TECHNICAL NOTE

Job Name: North Whiteley

Job No: 16659

Note No: 026

Date: 29th November 2012

Prepared By: Phil Rawlins

Subject: M27, Junction 9 Capacity Assessment

Item	Subject
1.	**Introduction** This note has been prepared by Peter Brett Associates LLP (PBA) on behalf of the North Whiteley Consortium to set out a preliminary capacity assessment of the M27 motorway Junction 9 (J9). The assessment has been based on SATURN modelling undertaken for the North Whiteley development in consultation with the Highways Agency (HA) and Hampshire County Council (HCC). The note sets out the capacity of the junction and resulting queuing and delay in the following scenarios: - 2009 Base - 2026 Base - 2026 Base with development and mitigation The results of the modelling work undertaken are set out within the following sections taking each scenario in turn. It should be noted that the modelling work presented here is preliminary at this stage and may be refined through the Transport Assessment process although it is considered that through refinement of the proposed junction design and modelling work that the junctions operation will improve and that the preliminary results presented here are robust. In completing the assessment, the modelling outputs from TRANSYT were compared with SATURN. Using the same signal timings and flows it was found that the SATURN model showed a greater capacity in the junction than the TRANSYT model due to the lane assignment used within SATURN. The SATURN model spreads flow equally amongst the available lanes, whereas TRANSYT allows for a more realistic assignment of flows to lanes that are unbalanced. To ensure that the two models were consistent in their assessment of capacity, the signal timings in the SATURN model were adjusted so that the resulting capacity was consistent with the TRANSYT model. The TRANSYT model used for this work has previously been agreed with both Transport for South Hampshire (TfSH) and the HA as an acceptable tool for use for the M27 corridor study. It is considered that this methodology provides robust SATURN results and allows a meaningful comparison to be made between the modelling scenarios.

Item	Subject
2.	**2009 Validation Base** The 2009 base SATURN model has been created as set out within the agreed Local Model Validation Report (LMVR) (PBA, September 2012). The results for J9 as taken from the SATURN modelling for the junction are as shown in **Table 1** at **Appendix A**. It can be seen from these results that the junction is currently operating at capacity in both the AM and PM peak periods with relatively low levels of queuing and delay predicted.
3.	**2026 Forecast Base** The 2026 forecast base SATURN model has been created as set out within the agreed Forecast Modelling Assumptions Scoping Report (PBA, September 2012). The results for J9 as taken from the SATURN modelling for the junction are shown in **Table 1** at **Appendix A**. This modelling scenario assumes background traffic growth, committed development and other future additional traffic (e.g. Solent Business Park unoccupied floor space), agreed with HCC and the HA. The junction and signal timings are assumed to be as existing (i.e. with no improvements). It can be seen from these results that the junction is predicted to be operating significantly over capacity in both the AM and PM peak periods with significant queuing and delay predicted on both the motorway slip road arms in the AM peak hour and on the Whiteley Way approach and westbound motorway slip road arm in the PM peak hour.
4.	**Proposed Mitigation Measures at Junction 9** **Highways Agency J9 Scheme** At a meeting between PBA and the HA on the 27th April 2012 the HA confirmed that they had undertaken an improvement study for J9 and tabled two proposed junction layouts for the improvement of J9. These preliminary designs are provided at **Appendix B**. It is understood that Option 1 was the HAs preferred scheme, this scheme would provide the following improvements: - One extra lane on the east and west motorway slip lanes - Lengthened flare on Whiteley Way - Addition of a foot / cycleway between Whiteley Way and Segensworth utilising the eastern overbridge It is understood from this meeting that the modelling of the scheme allowed for North Whiteley and that the scheme was considered to work effectively. However, there were no available funding mechanisms and therefore this was not progressed. **Peter Brett Associates J9 Scheme** PBA have also independently developed a proposed scheme for J9 (Drawing 16659/125C/035 Rev A at **Appendix C**) which provides the following improvements - Two extra lanes on the east and west motorway slip lanes - Widened circulating carriageway on the southern section of gyratory - One extra flare lane on Whiteley Way

Item	Subject
	- The provision of bus priority on Whiteley Way Southbound - Shared Foot / Cycleway between Whiteley Way and Segensworth utilising the western motorway overbridge, linking in with wider strategic foot / cycleway improvements. In this respect the main benefits of the PBA scheme over the HA scheme are - Increased slip lane capacity - Bus priority provision on Whiteley Way south. It is the PBA scheme that has been tested in the 2026 forecast with development scenario presented in this Technical Note.
5.	**<u>2026 Base + North Whiteley Development + Mitigation Measures</u>** The 2026 forecast with development SATURN model has been created as set out within the agreed Forecast Modelling Assumptions Scoping Report (PBA, September 2012). Whilst it is understood that both HCC and the HA have outstanding queries on the details of this forecast model it is understood that these relate to points of clarification rather than any fundamental issues with the model and therefore these results can be considered acceptable for testing the junctions performance. The results for J9 as taken from the SATURN modelling for the junction are shown in **Table 1** at **Appendix A**. It can be seen from these results that the junction is predicted to be operating with a significant improvement when compared to the 2026 base situation, with a significant reduction in queuing and delay in both the AM and PM peak hours. It can be seen that in the AM peak hour the Westbound motorway off slip is shown to be over capacity, however this arm is operating better than in the base situation and queuing can be easily contained within the slip lane for this arm. The proposed junction will also provide significant person capacity improvements at the junction with bus priority on the Whiteley Way south link and a foot / cycle connection through the junction facilitating the use of sustainable modes.
6.	**<u>Conclusions</u>** This Technical Note has set out a detailed traffic modelling analysis of the existing and future operational performance of the M27, J9, with and without North Whiteley and the proposed improvement scheme. The results of this analysis demonstrates that with full development at North Whiteley and the implementation of the proposed improvement scheme, the junction is predicted to operate significantly better than without the development and associated infrastructure. It is also understood that the HA have undertaken their own investigations into a potential improvement scheme at the junction and that this was considered to operate satisfactorily. However no secured funding arrangements were in place and therefore the scheme has not progressed. Whilst there are many similarities between the two schemes (the North Whiteley proposals and the HAs preferred scheme), the North Whiteley scheme actually includes for a greater level of vehicular capacity on the slips as well as the minor difference of the foot / cycleway on the opposite side of the junction (to ensure it ties in with the wider proposed strategic foot / cycleway identified in the Access and Movement Strategy document (April 2012)).

TECHNICAL NOTE

Item	Subject
	The proposed development is currently being promoted through the Winchester City Council Core Strategy Examination (Policy SH3). It is considered that the information contained within the Technical Note should provide the HA with confidence that there is a *reasonable prospect* that the planned infrastructure will be delivered in a timely fashion, in accordance with the NPPF (March 2012) and the recently published HA Protocol "The Highways Agency and the Local Plan Process: A Protocol for Local Authorities, Developers and the Highways Agency" (December 2012).

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
16659/TN026	-	03.12.12	Phil Rawlins	Tom Withey	Neil Thorne	Anthony Russell

Peter Brett Associates LLP. Caversham Bridge House, Waterman Place, Reading, Berkshire RG1 8DN
T:+44 (0)118 950 0761 F:+44 (0)118 959 7498 E:reading@peterbrett.com

TECHNICAL NOTE

Appendix A – Capacity Results Table

Table 1

Junctions within M27 J9	node from	node to	Base year						2026 No development						2026 Development and mitigation - with wider reassignment					
			Morning peak			Evening peak			Morning peak			Evening peak			Morning peak			Evening peak		
			V/C	Delay (secs)	Average queue (pcus)	V/C	Delay (secs)	Average queue (pcus)	V/C	Delay (secs)	Average queue (pcus)	V/C	Delay (secs)	Average queue (pcus)	V/C	Delay (secs)	Average queue (pcus)	V/C	Delay (secs)	Average queue (pcus)
Eastbound off slip/circulatory																				
Eastbound off slip approach	168	134	97.9%	19.6	11	81.5%	16.4	8	112.1%	237.1	130	101.3%	43.7	26	65.6%	10.6	9	94.7%	25.3	19
Circulating arm approach	133	134	87.0%	34.1	16	65.7%	31.2	10	92.9%	33.5	17	72.8%	32.5	12	93.8%	31.3	12	61.3%	13.8	7
HA depot exit																				
HA depot approach	308	170	7.1%	84.0	0	9.2%	48.4	0	3.0%	31.8	0	5.8%	26.4	0	5.9%	65.0	0	9.1%	41.6	0
Circulating arm approach	134	170	61.8%	0.0	0	50.3%	0.0	0	64.3%	0.0	0	59.2%	0.0	0	57.1%	0.0	0	55.3%	0.0	0
Whiteley Way/Circulatory																				
Whiteley Way approach	162	131	59.3%	25.1	7	96.2%	31.6	13	81.6%	27.1	10	123.9%	461.8	203	103.7%	66.6	25	108.0%	144.6	93
Circulating arm approach	170	131	52.0%	9.3	4	65.8%	11.0	7	46.5%	8.9	4	68.9%	11.4	7	48.0%	7.1	3	84.5%	17.9	11
Hill Coppice Road/circulatory																				
Hill Coppice Road approach	307	169	0.0%	24.5	0	0.0%	194.2	0	0.0%	30.4	0	0.0%	271.7	0	0.0%	37.8	0	0.0%	297.8	0
Circulating arm approach	131	169	44.9%	0.0	0	63.3%	0.0	0	47.9%	0.0	0	66.1%	0.0	0	38.0%	0.0	0	56.9%	0.0	0
Westbound off slip/circulatory																				
Westbound off slip approach	166	132	96.4%	25.0	10	93.7%	32.3	8	122.4%	428.9	170	118.9%	373.8	102	111.0%	234.7	83	62.8%	25.5	10
Circulating arm approach	169	132	54.0%	13.6	6	76.3%	11.3	9	57.5%	14.0	7	82.2%	48.7	38	44.3%	5.6	3	99.0%	16.3	15
Segensworth Link/circulatory																				
Segensworth Link approach	163	133	100.9%	41.7	14	92.6%	29.0	9	100.9%	41.7	14	101.0%	47.8	14	102.1%	69.9	14	100.9%	42.3	14
Circulating arm approach	132	133	39.1%	7.8	2	46.0%	5.4	2	45.7%	7.4	2	59.7%	8.0	3	34.0%	7.6	3	68.2%	12.0	7
Segensworth Link left filter																				
Segensworth Link approach	163	164	65.6%	0.0	0	83.7%	0.0	0	75.7%	0.0	0	86.8%	0.0	0	91.3%	0.0	0	91.4%	0.0	0
Eastbond on slip approach	133	164	16.3%	0.0	0	49.0%	0.0	0	17.0%	0.0	0	63.2%	0.0	0	17.5%	0.0	0	43.7%	0.0	0

V/C key

- > 100%
- 85%-10%
- < 85%

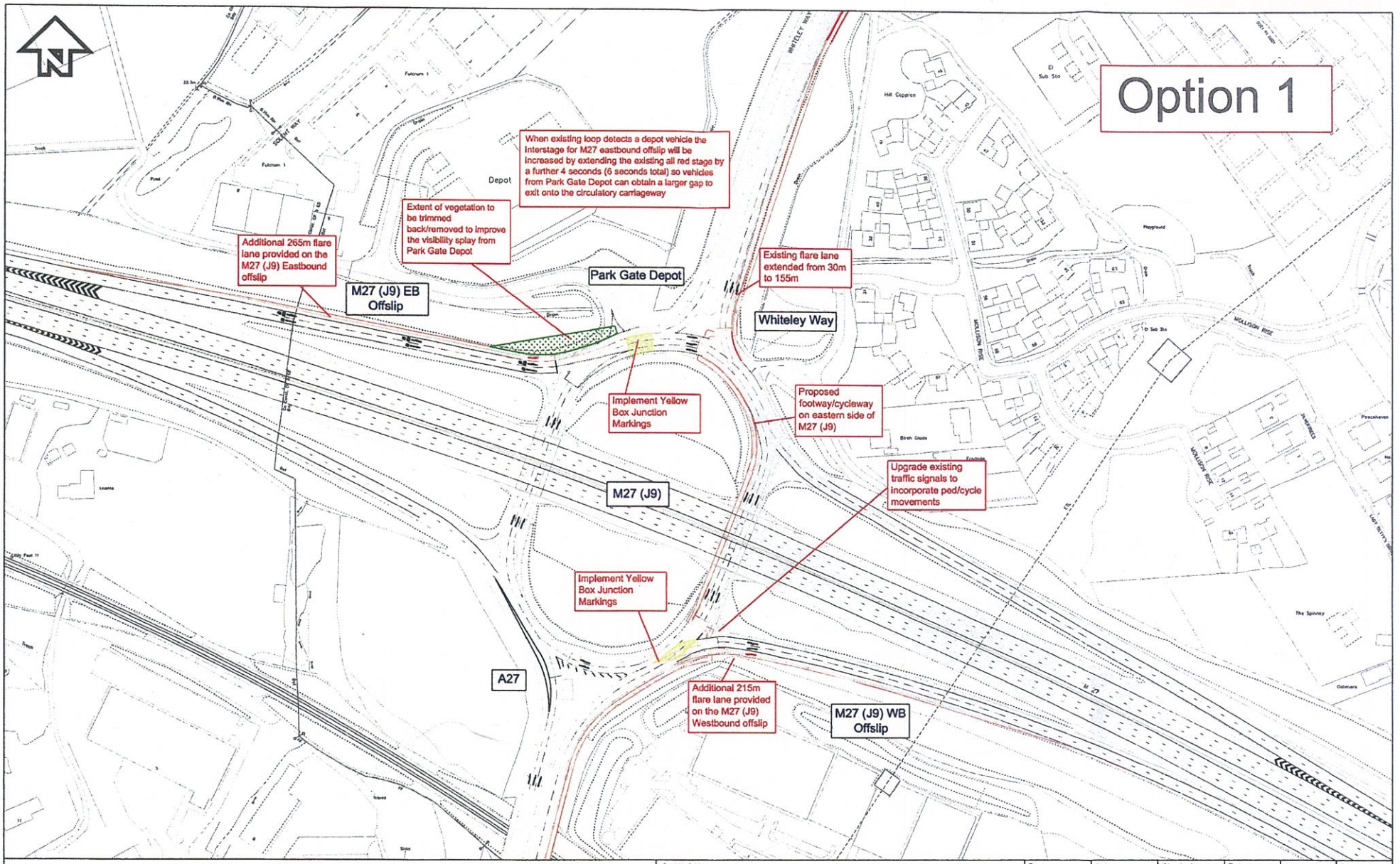
Delay key

- >180 seconds
- 90 - 180 seconds
- 15-90 seconds
- < 15 seconds

Average queue key

- > 100 pcus
- 30-100 pcus
- 10-30 pcus
- < 10 pcus

Appendix B – HA Scheme Design



At original drawing size (A3) this line measures 50mm

Notes

Rev.	Amendment	By	Chkd.	Date	Appd.
A	Proposed modifications amended	KH	TP	09/03/2012	TP

Cad Ref. No.
M:\F1042xxx\1042783 - M27 J9\200 Design control\200 Data and survey\203 Drawings

Project
M27 Junction 9

Title
Do Something Modelled Option 1 - M27 (J9) junction Improvements

Drawn	Date	Checked
KH	27/02/2012	TP

Date	Approved	Date
27/02/2012	TP	27/02/2012

mouchel

Export House
Woking, Surrey. GU21 6QX
Tel: +44 (0)1483 731000
Fax: +44 (0)1483 731010

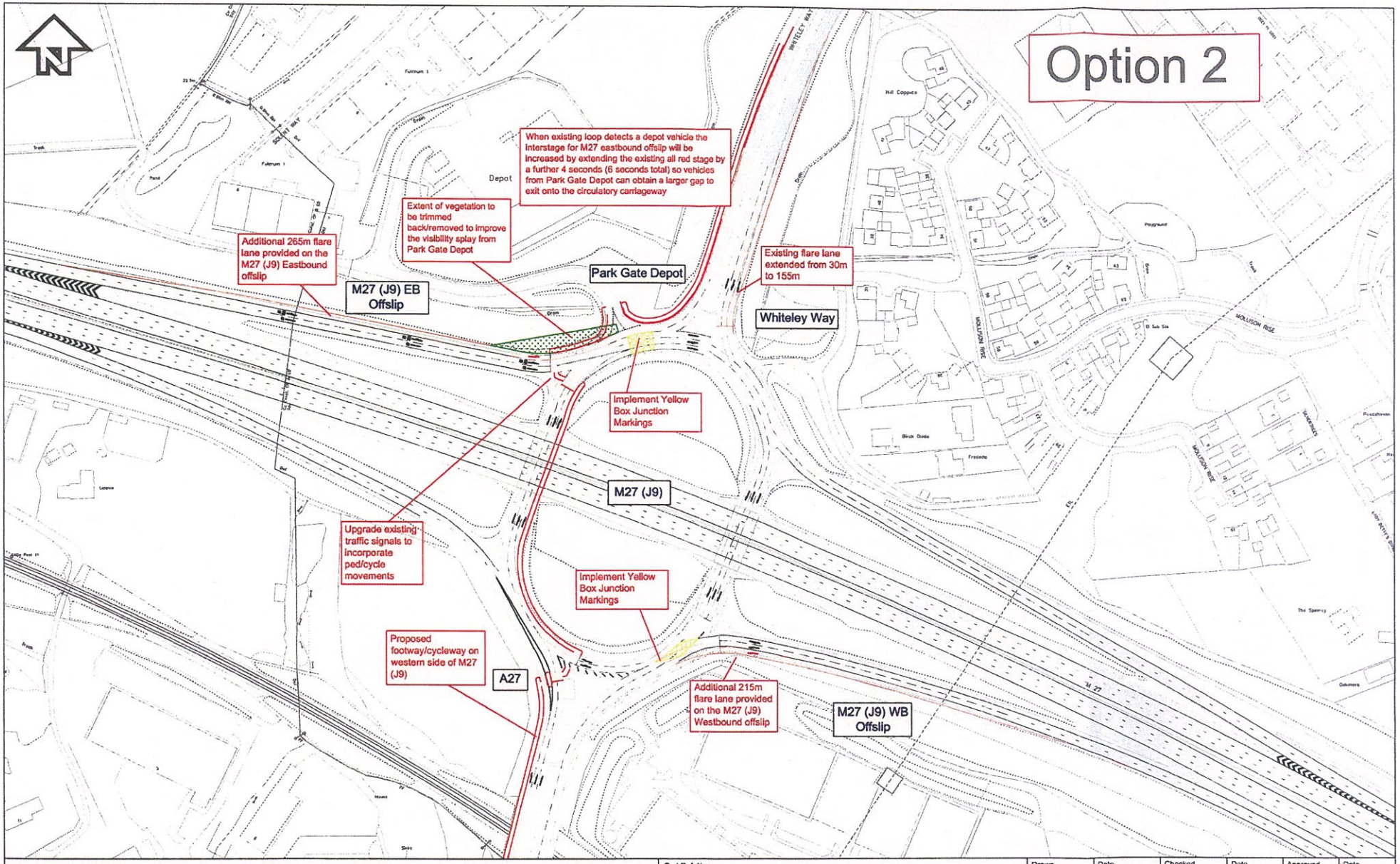
Scale 1:2000 @ A3 (main)

Job No. 1042783

Client EnterpriseMouchel

Drawing No. 1042783-D-002

Rev. A



At original drawing size (A3) this line measures 50mm

Notes

Rev.	Amendment	By	Chkd.	Date	Appd.

Cad Ref. No.
M:\F1042xxx\1042783 - M27 J9\200 Design control\200 Data and survey\203 Drawings

Project
M27 Junction 9

Title
Do Something Modelled Option 2 - M27 (J9) junction Improvements

Drawn	Date	Checked
KH	27/02/2012	TP

Date	Approved	Date
27/02/2012	TP	27/02/2012

Scale 1:2000 @ A3 (main)

Job No. 1042783

Client EnterpriseMouchel

Drawing No. 1042783-D-003

Rev.

mouchel
Export House
Woking, Surrey. GU21 6QX
Tel: +44 (0)1483 731000
Fax: +44 (0)1483 731010

TECHNICAL NOTE

Appendix C – PBA Scheme Design

WIDENING TO 4 LANES ON SLIP ROAD

WIDENED INTO CENTRAL RESERVE TO ALLOW WIDENING TO 2 TRAFFIC LANES AND A BUS LANE

PROPOSED BUS LANE

PROPOSED 3.0m SHARED FOOT/CYCLEWAY

BUS LANE WITH A 2m WIDE SEPARATION ISLAND AT BUS ADVANCE.

WIDENING INTO NEARSIDE VERGE AND CENTRAL RESERVE TO PROVIDE 4 LANES TO STOPLINE.

WIDENING TO CIRCULATING CARRIAGEWAY TO PROVIDE AN EXTRA LANE

CARRIAGEWAY MOVED OVER BY APPROX 1m WITHIN EXISTING BRIDGE TO ALLOW FOR FOOT/CYCLEWAY.

PROPOSED 3.0m SHARED FOOT/CYCLEWAY

EXTEND SOLID SEGREGATION LINE.

WIDENING TO 3 LANES

WIDENING TO 4 LANES ON SLIP ROAD

3m WIDE STAGGERED ISLAND FOR PEDESTRIAN / CYCLE CROSSING.

NEARSIDE LANE FREEFLOW EXCEPT WHEN STOPPED BY PED / CYCLE CROSSING.

WIDENING TO CIRCULATING CARRIAGEWAY TO PROVIDE AN EXTRA LANE

PROPOSED 3.0m SHARED FOOT/CYCLEWAY

KEY:

Proposed shared foot/cycleway

Proposed Bus Lane

Mark	Revision	Drawn	Date	Chkd
A	CHANGES FOLLOWING TEAM MEETING 23.01.12	AS	30.01.12	PR

SCALING NOTE: Do not scale from this drawing. If in doubt, ask.

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake his own investigation where the presence of any existing sewers, services, plant or apparatus may affect his operations.

Drawing Issue Status

FOR INFORMATION

NORTH WHITELEY

M27 JUNCTION 9 PROPOSALS CONCEPT SCHEME

Client

NORTH WHITELEY CONSORTIUM

Date of 1st Issue: 18.01.12	Drawn by: JMH
A0 Scale: 1:500	Checked by: PR
Drawing Number: 16659/125C/035	Revision: A

peterbrett

Offices throughout the UK, continental Europe, Africa and Asia

www.peterbrett.com

BRISTOL

Tel: 0117 928 1560 Fax: 0117 928 1570