

Appendix F
CAPITA Technical Audit

West Hendon - Major Highways Scheme

Review of Technical Audit
Responses
10 August 2016

Quality Management

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1. Executive Summary

1.1 General

This report provides a review of the designer's (CH2M) responses to the Capita report 'Review of Technical Audit Responses' dated 15th July 2016. The report reviews the current CH2M drawings as listed in Appendix A.1 and their responses dated 29th July 2016 issued to Barratt to the Capita July 2016 Technical Audit. The report replicates the schedules contained in Capita's Report 'Review of Technical Audit Response' July 2016 and adds comment in red. CH2M have not responded to comments highlighted in blue in the schedules and these require further investigation or consideration during design development. Reference comments made in the report are indicated on the drawings.

The comments with actions in this report should be considered at the Preliminary Design Stage along with a Road Safety Audit and prior to CH2M's proposal of addressing them at Detail Design Stage. This is because many of the comments are of an in-principle nature.

In the July 2016 Technical Audit Capita indicated that the proposed cross section for West Hendon Broadway Link is not in accordance with DMRB for the lane widths and therefore lane widths need to be reviewed to provide 3m minimum width and the footway a 2m minimum width. CH2M have since advised that during the planning application the London Borough of Barnet (LBB) confirmed that a standard 3m footway should be used which dictated that lanes would be less than 3.0m due to the existing highway constraints. Due to the important link to and future development in Brent Cross, the lane widths should be reviewed in sections along A5 as per the comments in the schedules.

An issue raised by Capita that impacted on all the signal junctions was the provision of the advance stop line (ASL), where a lead-in cycle lane had not been indicated within the scheme layout, so that cyclists can legally gain access to the reservoir ahead of the motorists' stop line. The road marking layout was not in accordance with 'The Traffic Signs Regulations and General Directions 2016' (TSRGD). A change to the prescribed layout would not be in accordance with the TSRGD and unlawful unless authorised by the Secretary of State. CH2M have confirmed that London Borough of Barnet had previously agreed to remove the ASL and therefore not shown on the current scheme drawings in Appendix A.1. This decision needs to be confirmed with TfL.

It is noted that comments to the drawings G/8/3 Herbert Road junction and G/8/6 Milton Road junction have not been submitted.

1.2 West Hendon Broadway Link

Capita advised in the July 2016 Technical Audit that along the Broadway Link the lane widths need to be reviewed to provide the minimum width. CH2M have since advised that during the planning application London Borough of Barnet confirmed that a standard 3m footway should be used which dictated that lanes would be less than 3.0m, due to the existing highway constraints.

1.3 Garrick Road junction

CH2M have provided the revised layout which widens the ghost lane to improve swept paths, but would still need a departure from standard. The number of northbound lanes has reduced from two to one to accommodate the 3m ghost lane.

1.4 Station Road junction

CH2M have revised the junction layout with stop lines and splitter islands moved to improve the intervisibility splay, and required splitter island width for the signal heads. These changes have reduced the lane widths further in places and therefore these need to be reviewed and if not acceptable, consideration should be given to reduce the footway from the 3m width.

It will be necessary to discuss with TfL the removal of the nearside flare lane to provide the proposed lane widths.

Capita advised in the July 2016 Technical Audit that the CPO2a land, currently proposed for a temporary purpose, is required permanently for the intervisibility splay of the junction. The adjusted intervisibility splay now crosses a smaller section of building 38, which is proposed for a temporary purpose, but intervisibility is not achieved. This issue needs to be discussed with TfL to establish if they would accept a departure from standard for the reduced intervisibility splay.

1.5 Ravenstone Road junction

The layout has been adjusted for the intervisibility splay to be within the CPO2a land and accommodating the swept path for a refuse vehicle, but not for an articulated vehicle which would impact on the junction layout.

1.6 Cool Oak Lane junction

Capita had advised that to improve the swept path and intervisibility, the position of the splitter island and alternating the staggered pedestrian crossing should be considered. CH2M have adjusted the corner radius to improve the swept path, but the splitter island width still needs to be reviewed.

CH2M have confirmed that the intervisibility splay is within the CPO2a land.

1.7 Wilberforce Road junction

An alternative layout is proposed to provide bus stands relocated from Perryfield Way, as per CH2M's Note April 2016 submitted to LBB. The alternative layout for Wilberforce Road was accepted in principle by LBB to the CCTV enforcement proposal, which limits the vehicle use to access and buses only, subject to a Road Safety Audit Stage 1.

1.8 Station Road link

No CH2M comments or information was provided for Station Road Link and therefore comments made by Capita in their July 2016 Technical Audit remain.

2. Introduction

This report provides a review of the designer's (CH2M) responses to the Capita Report 'Review of Technical Audit Responses' dated 15th July 2016.

A further column has been added which reviews the current CH2M drawings and provides Capita comments dated August 2016.

It is noted that CH2M responses to the comments with respect to the drawings G/8/3 Herbert Road junction and G/8/6 Milton Road junction have not been made.

3. West Hendon Broadway Link

Drawing reference G/8/1-1 and 1-2 provide comments for the highway link between Garrick Road and Cool Oak Lane.

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
1-1	For comments relating to the proposed ghost island arrangement refer to drawing G/8/2						Refer to Section 4.0		No Action Required
1-2	Refer to drawing no. G/8/2 for assessment of Garrick Road Junction						Refer to Section 4.0		No Action Required
1-3	Details of the stopping up of the junction are not available for comment						No Comment was provided by CH2M.		No Action Required
1-4	West Hendon Broadway would be categorised as an urban all-purpose dual carriageway in accordance with to 27/05 Figure 4-4a The cross section should therefore be regarded as a departure from standard due to the existing constraints (Refer to insert figure 4-4a)	A3	Paved width	Narrower lane widths (less than 3.65m) / no central reserve	The use of 3m lanes is considered to be acceptable for this urban location and reflects current layouts. The desire to maximise footway width means that the scope to widen is limited.	All lane widths to be reviewed with detailed design but need to balance any carriageway widening with maximising footway widths means limited scope to adjust from permitted scheme	Noted		No Action Required
1-5	Details of the stopping up of the junction are not available for comment						No Comment was provided by CH2M.		No Action Required
1-6	Controlled pedestrian crossing is not perpendicular to carriageway tactile paving will require reconfiguration (red tactile with tail)						No Comment was provided by CH2M. Assume will be reviewed at detailed design		No Action Required
1-7	Narrow lane widths 2 x 3m (Eastbourne) may not be conducive for cyclist use.	A1	Lane widths	The straight alignment approach to the junctions may in theory be appropriate for provision of 3m lanes or absolute minimum widths of 2.5m. However, consideration should be given to the relatively high commercial vehicle usage and the encouragement of cycle use.	CH2M previously produced a technical note investigating the provision of cycle facilities (WH_TN_01_v1a - March, 2014). The note concluded that modifying the approved scheme to introduce on carriageway cycle lanes would impact on predicted capacity such that general queuing and journey times, particularly for buses, would be unacceptable. Alternative strategic cycle routing was identified with a north south route through the new development along with existing roads being promoted.	No change to proposed highway scheme. Offline cycle route to be promoted.	With the provision of advance stop line (ASL) at signal controlled junctions, the ASL should have a lead-in cycle lane so that cyclists can legally gain access to the reservoir ahead of the motorists' stop line. The requirement for the lead-in cycle lane would require the widening of the carriageway which is not feasible within the land constraints of the CPO2a. The road marking layout is not in accordance with 'the Traffic Signs Regulations and General Directions 2016' A change to the prescribed layout would not be in accordance with the TSRGD and unlawful unless authorised by the Secretary of State. CH2M should reconsider the proposed introduction of the ASL.	It is understood that London Borough of Barnet had previously agreed to remove the ASL and therefore they are not currently shown on the current drawings in Appendix A.1. This decision is to be confirmed with TfL.	CH2M agree with this statement.

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
							This comment above applies to all signalised junctions in the scheme.		
1-8	The footway width has been reduced to accommodate dual lane traffic. Footway width to be a minimum of 2m to HD/39 (DMRB 7.2.5 clause 2.10) Residual width at this location 2.6m	A2	Footway widths	Footway widths at certain locations being reduced considerably. Section B-B for example has been reduced below recommended 2m minimum to 1.8m. The original footway width at this location was 4.8m.	The practical footway widths will be greater than suggested as the private strips along building lines will be incorporated into the footways. The design of the footway at the location specified has since be changed. The width now is 3m on both the north and south side of the carriageway based on the building line of the new development. The short nearside flare lane at the northbound approach to Station Road could be removed with little impact on capacity.	Footways widths maximised by extending new footway surfaces to building frontages. Need for nearside flare at Station Road northbound approach to be reconsidered and discussed with TFL	This responses does not appear to be relevant to this section of road.		No Action Required
1-9	Refer to drawing no. G/8/5 for assessment of Ravenstone Road Junction						Refer to Section 6.0		No Action Required
1-10	Narrow lane widths 2 x 3m (westbound) may not be conducive for cyclist use	A1	Lane widths	The straight alignment approach to the junctions may in theory be appropriate for provision of 3m lanes or absolute minimum widths of 2.5m. However, consideration should be given to the relatively high commercial vehicle usage and the encouragement of cycle use.	CH2M previously produced a technical note investigating the provision of cycle facilities (WH_TN_01_v1a - March, 2014). The note concluded that modifying the approved scheme to introduce on carriageway cycle lanes would impact on predicted capacity such that general queuing and journey times, particularly for buses, would be unacceptable. Alternative strategic cycle routing was identified with a north south route through the new development along with existing roads being promoted	No change to proposed highway scheme. Offline cycle route to be promoted.	Refer to item 1-7		No Action Required
1-11	Refer to drawing no. G/8/3 for assessment of Herbert Road Junction						No Comment was provided by CH2M.		No Action Required
1-12	No physical barrier has been provided in the central reserve to prevent right turners out of Herbert Street. Provision has been made elsewhere						No Comment was provided by CH2M. Consider at Preliminary Design.	With reference to CH2M drawing GWHPAS-C-DWG-4401 sheet 2 of 5, the proposed location of the bus stands on Wilberforce Road, buses will be allowed make right tune movements from Herbert Street on to the A5. The original comment is not applicable now.	CH2M agree with this statement.
1-13	Details of the Stopping up of the junction are not available for comment						No Comment was provided by CH2M.		No Action Required
1-14	Consideration of impact on footway should bus boarding platform kerbing be used						No Comment was provided by CH2M.		No Action Required
1-15	Taper to central island is incorrect requirements is for taper to be 1:40 for dual carriageways. Resulting in	C3	Taper lengths	Taper length is insufficient.	Based on a 2.5m pedestrian refuge island, DMRB guidance would result in a 50m taper. This is impractical for this	No action proposed.	The taper could be extended but still maintain a 3m lane adjacent to the bus stop, approx. 30m length.		No Action Required

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
	a length of 50m. This length would have a detrimental effect on the proposed bus stop locations to the west of this splitter island. This requirement may also require additional carriageway widening into the footway				location. It should also be noted that DMRB does not prescribe (black box) this standard taper.		Any reduction in taper length would be a departure from DMRB standards.		
1-16	West Hendon Broadway would be categorised as an urban all-purpose dual carriageway in accordance with to 27/05 Figure 4-4a The cross section should therefore be regarded as a departure from standard due to the existing constraints (Refer to insert figure 4-4a)	A3	Paved width	Narrower lane widths (less than 3.65m) / no central reserve	The use of 3m lanes is considered to be acceptable for this urban location and reflects current layouts. The desire to maximise footway width means that the scope to widen is limited.	All lane widths to be reviewed with detailed design but need to balance any carriageway widening with maximising footway widths means limited scope to adjust from permitted scheme	Noted.		No Action Required
1-17	Narrow lane widths 2 x 3m (Eastbound) may not be conducive for cyclist use	A1	Lane widths	The straight alignment approach to the junctions may in theory be appropriate for provision of 3m lanes or absolute minimum widths of 2.5m. However, consideration should be given to the relatively high commercial vehicle usage and the encouragement of cycle use.	CH2M previously produced a technical note investigating the provision of cycle facilities (WH_TN_01_v1a - March, 2014). The note concluded that modifying the approved scheme to introduce on carriageway cycle lanes would impact on predicted capacity such that general queuing and journey times, particularly for buses, would be unacceptable. Alternative strategic cycle routing was identified with a north south route through the new development along with existing roads being promoted	No change to proposed highway scheme. Offline cycle route to be promoted.	Refer to item 1-7		No Action Required
1-18	Stagger crossing arrangement is undesirable but arrangement is favourable in terms of the proposed stop line position (intervisibility benefit and traffic signal timings benefit)						No Comment was provided by CH2M.		No Action Required
1-19	Refer to Drawing no. G/8/4 for assessment of Station Road Junction						Refer to Section 5.0		No Action Required
1-20	Lane widths at stop line are very narrow. Consider increasing offside and nearside lane to 3m for larger vehicles and middle lane to 2.5m. This will require further widening of carriageway at footway or central island. Lane widths may not be conducive for cyclist use	A1	Lane widths	The straight alignment approach to the junctions may in theory be appropriate for provision of 3m lanes or absolute minimum widths of 2.5m. However, consideration should be given to the relatively high commercial vehicle usage and the encouragement of cycle use.	CH2M previously produced a technical note investigating the provision of cycle facilities (WH_TN_01_v1a - March, 2014). The note concluded that modifying the approved scheme to introduce on carriageway cycle lanes would impact on predicted capacity such that general queuing and journey times, particularly for buses, would be unacceptable. Alternative strategic cycle routing was identified with a north south route through the new development along with existing roads being promoted	No change to proposed highway scheme. Offline cycle route to be promoted.	<u>Westbound (A5)</u> With reference to drawing G/8/4 the lane widths proposed are as follows: Nearside 2.68m Middle 2.84m Offside 2.9m Total westbound carriageway width is 8.42m, to follow the suggestion this would require 8.5m. The footway width is 2.02m	CH2M drawing GWHPAS-C-DWG-4402 sheet 3 of 5 The lanes widths have been reduced to widen the splitter island to 1.7m. The need for the nearside flare lane needs to be discussed with TfL to improve the lane width. Junction capacity and queue lengths would need to be reviewed with TfL. Any adjustment to the kerb alignment if the flare lane is removed still needs to	CH2M agree with this statement. It should be noted that both a Barnet Refuge Vehicle (12m) and an Articulated Vehicle (16.5m) can undertake the desired right-turn from Station Road.

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
							<p>To avoid reducing the footway width, the central island would be reduced from 1.4m to 1.32m, however this does not meet TfL standard.</p> <p>The need for the nearside flare lane needs to be discussed with TfL, in order to remove and provide the lane widths suggested by Capita. Junction capacity and queue lengths would need to be reviewed with TfL.</p> <p>Refer to item 1-7 regarding the ASL.</p> <p>The alignment needs to be coordinated with the building line of the new development blocks (Barratt ref H3&4)</p>	accommodate the design vehicle swept paths turning right from Station Road.	
1-21	Footway width reduced to accommodate dual lane traffic of 2m to HD/39 (DMRB 7.2.5 Clause 2.10). Residual width at this location 1.8m. See section B – B below	A2	Footway widths	Footway widths at certain locations being reduced considerably. Section B-B for example has been reduced below recommended 2m minimum to 1.8m. The original footway width at this location was 4.8m.	The practical footway widths will be greater than suggested as the private strips along building lines will be incorporated into the footways. The design of the footway at the location specified has since be changed. The width now is 3m on both the north and south side of the carriageway based on the building line of the new development. The short nearside flare lane at the northbound approach to Station Road could be removed with little impact on capacity.	Footways widths maximised by extending new footway surfaces to building frontages. Need for nearside flare at Station Road northbound approach to be reconsidered and discussed with TfL	The revised CH2M plans indicating the 3m width on both the north and south side have now been provided.		No Action Required
1-22	Details of the stopping up of the junction are not available for comment						No Comment was provided by CH2M.		No Action Required
1-23	Consideration should be given to extending the central reserve to deter right turn out of Milton Road. Left arrow out together with give way markings should be introduced to the junction						No Comment was provided by CH2M.		No Action Required
1-25	Hatched area with taper will be required to the east end of the splitter island at 1:40						No Comment was provided by CH2M.		No Action Required
1-26	Refer to drawing no G/8/6 for assessment of Milton Road junction						No Comment was provided by CH2M.		No Action Required
1-27	Proximity of the westbound bus stop will restrict junction visibility at Milton Road. Consider relocation if feasible (particularly if central reserve is further extended)						No Comment was provided by CH2M.		No Action Required

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
1-28	West Hendon Broadway would be categorised as an urban all-purpose dual carriageway in accordance with to 27/05 Figure 4-4a The cross section should therefore be regarded as a departure from standard due to the existing constraints (Refer to insert figure 4-4a)	A3	Paved width	Narrower lane widths (less than 3.65m) / no central reserve	The use of 3m lanes is considered to be acceptable for this urban location and reflects current layouts. The desire to maximise footway width means that the scope to widen is limited	All lane widths to be reviewed with detailed design but need to balance any carriageway widening with maximising footway widths means limited scope to adjust from permitted scheme	Noted.		No Action Required
1-29	Details of the stopping up of the junction are not available for comment						No Comment was provided by CH2M.		No Action Required
1-30	Lane widths at stop line are very narrow consider increasing offside and nearside lane to 3.3m for larger vehicles and middle lane to 3m. This will require further widening of carriageway at footway or central island. Lane width may not be conducive for cyclist use	A1	Lane widths	The straight alignment approach to the junctions may in theory be appropriate for provision of 3m lanes or absolute minimum widths of 2.5m. However, consideration should be given to the relatively high commercial vehicle usage and the encouragement of cycle use.	CH2M previously produced a technical note investigating the provision of cycle facilities (WH_TN_01_v1a - March, 2014). The note concluded that modifying the approved scheme to introduce on carriageway cycle lanes would impact on predicted capacity such that general queuing and journey times, particularly for buses, would be unacceptable. Alternative strategic cycle routing was identified with a north south route through the new development along with existing roads being promoted	No change to proposed highway scheme. Offline cycle route to be promoted	With reference to drawing G/8/7 the lane widths proposed are as follows: <u>Eastbound (A5)</u> Nearside 2.6m Middle 2.6m Offside 2.78m Capita noted on drawing G/81-1, suggesting 3.3m for the offside and nearside lanes. In keeping with same principle as the Station Road junction, 3.0m for the nearside and offside lanes and 2.5m for the middle lane. The carriageway width 8.5m would need to be increased by 0.6m reducing the footway width on the northside.	CH2M drawing GWHPAS-C-DWG-4404 sheet 5 of 5 The eastbound (A5) lane widths have changed Nearside 2.66m Middle 2.66m Offside 2.65m In general the lanes widths need to be reviewed if the footway can be reduced from the 3m width, refer to item 1-33.	With regard to the road markings and lane widths. CH2M believe that certain issues, such as road markings should be resolved during the detailed design stage. Only issues, which in their Capita's opinion, cannot be resolved during the detailed design should be raised further with ourselves.
1-31	Consider alternating the staggered pedestrian crossing although undesirable the layout would improve junction intervisibility and traffic signal timings						No Comment was provided by CH2M. Consider at Preliminary Design.		No Action Required
1-32	Lane widths at stop lane are very narrow consider increasing offside and nearside lane to 3.3m for larger vehicles and middle lane to 3m. This will require further widening of carriageway at footway or central island. Lane widths may not be conducive for cyclist use.	A1	Lane widths	The straight alignment approach to the junctions may in theory be appropriate for provision of 3m lanes or absolute minimum widths of 2.5m. However, consideration should be given to the relatively high commercial vehicle usage and the encouragement of cycle use.	CH2M previously produced a technical note investigating the provision of cycle facilities (WH_TN_01_v1a - March, 2014). The note concluded that modifying the approved scheme to introduce on carriageway cycle lanes would impact on predicted capacity such that general queuing and journey times, particularly for buses, would be unacceptable. Alternative strategic cycle routing was identified with a north south route through the new development along with existing roads being promoted	No change to proposed highway scheme. Offline cycle route to be promoted			No Action Required
1-33	West Hendon Broadway would be categorised as an urban all-purpose	A3	Paved width	Narrower lane widths (less than 3.65m) / no central reserve	The use of 3m lanes is considered to be acceptable for this urban location and reflects current layouts. The desire to	All lane widths to be reviewed with detailed design but need to balance any carriageway	Noted.		No Action Required

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
	dual carriageway in accordance with to 27/05 Figure 4-4a The cross section should therefore be regarded as a departure from standard due to the existing constraints (Refer to insert figure 4-4a)				maximise footway width means that the scope to widen is limited	widening with maximising footway widths means limited scope to adjust from permitted scheme			
1-34	Refer to drawing no. G/8/8 for assessment of Cool Oak Lane junction						Refer to Section 7.0		No Action Required

4. Garrick Road Junction

Drawing reference G/8/2 provides comments for the Garrick Road junction.
Revised Scheme Layout - CH2M drawing GWHPAS-C-DWG-4400 Sheet 1 of 5

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
2-1	<p>This is the desirable visibility envelope for the junction (TD 42/95) para 7.6c): However visibility is obstructed by property boundaries and therefore is not achievable. This replicates the existing arrangement.</p> <p>This envelope illustrates an 'X' distance of 4.5m for difficult circumstances for lightly trafficked simple junction (TD 42/95 para 7.8). Again this is obstructed by existing property boundaries and therefore is not achievable</p> <p>The achieved 'x' distance is 3.4m which exceeds the 'X' distance of 2.4m for exceptionally difficult circumstances (TD 42/95 para 7.8) which replicates the existing arrangement</p> <p>Note: The stopping sight distance at one step below desirable minimum is 50m. Due to the close proximity of existing property boundaries this only improves the junctions visibility slightly by increasing the 'x' distance to 3.9m</p>		Junction Visibility				<p>No Comment was provided by CH2M.</p> <p>Noted that the visibility envelope replicates the existing arrangement.</p>		No Action Required
2-2	Note: It is assumed that due to the proximity of Garrick Road industrial estate. Articulated lorries will regularly use this junction	B1	Junction Swept Path	<p>LGV vehicles likely to use this junction due to the proximity of Garrick Road Industrial Estate. Swept paths have been tested with Articulated vehicles. The swept path analysis shown on drawing G/8/2 illustrates the difficulty with manoeuvres for this vehicle.</p>	<p>For the right turn into Garrick Road, the proposed 3m wide turning lane (see below) allows HGVs to take a wider line which has resolved the issue.</p> <p>To resolve the left-out conflict with the ghost island, the length of the turning bay can be reduced by 10m and still accommodate a 16.5m articulated vehicle.</p>	Shorten ghost island by 10m.	<p>CH2M to provide the revised layout which demonstrates this issue has been resolved.</p> <p>From observation of the swept path analysis Capita completed, widening the right turn lane by 3m is unlikely to address the failure of the swept path analysis. The concern is that in order to complete the right turn manoeuvre a HGV would have to drive into the adjacent through lane, thereby creating a hazardous movement with side swipe/rear shunt accidents likely.</p> <p>TD 42/95 outlines for a 30mph (design speed 60kph) Turning length 10m,</p>	<p>CH2M drawing GWHPAS-C-DWG-4400 sheet 1 of 5, indicates a revised layout consisting of one lane instead of two lanes northbound. This has allowed for the ghost lane to be widened and offset away from Garrick Road junction to provide the vehicle track movement for the 16.5m articulated vehicle to turn right on to the A5.</p> <p>Measuring the ghost lanes on the drawing it shows the ghost lane is less than 3m and varies to 2.3m. The northbound lane width of 3.6m will need to be reviewed to accommodate the 3m ghost lane.</p> <p>Add road marking to indicate the reduction in lanes northbound.</p>	<p>CH2M agrees with this statement. The ghost lane is now 3m as requested.</p> <p>With regard to the road markings, CH2M believe that certain issues, such as road markings should be resolved during the detailed design stage. Only issues, which in their Capita's opinion, cannot be resolved during the detailed design should be raised further with ourselves.</p>

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
							Deceleration length 25m (including a 5m direct taper length) CH2M proposal would require a departure from DMRB Standards for ghost lanes for the turning length and deceleration length.		
2-3	The pedestrian refuge is a considerable size and consideration should be taken to reduce the size to improve vehicle movements (right turn in)		Junction geometrical				No Comment was provided by CH2M. Should be considered at Preliminary Design Stage		No Action Required
2-4	Lane widths are very narrow and will be difficult for LGVs to negotiate	B2	Carriageway widths	DMRB Standards permits a reduction to 2.5m in exceptional circumstances and where the alignment permits. The immediate approach to the junction follows a reverse curve with 2.5m to 3m lane widths which are not suitable for LGVs.	This alignment exists currently - no changes to highway alignment or splitter island are proposed as part of the scheme. The traffic flows at this location are not anticipated to change significantly as result of the scheme.	No action proposed.	Are there any current reported difficulties for HGV using this junction, which do not require any improvements? What do the accident records show and is there a road safety issue to be addressed?		No Action Required
2-5	The existing kerb line comprises of a reverse curve consideration should be given to straightening the approach to the junction to assist vehicle movements	B2	Carriageway widths	DMRB Standards permits a reduction to 2.5m in exceptional circumstances and where the alignment permits. The immediate approach to the junction	This alignment exists currently - no changes to highway alignment or splitter island are proposed as part of the scheme. The traffic flows at this location are not anticipated to change significantly as result of the scheme.	No action proposed.	Should be considered at Preliminary Design Stage	CH2M drawing GWHPAS-C-DWG-4400 sheet 1 of 5. Suggest some on-site observation of vehicle movement and note any difficulties for negotiating the right turn onto the A5. Subsequently consider modification to layout	CH2M agree with this statement.
2-6	The ghost island configuration is incorrect. Taper should be set at 1:20 (See TD 42/95 Fig 7/3)	B3	Tapers	Taper from southern end of ghost island should be 1:20 to comply with DMRB	Based on the now modified 3m ghost island turning lane (see below), DMRB guidance would result in a 60m taper. This is impractical for this location. It should also be noted that DMRB does not prescribe (black box) this taper requirement, it only prescribes direct taper lengths (the taper that forms the ghost island turning lane).	No action proposed	Refer to item 2-2 CH2M proposal would require a departure from DMRB Standards for the taper.	CH2M drawing GWHPAS-C-DWG-4400 sheet 1 of 5. The vehicle swept path movement of articulated vehicles into the ghost lane will transgress into the hatching to complete the manouvre. Review the layout/hatching to avoid transgression. The ghost lane would be departure from standard.	The layout has been revised to accommodate the movement of the articulated vehicle (see CH2M email 2016-08-01). Again CH2M, reference TfL's own guidance it states that it is important not to design geometry solely based on occasional use by large vehicles, such as refuse or removal trucks. In all instances, the designer should take into account the individual site characteristics when choosing the appropriate corner radii. Provided drivers can make the turn within the overall road space available, it is rarely necessary to design so that they can do so while remaining entirely in a single nearside lane.
2-7	The width of the turning lane for the proposed ghost island layout is substandard at 2m. The desirable width is 3.5m with a relaxation to 3m (TD 42/95 para 7.35. For	B4	Turning lane width	Turning lane width is proposed to be 2m, whereas the absolute minimum suggested in DMRB, where space is very limited, is 2.5m.	The proposed turning lane can be provided as 3m in width	3m turning lane to be provided	Refer to item 2.2, CH2M to indicate how the 3m width is achievable and which other lanes or footway widths are reduced.	Refer to item 2-2 for the lane widths.	CH2M agrees with this statement. The ghost lane is now 3m as requested. With regard to the road markings, CH2M believe that certain

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	improvements to existing junctions this may be reduced further to a minimum 2.5m								issues, such as road markings should be resolved during the detailed design stage. Only issues, which in their Capita's opinion, cannot be resolved during the detailed design should be raised further with ourselves.

5. Station Road Junction

Drawing reference G/8/4 provides comments for the Station Road junction.

Revised Scheme Layout - CH2M drawing GWHPAS-C-DWG-4402 Sheet 3 of 5

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
4-1	<p>Review of stop lines should be considered to improve intervisibility of junction and traffic signal timings generally</p> <p>Junction intervisibility is obstructed by existing buildings</p>	C1	Junction intervisibility	The existing intervisibility envelope is shown on drawing G/8/4 which shows non-compliance with DMRB due to the proximity of the corner buildings. This is exacerbated by the requirement for advanced stop lines for cyclists.	As part of the CPO process, the two buildings within the intervisibility envelope will be removed providing opportunity to enhance intervisibility.	Intervisibility to be maximised within CPO land.	<p>The temporary CPO2a (light blue) must be permanently acquired to achieve the visibility splay.</p> <p>If the junction is widened for an ASL feeder lane and improve the tight vehicle track movement this would alter the visibility line to clash with the property being retained.</p>	<p>CH2M drawing GWHPAS-C-DWG-4402 Sheet 3 of 5, indicates a revised layout with the stop lines and traffic islands repositioned.</p> <p>CH2M drawing Junction Intervisibility Zone sheet 2 of 5 has adjusted the intervisibility but still crosses the corner of the temporary CPO2a building. To be discussed with TfL to establish if TfL would accept a departure.</p>	<p>CH2M have suggested that a Departure of Standard would be required. It is also recommended that Capita would need to progress any Departures from Standard and obtain LB of Barnet's approval as well as progressing the dialogue with TfL as part of the Detailed Design Process. It is also suggested that a Road Safety Audit be prepared by Capita to demonstrate that there is no issue in terms of vehicle or pedestrian safety.</p>
4-2	<p>Swept path is very tight which is exacerbated by the narrow lanes on West Hendon Broadway and the location of the splitter island on Station Road</p> <p>The dual lane right turn swept path from Station Road to West Hendon Broadway is very tight due to the narrow lanes of 3m at the junction approach. This has the potential to cause vehicle side swipes during the manoeuvre. The splitter island on West Hendon is also impacted according to the analysis</p> <p>Impact with splitter island see commentary below</p> <p>Swept path encroaches the footway from Station Road to West Hendon Broadway and traverses the central hatched area. This is exacerbated by the narrow lanes Station Road</p> <p>There appears to be no scope to increase the junction radius at this location</p>	C5	Junction Visibility Path	Currently single lane right turn. This is to be reverted to dual lane turning right from Station Road. Lane widths currently 3m. Lane widths should increase significantly in line with the Standard.	Modification of lane widths or the reduction of the refuge island width is not possible. It is also considered highly unlikely that two large vehicles would simultaneously attempt the manoeuvres tested.	No action proposed.	<p>Review layout to accommodate swept path of design vehicles. Not achieving design swept paths are likely to lead to shunt/ side swipe accidents. Review need for dual right turn lane in terms of capacity and queue length and overall review of junction layout as 4-1.</p>	<p>CH2M have provided further swept paths for dual bus movement, turning right from Station Road to the A5. There is a spot that could cause a side swipe. CH2M reference TfL guidance that states 'that it is important not to design geometry solely based on occasional use by large vehicles, such as refuse or removal trucks. In all instances, the designer should take into account the individual site characteristics when choosing the appropriate corner radii. Provided drivers can make the turn within the overall road space available, it is rarely necessary to design so that they can do so while remaining entirely in a single nearside lane'. Notwithstanding this TfL agreement is required regarding any design conflict between adjacent vehicles negotiating the turn.</p> <p>As a minimum the design should allow for a car/light vehicle with an adjacent articulated vehicle to complete the movement without conflict.</p> <p>The position of the splitter island on the south side has been offset</p>	<p>CH2M have undertaken the required swept paths as recommended by Capita and have now been provided.</p> <p>With regard to position of the splitter island. The swept path does show the Articulated Vehicle (16.5m) entering the hatched marking area. However it should be noted that this vehicle does not make any contact with traffic in the opposing lane. Again reference to TfL's guidance that states that it is important not to design geometry solely based on occasional use by large vehicles, such as refuse or removal trucks. In all instances, the designer should take into account the individual site characteristics when choosing the appropriate corner radii. Provided drivers can make the turn within the overall road space available, it is rarely necessary to design so that they can do so while remaining entirely in a single nearside lane.</p>

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
								to allow the swept path of a 16.5m articulated vehicle to turn left from Station Road. The swept path still indicates it will be necessary for the vehicle to cross into the hatch road marking. The option to omit the taper lane needs to be considered. The layout therefore needs to be reviewed.	
4-3	The corner radii for this side of the junction is adequate for all types of vehicles tested		Junction Geometrical				No comment was provided by CH2M.		No Action Required
4-4	Limits of pedestrian crossing could be reduced which will allow a larger curve radius to be introduced making it easier for LGV's to make the right turn onto West Hendon Broadway		Junction Geometrical				No comment was provided by CH2M. Consider at Preliminary Design.		No Action Required
4-5	The proposed corner radii is below recommended 10m assuming the junction is going to be used by large goods vehicles (TD 50/04) Table 2/1). This makes the manoeuvre unachievable for LGVs. There appears to be little scope to increase radius at this location	C2	Corner radii	The 6m radius reflects the existing radius (noncompliant) and the 10m radius provides a DMRB compliant radius for anticipated LGV use. DMRB standard requires 10m radius for LGVs	As noted, the existing situation is non-compliant but there is no scope to improve it due to existing buildings and footway requirements. Any increase will reduce footway widths and increase crossing distances.	No action proposed.	Any increase in radius would result in additional CPO2a land requirement. CH2M proposal would require a departure from DMRB Standards for the radii	CH2M drawing GWHPAS-C-DWG-4402 Sheet 3 of 5, provides no change to the existing radius and requires a departure from DMRB Standards.	Capita are correct, CH2M are proposing no modifications to the existing radius. Therefore, should a Departure in Standard be required. It is recommended that Capita would need to progress any Departures from Standard and obtain LB of Barnet's approval as well as progressing the dialogue with TfL as part of the Detailed Design Process. It is also suggested that a Road Safety Audit be prepared by Capita to demonstrate that there is no issue in terms of vehicle or pedestrian safety.
4-6	The splitter island is situated 4.2m ahead of its required minimum distance of 1.5m back from the extended kerb line (To 50/04 para 2.38). Assuming this has been done to gain full intervisibility on this side. The island will in turn impede larger vehicles making the right turn onto West Hendon Broadway more difficult for larger vehicles (See above).	C4	Splitter Island	The TfL standard requires 1.4m minimum and 1.7m if a right filter arrow is required to the signal head.	Shifting the splitter island back so it aligns with extended Station Road kerblines results in it blocking left turning vehicles out of Station Road. Proposed position represents the best balance between catering for both left and right turning vehicles. It could be practical to increase splitter island width if nearside flare lane is removed.	Need for nearside flare at Station Road northbound approach to be reconsidered and discussed with TfL. If removed, the splitter island can be widened.	If a right turn filter head is required the width of the separation island would need to be 1.7m. The junction layout needs to be reviewed to accommodate design swept path, lane separation island, footway widths and provision of ASL feeder lane and the necessity of the near side flare lane on West Hendon Broadway westbound with consideration given to capacity and queue lengths all to be agreed with TfL. Read in conjunction with item 1-20.	CH2M drawing GWHPAS-C-DWG-4402 Sheet 3 of 5, shows the splitter island has been widened to 1.7m. The lane widths have reduced further to accommodate the splitter island, but remain wider than minimum 2.5m width.	CH2M agree with this statement.
4-7	The lane widths at the stop line are very narrow furthermore. The inside lane is not a straight alignment for this						No comment was provided by CH2M.		No Action Required

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	configuration a lane width greater than 3m is recommended. To achieve this an increase in carriageway width would be required						Refer to item 1-20 Refer to item 1-7 concerning the ASL		
4-8	The residual footway width after the proposed design is approximately 3m leaving potential for the proposed channel and kerb to be set back further to provide additional carriageway for the swept path of LGVs (TD 50/04 para 2.41)						No comment was provided by CH2M. To be considered in review of the junction layout		No Action Required
4-9	The pedestrian crossing impedes the path of large goods vehicles when running in tandem. The introduction of a radius is recommended to make the manoeuvre achievable						No comment was provided by CH2M. To be considered in review of the junction layout		No Action Required

6. Ravenstone Road Junction

Drawing reference G/8/5 provides comments for the Ravenstone Road junction.
Revised Scheme Layout - CH2M drawing GWHPAS-C-DWG-4401 Sheet 2 of 5

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
5-1	<p>Reconfiguration of the junction radius and repositioning of the splitter island [north] could improve / eliminate the poor intervisibility zone as designed</p> <p>Junction intervisibility is obstructed by buildings</p> <p>Repositioning of the splitter island [south] could improve the poor intervisibility zone as designed</p> <p>Review of stop lines should be considered to improve intervisibility of junction and traffic signal timings</p>	D1	Junction intervisibility	The existing intervisibility envelope is shown on drawing G/8/5 which shows non-compliance due to the proximity of the corner buildings. This is exacerbated by the requirement for advanced stop lines for cyclists.	For intervisibility looking left, Capita suggestion to increase radius to 8m and bring splitter island forward will be investigated. Maintaining a 2m footway could be an issue due to close proximity of building not currently within CPO.	Radius increase and splitter island modification to be investigated at detailed design.	<p>On the west side of Ravenstone Road the CPO2a needs to be extended to achieve full intervisibility. The reconfiguration of the junction radius and reposition of splitter island could improve the poor intervisibility.</p> <p>Whilst the east side intervisibility line on the east side is within the CPO2a, it is restricted by the proposed new development block G5 (Barratt ref). Reposition of the splitter island could improve the poor intervisibility. The CPO2a would need to be extended to achieve full intervisibility.</p> <p>CH2M to provide details of the radius increase and splitter island modification proposal.</p>	<p>CH2M drawing GWHPAS-C-DWG-4401 Sheet 2 of 5, indicates a revised layout with splitter island and stop line positions to improve the intervisibility.</p> <p>CH2M drawing Junction Intervisibility Zone Sheet 2 of 5 is within the CPO2a land for the northside of the junction.</p> <p>Barratt have advised the position for the block G5 can be reviewed under the reserved planning matters.</p>	CH2M agree with this statement.
5-2	<p>The swept path from Ravenstone Road/ Broadway north is very tight due to the proposed location of the splitter island consider increasing junction radii to 8m</p> <p>The swept path from Broadway south to Ravenstone Road conflicts with the corner of the advance stop line for cyclists. Consider increasing the junction and introducing an exit taper and / or relocating the stop line</p> <p>There may be opportunity to reposition the splitter island further to the north west to create a more compact junction arrangement. This subject to further analysis of the right turn out of Ravenstone Road</p>	D2	Swept Path	The swept path analysis is shown on drawing G/8/5. The 6m radius may be problematic for LGVs. There may be scope to increase this radius to 8m. Standard requires 10m radius for LGVs.	For left out (see above). For left in movement, the swept-path issue has been resolved using an exit taper.	Adopt exit taper in detailed design.	CH2M to provide details of the exit taper layout and indicate how this impacts on the footway width at the pinch point. adjacent to proposed building block G5.	CH2M drawing GWHPAS-C-DWG-4401 Sheet 2 of 5, The junction has been tested for a large refuse vehicle. But not for an articulated vehicle. This would impact on the geometry of the junction and therefore junction layouts should be reviewed.	As referenced in the Masterplan 'Design & Access Statement the development's streets have been designed to accommodate refuse vehicles and other HGV movements based on deliveries. Therefore, CH2M believe that Refuge Vehicles and a 7.5t Vehicle used for swept-path purposes are acceptable. It is also proposed that a weight restriction sign be placed at Ravenstone Road Junction to notify drivers of the weight restriction.
5-3	<p>The splitter island [north] width is narrow at 1.2m which leaves provision for 300mm to accommodate signs / signal heads with a 450mm clearance either side.</p> <p>There is risk that signs / signal heads will be impacted due to the narrow width</p>	D3	Separation island	The TfL standard requires 1.4m minimum and 1.7m if a right filter arrow is required to the signal head.	Method of control needs to be agreed before any modification is adopted. There are constraints on footpath widths along the Broadway though lower pedestrian movement in this location could enable some additional splitter island width.	Splitter island modification to be investigated at detailed design.	Noted. Footway width in the vicinity are 2.68m and 2.81m	CH2M drawing GWHPAS-C-DWG-4401 Sheet 2 of 5, the splitter islands have been adjusted to 1.3m wide, this would indicate a side mounted arrow or box sign is not required. If these were required the splitter island would require to be wider.	CH2M believe that there is no need for a side mounted arrow as the right hand lane is for straight ahead and right turn vehicles. Consequently there would be no need for a separate right turn arrow.

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								Noted the footway width at the corners pinch points are labelled as 2.7m and 2.4m.	
5-4	The splitter island has potential to be moved forward to an offset distance of approx. 1.9m from the extended kerb line. Subject to further swept path analysis	D1	Junction intervisibility	The existing intervisibility envelope is shown on drawing G/8/5 which shows non-compliance due to the proximity of the corner buildings. This is exacerbated by the requirement for advanced stop lines for cyclists.	For intervisibility looking left, Capita suggestion to increase radius to 8m and bring splitter island forward will be investigated. Maintaining a 2m footway could be an issue due to close proximity of building not currently within CPO	Radius increase and splitter island modification to be investigated at detailed design.	Refer to item 5-1	CH2M drawing GWHPAS-C-DWG-4401 Sheet 2 of 5, The splitter island has been moved forward and the radius increased to 7m to improve the swept paths and intervisibility splay.	CH2M agree with this statement.
5-5	The splitter island [south] has potential to be moved forward to an offset distance of approx. 4m from the extended kerb line. Subject to further swept path analysis		Splitter Island				No comment was provided by CH2M. Refer to item 5-1	CH2M drawing GWHPAS-C-DWG-4401 Sheet 2 of 5, A revised layout with splitter island and stop line positions improve the intervisibility, but is subject to further swept path analysis for an articulated vehicle.	As referenced in the Masterplan 'Design & Access Statement the development's streets have been designed to accommodate refuse vehicles and other HGV movements based on deliveries. Therefore, CH2M believe that Refuse Vehicles and a 7.5t Vehicle used for swept-path purposes are acceptable. It is also proposed that a weight restriction sign be placed at Ravenstone Road Junction to notify drivers of the weight restriction.
5-6	The proposed corner radii is the recommended 10m for urban areas (TD 50/04 Table 2/1). However the swept path analysis demonstrates encroachment into the opposite traffic lane. Consideration should be made to increase the junction radius and introduce an exit taper or to reposition the stop line and cycle refuge area to avoid the conflict. Furthermore, a pinch point in the footway is created leaving a residual width of 1.3m at this point which is below the recommended 2m (TD 90/05 Table 7.1)	D2	Swept Path	The swept path analysis is shown on drawing G/8/5. The 6m radius may be problematic for LGVs. There may be scope to increase this radius to 8m. Standard requires 10m radius for LGVs	For left out (see above). For left in movement, the swept-path issue has been resolved using an exit taper	Adopt exit taper in detailed design.	Refer to item 5-2 Refer to item 1-7 concerning the ASL.		No Action Required
5-7	Furthermore a pinch point in the footway is created leaving a residual width of 1.3m at this point which is below the recommended 2m (TD 90/05 table 7.1)		Footway width				No comment was provided by CH2M. This is still an issue to resolve and coordinate with the new development block.	CH2M drawing GWHPAS-C-DWG-4401 Sheet 2 of 5, The revised drawing indicates a footway width of 2.4m at the pinch point.	CH2M agree with this statement.
5-8	The proposed corner radii is below the recommended 10m radius (TD 50/04 Table 2/1) making it difficult for LGVs and rigid base vehicles to make the manoeuvre. By increasing the radius to 8 – 10m the turn becomes more manageable and it allows the vehicles to clear the splitter island if it is moved forward	D2	Swept Path	The swept path analysis is shown on drawing G/8/5. The 6m radius may be problematic for LGVs. There may be scope to increase this radius to 8m. Standard requires 10m radius for LGVs	For left out (see above). For left in movement, the swept-path issue has been resolved using an exit taper	Adopt exit taper in detailed design.	Refer to item 5-1		No Action Required

7. Cool Oak Lane Junction

Drawing reference G/8/7 provides comments for the Cool Oak Lane junction
Revised Scheme Layout - CH2M drawing GWHPAS-C-DWG-4404 Sheet 5 of 5

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
7-1	Junction intervisibility is obstructed by existing buildings Reconfiguration of the junction radius and repositioning of the splitter island [north] could improve / eliminate the poor intervisibility zone as designed Reconfiguration of the staggered pedestrian crossing and relocating the splitter island could improve / eliminate the poor intervisibility zone as designed	E1	Junction intervisibility	The existing intervisibility envelope is shown on drawing G/8/7 which shows non-compliance due to the proximity of the corner buildings. This is exacerbated by the requirement for advanced stop lines for cyclists.	Both portions of land, looking left and right, form part of the CPO process. Intervisibility will therefore be maintained	Intervisibility to be maximised within CPO land.	The intervisibility splay needs to be overlaid with the CPO2a lines to confirm intervisibility splay is achieved. CH2M to confirm intervisibility splay achieved.	CH2M drawing Junction Intervisibility Zone Sheet 5 of 5, indicates the intervisibility splay is achieved in the CPO land.	CH2M agree with this statement.
7-2	The swept path from Cool Oak Lane / Broadway north is very tight due to the proposed location of the splitter island. Consider increasing junction radii to 8m The swept path from Broadway south to Cool Oak Lane conflicts with the corner of the advance stop line for cyclist consider increasing the junction radius to 10m or relocating the stop line	E2		The 6m radius reflects the existing radius and the 8m radius improves the existing 3m radius. Standard requires 10m radius for LGVs.	The left out radius can be increased to 8m and the left in radius increased to 9m and has been modified in the latest design revisions.	Radii maximised at detailed design within CPO land.	CH2M to provide the latest drawings to confirm the layout is within the CPO land. Departure from standard required for radius less than 10m.	CH2M drawing Junction Intervisibility Zone Sheet 5 of 5, indicates the intervisibility splay is achieved in the CPO land. It is noted the left radius has only been increased to 8m rather than 9m, but accommodates the design vehicles swept path. The radius will still require a departure from standard	CH2M have redesigned the junction to now accommodate the 9m radius as requested.
7-3	The taper for the right hand turning traffic should be 1:5 (15m lengths). Sharp tapers will introduce an area of superfluous carriageway	E3		The design as shown is likely to result in an area of superfluous carriageway	In the latest design revisions, the traffic island has been amended to resolve this issue.	Revised layout adopted for detailed design.	CH2M to provide the latest drawings to confirm.	CH2M drawing GWHPAS-C-DWG-4404 Sheet 5 of 5, The taper has been adjusted to 1:5.	CH2M agree with this statement.
7-4	The lane widths at the stop line are very narrow. The widths indicated are close to the absolute minimum width of 2.5m Widths are therefore complaint with TD 50/04 2.23 (Assuming the 85 th percentile speeds do not exceed 35mph) Lane widths should be considered in relation to the high street urban environment in relation to the high volume traffic can be intimidating to road users, pedestrians and cyclists						Refer to item 1-30 Review as part of the junction layout to increase the nearside lane to 3m. Refer to item 1-7 concerning the ASL		No Action Required
7-5	The splitter island [north] width is narrow at 1.4m which leave provision for 500mm to accommodate signs / signal heads with a 450mm clearance either side						No comment was provided by CH2M If a right turn filter is required to the signal head the minimum width of the splitter island would be 1.7m.	CH2M drawing GWHPAS-C-DWG-4404 Sheet 5 of 5. The splitter island has been reduced to 1.3m (TfL Guidance Document SQA -0643) and is now a continuous island. This would indicate a side mounted arrow or box sign is not required. If these were required the splitter island would require to be widened. TfL Guidance	This can only be confirmed following the traffic signal design for which Capita will need to liaise with/instruct TfL.

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								Document SQA 0064 indicates a min width of 1.4m. This will be subject to the traffic signal design.	
7-6	The splitter island [north] could be moved forward to its minimum recommended position of 1.5m back from the extended kerb line (TD 50/04 para 2.38). This will improve the intervisibility of the junction and marginally improve traffic signal timings. Subject to conflict with vehicle swept path						No comment was provided by CH2M. Consider at Preliminary Design.	CH2M drawing GWHPAS-C-DWG-4404 Sheet 5 of 5. No change to splitter island positions. Refer to item 7-1 regarding the intervisibility	CH2M agree with this statement.
7-7	With the proposed corner radii at 6m and the adjacent splitter island being moved closer the left turn onto West Hendon Broadway is very tight. It would require a bus to swing out to make the turn (see swept path above). Furthermore, if the island is to be moved forward to improve intervisibility the bus swept path would be in conflict with the splitter island. Therefore it is recommended that the curve radius is increased to 10m. Leaving a residual footway width of approximately 2.2m Note: The repositioning of the splitter island on West Hendon Broadway (Western arm) exacerbates the difficulty for left turning traffic from Cool Oak Lane	E2	Corner radii	The 6m radius reflects the existing radius and the 8m radius improves the existing 3m radius. Standard requires 10m radius for LGVs.	The left out radius can be increased to 8m and the left in radius increased to 9m and has been modified in the latest design revisions.	Radii maximised at detailed design within CPO land.	Refer to item 7-2		No Action Required
7-8	The splitter island could be moved forward so it is set back approximately 4m back from extended kerb line. This will give full intervisibility for this side of the junction. Subject to conflict with vehicle swept path (see above)						No comment was provided by CH2M Considered at Preliminary Design Stage		No Action Required
7-9	Alternating the layout of the staggered pedestrian crossing should be considered although this is an undesirable arrangement this would improve junction intervisibility and traffic signal timing, This may also permit the splitter island to be relocated further west.						No comment was provided by CH2M To be considered at preliminary design stage, this might assist with CPO2 land issue in reference to item 7-1, if the intervisibility splay extends beyond the CPO2 line.	CH2M drawing GWHPAS-C-DWG-4404 Sheet 5 of 5. No change to splitter island positions. Refer to item 7-1 regarding the intervisibility	CH2M agree with this statement.
7-10	The proposed corner radius is below recommended 10m assuming the junction is going to be used by large goods vehicles (TD 50/04 table 2/1). This makes the manoeuvre difficult for LGVs with potential encroachment into opposite traffic lanes. It is worth noting		E2	The 6m radius reflects the existing radius and the 8m radius improves the existing 3m radius. Standard requires 10m radius for LGVs	The left out radius can be increased to 8m and the left in radius increased to 9m and has been modified in the latest design revisions.	Radii maximised at detailed design within CPO land.	Refer to item 7-2		No Action Required

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
	that if the corner radius was to be increased to 10m the residual footway width would be approx. 2.8m. see swept path above								

8. Wilberforce Road Junction

Drawing reference G/8/8 provides comments for the Wilberforce Road junction
Revised Scheme Layout - CH2M drawing GWHPAS-C-DWG-4403 Sheet 4 of 5

Capita Ref.	Capita Comment as per the drawing	CH2M Ref.	Category	CH2M's Summary of Capita Comments March 2016	CH2M Response March 2016	CH2M's Proposed Actions	Capita Comment July 2016	Capita Comments August 2016	CH2M Comments August 2016
8-1	<p>Visibility splay (north) shown as 9m x 70m (Desirable minimum tangential with carriageway)</p> <p>Visibility splay shown as 9m cx 50m (1 step below desirable minimum). Full assessment cannot be undertaken due to unknown development proposal in the Mapesbury Mews area</p>	F1	Junction Visibility	The left visibility splay is compliant based on a 9m x distance and 70m DM. The right visibility splay would require a 1 step below DM of 50m, but this depends on the redevelopment proposals for this area which are not indicated and cannot be assessed.	No land is being taken through CPO at this location. Departure from standard will need to be sought.	Departure from standard will need to be sought.	<p>Noted.</p> <p>An alternative layout is proposed by CH2M to provide to bus stands relocated from Perryfield Way, as per CH2M's Note April 2016 submitted to LBB.</p>	<p>CH2M drawing GWHPAS-C-DWG-4403 provides the revised layout.</p> <p>The direction of flow is changed and the junction visibility comment is N/A</p>	CH2M agree with this statement.
8-2	The proposed corner radii is 6m which is the recommended for urban area and is adequate for the vehicles that will use this junction (TD 42/95 para 7.17)		Junction Geometrical				<p>No comment was provided by CH2M</p> <p>To be reviewed at Preliminary Design</p>	Swept path analysis to be provided for the other vehicles using the access such as refuse vehicles	CH2M agree with this statement. And have provided a series of revised swept-paths.
8-3	The proposed corner radii at 4m has been proposed presumably to deter left turning traffic from Station Road. However, a 4m radius could still be achieved by lighter vehicles. Consideration should be given to further reducing this radius to further deter such movements		Junction Geometrical				<p>No comment was provided by CH2M</p> <p>To be reviewed at Preliminary Design</p>	Comment related to the previous layout – N/A	CH2M agree with this statement.
8-5	Suitable advance warning signs should be posted on the northbound approach to the Wilberforce Road junction from Station Road due to the left bend approach. No information has been provided off road to determine the stopping sight distance to this junction		Junction Geometrical				<p>No comment was provided by CH2M</p> <p>To be reviewed at Preliminary Design</p>	Comment related to the previous layout – N/A	CH2M agree with this statement.

9. Station Road Link

Drawing reference G/8/9 provides comments for the Station Road link

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9-1	Refer to drawing no. G/8/4 for assessment of Station Road junction						Refer to Section 5.0	CH2M drawing GWHPAS-C-DWG-4402 Sheet 3 of 5, Refer to Section 5.0	CH2M agree with this statement.
9-2	Staggered pedestrian crossing in undesirable layout (DMRB, but preferential to layout. The arrangement maximises lane lengths creates compact junction (shorter green times)						No comment was provided by CH2M	Noted no change to staggered pedestrian crossing.	CH2M agree with this statement.
9-3	Footway not shown on the proposal. Footway should be a minimum 2m wide, with further consideration for forward visibility on the link						No comment was provided by CH2M Details to be provided.	On CH2M drawing GWHPAS-C-DWG-4402 indicates the offset for a 3m footway.	CH2M agree with this statement.
9-4	Controlled pedestrian crossings and cycle refuge area are not perpendicular to the main carriageway						No comment was provided by CH2M To be reviewed at Preliminary Design		No Action Required
9-5	Consider use of antiskid material on approaches to signal junctions / pedestrian crossings						No comment was provided by CH2M To be reviewed at Detail Design		No Action Required
9-6	Taper to pedestrian crossing is incorrect. Requirement is for taper to be 1:20 for single carriageway (TD 42/95 table 7.3). Resulting in a length of 27m						No comment was provided by CH2M This would be a departure to DMRB Standards		No Action Required
9-7	Footway width is below recommended minimum at approx. 1.8m footways are generally required to be 2m wide as stated in DMRB TD 90/05 table 7.1. It is recognized that the footway width here reflects the existing width						No comment was provided by CH2M		No Action Required
9-8	Proposed bus stop and loading bay have been positioned in the dedicated left hand turn lane. Consider impact on traffic queues						No comment was provided by CH2M Bus stop and parking bay are existing, still need to consider impact on traffic queues as there is now only one lane turning left at the junction.		The loading bay is presumed to be provided for No. 232a West Hendon Broadway for their service needs. The Bus Stand currently behind the loading bay at Station Rd could be re-provided at the new proposed Bus Stand at Wilberforce road subject to agreement with TfL at detail design stage.
9-9	Narrow lane widths 3 x 3m (eastbound) may not be conducive for cyclist use	G3		Reverts from one way traffic to two way. Lane widths less than 3.65m. Lane widths away from the traffic signal junction match the original configuration (refer to drawing G/8/9)	The use of 3m lanes is considered to be acceptable for this urban location and improves upon existing layout. The desire to maximise footway width means that the scope to widen is limited.	No action proposed.	Refer to item 1-7.		TfL design guidance SQA-0064 suggest that the entry lane width should be 3.0m and 3.65m, but narrow lane widths to a minimum of 2.5m are also acceptable in some cases.

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									The design carriageway space is constrained by the available land, therefore, the provision of ASL will require further investigation in the detail design stage. The TfL LCDS guidance suggested that if the proportion of HGV exceed 5% of the traffic during peak hour, a segregated cycle track should be considered to provide a high degree separation.
9-10	Details of the stopping up of the junction are not available for comment						No comment was provided by CH2M		No Action Required
9-11	The building adjacent to the proposed footway are to be demolished. The proposed development should take into account the forward visibility (SSD) requirements associated with this link (Refer to drawing G/8/11/1)	G1		From Wilberforce Rd, northbound the highway configuration remains as existing. From Wilberforce Rd southbound, the highway is proposed to widen considerably, but little detail has been provided in respect of the proposed footway widths or proposed adjacent developments	The latest drawing revision provides further details regarding footway widths.	Latest layouts taken forward to detailed design.	CH2M to provide drawings for clarification of footway widths and sight lines, and with latest proposal for Wilberforce Road with bus stand.		See below
		G2		See above. The section between Wilberforce Road and West Hendon Broadway may have marginal improvement which has been made possible by the demolition of properties near the West Hendon Junction	With a 3m pedestrian footway on the east side there is very little scope to significantly improve horizontal alignment	No action proposed	Assume the 3m refers to the footway on the northside of Station Road. No development proposals shown and so cannot determine whether alignment improvements could be made.		Proposed 3m footway width north side of Station Road outside the development. The proposed building outline has also been included in the drawing (see CH2M Drawing DWGHPAS-C-DWG-4403). The final design will require confirmation from the Road Safety Audit process in the detail design stage.
9-12	Station Road would be categorised as an urban all-purpose single carriageway in accordance with TF 27/05 Figure 4 – 4a. The cross section should therefore be regarded as a departure from standard due to the existing constraints (Refer to insert Figure 4 – 4a)						No comment was provided by CH2M Refer to item 1-4		No Action Required
9-13	Introduction of road marking such as straight ahead and left turn arrow to make the routes more clear for vehicles						No comment was provided by CH2M To be reviewed at Preliminary Design		No Action Required
9-14	Refer to drawing no. G/8/8 for assessment of Wilberforce Road junction						Refer to Section 8.0		The traffic arrangement for Wilberforce Road has changed to one-way traffic direction from Station Road to Wilberforce Road (see Revised CH2M Layout Drawing GWHPAS-C-DWG-4403).

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9-15	No entry markings should be located within the bell mouth of the junction not on the main carriageway						No comment was provided by CH2M To be amended at Preliminary Design		No Action Required
9-16	If the existing parking bays are occupied they will reduce the stopping sight distance for the link road considerable (refer to drawings G/8/11/1 & G/8/11/2)	G1 & G2					No comment was provided by CH2M To be reviewed at Preliminary Design		Currently the existing carriageway space is limited and it is not feasible to re-provide the whole strip of parking bay in the adjacent area. The decision on either retaining or removing parking is subject to follow up consultation with LBB in detail design stage.
9-17	The location of the northbound bus stop cage and the southbound residential parking bays produces a narrowing of approximately 4.6m. This would not permit the passing of two vehicles. Consider reconfiguring the layout to allow safe passage of two vehicles						No comment was provided by CH2M The location of the bus stop and loading bay are existing on a one-way road. It is proposed to change the Station Road to two-way which then creates a situation where vehicles would be flowing in opposite direction with the likelihood of head on accidents given the 2 x 2.3m lane widths at this location.		The described traffic movement appears to be existing. Two way traffic arrangement is currently allowed at this particular location. To improve the existing situation, it is feasible to reposition the parking bay by approximately one car length to the south with the necessary changes on TRO. The exact detail changes are to be followed up in the detail design stage.
9-18	The location of residential parking bays on the southbound lane prior to a left turn presents risk of potential head on collision with northbound traffic, which is exacerbated by the bus stop location						No comment was provided by CH2M Refer to Item 9-17		See above 9.17 comment
9-19	Consideration on the impact on the footway, should bus boarding kerbs be used						No comment was provided by CH2M Consider at Preliminary Stage		No Action Required