

Cambridge Waste Water Treatment Plant Relocation Project
Anglian Water Services Limited

Appendix 19.13: Sensitivity test of a 50%-50% west-east directional split of construction traffic

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Contents

1	Introduction	1
2	Changes to the Directional Split.....	3
2.1	Without mitigation.....	3
2.2	With mitigation	4
3	Comparison of Out of Peak and In Peak 2026 Baseline Traffic Flows.....	5
4	Calculations for 2026 AM	6
5	Calculations for 2026 PM Peak	7
6	Conclusion	8

Tables

Table 2-1 Change in assumed directional split	3
Table 4-1 J33: 2026 AM peak hour and before peak hour comparison	6
Table 4-2 Arm C of J33: 2026 AM peak hour and before peak hour comparison	6
Table 5-1 J33: 2026 PM peak hour and after the peak hour comparison	7
Table 5-2 Arm C of J33: 2026 PM peak hour and after peak hour comparison	7

Figures

Figure 1-1 Location of potential construction material	2
Figure 3-1 Diagram of Milton Interchange/J33	5

Summary

The following note sets out how a change to the assumed 90 percent from the west and 10 percent from the east directional split could change the modelled highway impacts, with reference to the effects on the Milton Interchange/Junction 33 (J33) and Junction 34 (J34).

For a scenario without mitigation measures contained within the CTMP [REP1-044], capacity issues would likely arise at J33 Milton Interchange owing to the increase of construction vehicles originating from the east and having to travel through the Milton Interchange roundabout at peak time, when the junction operates close to its capacity. No change is expected at J34 as all vehicles would still have to travel through the J34 A14 off-slip to access the proposed WWTP.

With the mitigation measures contained within the CTMP [REP1-044] applied, primarily the requirement for the scheduling of deliveries outside of the peak hours, the peak hour scenario described above for J33 would not be likely to occur and no significant impacts on the junction operation would be likely.

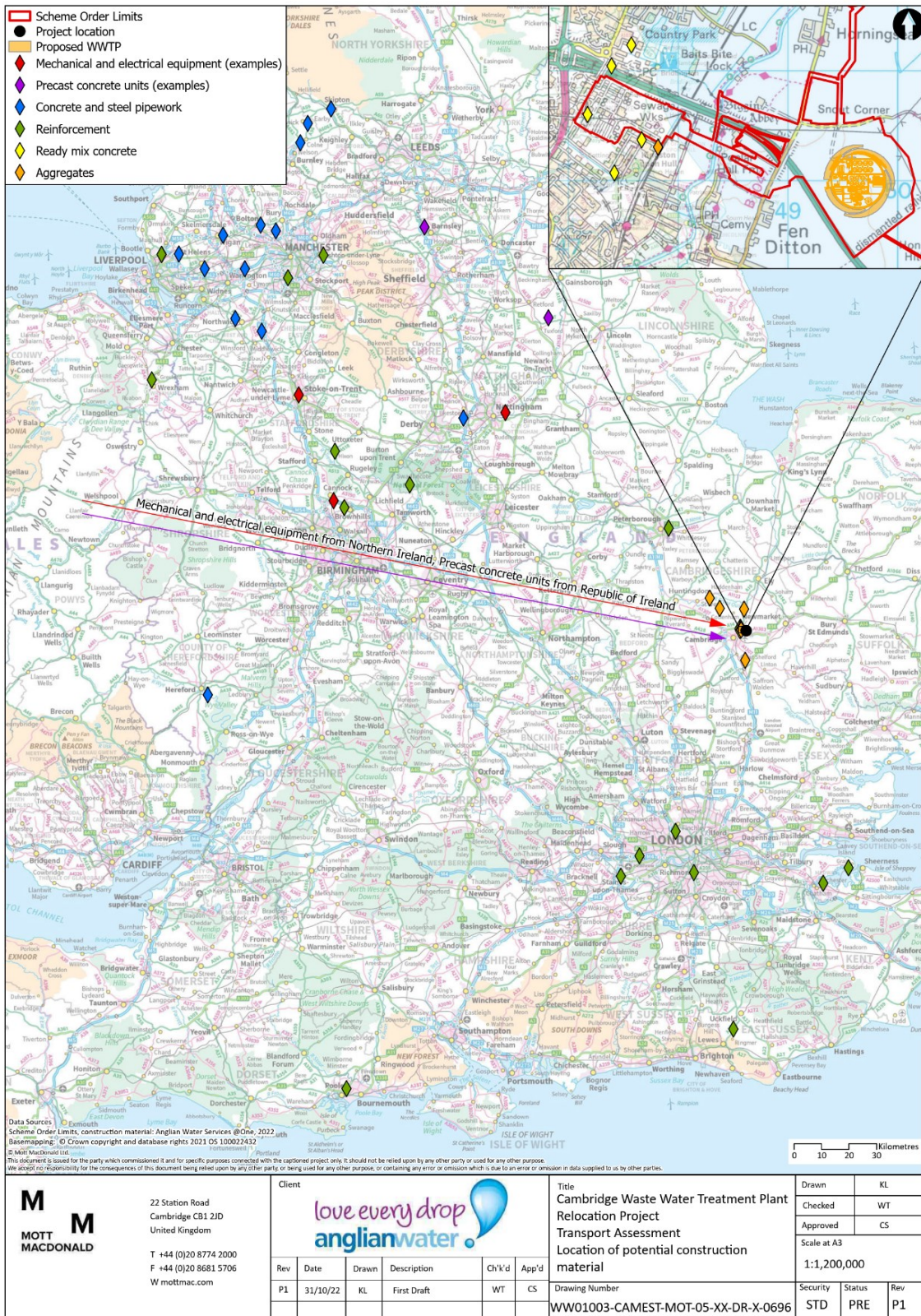
The conclusion is that there would be unlikely to be additional impacts to those set out in the Transport Assessment [AS-108a] due to the additional vehicle volumes at J33 with the CTMP measures in place.

1 Introduction

In Appendix A, Figure A.39 of the Transport Assessment (TA) [AS-108a], copied in **Figure 1-1** below, the Applicant showed the location of identified construction materials required for the Proposed Development. This demonstrated that the majority of construction materials are likely to be sourced from the west of the Proposed Development. This therefore informed the assumption in the Transport Assessment that 90% of construction traffic is assumed to originate from the west and 10% from the east.

However, the Examining Authority (ExA) requested in their First Round of Written Questions (ExQ1) Q20.49 that the Applicant completed a sensitivity test to confirm whether any change from the current 90%-10% assumption would lead to additional highways impacts, particularly in relation to the operation of the J33 Milton Interchange of the A14. This technical note presents the results of the sensitivity test completed by the Applicant.

Figure 1-1 Location of potential construction material



2 Changes to the Directional Split

The following note sets out how a change to the assumed 90-10 directional split would change the modelled highway impacts, with reference to the effects on the Milton Interchange/Junction 33 (J33) and Junction 34 (J34) of the A14.

2.1 Without mitigation

With the currently assumed 90-10 split, 10% of construction vehicles are assumed to originate from the east of J33, and to travel around J33 via the A14 westbound off-slip and to the A14 eastbound on-slip. The TA [AS-108a] results for the J33 AM and PM peak hour with construction flows added to the baseline flows (shown in Table 9-28 of the TA) demonstrate that the junction operates within capacity in the AM and PM peak with a 90-10 assumed split. No capacity issues are noted on the A14 eastbound off-slip and the westbound off-slip.

The volume of traffic based on the directional split is shown below in **Table 2-1**, based on the estimated movements for the proposed WWTP, the Transfer Tunnel and the Waterbeach pipeline presented in the TA [AS-108a] in Tables 7-4, 7-5 and 7-7.

Table 2-1 Change in assumed directional split

Directional split	Volume of construction vehicles
90% from the west, 10% from the east	Total peak hourly movements: 148 Total peak hourly volumes: 74 Assumed directional split hourly results: - 90% of vehicles originating from the west: 67 vehicles from the west - 10% of vehicles originating from the east: 7 vehicles from the east
50% from the west, 50% from the east	Total peak hourly movements: 148 Total peak hourly volumes: 74 Assumed directional split hourly results: - 50% of vehicles originating from the west: 37 vehicles from the west - 50% of vehicles originating from the east: 37 vehicles from the east

Source: Mott MacDonald calculations

For J33, in the event that the 90-10 assumed split changes to a 50-50 split, without mitigation it is likely that J33 would operate close to or over capacity. This occurs due to the significant increase in vehicles originating from the east when comparing the 90-10 and 50-50 split (7 vehicles to 37 vehicles).

For J34, a change in the directional assumption would not influence the effects previously shown in the TA [AS-108a] and ES Chapter 19 [AS-038]. This is owing to the existing layout of J34, as all construction vehicles accessing the proposed WWTP site would need to originate from the west of J34 to access the A14 off-slip and all vehicles egressing the site to travel via the A14 would do so via the A14 on-slip.

2.2 With mitigation

The Construction Transport Management Plan (CTMP) [REP1-044] sets out that construction vehicles can be managed to minimise the effect on the road network. A mitigation measure proposed as part of the CTMP is that construction vehicles will be timed to avoid the peak traffic periods. This measure would address the potential capacity issues arising at J33 in the event of a change to the 90-10 assumed split.

On that basis, if baseline traffic flows are lower at J33 outside of the peak periods, this would indicate that there is remaining capacity at the junction and, in the event of a change in the 90-10 directional assumption, that the junction would be able to accommodate the change in the volume of vehicles originating from the east without severely impacting the performance of the junction.

A comparison of out of peak hour and peak hour 2026¹ baseline flows has been carried out in the following sections.

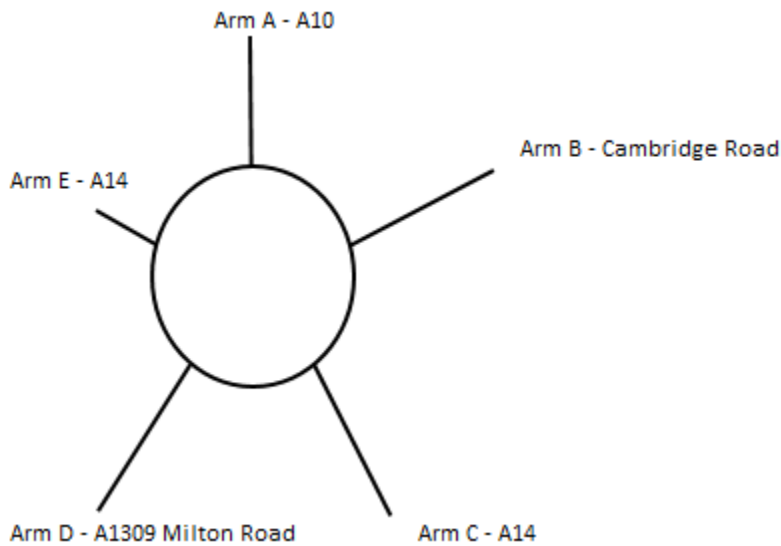
¹ 2026 assumed year 3 of construction corresponding with peak construction movements

3 Comparison of Out of Peak and In Peak 2026 Baseline Traffic Flows

In order to establish a 2021 baseline, traffic surveys were carried out on the road network and to represent the growth in traffic from 2021 to 2026, a TEMPro growth factor of 1.0457 has been used.

These data represent the 2026 future baseline and do not include construction traffic flows. For J33, this includes data for five arms of the junction shown in **Figure 3-1**.

Figure 3-1 Diagram of Milton Interchange/J33



Using the data from the 2026 baseline, traffic flows for the AM and PM peak periods (08:00-09:00 and 17:00-18:00) are compared to the hour before and after at a junction level. The comparison is used to determine the additional available capacity at the junction outside of these peak periods and to understand if construction traffic is likely to be able to travel from the east through the junction (via the A14 westbound off-slip, around the roundabout and the A14 eastbound on-slip) without causing significant impacts on the operation of the junction.

The TA [AS-108a] has provided results for J33 in 2026 in Table 9-26 'Future baseline performance at Milton Interchange' for the AM and PM peak periods. No capacity issues are noted for 2026 in these periods. As such, where baseline traffic flows outside of the peak periods have been determined to be lower than in the peak periods, the junction should be expected to perform better and with more remaining capacity.

4 Calculations for 2026 AM

The 2026 AM peak period (08:00-09:00) is compared to the 2026 AM hour before the peak period (07:00-08:00) in **Table 4-1** below.

Table 4-1 J33: 2026 AM peak hour and before peak hour comparison

Overall junction

Time period	Total flows
07:00-08:00	7655
08:00-09:00	9556
Flow difference	-1901
% difference	-20%

Source: Mott MacDonald calculations

At a junction level, the Milton Interchange operates with 20% less traffic in 2026 in the hour before the peak hour (07:00-08:00). This indicates that there is sufficient capacity from 07:00 to 08:00 for additional traffic in the event that the 90-10 directional split assumption changes.

The comparison of J33, A14 westbound off-slip traffic flows in the AM peak and one hour after peak is provided below in **Table 4-2**.

Table 4-2 Westbound off-slip of J33: 2026 AM peak hour and before peak hour comparison

Arm C

Time period	Total flows
07:00-08:00	1207
08:00-09:00	1588
Flow difference	-382
% difference	-24%

Source: Mott MacDonald calculations

At an arm level, Arm C operates with 24% less traffic in 2026 in the hour before the peak hour (07:00-08:00). Given this difference, there is sufficient capacity in this hour for additional traffic in the event that the directional split changes and more construction traffic is required to travel through the A14 eastbound off-slip, through the roundabout and A14 westbound on-slip.

Table 4-2 indicates traffic flow would be around 382 vehicles lower in the 07:00-08:00 period. Table 2-1 indicates that around 37 construction vehicles could be added in the event of a 50-50 directional split.

As traffic flows are lower, the associated junction performance results would also be expected to be better and with more remaining capacity.

Therefore the conclusion is that there is capacity available at the junction if the directional split changes and a change in construction vehicle directional split would not adversely impact the junction operation.

5 Calculations for 2026 PM Peak

The 2026 PM peak period (17:00-18:00) is compared to the 2026 PM hour after the peak period (18:00-19:00) in **Table 5-1** below.

Table 5-1 J33: 2026 PM peak hour and after the peak hour comparison

Overall junction

Time period	Total flows
17:00-18:00	8776
18:00-19:00	6220
Flow difference	-2556
% difference	-29%

Source: Mott MacDonald calculations

At a junction level, J33 operates with 29% less traffic in 2026 in the hour after the peak hour (18:00-19:00). This indicates that there is sufficient capacity from 18:00 to 19:00 for additional traffic in the event that the 90-10 directional split changes.

The comparison of J33, A14 westbound off-slip traffic flows in the PM peak and one hour after peak is provided below in **Table 5-2** below.

Table 5-2 A14 westbound off-slip of J33: 2026 PM peak hour and after peak hour comparison

Arm C

Time period	Total flows
17:00-18:00	1428
18:00-19:00	914
Flow difference	-514
% difference	-36%

Source: Mott MacDonald calculations

At an arm level, Arm C operates with 36% less traffic in 2026 in the hour after the peak hour (17:00-18:00). Given this difference, there is sufficient capacity in this hour for additional traffic in the event that the directional split changes and more construction traffic is required to travel through the A14 eastbound off-slip, through the roundabout and A14 westbound on-slip.

Table 5-2 indicates traffic flow would be around 514 vehicles lower in the 18:00-19:00 period. Table 2-1 indicates that around 37 construction vehicles could be added in the event of a 50-50 directional split.

As traffic flows are lower the associated junction performance results would also be expected to be better and with more remaining capacity.

Therefore the conclusion is that there is capacity available at the junction if the directional split changes and a change in construction vehicle directional split would not adversely impact the junction operation.

6 Conclusion

With no mitigation in place a change to the 90-10 split of construction traffic in the peak hour, junction capacity and performance issues are likely to rise owing to the increase in construction traffic originating from the east (7 vehicles to 37, if 10% from the east increases to 50%) at J33 in the peak hour.

No issues are expected at J34 and the effects contained within the TA [AS-108a] and ES Chapter 19 [AS-038] would not change in the event of a change to the directional split.

The CTMP [REP1-044] contains measures that would address the capacity issues that may arise as a result of a change in the directional assumption as follows:

- Sections 6.4 'Vehicle scheduling' and 6.5 'Delivery scheduling' of the CTMP list out the measures in place to effectively manage construction traffic.
- Section 6.4, para 6.4.1 requires deliveries to be scheduled and arranged so that they do not bring inconvenience, as far as is reasonably practicable, to the community and other road users.
- Section 6.5, para 6.5.2 requires the Principal Contractor to schedule deliveries, where reasonably practicable, so that they do not coincide with peak hours, especially during the AM and PM peak to minimise the possibility of adding to congestion on the road network.

Through these measures, the scheduling of vehicles would be pushed to outside of the peak hours. As shown in section 0 and 5 for J33, there is sufficient capacity at the junction one hour before the AM peak hour and one hour after the PM peak hour. Therefore, in the event of a change in the directional assumption from 90-10 to the worst case 50-50, J33 would have sufficient remaining capacity to accommodate the increase in construction vehicles originating from the east.

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<https://infrastructure.planninginspectorate.gov.uk/projects/eastern/cambridge-waste-water-treatment-plant-relocation/>