



Derby City Council

A5111/Kingsway Roundabout

Technical Note
Options Analysis

Report No. RT81175-72-001

WYG
Executive Park
Avalon Way
Anstey
Leicester
LE7 7GR

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REPORT CONTROL

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1 Introduction

- 1.1.1 WYG were commissioned to undertake an assessment of options to improve the operation of the recently commissioned traffic signals at the A5111/Kingsway, Derby.
- 1.1.2 As part of the development of the Manor/Kingsway hospital site in Derby, the priority roundabout at the A5111/Kingsway has been improved to include a new 4th arm into the development and traffic signal control with pedestrian/cycle crossings on all 4 approaches. Following commissioning problems, queues in the retail park were experienced in the weekday inter-peak and at weekends, which subsequently led to the traffic signals being switched off and the roundabout reverting to priority control.
- 1.1.3 The layout of the traffic signals is shown in **Appendix A**. The signals incorporate Micro-processor Optimised Vehicle Activation (MOVA), which uses a system of detection loops and special delay optimising software in order to determine the most efficient traffic signal timings.
- 1.1.4 This report summarises the performance of the junction and proposed improvement options for the following scenarios:
- i) 2015 AM plus development
 - ii) 2015 PM plus development
 - iii) 2015 IP plus development
 - iv) 2015 Saturday peak plus development
- 1.1.5 The JCT LINSIG software is an industry standard tool for modelling the operation of traffic signal controlled junctions.
- 1.1.6 The following information was provided by DCC to form the basis of the options analysis:
- i) An AutoCAD layout of the 'as built' roundabout
 - ii) A LINSIG model of the 'as built' roundabout
 - iii) Traffic flow data from a 2015 survey
 - iv) Traffic signal controller configuration data
- 1.1.7 Flows from the 2015 survey were combined with the forecast development trips to form the basis of the scenarios tested as per 1.1.4 above.
- 1.1.8 Whilst every effort has been made to accurately model the operation of the junction and proposed amendments with the information available, it is recommended that more detailed assessment of any proposal is carried out prior to implementation.

2 Existing Operation

- 2.1.1 The results of the LINSIG model as provided by DCC for the test scenarios are summarised in **Table 1** below. The LINSIG model was adjusted to reflect the actual controller configuration and handset modifications. The table shows the LINSIG results for degree of saturation (%SAT) and Mean Maximum Queue (MMQ) for each approach and the overall Practical Reserve Capacity (PRC) and total delay (DELAY) for the roundabout.

	2015 AM		2015 PM		2015 IP		2015 SAT	
	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ
A5111 SB	88.0	16.6	92.2	9.8	110.8	44.0	118.4	60.7
Retail Park	31.3	1.8	90.8	10.9	109.0	55.7	117.2	104.2
A5111 NB	86.8	12.0	78.0	5.8	108.3	39.9	113.6	52.3
Development	54.9	3.2	84.7	7.1	102.7	17.6	27.6	1.5
PRC	2.3%		-2.4		-23.2		-31.6	
DELAY (pcuHr)	30.36		34.25		199.87		285.44	

Table 1: LINSIG Results - DCC Model

- 2.1.2 Following a review of the 'as built' drawing and the controller specification some changes were made to the LINSIG model as follows:
- The modelling was reviewed against the 'as built' drawings and there were several inconsistencies including:
 - Flare lane length on A5111 SB is modelled as 5 pcus and should be 3 pcus
 - Flare lane length on the retail park is modelled as 5 pcus and should be 3 pcus
 - Flare lane length on A5111 NB is modelled as 5 pcus and should be 3 pcus
 - Some link connector travel times were incorrect
 - It was also noted that the stage to stage intergreens could be improved by changing the stage arrangement so that u-turn movements receive a red signal on the circulating carriageway. This allows the next anti-clockwise approach to start earlier, reducing intergreen times.

2.1.3 With these changes made to the model the results are as summarised in **Table 2**.

	2015 AM		2015 PM		2015 IP		2015 SAT	
	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ
A5111 SB	83.1	14.3	89.7	10.9	105.1	32.6	113.5	48.9
Retail Park	37.1	1.7	91.5	13.2	108.3	52.9	117.0	104.6
A5111 NB	82.0	10.6	87.7	7.4	108.4	38.2	114.3	53.3
Development	52.8	3.0	87.6	9.9	102.7	17.1	27.6	1.5
PRC	8.3%		-1.6%		-20.4%		-30.0%	
DELAY (pcuHr)	26.06		37.47		176.17		255.68	

Table 2: LINSIG Results – WYG 'As Built' Do Minimum

2.1.4 The results in table 2 illustrate that there is spare capacity in the weekday AM peak period and the junction is at capacity in the PM peak. In the weekday inter-peak and Saturday peak period however the junction is significantly over capacity.

2.1.5 Practical reserve capacity (PRC) is an estimate of the spare capacity of the junction based on the link with highest degree of saturation. If a link has a degree of saturation of 90% the PRC will be zero. In theory links are not oversaturated until the degree of saturation exceeds 100% (i.e. demand is equal to capacity) but operational performance above 90% saturation is much more volatile. The PRC for a junction with a degree of saturation of 100% is -11.1%.

2.1.6 The approach from the retail park's internal roundabout is approximately 240m in length. Queue lengths over 40 pcus will therefore impact on the operation of the internal roundabout leading to congestion in the car parks. This is the case in both the weekday inter-peak and Saturday peak periods.

2.1.7 It should also be noted that there are issues with the 'as built' layout which will potentially reduce the operational performance and safety of the junction. These are:

- i) The 2 to 1 lane merges on the A5111 NB and SB exits from the roundabout are shorter than the standard specified in the Design Manual for Roads and Bridges (DMRB) TD50, which recommends a merge length of 100m.
- ii) The exit pedestrian crossings are situated very close to the roundabout, so that long vehicles extend on to the circulating carriageway if stopped on red.
- iii) The circulating lane widths are insufficient to allow for the swept paths of vehicles in 3 lanes side by side.
- iv) Visibility from approach stop lines to exit pedestrian crossings is across third party land. For the new development approach visibility is obstructed by the new apartment building.
- v) A left turn filter has been provided on the retail park exit, however the nearside lane is marked as ahead and left, which could be confusing. The appearance of the left turn filter also means

that left turning traffic would possibly run on to a red signal if the exit crossing on the A5111 southbound is demanded.

3 Options Analysis

3.1 AS BUILT METHOD OF CONTROL

3.1.1 Drawing number A081175-TS002 shows amendments to road markings aimed at maximising the performance of the junction by improving driver behaviour, without physical alterations to kerb lines. The proposals include:

- i) Provision of spiralised lane markings on the circulatory carriageway
- ii) Amendments to the lane widths on A5111 SB in order to provide 2 lanes on the northbound exit and remove the 2 to 1 merge

3.1.2 In conjunction with the road markings the traffic signal controller configuration could be amended as discussed in 2.1.2 to allow for a more efficient implementation of MOVA control. The changes to road markings would also require the MOVA loop detectors on the A5111 SB to be re-cut.

3.1.3 The MOVA detection on the retail park approach is currently provided using an above ground RADAR detector simulating detector loops. It would potentially improve the operation of MOVA if inductive loops could be slot cut on this approach at appropriate distances. This would require the agreement of the landowner. Failing this, the set up of the RADAR detection should be reviewed in order to obtain better virtual loop locations. This may require the unit to be mounted on a taller pole.

3.1.4 Whilst the measures described above are aimed at improving driver behaviour and maximising the efficiency of the existing layout, in practice the theoretical capacity of the roundabout would not be improved. The capacity results are therefore as shown in **Table 2** above.

3.1.5 Drawing number A081175-TS003 in **Appendix A** shows a possible improvement to the approach from the retail park. The improvement consists of widening to provide 2 lanes on the approach to the roundabout for a distance of approximately 100m. The LINSIG results for this improvement with the 'as built' method of control are summarized in **Table 3** below.

	2015 AM		2015 PM		2015 IP		2015 SAT	
	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ
A5111 SB	83.1	14.3	85.4	9.6	89.6	12.9	96.0	19.6
Retail Park	26.6	1.6	81.3	8.9	91.1	11.7	97.3	22.9
A5111 NB	82.0	10.6	87.0	9.0	92.8	13.7	94.9	19.5
Development	52.8	3.0	83.8	8.9	93.4	10.1	27.6	1.5
PRC	8.3%		3.5%		-3.8%		-8.1%	
DELAY (pcuHr)	25.95		34.19		50.30		61.63	

Table 3: LINSIG Results – WYG 'As Built' and 2 lane Retail Park Exit

3.1.6 The results in **Table 3** demonstrate that widening the retail park exit with no other physical improvements would be a significant improvement to the capacity of the junction; however the

roundabout would still be approaching the limit of capacity in the inter-peak and Saturday peak periods.

3.1.7 It should be noted that the improvement shown on drawing number A081175-TS003 would require land in third party ownership, which would be a significant risk to the delivery of this option.

3.1.8 Drawing number A081175-TS004 shows further amendments to the junction within the highway boundary alongside the proposed widening of the retail park exit, which includes:

- i) Widening of the A5111 North on the east and west sides to increase the length of the third approach lane and provide 2 exit lanes.
- ii) Amending the traffic signals to include a left turn filter signal on the A5111 North approach. LINSIG modelling shows that the appearance of the exit crossing on the retail park arm can be co-ordinated with the green signal for the Manor Kingsway development to avoid conflicts with the appearance of the filter.
- iii) Widening of the circulatory carriageway on the west side of the roundabout to allow space for the swept paths of 3 vehicles.
- iv) Amend the circulatory carriageway on the east side of the roundabout to 2 lanes and provide a left turn lane on the A5111 southbound approach to improve vehicle tracking on this side of the roundabout.

3.1.9 Observations on site indicate that the above improvements could be made with minimal impact on utilities; however this would need to be confirmed prior to detailed design and implementation.

3.1.10 With the amendments described above, the LINSIG model results are summarised in **Table 4** below.

	2015 AM		2015 PM		2015 IP		2015 SAT	
	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ
A5111 SB	88.5	16.2	82.2	8.2	87.6	8.9	86.2	9.8
Retail Park	19.3	1.4	66.5	7.1	80.5	8.4	87.1	14.1
A5111 NB	89.8	12.6	87.0	9.0	88.2	11.7	85.1	15.0
Development	52.8	3.0	87.6	9.9	85.6	7.7	27.6	1.5
PRC	0.2%		2.7%		2.1%		3.3%	
DELAY (pcuHr)	29.66		31.76		35.89		36.23	

Table 4: LINSIG Results – WYG 'As Built', 2 Lane Retail Park Exit and Highway Improvement 1

3.1.11 The results show that, with the inclusion of these two improvements the operation of the roundabout would be improved to be operating with spare capacity in all scenarios.

3.1.12 Drawing number A081175-TS005 in **Appendix A** shows a second option for improving the layout of the roundabout within highway. This consists of widening the A5111 South arm to increase the length of the exit merge to standard and to increase the length of the third approach lane. **Table 5** below summarises the LINSIG results with these improvements:

	2015 AM		2015 PM		2015 IP		2015 SAT	
	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ
A5111 SB	86.8	15.2	79.7	8.0	87.8	10.5	86.3	12.9
Retail Park	19.3	1.4	73.1	7.7	80.5	8.4	87.1	14.1
A5111 NB	85.4	11.0	82.7	7.1	85.0	10.0	85.6	15.1
Development	52.8	3.0	83.8	8.9	85.6	7.7	27.6	1.5
PRC	3.7%		7.3%		2.5%		3.3%	
DELAY (pcuHr)	27.19		28.67		33.33		35.34	

Table 5: LINSIG Results – WYG 'As Built', 2 Lane Retail Park Exit and Highway Improvements 1 and 2

3.1.13 The results above show that the second option for improvement within highway would increase the capacity of the roundabout. However, the additional improvement over and above the combination of the widening of the retail park exit and widening on the A5111 North (Option 1) is limited. This improvement does, however, improve the A5111 southbound exit merge to the standard required by the DMRB, which in turn increases the robustness of the operation.

3.1.14 As stated in 3.1.7 the widening of the retail park exit requires third party land and therefore the delivery of this improvement may be difficult. Drawing number A081175-TS006 in **Appendix A** shows a layout with the options 1 and 2 for improvement within highway and not including the widening of the retail park exit. The LINSIG results for this layout are summarised below in **Table 6**:

	2015 AM		2015 PM		2015 IP		2015 SAT	
	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ
A5111 SB	86.4	15.1	82.6	7.9	95.9	14.3	100.0	22.7
Retail Park	30.7	1.5	89.3	10.6	97.4	20.2	101.4	40.0
A5111 NB	85.6	11.0	67.2	4.9	96.0	14.5	102.5	27.4
Development	52.8	3.0	83.3	7.8	92.5	9.2	23.9	1.2
PRC	4.2%		0.7%		-8.3%		-13.9%	
DELAY (pcuHr)	28.58		29.18		61.13		96.30	

Table 6: LINSIG Results – WYG 'As Built' with Highway Improvements 1 and 2

3.1.15 The results show that with improvements in the highway but without widening on the retail park exit the junction is over capacity in the weekday inter-peak and Saturday peak periods.

3.2 REVISED METHOD OF CONTROL - OPTION 1

3.2.1 The capacity of the roundabout can be improved by amending the traffic signal staging and sequence. The first option tested in LINSIG involves amending the stage arrangement to allow the Retail Park and development approaches to start early. The proposed stage sequence is shown in Figure 1 below. Stages 2 and 3 of the sequence would appear if demanded by high volume of right turning vehicles.

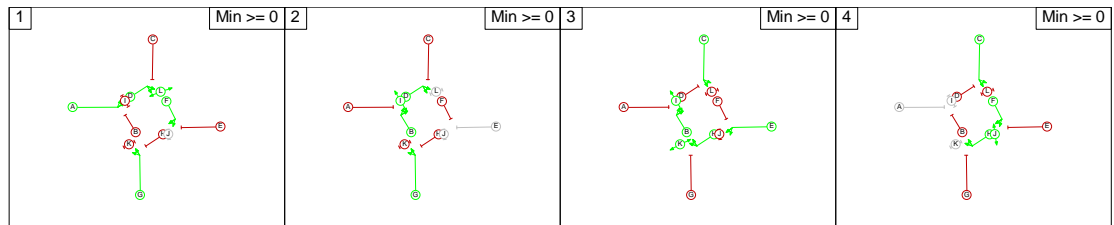


Figure 1 – Option 1 Stage Sequence

3.2.2 A drawback of the proposed method of control is that vehicles exiting the retail park and the development arms would be required to stop at a red signal on the roundabout and at the exit pedestrian crossing, which impacts on safety at the junction.

3.2.3 **Table 7** provides a summary of the LINSIG results for this method with the 'do minimum' layout.

	2015 AM		2015 PM		2015 IP		2015 SAT	
	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ
A5111 SB	87.8	14.8	88.2	14.3	95.5	21.6	86.8	12.5
Retail Park	40.3	3.1	89.7	14.6	93.8	24.0	89.8	18.5
A5111 NB	88.5	14.1	81.4	11.1	70.0	12.1	76.5	10.9
Development	20.2	1.8	80.0	9.4	59.5	7.3	17.0	1.0
PRC	1.6%		0.4%		-6.1%		0.2%	
DELAY (pcuHr)	34.18		40.62		50.94		34.96	

Table 7: LINSIG Results – WYG Option 1 Do Minimum Layout

3.2.4 The results show that the junction would operate with spare capacity in the weekday AM and PM peak periods and the Saturday peak. The junction would be slightly over capacity in the weekday inter-peak period but the overall degree of saturation would be less than 100%.

3.3 REVISED METHOD OF CONTROL - OPTION 2

3.3.1 The second option for an amendment to the method of control involves amending the stage sequence to allow both A5111 approaches to run together, followed by both side roads running together. Intermediate stages would allow for large right turn movements to clear. The stage sequence for this option is shown in Figure 2.

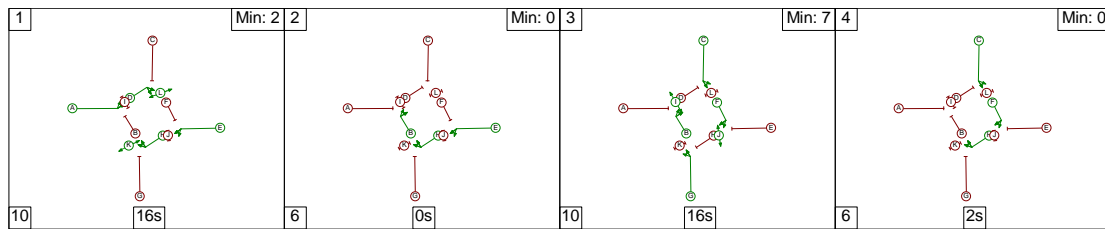


Figure 2 – Option 2 Stage Sequence

3.3.2 Drawbacks of this method of control include:

- i) Right turning traffic is required to stop at a red signal
- ii) Left turning traffic is required to stop at a red signal on the exit crossings
- iii) Difficult to operate on MOVA as rigid control of cycle time is required

3.3.3 **Table 8** provides a summary of the LINSIG results for this method with the 'as built' layout.

	2015 AM		2015 PM		2015 IP		2015 SAT	
	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ	%SAT	MMQ
A5111 SB	85.4	10.5	78.2	8.4	85.6	12.7	92.5	15.8
Retail Park	30.0	1.3	86.6	11.7	92.9	17.9	95.5	26.3
A5111 NB	64.4	5.3	63.8	5.7	85.5	11.7	93.7	17.1
Development	32.0	1.7	83.2	9.0	67.8	6.2	15.1	1.1
Circ @ Retail		1.0		10.0		5.0		1.3
Circ @ A5111 NB		3.0		3.5		1.9		1.3
PRC	5.3%		0.4%		-3.4%		-6.2%	
DELAY (pcuHr)	20.34		31.53		42.97		54.72	

Table 8: LINSIG Results – WYG Option 2 Do Minimum Layout

3.3.4 The results show that the junction would operate with spare capacity in the weekday AM and PM peak periods. The junction would be slightly over capacity in the weekday inter-peak and Saturday peak periods but the overall degree of saturation would be less than 100%.

3.3.5 It should be noted that, although the results in tables 8 and 9 indicate that the capacity of the roundabout could be improved, there are significant queues predicted on the internal circulating links for right turns that do not have a clearance stage. It is possible for these queues to cause the roundabout to lock up, causing significant congestion. For this reason this method of control is not suitable where 2 large right turns oppose each other.

3.3.6 It would be possible to combine the changes to the traffic signal operation with the options for improvements to the layout described in section 3.1. The results have not been listed but could be provided if required.

3.4 OPERATION AS A PRIORITY ROUNDABOUT

3.4.1 As stated in the introduction to this report the traffic signals are currently switched off with the roundabout operating under priority control. The capacity of the priority controlled roundabout has been assessed using the TRL ARCADY software and the results are summarised in **Table 9** below.

	2015 AM		2015 PM		2015 IP		2015 SAT	
	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
A5111 SB	0.61	1.6	0.51	1.0	0.59	1.4	0.52	1.1
Retail Park	0.20	0.3	0.61	1.6	0.83	4.6	0.78	3.4
A5111 NB	0.43	0.8	0.41	0.7	0.53	1.1	0.53	1.1
Development	0.13	0.2	0.55	1.2	0.39	0.6	0.14	0.2

Table 9: ARCADY Results – 'As built' priority roundabout

3.4.2 The results are listed for the Ratio of Flow to Capacity (RFC), which is equivalent to the degree of saturation produced by LINSIG, and the average queue on each approach. In ARCADY models an approach is considered to be operating with spare capacity if the RFC is below 0.85, however in theory the approach is not oversaturated until the RFC exceeds 1.00.

3.4.3 The results show that in all scenarios the priority roundabout would operate with spare capacity.

3.4.4 A significant drawback of the priority roundabout arrangement is that there are no controlled crossings for pedestrians. Drawing number A081175-TS006 in **Appendix A** shows an amendment to the layout which would provide displaced Toucan crossings on the A5111 North and South arms of the roundabout. In order to provide the crossings at an appropriate distance from the roundabout give way the central splitter islands would need to be increased in size. The ARCADY results for the amended layout are shown in Table 10.

	2015 AM		2015 PM		2015 IP		2015 SAT	
	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
A5111 SB	0.69	2.2	0.58	1.4	0.67	2.0	0.66	1.9
Retail Park	0.20	0.3	0.61	1.6	0.83	4.6	0.78	3.4
A5111 NB	0.54	1.2	0.51	1.0	0.66	2.0	0.73	2.6
Development	0.13	0.2	0.55	1.2	0.39	0.6	0.14	0.2

Table 10: ARCADY Results – Priority roundabout with displaced crossings on A5111

3.4.5 The results show that the amended priority controlled roundabout would operate with spare capacity in all scenarios.

3.4.6 There are several issues with the operation as a priority roundabout that would need to be assessed prior to implementation:

- i) There are no controlled crossing facilities across the Retail Park or new development arms. Uncontrolled crossing facilities could be provided, however further assessment would be required to determine the suitability and safety of uncontrolled crossings, particularly with regard to vehicle/pedestrian inter-visibility.

- ii) The layout should be checked for compliance with design guidance for priority controlled roundabouts.
- iii) More detailed assessment of the performance of the roundabout is recommended, such as with a micro-simulation model, to determine if the junction would perform adequately.

4 Summary

- 4.1.1 This report summarises the outline assessment of a number of improvement options for A5111/Kingsway roundabout in Derby.
- 4.1.2 The report identifies a number of improvements to the layout of the roundabout which would improve the operation of the signals with the 'as built' method of control.
- 4.1.3 Two options for modification of the traffic signal method of control have been identified which improve the capacity of the roundabout. Retention of the 'as built' method of control is preferable to either Option 1 or Option 2 as it minimises risks relating to:
- i) Storage of queues on the internal links
 - ii) Red light contraventions
- 4.1.4 An option for a priority controlled roundabout solution has been identified, which would operate with spare capacity in the test scenarios and provide controlled crossing facilities on the A5111 North and South arms. A drawback of this proposal is that there is no provision for controlled pedestrian crossing facilities on either the new development arm or the retail park exit.
- 4.1.5 **Table 11** shows a summary of the improvement options identified. The Operation of the junction has been classified as either A, B, C or D where
- i) A = Worst %SAT < 90%, or RFC < 0.85
 - ii) B = Worst %SAT > 90% but < 100%, or RFC > 0.85 but < 1.00
 - iii) C = Worst %SAT > 100% but < 110%, or RFC > 1.00 but < 1.10
 - iv) D = Worst %SAT > 110%, or RFC > 1.10

%SAT being the degree of saturation in LINSIG and RFC the Ration of Flow to Capacity in ARCADY.

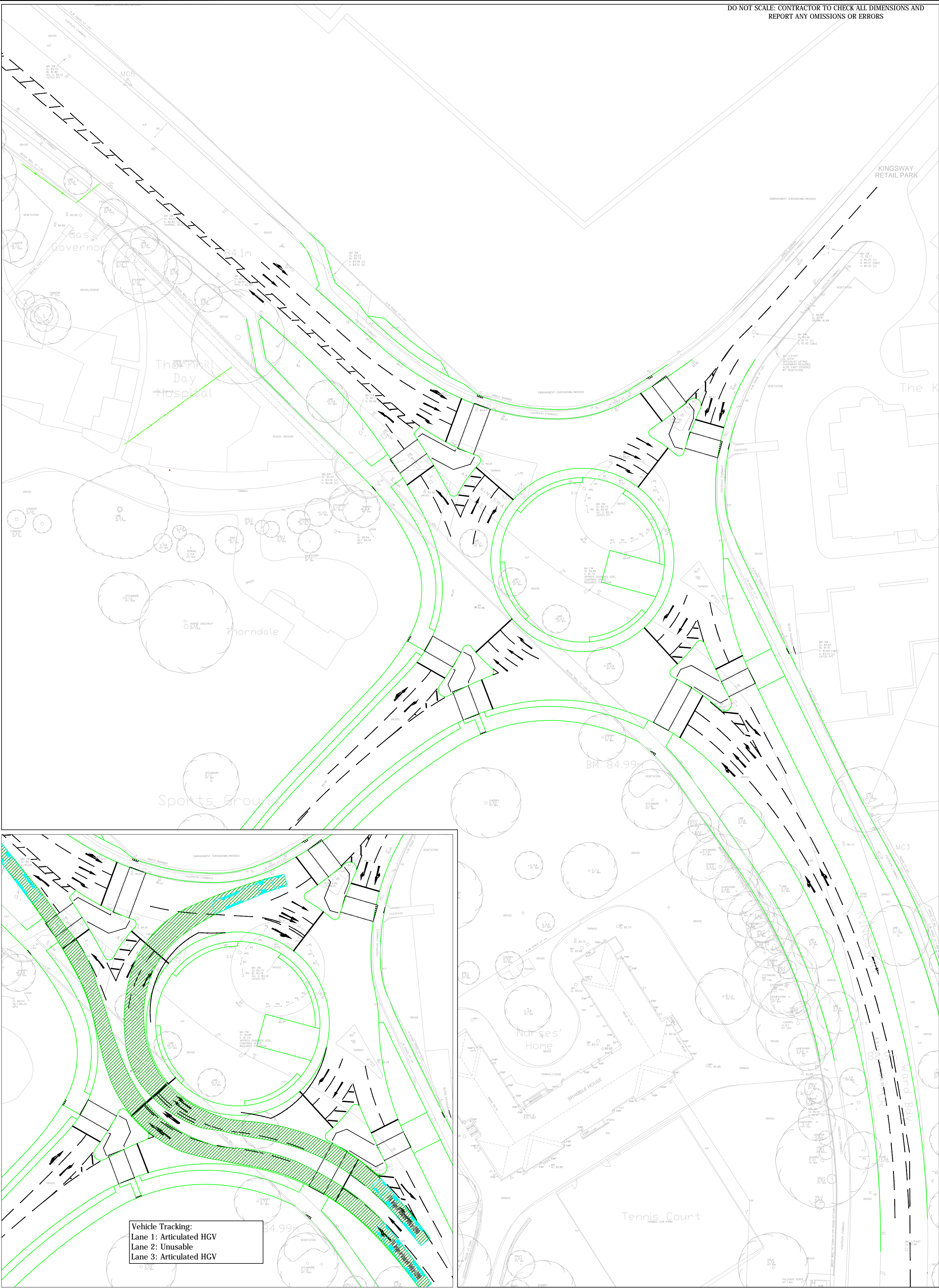
Layout	Method of Control	Operation	Significant Issues/Risks	Relative Cost
Do Minimum	As Built	D	-	-
Do Minimum plus 2 Lane Retail Exit	As Built	B	Third party land required Potential impact on Utilities	High
Do Minimum plus 2 Lane Retail Exit Highway Improvement 1	As Built	A	Third party land required Potential impact on Utilities	High
Do Minimum plus 2 Lane Retail Exit Highway Improvement 1 & 2	As Built	A	Third party land required Potential impact on Utilities	High
Do Minimum plus Highway Improvement 1 & 2	As Built	C	Potential impact on Utilities	Medium
Do Minimum	Option 1	B	Potential impact on safety	Low
Do Minimum	Option 2	B	Potential impact on safety	Low
Priority with displaced crossings	Priority Control	A	Potential impact on safety No controlled pedestrian crossings on side roads	Low

Table 11: Improvement Option Summary

- 4.1.6 Any option for improvement or amendment to the roundabout should be fully assessed prior to implementation.

Appendix A – Drawings

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS



Vehicle Tracking:
Lane 1: Articulated HGV
Lane 2: Unusable
Lane 3: Articulated HGV

REV	DESCRIPTION	BY	CHK	APP	DATE
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EXECUTIVE PARK
AVALON WAY
ANSTHEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

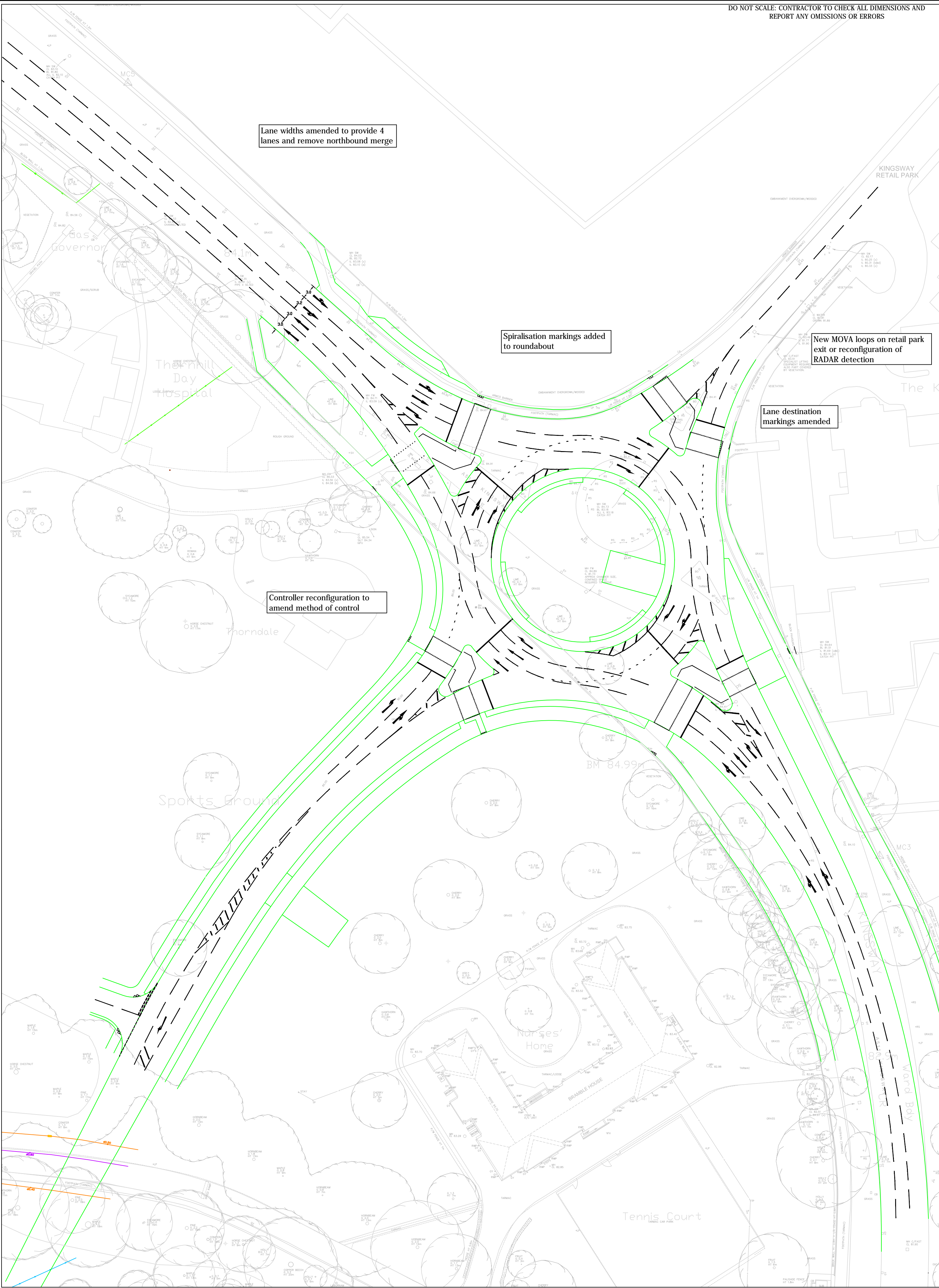


DERBY CITY COUNCIL

Project:
A5111/KINGSWAY

Drawing Title:
AS BUILT LAYOUT

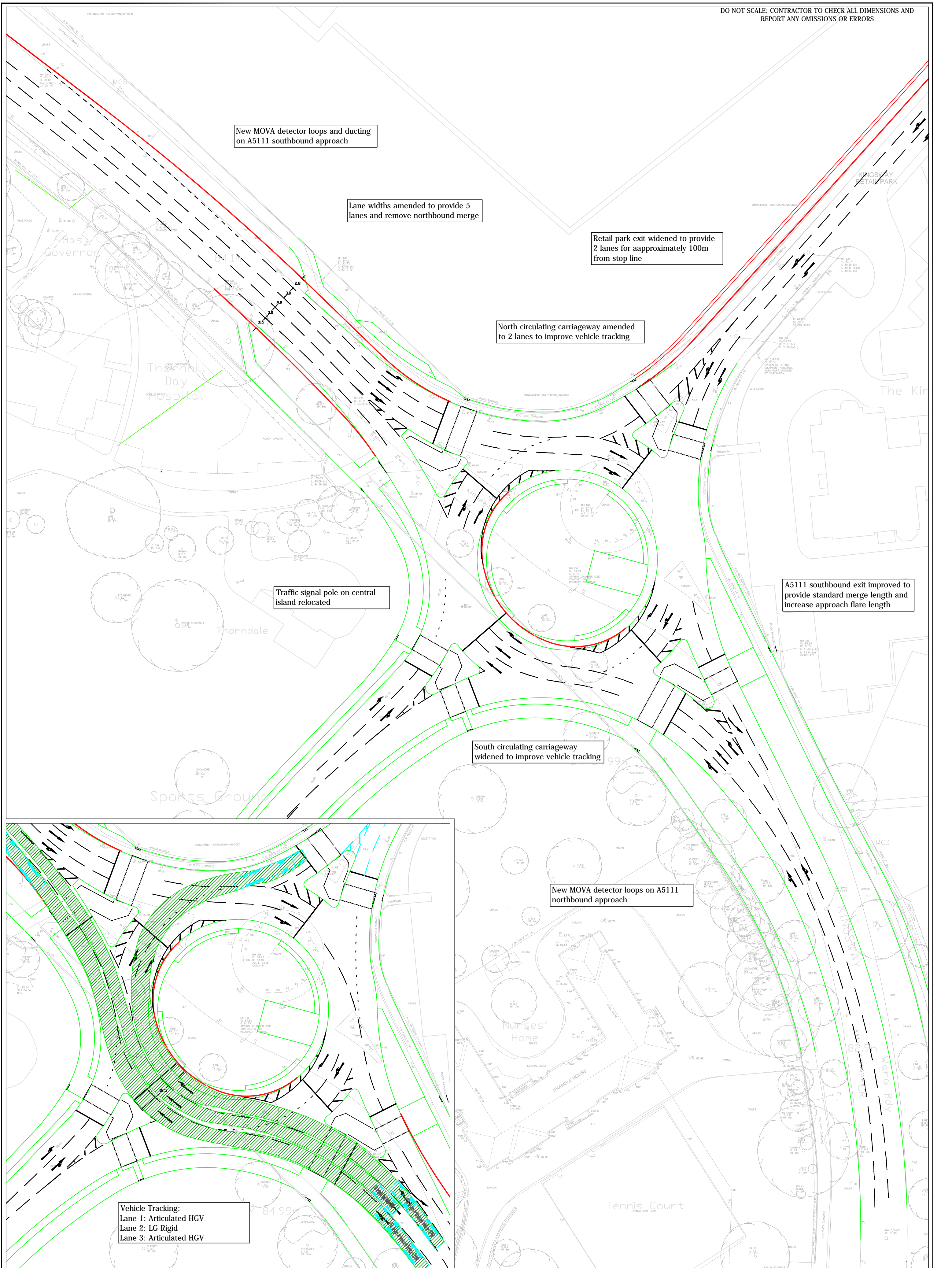
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Project No. A081175-72	Office 25	Type 18	Drawing No. TS001	Revision -		



REV				DESCRIPTION				BY	CHK	APP	DATE										
<div>EXECUTIVE PARK AVALON WAY ANSTEY LEICESTER LE7 7GR TEL: +44 (0)116 234 8000 FAX: +44 (0)116 234 8001 e-mail: leicester@wyg.com</div> <div></div> <div>DERBY CITY COUNCIL</div>				<div>Project: A5111/KINGSWAY</div>				<div>Drawing Title: PROPOSED IMPROVEMENTS DO MINIMUM</div>				Scale @ A2		Drawn	Date	Checked	Date	Approved	Date		
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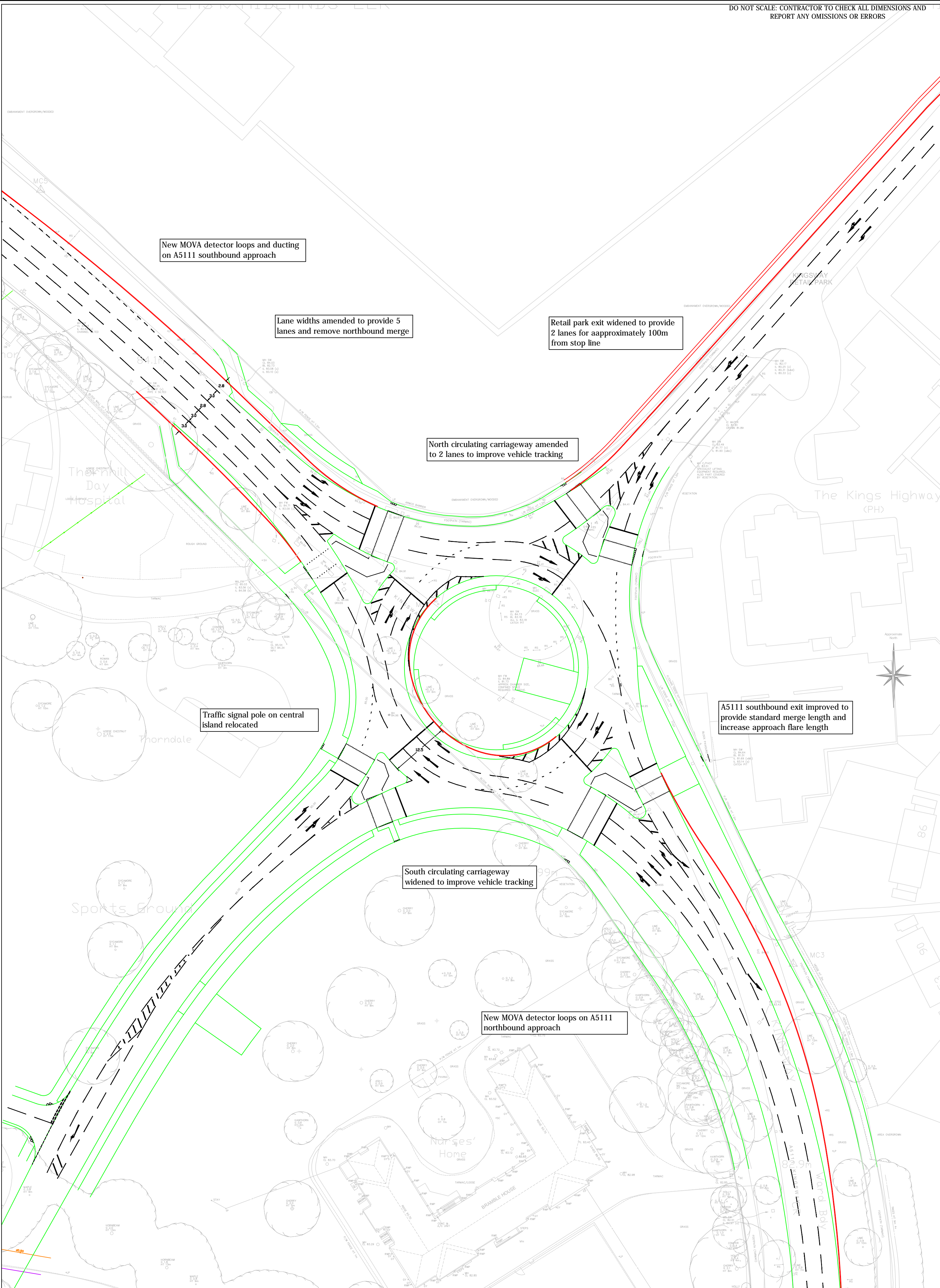
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Project:
A5111/KINGSWAY

Drawing Title:
PROPOSED IMPROVEMENTS
RETAIL APPROACH WIDENING &
HIGHWAY OPTION 1

Scale @ A2 1:500		Drawn AC	Date 14.9.16	Checked	Date	Approved	Date
Project No. A081175-72	Office 25	Type 18	Drawing No. TS004	Revision -			

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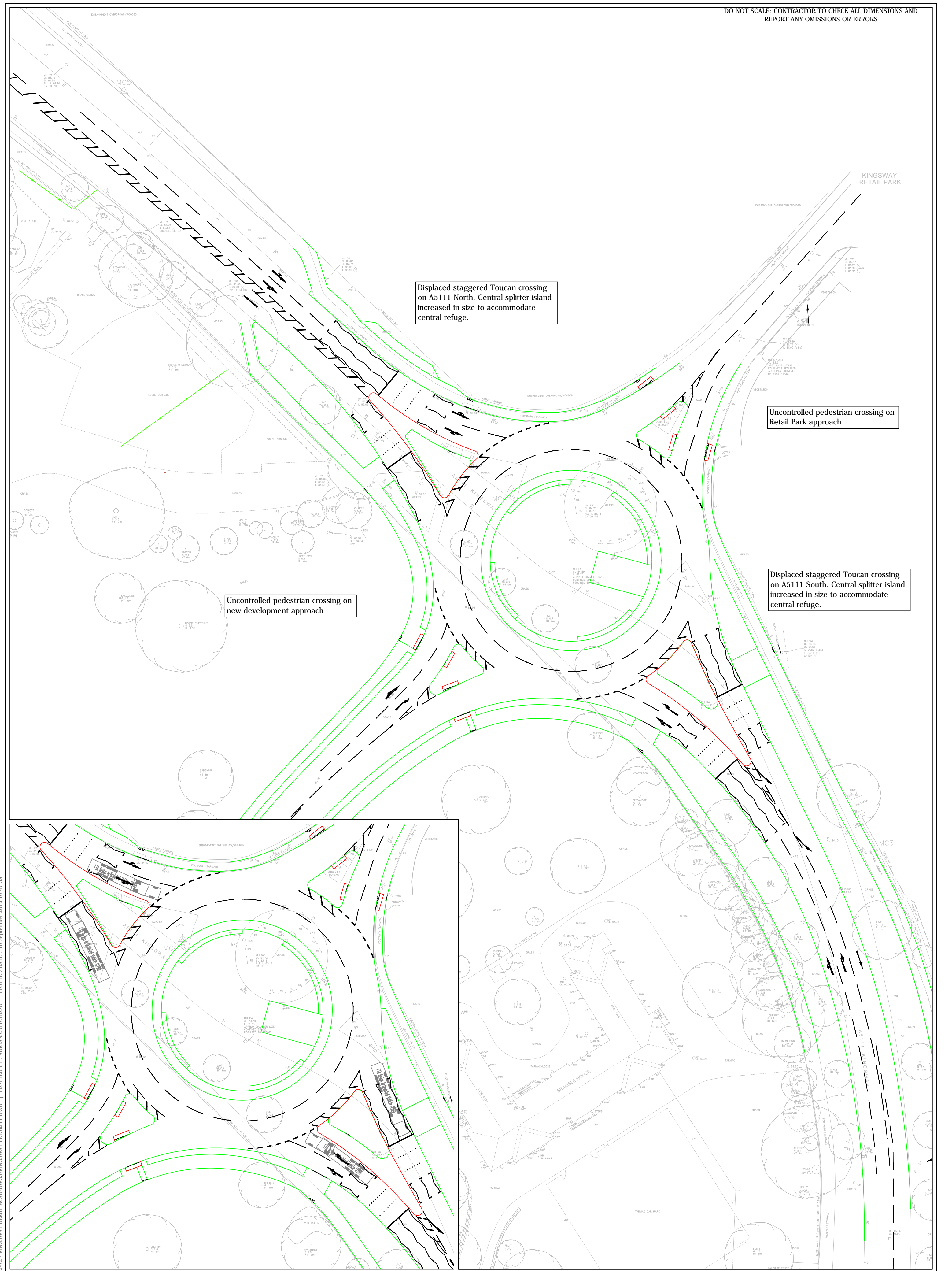


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REV	DESCRIPTION				BY	CHK	APP	DATE
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Project No. A081175-72						Office 25	Type 18	Drawing No. TS007		Revision -			
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DERBY CITY COUNCIL

Project:
A5111/KINGSWAY

Drawing Title:
PROPOSED IMPROVEMENTS
PRIORITY ROUNDABOUT WITH
DISPLACED CROSSINGS