

Chipstead Valley Road Right Turn Improvements

Traffic Signal Supplementary Report (TSSR) – AMD Scheme Design and Impact Assessment

Document No: SQA-0569 - issue: 2

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1 Purpose

To provide the template for the client / promoter scheme proposal and the Asset Management Directorate (AMD) audit of signal design and network impact.

The template must be completed for all schemes planned for implementation on the Transport for London Road Network (TLRN) and Strategic Road Network (SRN) and where schemes on other roads impact the performance of the TLRN, SRN or bus operation.

The audit and assessment completed by AMD will be undertaken on schemes that are accepted traffic signal schemes and this document will provide a summary of the findings with recommendations, with respect to safe signal design and road network impact.

The Traffic Signal Supplementary Report (TSSR) will be initiated and submitted by the promoter (section 1). AMD Traffic Infrastructure (TI) Signals and Road Space Management (RSM) Network Performance (NP) will complete their assessment (Sections 2 and 3 respectively). It will then be returned to the promoter for them to submit to RSM's Planned Interventions (PI) and Forward Planning Team (FPT), along with other supporting information.

2 Scheme Types

1. Minor works (usually not in carriageway) not effecting signal operation or capacity.
2. Isolated crossings (Pelican, Toucan, Puffin).
3. Crossing in a linked system (Pelican, Toucan, Puffin).
4. Modifications to existing signals to improve facilities
5. New junctions
6. Modernisation Programme.

Notes:

Type 1: A TSSR is generally not required for this type of scheme, however a road network impact assessment (Section 3) may be required for non-traffic signal schemes that could affect road capacity.

A network impact assessment will require operational traffic modelling and must follow the Model Audit Process (MAP) – SQA-0184.

Type 5: Justification will need to be provided for new signal installations.

3 Reference Documents

| Document Number | Document Title |
|-----------------|--|
| SQA-0064 | Design Standards for Signal Schemes in London. |
| SQA-0184 | Model Audit Process (MAP) Overview. |
| SQA-0448 | Signal Design Review Sheet |

4 Document Reference

4.1 Document Control - for Scheme Submission

| Issue | Date | Status / Notes | By | Checked | Approved |
|-------|------------|----------------|------------------------|-------------------------|--------------------------|
| 0.1 | 17/11/2016 | Draft | Chris McCabe WSP:PB | Paul Bright WSP PB | Nick Cottman WSP PB |
| | | | | | |
| | | | | | |
| | | | | | |

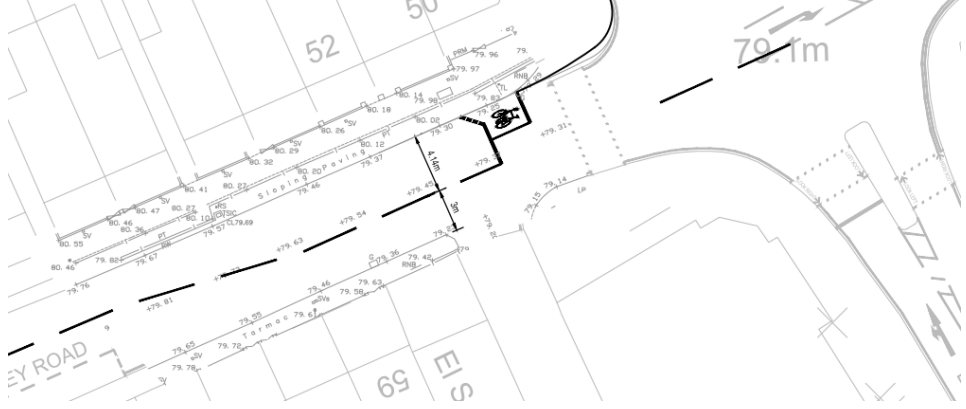
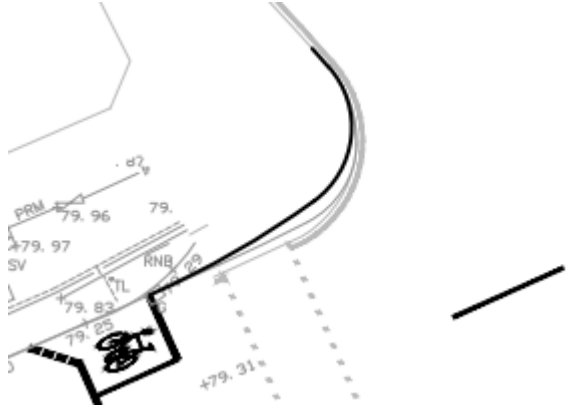
4.2 Scheme Reference

| | |
|------------------------------|---------------|
| Scheme Type Number: | |
| FPT Reference Number: | |
| Sponsor: | Barratt Homes |

5 Scheme Summary (Promoter to complete this section)

5.1 Scheme Overview

| | | | |
|--------------------------------|---|---|----------------------------------|
| Title: | <i>Chipstead valley Road / Woodman Road / Lion Green Road / Woodcote Grove Road (20/039)</i> | | |
| Location (Area): | <i>Coulsdon</i> | | |
| Borough: | <i>London Borough of Croydon</i> | Road Network (TLRN, SRN, Other): | <i>Other</i> |
| Road Number / Corridor: | <i>A237/B2032</i> | WBS Code: | |
| Funding: | <i>Barratt Homes</i> | Highway Authority: | <i>London Borough of Croydon</i> |
| Objective: | <i>The scheme is designed to reduce blocking back on the B2032 Chipstead Valley Road eastbound approach to its junction with Lion Green Road by increasing the space for ahead/left turning traffic to pass right turning vehicles held up centre junction.</i> | | |
| Scheme Details: | <p><i>Scheme to accompany a proposed housing development being completed by Barratt Homes to the southwest of the junction which will increase trips through site 20/039.</i></p> <p><i>Works include proposed re-marking of eastbound approach extending to approximately 40m back from the stopline. Eastbound approach is widened to allow right turning vehicles to move over safely. Westbound exit vehicles are guided to the nearside of the lane.</i></p> <p><i>The northwest corner kerblines has also been trimmed by up to 0.5m to increase passing space.</i></p> <p><i>These proposed changes are illustrated in drawing 50400637-0637-SK-57.dwg</i></p> | | |
| New Signals Required? | <i>No – eastbound stopline signal pole moved to the north to maintain clearance distance.</i> | | |
| Scope of Works: | <i>-Re-marking of eastbound approach extending to approximately 40m back from the stopline:</i> | | |

| | |
|--|--|
| |  <p>-moving back northwestern junction corner kerbline with associated signal movement:</p>  <p>-Optimisation of signal timings in response to revisions.</p> |
| <p>Comments or Promoters assessment of scheme impact:</p> | <p><i>The LMAP 5 report results tables contained in Appendix B of this document outline the LinSig modelling results in detail. Headline results are discussed below.</i></p> <p><i>Chipstead Valley Road eastbound in the base model has degree of saturation levels of 93%, 86% and 98% in the AM, PM and Saturday peak hours respectively.</i></p> <p><i>In the proposed model the same link is 93%, 94% and 93% saturated in the AM, PM and Saturday peak hours respectively. This represents a change of 0%, +8% and -5% respectively.</i></p> <p><i>With regard to queue levels, Chipstead Valley Road eastbound has mean maximum queues in the base model of 19, 19 and 24 PCUs in the AM, PM and Saturday peak hours respectively. Under the proposed layout these are 20, 23 and 20 PCUs in the AM, PM and Saturday peak hours respectively. This represents changes of +1, +4 and -4 PCUs in the respective peak hours.</i></p> <p><i>Summary: The alterations outlined above mitigate the impact of the increased trips on the local area road network as a result of the housing development with only minor alterations in both saturation</i></p> |

Traffic Signal Supplementary Report (TSSR)

| | |
|--|---------------------|
| | <i>and queuing.</i> |
|--|---------------------|

5.2 Site Works Breakdown

| Existing or New Signals | Site No. | Address | Type | Controller / Stream | Scope of Works |
|-------------------------|----------|---|-----------------|---------------------|--|
| Existing | 20/039 | <i>Chipstead valley Road / Woodman Road / Lion Green Road / Woodcote Grove Road</i> | <i>Junction</i> | <i>C1, S1</i> | <i>-Re-marking of eastbound approach extending to approximately 40m back from the stopline. -moving back kerb on northwestern junction corner kerblines with associated signal movement.</i> |
| Existing | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

5.3 Information Supplied

| Type | Title | Version / Reference No. | Date | Author | Organisation |
|------------|----------------------------------|-------------------------|------------|---------------|--------------|
| Checksheet | LMAP 2/3 AM, PM, SAT Checksheets | V1 | 07/01/2016 | Jose Bernaldo | TfL |
| Checksheet | LMAP 5 AM, PM, SAT Checksheets | V1 | 03/08/2016 | Jose Bernaldo | TfL |
| Report | VMAP 5 Report | V2 | 01/08/2016 | Chris McCabe | WSP PB |
| | | | | | |
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| | | | | | |
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5.4 Promoter Submission Details

The described scheme has been submitted for audit on behalf of the following:

| | |
|--------------------------------------|--|
| Sponsor (Client): | <i>Barratt Homes</i> |
| Promoter (Design consultant): | <i>traffic modelling - WSP PB – Chris McCabe, Detailed Design - WSP PB – TBC</i> |

| | |
|--------------------------|---|
| Contact Details: | <i>70 Chancery Lane London WC2A 1AF</i> |
| Name: | Chris McCabe |
| E Mail Address: | Chris.McCabe @wspgroup.com |
| Telephone Number: | 0207 314 5105 |

Note: Please ensure that the relevant line in the document control table (section 4.1) has been completed including date submission sent.

6 Scheme Assessment (*To be completed by TI Signals*)

6.1 Data and Information

6.2 Signal Design

6.3 Assessment Summary

No changes to Method of Control, not SLRN or TRLN – TI not required to enter details.

Traffic Signal Supplementary Report (TSSR)

The scheme has been assessed / audited and approved by:

| | |
|---|---------------------|
| TI Traffic Control Engineer: | <i>n/a</i> |
| TI Principal Traffic Control Engineer: | <i>James Pinder</i> |

| | |
|--------------------------|--|
| Contact Details: | |
| Name: | <i>James Pinder</i> |
| E Mail Address: | James.pinder@tfl.gov.uk |
| Telephone Number: | 0203054 2008 |

Note: Please ensure that the relevant line in the document control table (section 4.1) has been completed.

7 **Network Impact Assessment** *(To be completed by NP-NM)*

7.1 **Model Integrity**

A LINSIG v3.2.28 model for the AM, PM and SAT peaks was produced for the scheme. All models were developed in accordance with the Modelling Guidelines and passed through the LMAP process. The base model was approved in January 2016 and the proposed model was approved in August 2016.

Base flows were surveyed during November 2015 by TSP. The proposed future flows include figures for Cane Hill housing development and a larger development on Lion Green Road which is now no longer to be built. Hence the flows are higher than to be expected so can be interpreted as worse case.

The future flows were generated by TRICS and had been previously approved by TfL Borough Planning. WSP and TfL met again in October to agree the methodology.

The proposed model includes the priority junction for the Lion Green development which is no longer being built. The addition of this junction does not affect the models traffic arrival or capacity at the Chipstead Valley Road junction.

WSP has informed us that a small carpark (CALAT) on the corner of Woodcote Grove Avenue and Chipstead Valley Road will move its entrance from Chipstead to Woodcote. The park is to suit a temporary condition where the Lion Green Road car park is closed (during construction and not the case once the scheme is open as per the model scenario). It is expected to be very light traffic flows and was not considered in this model.

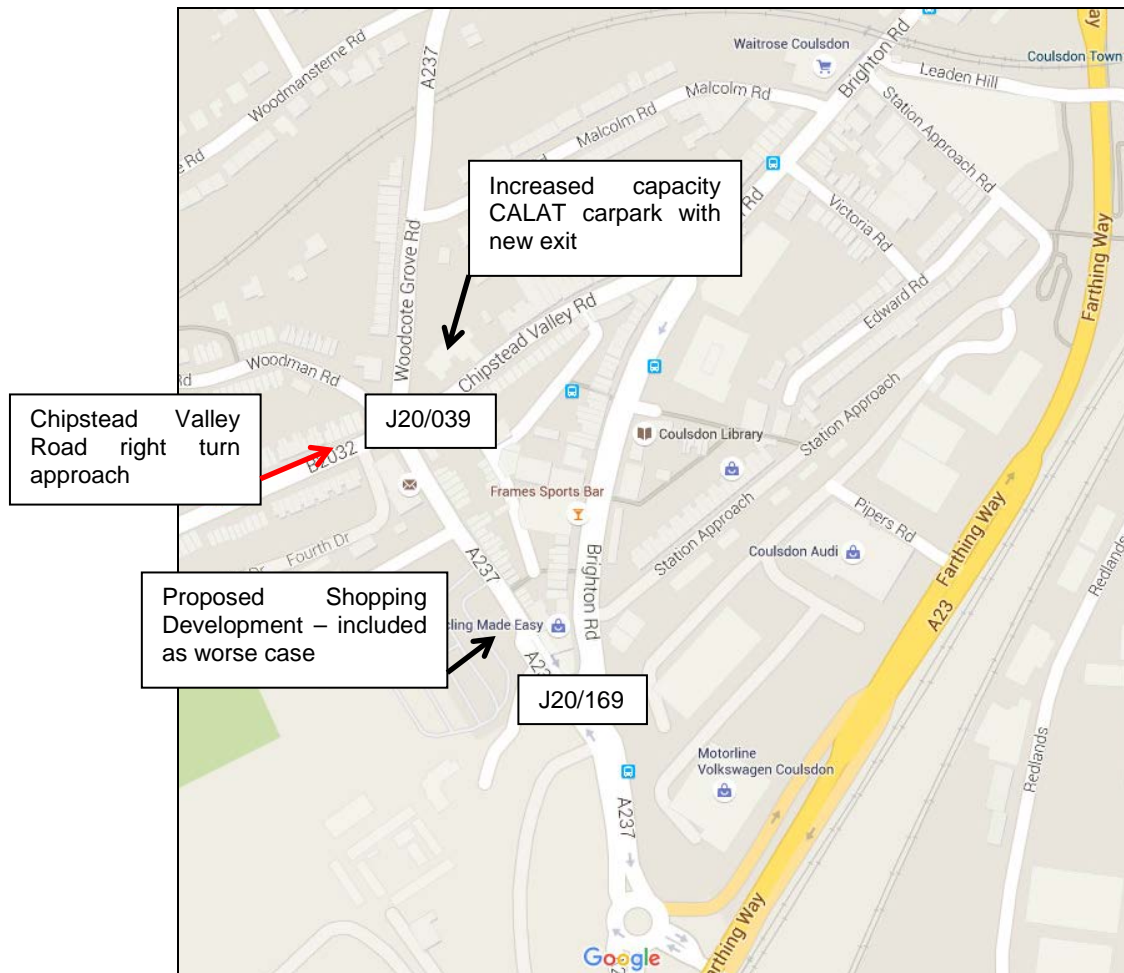
The staging has not changed in the proposal and due to the stoplines remaining as they are currently all other junction details remain the same. The proposed models have been re-optimised.

The proposed designs can be seen in Appendix B.

All modelling assumptions are captured in the technical notes and information provided.

7.2 Network Impact Assessment

Site Location



Reliable Roads

All results below rely on the assumption that changes to the layout at the Lion Green junction (J20/39) will result in an extra vehicle being able to fit into the right turn storage of the junction. While evidence to this effect has been provided via swept path drawings there is no prior evidence to guarantee that the lane alteration on street will encourage such driver behaviour as stated in the report. The proposal has been reviewed by ODE and they agree with the previous statement. More details can be seen in Appendix B.

AM Peak

| AM | 20/039 | | | |
|-----------------------------------|---------------------------|------------------------|---------------------------|------------------------------------|
| Lane | Base Model DoS (%) | Future Base (%) | Prop Model DoS (%) | Base vs Prop Difference (%) |
| J1:1/1 – Woodcote Grove Road NS | 70% | 66% | 77% | 7% |
| J1:1/2 – Woodcote Grove Road OS | 91% | 94% | 94% | 3% |
| J1:2/1 – Chipstead Valley Road WB | 53% | 54% | 57% | 4% |
| J1:3/1 – Lion Green Road NB | 91% | 98% | 94% | 3% |
| J1:4/1 – Chipstead Valley Road EB | 93% | 96% | 93% | 0% |
| J1:5/1 – Woodman Road | 43% | 43% | 43% | 0% |

Both base and proposed modelling operate on a 120 second cycle time.

At junction J20/039 there are increases to degree of saturation on all approaches as a result of housing and growth flow increase.

When looking at the difference in modelling results between the future base and the proposed model the changes made to the layout slightly minimise the impact to Lion Green Road and Chipstead Valley Road.

PM Peak

| PM | 20/039 | | | |
|-----------------------------------|---------------------------|------------------------|---------------------------|------------------------------------|
| Lane | Base Model DoS (%) | Future Base (%) | Prop Model DoS (%) | Base vs Prop Difference (%) |
| J1:1/1 – Woodcote Grove Road NS | 83% | 87% | 85% | 2% |
| J1:1/2 – Woodcote Grove Road OS | 83% | 83% | 85% | 2% |
| J1:2/1 – Chipstead Valley Road WB | 41% | 44% | 45% | 4% |
| J1:3/1 – Lion Green Road NB | 96% | 98% | 95% | -1% |
| J1:4/1 – Chipstead Valley Road EB | 86% | 98% | 94% | 8% |
| J1:5/1 – Woodman Road | 22% | 22% | 22% | 0% |

Both base and proposed modelling operate on a 120 second cycle time.

At junction 20/039 Chipstead Valley Road eastbound, degree of saturation on this approach rises significantly as a result of the flow increase. The road layout improvements at this approach are to increase the non-blocking storage by

introducing central hatching up to the stop line and reducing the width of the westbound exit lane. The impact of these changes can be seen above which compare the results of the future base and the proposed model.

The Brighton Road northbound approach at 20/169 also remains at levels close to or at 100% degree of saturation. Re-routing of traffic around the network as a result of the new developments mean that flow on this approach has increased. (See table 8 in Appendix B)

Sat Peak

| SAT | 20/039 | | | |
|-----------------------------------|--------------------|-----------------|--------------------|-----------------------------|
| | Base Model DoS (%) | Future Base (%) | Prop Model DoS (%) | Base vs Prop Difference (%) |
| J1:1/1 – Woodcote Grove Road NS | 61% | 66% | 64% | 3% |
| J1:1/2 – Woodcote Grove Road OS | 64% | 72% | 66% | 2% |
| J1:2/1 – Chipstead Valley Road WB | 48% | 44% | 47% | -1% |
| J1:3/1 – Lion Green Road NB | 85% | 95% | 93% | 8% |
| J1:4/1 – Chipstead Valley Road EB | 98% | 95% | 93% | -5% |
| J1:5/1 – Woodman Road | 37% | 37% | 37% | 0% |

Both base and proposed modelling operate on a 120 second cycle time.

At 20/039 during the weekend peak the Lion Green Road northbound approach experiences a considerably higher degree of saturation in the proposed modelling than in the base.

Chipstead Valley Road eastbound also has a very high degree of saturation in both the base and the proposed modelling. As seen above the proposed modelling reduces this by only a small percentage in comparison to the future base scenario.

20/169 in both the base and proposed models experiences relatively little congestion.

Quality Bus Network

There are 3 bus routes that pass through the junction, the 166 and 434 routes travel along Chipstead Valley Road.

166 – Epsom Hospital to West Croydon Station

434 – Ridgemount Avenue to Wapses Lodge Roundabout

404 – Coulsdon Library to Westway

The network performance results shows that similar to general traffic due to increases in degrees of saturation and queue lengths on certain links some bus journey times will increase slightly.

More and Safer Cycling

There are no new cycling facilities as part of the scheme proposals. Currently there is an advanced cycle stop line on Chipstead Valley Road.

More and Safer Walking

There are existing pedestrian facilities at the junction and waiting times will be unaffected.

7.3 Assessment Summary

| |
|---|
| The following recommendation is made: |
| No objections raised. |
| <i>This scheme will provide some relief to Chipstead Valley providing vehicles use the altered lane markings as intended.</i> |
| |
| |

The scheme has been assessed / audited and approved by:

| | |
|--|---|
| NP-NM Traffic Control Engineer: | <i>Jose Bernaldo / Outcomes Management (South Team)</i> |
| NP-NM Principal Traffic Control Engineer: | <i>Nigel Gazley / Outcomes Management (South Team)</i> |

| | |
|--------------------------|---------------------------------|
| Contact Details: | <i>For communication</i> |
| Name: | <i>Jose Bernaldo</i> |
| E Mail Address: | <i>Jose.bernaldo@tfl.gov.uk</i> |
| Telephone Number: | <i>020 3054 2689</i> |

Note: Please ensure that the relevant line in the document control table (section 4.1) has been completed.

8 **Document Control**

| Issue | Date | Change Summary | Author | Checker | Approver |
|--------------|-------------|-----------------------|---------------|----------------|-----------------|
| 1.0 | 18/11/16 | First draft | J Bernaldo | N Gazley | |
| 3.0 | 29/11/16 | Final Draft | J Bernaldo | N Gazley | |
| 4.0 | 02/12/16 | OM Final | J Bernaldo | N Gazley | J Melbourne |

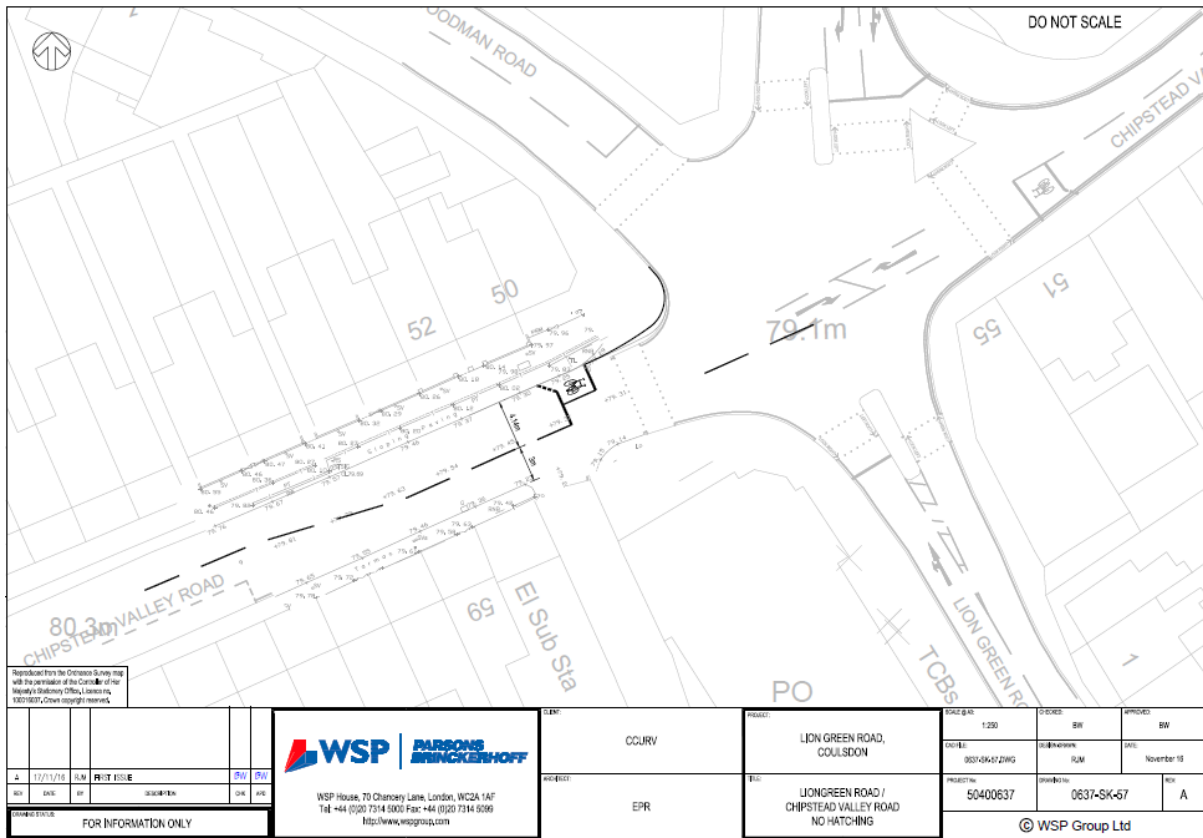
Appendix A – References

| Reference | TfL file location | Title | Author | Content |
|-----------|--|---|------------|------------------------------|
| 1.0 | W:\21_AREA_TEAMS\25_Schemes\20 LB Croydon\z2015 Lion Green Rd Coulsdon\16_12_15 LMAP 2 & 3\Lion Green Road MAP2_3 Supporting Data | 20_039_DoS_Calcs_A M_V2 | WSP / TSP | Base supporting data |
| 2.0 | W:\21_AREA_TEAMS\25_Schemes\20 LB Croydon\z2015 Lion Green Rd Coulsdon\16_12_15 LMAP 2 & 3 | Lion Green Road_lmap-check- sheets2and3 | J Bernaldo | LMAP stage 2 & 3 audit sheet |
| 3.0 | W:\21_AREA_TEAMS\25_Schemes\20 LB Croydon\z2015 Lion Green Rd Coulsdon\16_12_15 LMAP 2 & 3 | Lion Green Road_lmap-check- sheets2and3 | WSP | Approved base model |
| 4.0 | W:\21_AREA_TEAMS\25_Schemes\20 LB Croydon\z2015 Lion Green Rd Coulsdon\15_06_16 LMAP 5\Drawings\Drawing Nov 16 | 0637-SK-57-A | WSP | Final proposed drawing |
| 5.0 | W:\21_AREA_TEAMS\25_Schemes\20 LB Croydon\z2015 Lion Green Rd Coulsdon\15_06_16 LMAP 5\Flows data | 1_Cane Hill_Trip_Gen | WSP | Future Cane Hill flows |
| 6.0 | W:\21_AREA_TEAMS\25_Schemes\20 LB Croydon\z2015 Lion Green Rd Coulsdon\15_06_16 LMAP 5\modelling | Lion Green Road Prop V4 | WSP | Approved proposed model |
| 7.0 | W:\21_AREA_TEAMS\25_Schemes\20 LB Croydon\z2015 Lion Green Rd Coulsdon\15_06_16 LMAP 5\Audit | TD LMAP Stage 5 Check Sheet v3.1 | J Bernaldo | LMAP stage 5 audit sheet |
| | | | | |
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Appendix B – Comparative Performance Statistics

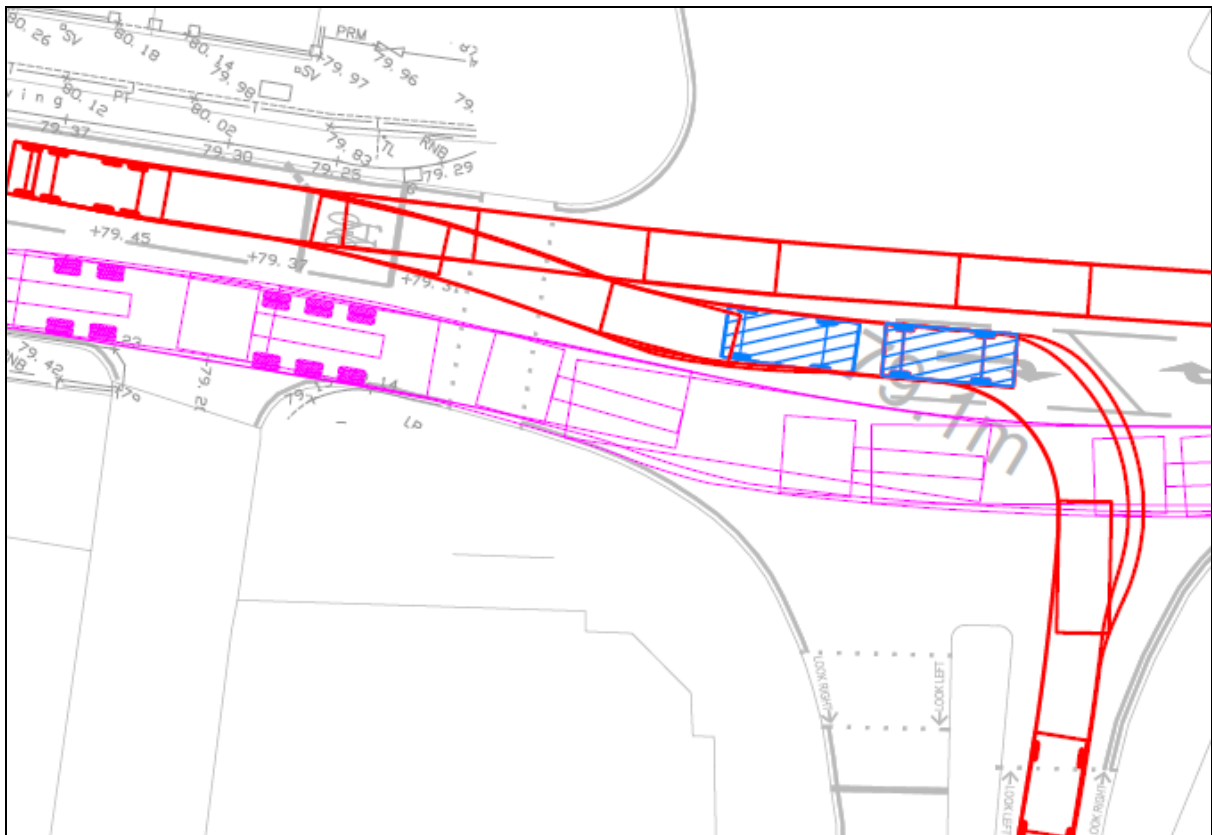
Proposed Drawing [50400637-0637-SK-57.dwg](#)



CALAT carpark for Coulsdon Centre (in Red)



Current – Only 2 vehicles can store before blocking occurs



Proposed – 3 vehicles can store until blocking occurs.

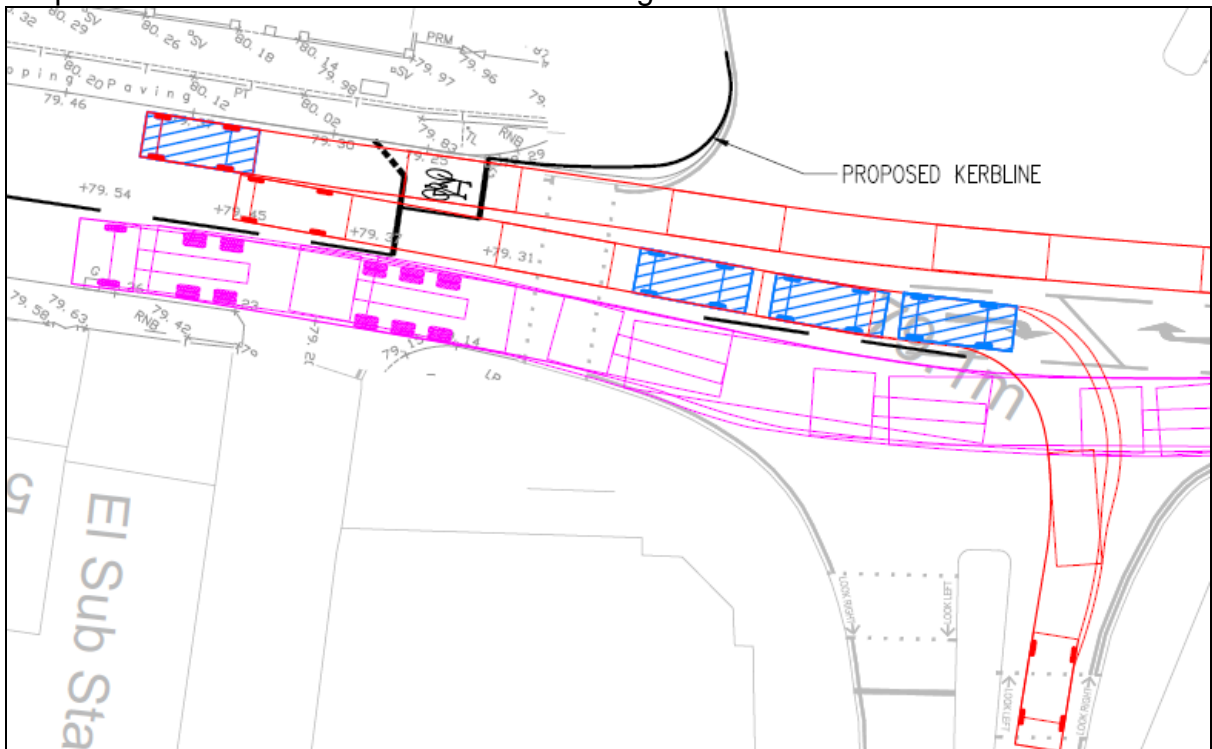


Table 1 – Degree of Saturation Summary AM

| AM | 20/039 & 20/169 | | |
|---------------------------------------|----------------------------|-------------------|-----------------------|
| | Base Model | Prop Model | |
| Lane | DoS (%) | DoS (%) | Difference (%) |
| J1:1/1 – Woodcote Grove Road NS | 70% | 77% | 7% |
| J1:1/2 – Woodcote Grove Road OS | 91% | 94% | 3% |
| J1:2/1 – Chipstead Valley Road WB | 53% | 57% | 4% |
| J1:3/1 – Lion Green Road NB | 91% | 94% | 3% |
| J1:4/1 – Chipstead Valley Road EB | 93% | 93% | 0% |
| J1:5/1 – Woodman Road | 43% | 43% | 0% |
| J2:1/1 – Brighton Road SB | 61% | 61% | 0% |
| J2:2/1 – Brighton Road NB NS | 91% | 90% | -1% |
| J2:2/2 – Brighton Road NB OS | 84% | 91% | 7% |
| J2:3/1 – Lion Green Road SB | 47% | 51% | 4% |
| J3:1/1 and 1/2 Development Exit Lanes | | 7% | |
| J3:3/1 and 3/2 Lion Green Road SB | | 36% | |
| J3:4/1 Lion Green Road NB | | 34% | |

Table 2 – Degree of Saturation Summary PM

| PM | 20/039 & 20/169 | | |
|---------------------------------------|----------------------------|-------------------|-----------------------|
| | Base Model | Prop Model | |
| Lane | DoS (%) | DoS (%) | Difference (%) |
| J1:1/1 – Woodcote Grove Road NS | 83% | 85% | 2% |
| J1:1/2 – Woodcote Grove Road OS | 83% | 85% | 2% |
| J1:2/1 – Chipstead Valley Road WB | 41% | 45% | 4% |
| J1:3/1 – Lion Green Road NB | 96% | 95% | -1% |
| J1:4/1 – Chipstead Valley Road EB | 86% | 94% | 8% |
| J1:5/1 – Woodman Road | 22% | 22% | 0% |
| J2:1/1 – Brighton Road SB | 71% | 71% | 0% |
| J2:2/1 – Brighton Road NB NS | 99% | 100% | 1% |
| J2:2/2 – Brighton Road NB OS | 95% | 90% | -5% |
| J2:3/1 – Lion Green Road SB | 61% | 67% | 6% |
| J3:1/1 and 1/2 Development Exit Lanes | | 40% | |
| J3:3/1 and 3/2 Lion Green Road SB | | 52% | |
| J3:4/1 Lion Green Road NB | | 35% | |

Table 3 – Degree of Saturation Summary SAT

| SAT | 20/039 & 20/169 | | |
|---------------------------------------|--------------------------|--------------------------|-------------------|
| Lane | Base Model DoS (%) | Prop Model DoS (%) | Difference (%) |
| J1:1/1 – Woodcote Grove Road NS | 61% | 64% | 3% |
| J1:1/2 – Woodcote Grove Road OS | 64% | 66% | 2% |
| J1:2/1 – Chipstead Valley Road WB | 48% | 47% | -1% |
| J1:3/1 – Lion Green Road NB | 85% | 93% | 8% |
| J1:4/1 – Chipstead Valley Road EB | 98% | 93% | -5% |
| J1:5/1 – Woodman Road | 37% | 37% | 0% |
| J2:1/1 – Brighton Road SB | 60% | 60% | 0% |
| J2:2/1 – Brighton Road NB NS | 55% | 62% | 7% |
| J2:2/2 – Brighton Road NB OS | 66% | 69% | 3% |
| J2:3/1 – Lion Green Road SB | 52% | 59% | 7% |
| J3:1/1 and 1/2 Development Exit Lanes | | 26% | |
| J3:3/1 and 3/2 Lion Green Road SB | | 38% | |
| J3:4/1 Lion Green Road NB | | 36% | |

Table 4 – Queue Length Summary – AM

| AM | 20/039 & 20/169 | | |
|---------------------------------------|---------------------------------|---------------------------------|-----------------------------|
| Lane | Base Model MMQ (PCU) | Prop Model MMQ (PCU) | Difference (PCU) |
| J1:1/1 – Woodcote Grove Road NS | 13 | 14 | 1 |
| J1:1/2 – Woodcote Grove Road OS | | | |
| J1:2/1 – Chipstead Valley Road WB | 9 | 9 | 0 |
| J1:3/1 – Lion Green Road NB | 14 | 16 | 2 |
| J1:4/1 – Chipstead Valley Road EB | 19 | 20 | 1 |
| J1:5/1 – Woodman Road | 1 | 1 | 0 |
| J2:1/1 – Brighton Road SB | 4 | 4 | 0 |
| J2:2/1 – Brighton Road NB NS | 24 | 24 | 0 |
| J2:2/2 – Brighton Road NB OS | 9 | 11 | 2 |
| J2:3/1 – Lion Green Road SB | 5 | 5 | 0 |
| J3:1/1 and 1/2 Development Exit Lanes | | 1 | |
| J3:3/1 and 3/2 Lion Green Road SB | | 1 | |
| J3:4/1 Lion Green Road NB | | 0 | |

Table 5 – Queue Length Summary - PM

| PM | 20/039 & 20/169 | | |
|---------------------------------------|---------------------------------|---------------------------------|-----------------------------|
| Lane | Base Model MMQ (PCU) | Prop Model MMQ (PCU) | Difference (PCU) |
| J1:1/1 – Woodcote Grove Road NS | 19 | 22 | 3 |
| J1:1/2 – Woodcote Grove Road OS | | | |
| J1:2/1 – Chipstead Valley Road WB | 7 | 8 | 1 |
| J1:3/1 – Lion Green Road NB | 23 | 29 | 6 |
| J1:4/1 – Chipstead Valley Road EB | 19 | 23 | 4 |
| J1:5/1 – Woodman Road | 1 | 1 | 0 |
| J2:1/1 – Brighton Road SB | 7 | 7 | 0 |
| J2:2/1 – Brighton Road NB NS | 29 | 34 | 5 |
| J2:2/2 – Brighton Road NB OS | 13 | 14 | 1 |
| J2:3/1 – Lion Green Road SB | 7 | 18 | 11 |
| J3:1/1 and 1/2 Development Exit Lanes | | 2 | |
| J3:3/1 and 3/2 Lion Green Road SB | | 2 | |
| J3:4/1 Lion Green Road NB | | 0 | |

Table 6 – Queue Length Summary – SAT

| SAT | 20/039 & 20/169 | | |
|---------------------------------------|---------------------------------|---------------------------------|-----------------------------|
| Lane | Base Model MMQ (PCU) | Prop Model MMQ (PCU) | Difference (PCU) |
| J1:1/1 – Woodcote Grove Road NS | 12 | 13 | 1 |
| J1:1/2 – Woodcote Grove Road OS | | | |
| J1:2/1 – Chipstead Valley Road WB | 7 | 7 | 0 |
| J1:3/1 – Lion Green Road NB | 19 | 24 | 5 |
| J1:4/1 – Chipstead Valley Road EB | 24 | 20 | -4 |
| J1:5/1 – Woodman Road | 1 | 1 | 0 |
| J2:1/1 – Brighton Road SB | 7 | 7 | 0 |
| J2:2/1 – Brighton Road NB NS | 13 | 15 | 2 |
| J2:2/2 – Brighton Road NB OS | 8 | 9 | 1 |
| J2:3/1 – Lion Green Road SB | 8 | 10 | 2 |
| J3:1/1 and 1/2 Development Exit Lanes | | 2 | |
| J3:3/1 and 3/2 Lion Green Road SB | | 1 | |
| J3:4/1 Lion Green Road NB | | 0 | |

Table 7 – Comparison between future base and proposed – AM

| AM | 20/039 & 20/169 | | | |
|---------------------------------------|-----------------------------------|--------------------------------|-----------------------------------|--|
| Lane | Base Model DoS (%) | Future Base (%) | Prop Model DoS (%) | Base vs Prop Difference (%) |
| J1:1/1 – Woodcote Grove Road NS | 70% | 66% | 77% | 7% |
| J1:1/2 – Woodcote Grove Road OS | 91% | 94% | 94% | 3% |
| J1:2/1 – Chipstead Valley Road WB | 53% | 54% | 57% | 4% |
| J1:3/1 – Lion Green Road NB | 91% | 98% | 94% | 3% |
| J1:4/1 – Chipstead Valley Road EB | 93% | 96% | 93% | 0% |
| J1:5/1 – Woodman Road | 43% | 43% | 43% | 0% |
| J2:1/1 – Brighton Road SB | 61% | 61% | 61% | 0% |
| J2:2/1 – Brighton Road NB NS | 91% | 90% | 90% | -1% |
| J2:2/2 – Brighton Road NB OS | 84% | 81% | 91% | 7% |
| J2:3/1 – Lion Green Road SB | 47% | 51% | 51% | 4% |
| J3:1/1 and 1/2 Development Exit Lanes | | | 7% | |
| J3:3/1 and 3/2 Lion Green Road SB | | | 36% | |
| J3:4/1 Lion Green Road NB | | | 34% | |

Table 8 – Comparison between future base and proposed – PM

| PM | 20/039 & 20/169 | | | |
|---------------------------------------|--------------------|-----------------|--------------------|-----------------------------|
| Lane | Base Model DoS (%) | Future Base (%) | Prop Model DoS (%) | Base vs Prop Difference (%) |
| J1:1/1 – Woodcote Grove Road NS | 83% | 87% | 85% | 2% |
| J1:1/2 – Woodcote Grove Road OS | 83% | 83% | 85% | 2% |
| J1:2/1 – Chipstead Valley Road WB | 41% | 44% | 45% | 4% |
| J1:3/1 – Lion Green Road NB | 96% | 98% | 95% | -1% |
| J1:4/1 – Chipstead Valley Road EB | 86% | 98% | 94% | 8% |
| J1:5/1 – Woodman Road | 22% | 22% | 22% | 0% |
| J2:1/1 – Brighton Road SB | 71% | 71% | 71% | 0% |
| J2:2/1 – Brighton Road NB NS | 99% | 100% | 100% | 1% |
| J2:2/2 – Brighton Road NB OS | 95% | 96% | 90% | -5% |
| J2:3/1 – Lion Green Road SB | 61% | 67% | 67% | 6% |
| J3:1/1 and 1/2 Development Exit Lanes | | | 40% | |
| J3:3/1 and 3/2 Lion Green Road SB | | | 52% | |
| J3:4/1 Lion Green Road NB | | | 35% | |

Table 9 – Comparison between future base and proposed - SAT

| SAT | 20/039 & 20/169 | | | |
|---------------------------------------|--------------------|-----------------|--------------------|-----------------------------|
| Lane | Base Model DoS (%) | Future Base (%) | Prop Model DoS (%) | Base vs Prop Difference (%) |
| J1:1/1 – Woodcote Grove Road NS | 61% | 66% | 64% | 3% |
| J1:1/2 – Woodcote Grove Road OS | 64% | 72% | 66% | 2% |
| J1:2/1 – Chipstead Valley Road WB | 48% | 44% | 47% | -1% |
| J1:3/1 – Lion Green Road NB | 85% | 95% | 93% | 8% |
| J1:4/1 – Chipstead Valley Road EB | 98% | 95% | 93% | -5% |
| J1:5/1 – Woodman Road | 37% | 37% | 37% | 0% |
| J2:1/1 – Brighton Road SB | 60% | 60% | 60% | 0% |
| J2:2/1 – Brighton Road NB NS | 55% | 62% | 62% | 7% |
| J2:2/2 – Brighton Road NB OS | 66% | 84% | 69% | 3% |
| J2:3/1 – Lion Green Road SB | 52% | 59% | 59% | 7% |
| J3:1/1 and 1/2 Development Exit Lanes | | | 26% | |
| J3:3/1 and 3/2 Lion Green Road SB | | | 38% | |
| J3:4/1 Lion Green Road NB | | | 36% | |

