 Retention socket with duck foot
3	RS168 Retention socket with duck foot
qty	100mm traffic signal ducting as shown
qty	50mm under kerb duct as shown
1	Electrical Supply Pillar (ESP)

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

5 ELECTRICAL REQUIREMENTS

A suitable 240v 50Hz electrical supply should be provided and terminated into a feeder pillar adjacent to the signal controller position. The traffic signal controller will be connected to the mains supply via a 45 amp rated lockable isolator or as specified by the controller manufacturer.

The civil engineering contractor shall be responsible for the provision of the 240V mains supply to the feeder pillar.

The signal contractor shall be responsible for providing the double pole, fused, secondary isolator in the feeder pillar and any mains cable required from the feeder pillar to the controller.

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

6 TRAFFIC SIGNAL REQUIREMENTS

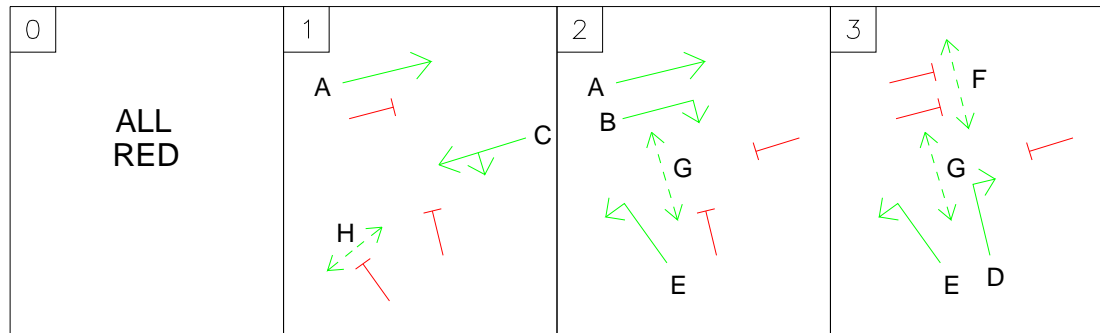
Please refer to drawing number 853814759_d for traffic signal layout design.

All traffic signals equipment are to be installed as per Bedfordshire C.C guide-lines Appendix 12/5 and Appendix 12/70 documents.

6.1 PHASING & STAGING

Phase	Description
A	A428 Goldington Road Eastbound
B	A428 Goldington Road Eastbound Right turn
C	A428 Goldington Road Westbound
D	Waitrose Exit Right turn
E	Waitrose Exit Left turn
F	Pedestrian phase Goldington Road Eastbound
G	Pedestrian phase Goldington Road Westbound
H	Pedestrian phase Waitrose Exit Left turn

STAGING DIAGRAM



6.2 DETECTION

Microprocessor Optimised Vehicle Actuated (MOVA) will be used to control the junction with Vehicle Actuated. Carriageway inductive loops are proposed for 'IN', 'X' and stop line loops.

Kerb-side detectors are proposed for each crossing location to monitor pedestrian demands along with associated PUFFIN near sided demand units.

On-crossing detectors are to be used.

6.3 TIMINGS

Version : 1-a
2011

Page 12 of 16

Date : 22 December

Use, duplication or disclosure of data contained on this sheet is subject to the restrictions on the title page of this document. Copyright © Siemens plc 2011 All Rights Reserved.

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

All signal timings have been calculated or determined using the latest standards and guidelines and conform to TR2500.

Intergreens have been calculated according to TAL 1/06. Any adjustments made have been done by a competent engineer on the basis of site specific conditions. A copy of the calculations can be found in Appendix A.

Crossing timings have been calculated according to TAL 5/05, and can be in appendix B.

Crossing widths;

PUFFIN crossing Phase F = 10.3m
PUFFIN crossing Phase G = 9.45m
PUFFIN crossing Phase H = 5.2m

6.4 COMMUNICATION

A GSM Peek Chameleon MOVA unit shall be provided and terminated into the traffic signal controller cabinet. This will be used for fault monitoring and site communications with Bedfordshire instation.

The local authority shall be responsible for the provision of the GSM SIM card and ensuring suitable coverage.

6.5 SIGNAL EQUIPMENT

Please refer to drawing number 853814759_d for traffic signal layout design. The below quantities are also taken from this design.

Quantity	Item
1	8 phase ELV Traffic Signal Controller Grey Case
1	MOVA control and Outstation Monitoring Unit (OMU) – for MOVA control and fault monitoring / site communications e.g. Peek Chameleon
5	4 channel detector pack
5	ELV RAG LED Signal head complete with backing boards
4	ELV RAGA LED Signal head with ahead green arrow aspect complete with backing boards
3	ELV RAGA LED Signal head with left turn green arrow aspect complete with backing boards
6	ELV RAGA LED Signal head with right turn green arrow aspect complete with backing boards

Version : 1-a
2011

Page 13 of 16

Date : 22 December

Use, duplication or disclosure of data contained on this sheet is subject to the restrictions on the title page of this document. Copyright © Siemens plc 2011 All Rights Reserved.

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

2	ELV "No U Turn" box sign (4-in-line mounting)
33	Primary RAG cowl (single)
21	Secondary RAG cowl (single)
1	Bracket for double head mounting
2	Near sided combined RM/GM Puffin display and Pushbutton demand unit with Tactile rotating cone
4	Near sided combined RM/GM Puffin display with narrow field of view optics and Pushbutton demand unit with Tactile rotating cone
4	Near side Push Button Wait Indicator Unit with Tactile rotating cone
3	Grey 6m tall wide base traffic signal pole with low level cable terminations suitable for RS168 Pole retention sockets
7	Grey 4m tall standard traffic signal pole
3	Grey 4.32m swan neck traffic signal pole
3	Grey 2.0m stub pole
1	Photo Electric cell

6.6 STREET LIGHTING AND SIGNAL DIMMING

The Photo Electric (PE) cell is proposed installed onto pole 16 on the central reserve to reduce the effects of the street lighting.

Street lighting is located along the A428 Goldington Road. It is recommended that a new street lighting design is completed by a suitably experienced Street Lighting Engineer.

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

7 APPENDIX A – INTERGREEN CALCULATIONS

See TR2500

Version : 1-a
2011

Page 15 of 16

Date : 22 December

Use, duplication or disclosure of data contained on this sheet is subject to the restrictions on the title page of this document. Copyright © Siemens plc 2011 All Rights Reserved.

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc

8 APPENDIX B – PUFFIN TIMINGS

See TR2500

Version : 1-a
2011

Page 16 of 16

Date : 22 December

Use, duplication or disclosure of data contained on this sheet is subject to the restrictions on the title page of this document. Copyright © Siemens plc 2011 All Rights Reserved.

Document Template prepared by	Gary Bray	Template version	1-0
Document Template approved by	Brian Carpenter	Template number	853814759 Tech Prop iss1.doc