

# Technical Note

Project:	Gloucester City Plan Transport Assessment		
Subject:	Response to Gloucestershire County Council comments on Junctions 6 and 7		
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## Document history

Revision	Purpose description	Originated	Checked	Reviewed	Author-ised	Date
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Rev 2.0	For issue	PR	PR	TC	TC	20/03/2020

## Client signoff

Client	Gloucester City Council
Project	Gloucester City Plan Transport Assessment
Project No.	5157942
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# 1. Introduction

This note has been prepared in response to Gloucestershire County Council's (the county council) comments on the Gloucester City Plan Transport Assessment (GCPTA) report, dated October 2019, specifically in relation to the findings reported for Junctions 6 and 7, the A430 / A4301 / Bristol Road junction (referred to as Junction 6) and Bristol Road / Clifton Road junction (referred to as Junction 7).

Junction capacity modelling undertaken for the Gloucester City Plan (GCP) forecasted that both junctions will be over acceptable capacity thresholds with GCP in place and with the Joint Core Strategy (JCS) Do Minimum (DM) mitigation schemes. However, the junctions were forecast to operate within capacity when the JCS Do Something scenario 7 (DS7) mitigation is provided.

The following comment was received from the county council:

*Comment CH16: Junction 6 A4301/A430/Bristol Road and Junction 7 Bristol Road/Clifton Road would require further modelling. Mitigation currently relies on measures identified in the JCS DS7 mitigation package. Modelling these junctions is recommended to identify measures to help mitigate the impacts from the City Plan Development, should development come forward before the full implementation of the JCS DS7, so that new development can be accommodated on the road network.*

This note covers Junctions 6 and 7 in turn and considers whether there is a need to consider mitigation for the JCS DM scenario after reviewing:

- The operational performance as reported in the GCPTA report;
- The trip generation of GCP site allocations that impact at these locations; and
- The sustainability of the locations of the sites which are determined impact most on these junctions.

This remainder of this note is structured as follows:

- Chapter 2 – Junction 6;
- Chapter 3 – Junction 7; and
- Chapter 4 – Summary and Recommendations.

## 2. Junction 6 - A4031/A430/Bristol Road

### 2.1. Description of Junction

The A4031/A430/Bristol Road is a signal-controlled junction with four arms. The junction is situated south of the city centre and The Docks area and is located on the A430 route around the city centre. Full details of the junction are provided in the GCPTA report.

### 2.2. Junction Performance with GCP (DM Network)

The junction was modelled in the GCPTA using Linsig 3. A summary of the results for the GCP with JCS DM network scenario is presented in Table 2-1.

The results show the junction is forecast to operate below capacity thresholds in the AM peak and slightly above capacity thresholds in the PM peak hour in the 2031 with GCP and with the JCS DM network. The lanes forecast to be over acceptable capacity thresholds are A4301 Southgate Street, A430 Trier Way left and ahead, and St Ann Way all lanes.

Whilst the assessment has been undertaken of GCP with JCS DM, no assessment has been undertaken of the operation of the junction with and without GCP, so it cannot be determined how much the junction performance is impacted on by GCP compared to without the GCP.

**Table 2-1 - Linsig Results - A4031/A430/Bristol Road - with GCP (JCS DM Network)**

Lane	AM Peak			PM Peak		
	Degree of Saturation	Average Delay per PCU (s/PCU)	Mean Max Queue (pcu)	Degree of Saturation	Average Delay per PCU (s/PCU)	Mean Max Queue (pcu)
A4301 Southgate St Left Ahead Right	88.3%	65.8	19.7	96.7%	113.4	20.3
A430 Trier Way Left Ahead	89.1%	62.2	17.1	97.9%	87.8	28.1
A430 Trier Way Right	50.5%	60.6	4.6	0.0%	0.0	0.0
Bristol Road South Left	69.1%	34.2	17.1	87.9%	60.6	20.7
Bristol Road South Ahead Right	87.1%	43.1	21.1	80.9%	52.7	17.6
St Ann Way Left Ahead	80.9%	70.4	10.1	97.2%	108.8	19.6
St Ann Way Right	86.5%	101.8	9.0	96.4%	111.9	19.1
<b>PRC</b>		1.0%			-8.8%	
<b>Total Delay (pcuHr)</b>		49.86			75.88	

### 2.3. GCPTA Findings

The recommendations for Junction 6 in the GCPTA report were as follows:

*The junction is located in a built-up location with limited scope to widen. The junction appears to be under MOVA control with nearside pedestrian detection in operation. Without mitigation, the forecast queuing is not excessive with a max queue of 28.1 pcu on Trier Way.*

The junction is forecast to operate better in the JCS DS7 mitigation scenario, than in the JCS DM scenario. The JCS DM scenario is an unlikely scenario as the DS7 mitigation is the agreed mitigation for the JCS, and therefore it is unlikely that the JCS developments would be implemented without the required DS7 mitigation. It is therefore considered that further mitigation over and above the JCS DS7 mitigation is not required at this junction.

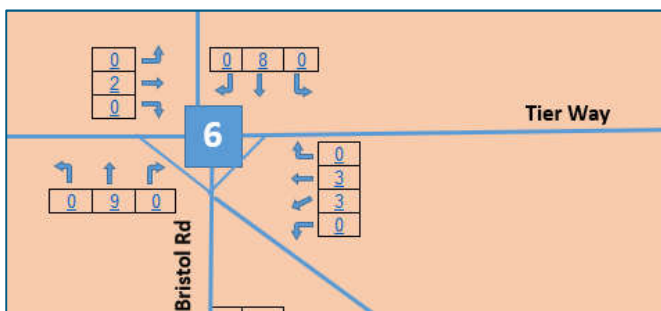
## 2.4. GCP Trips at Junction 6

### GCP Trip Generation

Figure 2-1 is an extract from the spreadsheet model created to test the GCP, prior to using the 2031 JCS CSV model for Stages 1 & 2 of the GCPTA report. This included a manual assignment of GCP trips on the local highway network. The trips generated by each of the GCP sites used the same trip rate assumptions as in the JCS CSV model, and assigned the trips onto the network using Census data and journey planning software. The full trip generation and vehicle routing is included in Appendix A. The extract below is for Junction 6 in the PM peak. Note the AM peak has not been considered as the county council comment relates to the PM peak only.

The extract shows that GCP will add a total of 24 trips to Junction 6 in the PM peak. The largest increase is 9 trips on Bristol Road, which in the assessment presented above, this approach is forecast to operate within capacity.

Figure 2-1 - GCP Trip Generation at Junction 6



In the PM peak the total junction throughput for 2031 with GCP is 3,900 pcu, therefore the GCP trips represent circa 0.6% of the total flow.

### GCP Sites

Of the 24 additional trips at the junction, the majority of the trips are from:

- SA11 – Land at St Oswalds, 9 trips;
- SA21 – Part of West Quay, 3 trips;
- SA06 – Blackbridge Sports Hub, 2 trips; and
- SA13 – Former Colwell Youth and Community Centre, 2 trips.

Figure 2-2 shows the forecast GCP delivery plan for the 4 sites listed above, focussing on residential delivery. Taken together, the forecast programme for these developments is spread over 4 years.

Figure 2-2 - GCP Delivery Plan (residential sites)

Ref No	Site	Residential Capacity	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
SA06	Blackbridge Sports Hub (Sports)	0		0				
SA11	Land at St Oswalds	300		25	75	100	100	
SA13	Former Colwell Youth & Community Centre	20		20				
SA21	Part of West Quay, the Docks	20			20			

The delivery of the sites which impact the junction shows a gradual delivery over 4 years, therefore the increase of the 24 trips will not be realised in a single year, and instead result in an extra circa 6 trips per annum between 2021/22 and 2024/25.

## Site Sustainability Assessment

The site sustainability undertaken in Chapter 8 of the GCPTA report shows that the sites forecast to provide the majority of the additional trips are located in sustainable locations.

**Table 2-2 - Sustainability Assessment (extract of Table 8-1 in GCPTA Report)**

Site Ref	Site Name	Time to city centre by bus (mins)	Local amenities within 10-min walk	Local amenities with a 20-min cycle	All criteria met?	Comment
SA06	Blackbridge Sports Hub (Sports)	<20	0	5	No	<b>No mitigation required</b> – site is a local facility itself and is located within a residential area, within 20-minute cycle of a large part of south Gloucester, and 20 mins from the city centre by bus
SA11	Land at St Oswalds	<20	2	5	Yes	<b>No mitigation required</b> – site considered to be in a sustainable location
SA13	Former Colwell Youth & Community Centre	<20	3	5	Yes	<b>No mitigation required</b> – site considered to be in a sustainable location
SA21	Part of West Quay, the Docks	<20	2	5	Yes	<b>No mitigation required</b> – site considered to be in a sustainable location

## 2.5. Summary – Junction 6

Modelling undertaken for the GCP forecasted that Junction 6 will be operating over acceptable capacity thresholds with GCP and with the JCS DM mitigation, but within capacity when the JCS DS7 mitigation is provided.

The GCP results in 24 additional trips at the junction, representing circa 0.6% of the total flow, and well within accepted daily variation in traffic flows.

The delivery of the GCP sites which result in the majority of additional trips at the junction is phased over 4 years and the majority of the 24 trip increase will be realised over 4 years.

The GCP assessments assumes no modal shift away from car to sustainable modes, but in practice all sites in the GCP will have Travel Plans which reflect the sustainable locations in which they are located, therefore the trip generation is expected to be robust.

The junction is located in a city location and as such is in a built-up area. It is not considered that mitigation is appropriate at this location, given the small increase in trips and that the wider DS7 mitigation will relieve pressure on the junction in the longer term.

# 3. Junction 7 - Bristol Road/Clifton Road

## 3.1. Description of Junction

The Bristol Road / Clifton Road is a signal-controlled junction with three arms. The junction is situated south of the Gloucester Docks and is located on Bristol Road which links with the A430 – route which links with A38 and M5 Junction 12 to the south, and with A417 to the north. Full details of the junction are provided in the GCPTA report.

## 3.2. Junction Performance with GCP (DM Network)

The junction was modelled using Linsig 3. A summary of the results for the GCP with JCS DM network scenario is presented in Table 3-1.

The results show the junction is forecast to operate below capacity thresholds in the AM and fractionally above acceptable capacity thresholds in the PM peak hours in 2031 with GCP and with the JCS DM network. The arms forecast to be over capacity are the Bristol Road (S) and Clifton Road arms.

Whilst the assessment has been undertaken of GCP with JCS DM, no assessment has been undertaken of the operation of the junction with and without GCP, so it cannot be determined how much the junction performance is impacted on by GCP compared to without the GCP.

**Table 3-1 - Linsig Results - Bristol Road / Clifton Road - with GCP (JCS DM Network)**

Lane	AM Peak			PM Peak		
	Degree of Saturation	Average Delay per PCU (s/PCU)	Mean Max Queue (pcu)	Degree of Saturation	Average Delay per PCU (s/PCU)	Mean Max Queue (pcu)
Bristol Road (N) entry Left Ahead	64.7%	18.0	11.6	60.5%	11.8	10.7
Clifton Road entry Right Left	81.3%	35.3	16.3	99.8%	122.9	29.8
Bristol Road (S) entry Ahead Right	78.0%	31.5	12.2	99.4%	56.6	19.9
<b>PRC</b>		10.8%			-10.9%	
<b>Total Delay (pcuHr)</b>		16.40			33.87	

## 3.3. GCPTA Findings

The recommendations for Junction 7 in the GCPTA report was as follows:

*Given the junction is only forecast to be very slightly above capacity thresholds with the GCP in one scenario - in the PM peak with JCS DM mitigation - it is considered that no mitigation is required at this location.*

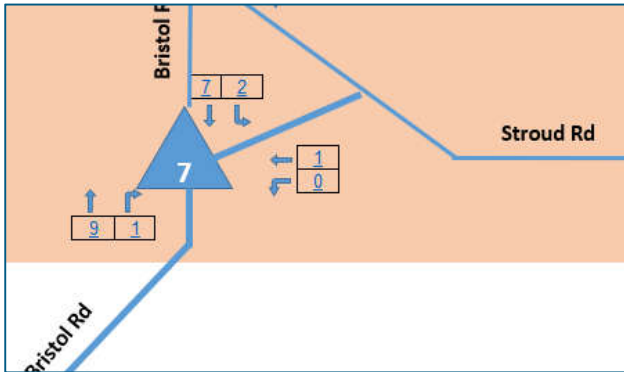
## 3.4. GCP Trips at Junction 7

### GCP Trip Generation

Figure 3-1 is an extract from the spreadsheet model created to test the GCP. The trips generated by each of the GCP sites used the same trip rate assumptions as the JCS CSV model, and assigned the trips using Census and internet-based journey planning software. The full trip generation and vehicle routing is included in Appendix A. The extract below is for Junction 7 in the PM peak.

The extract shows that GCP will add a total of 20 trips to Junction 7 in the PM peak. The largest increase is 10 trips on Bristol Road (S), and 9 trips on Bristol Road (N) which in the assessment presented above is forecast to operate within capacity. Note the AM peak has not been considered as the county council comment relates to the PM peak only.

Figure 3-1 - GCP Trip Generation at Junction 7



In the PM peak the total junction throughput for 2031 with GCP is 2,550 pcu, therefore the GCP trips represent circa 0.8% of the total flow.

### GCP sites

Of the 20 additional trips at the junction, the majority of the trips are from:

- SA11 – Land at St Oswalds, 9 trips; and
- SA14 – Land at Blackbridge, Land off New Dawn View, 3 trips

Figure 3-2 shows the forecast GCP delivery plan for the 2 sites listed above. The forecast programme for the development of these sites is spread over 4 years.

Figure 3-2 - GCP Delivery Plan

Ref No	Site	Residential Capacity	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
SA11	Land at St Oswalds	300		25	75	100	100	
SA14	Land at Blackbridge - Land off New Dawn View	30		15	15			

The delivery of the majority of sites which impact the junction shows a gradual delivery over 4 years, therefore the increase of the 20 trips will not be realised in a single year and instead result in an extra circa 5 trips per annum between 2021/22 and 2024/25.

## Site Sustainability Assessment

The site sustainability assessment undertaken the GCPTA report shows that SA11, and SA14 which provides the majority of additional trips at Junction 7 are located in sustainable locations.

**Table 3-2 - Sustainability Assessment (extract of Table 8-1 in GCPTA Report)**

Site Ref	Site Name	Time to city centre by bus (mins)	Local amenities within 10-min walk	Local amenities with a 20-min cycle	All criteria met?	Comment
SA11	Land at St Oswalds	<20	2	5	Yes	<b>No mitigation required</b> – site considered to be in a sustainable location
SA14	Land at Blackbridge	<20	0	5	No	<b>No mitigation required</b> – Although the site has no local amenities within a 10 minute walk, the site is within 20 minutes cycle of 5 amenities and 20 minutes from the city centre by bus. The is site considered to be in a sustainable location

## 3.5. Summary – Junction 7

Modelling undertaken for the GCP forecasted that Junction 7 will be over acceptable capacity thresholds with GCP and with the JCS DM mitigation, but within capacity when the JCS DS7 mitigation is provided.

The GCP results in 20 additional trips at the junction, representing circa 0.8% of the total flow, and well within accepted daily variation in traffic flows.

The delivery of the GCP sites which provide the majority of the impact on the junction is phased over 4 years and the 20 trip increase will be realised over 4 years.

The GCP assessments assumes no modal shift away from car to sustainable modes, but in practice all sites in the GCP will have Travel Plans which reflect the sustainable locations in which they are located, therefore the trip generation is expected to be robust.

The junction is located in a city location and as such is in a built-up area. It is not considered that mitigation is appropriate at this location, given the small increase in trips and that the wider DS7 mitigation will relieve pressure on the junction in the longer term.



## 4. Summary and Recommendations

This note has been prepared in response to Gloucestershire County Council's comments on the GCPTA Report, specifically in relation to the findings reported for Junctions 6 and 7, the A430 / A4301 / Bristol Road junction and Bristol Road / Clifton Road junctions respectively.

Modelling undertaken for the GCP forecasted that both junctions will be over acceptable capacity thresholds with GCP and with the JCS DM mitigation, but within capacity when the JCS DS7 mitigation is provided. However, no testing was undertaken of junction performance without the GCP developments to determine the impact of the GCP at these junctions.

The additional trips GCP generated by the GCP at the two junctions represents less than 0.8% of the total flow, and well within accepted daily variation in traffic flows.

The delivery of the GCP sites which provide the majority of the impact on the junctions is phased, so the small increases in trips will be realised over 4 years.

The GCP assessments assumes no modal shift away from car to sustainable modes, but in practice all sites in the GCP will have Travel Plans which reflect the sustainable locations in which they are located, therefore the trip generation is expected to be robust.

The junctions are located in a city location and as such are in a built-up area. It is not considered that mitigation is appropriate at these locations, given the small increase in trips and that the wider DS7 mitigation will relieve pressure on the junctions in the longer term.

It is therefore recommended that no further work is required at these junctions, and the findings of the GCPTA report remain – i.e. that mitigation at these junctions is not required.

# Appendix A

## JCS Sites Trip Generation and Distribution – PM Peak

