

Lower Thames Crossing

Post-Consultation Scheme Assessment Report

Volume 3: Identification of Routes and Public Consultation

Section 10: Appendices

Volume 3

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Appendix 3.1 - Options not selected from previous DfT studies

- A3.1.1. Options A, B, C, D and E were investigated as part of the 2009 Department for Transport (DfT) study into ways to address capacity constraints at the Dartford-Thurrock River Crossing. The study concluded that options D and E should not be taken forward, and that options A, B and C offered the greatest benefits in terms of relieving congestion at the existing crossing and should be assessed further.
- A3.1.2. The DfT commenced a further study in 2012 to investigate the three remaining options (A, B and C) for a new Lower Thames Crossing. Following this assessment and public consultation (May 2013), the DfT announced in December 2013 that there were sufficient grounds to disregard Option B.
- A3.1.3. A review has been undertaken to check that the appraisal conclusions and assumptions from the earlier DfT studies remain valid. **Tables A3.1.1 to A3.1.3** summarise the appraisal of options at Locations B, D and E respectively against the current LTC scheme objectives.
- A3.1.4. **Figure A3.1.1** shows a plan of the options at Locations A to E.

TABLE A3.1.1 - OPTION AT LOCATION B

Description of Option		
A new crossing in the vicinity of the Swanscombe peninsula. It would connect the A2 to the south in the vicinity of Dartford to the A1089 to the north in the vicinity of Tilbury Docks. The Option would cross the Eastern Quarry development site and the Swanscombe Peninsular.		
Appraisal against Scheme Objectives		
Economic	To support sustainable local development and regional economic growth in the medium to long term.	Would significantly impact the Eastern Quarry development site, and would jeopardise major redevelopment of the Swanscombe Peninsular, a key part of the growth strategy for the Thames gateway area.
	To be affordable to Government and users	The estimated capital cost of the option would be similar to the cost of Option A.
	To achieve value for money.	Option B had the lowest value for money of the three options appraised (A, B and C). The benefit to cost ratio (BCR) was between 44% and 60% of Option A and between 42% and 62% of Option C without wider impact benefits. With wider impact benefits the BCR was between 71% and 86% of Option A and between 58% and 85% of Option C.
Environment and Community	To minimise adverse impacts on health and the environment.	The option covers a well-established urban area which would cause severance to the local community. It would create a large adverse impact on a number of committed and allocated development sites. Option B received limited support in the consultation carried out in May 2013.
Transport	To relieve the congested Dartford Crossing and approach roads and improve their performance by providing free flowing north-south capacity	Provides relief to the Dartford Crossing. There may be problems with connections to adjacent junctions and impacts on local roads, particularly the connection with the A2. The A2 in this area is likely to be heavily congested due to the planned developments at Ebbsfleet and the Eastern Quarry development site.
	To improve resilience of the Thames crossings and major road network.	Provides an alternative crossing in order to manage the network when problems arise at the existing crossing.
	To improve safety.	Potential reduction in road accidents from current levels as a result of the removal of some traffic from the existing Dartford Crossing, and the provision of a relatively short new crossing route.
Conclusion Option B would jeopardise major redevelopment of the Swanscombe Peninsular, and received limited support in the 2013 public consultation. The Secretary of State announced in December 2013 that Option B had the weakest case of the three locations at A, B and C, and that the option should not be taken forward. The appraisal against the current LTC scheme objectives set out above confirms this conclusion.		

TABLE A3.1.2 - OPTION AT LOCATION D

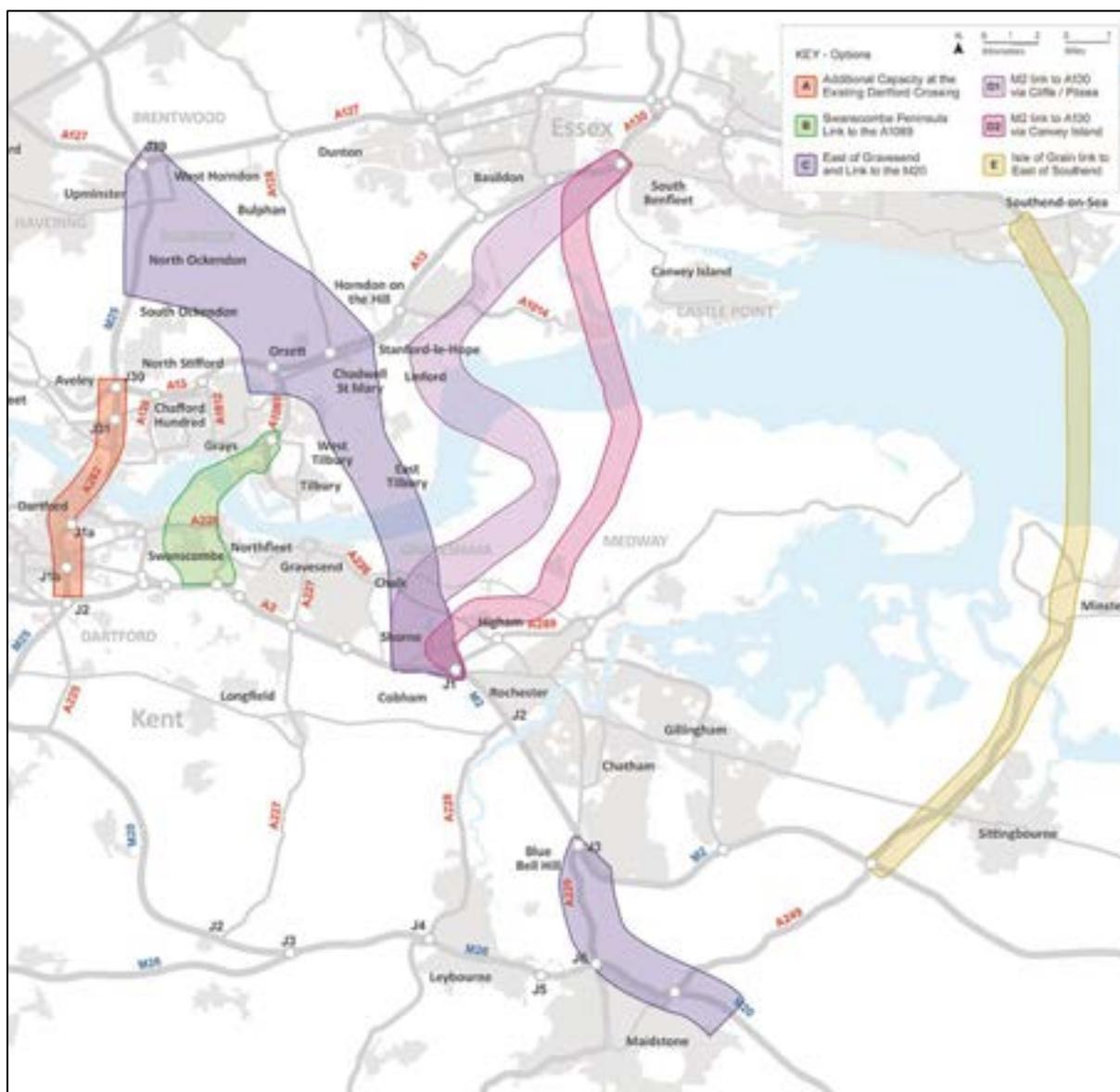
Description of Option														
<p>The option would provide a new crossing connecting the M2 to A13/ A130, with two possible alignments via Cliffe/ Pitsea (D1) and Canvey Island (D2), as shown in Figure A3.1.1. The river crossing options considered were a bridge, bored tunnel or immersed tunnel. The traffic model used for the appraisal of the option was the East of England model.</p>														
Appraisal against Scheme Objectives														
Economic	To support sustainable local development and regional economic growth in the medium to long term.	Due to the limited relief provided to traffic at the existing Dartford crossing, together with the low volume of traffic predicted to use the new crossing, the economic benefits generated by Option D would be considerably less than Option C.												
	To be affordable to Government and users	The cost of Option D would be around 40% more than a solution at Option C, as shown in the table below.												
	To achieve value for money.	The low level of traffic demand using the new crossing and limited relief provided at the existing crossing, together with the high scheme cost would be likely to result in poor to low value for money.												
Environment and Community	To minimise adverse impacts on health and the environment.	The option would have an adverse impact upon nationally designated Sites of Special Scientific Interest (SSSIs) located along the routes, and cross long lengths of flood plain, which would require substantial areas for flood compensation.												
	To relieve the congested Dartford Crossing and approach roads and improve their performance by providing free flowing north-south capacity	Option D would result in a reduction in traffic at the existing crossing of only 3%, as shown in the table below. With the option being further downstream from the existing crossing than Option C and having no direct connection to the M25, it is predicted that the new crossing would carry a low volume of traffic (2,600 pcus/ hour); this is around 50% of the traffic that a new crossing at Location C would carry. There would need to be substantial alterations to the road network within Essex and Kent to accommodate the option, including the A130 and A13; there would be a 54% increase in traffic using the A130.												
Transport		<table border="1"> <thead> <tr> <th></th> <th>Existing Dartford Crossing</th> <th>New Crossing</th> </tr> </thead> <tbody> <tr> <td>Do Minimum 2031</td> <td>16,900</td> <td></td> </tr> <tr> <td>Option D</td> <td>16,400 (3% reduction)</td> <td>2,600</td> </tr> <tr> <td>Option C</td> <td>14,300</td> <td>5,100</td> </tr> </tbody> </table> <p>AM Peak Flows in 2031 (pcus)</p>		Existing Dartford Crossing	New Crossing	Do Minimum 2031	16,900		Option D	16,400 (3% reduction)	2,600	Option C	14,300	5,100
		Existing Dartford Crossing	New Crossing											
Do Minimum 2031	16,900													
Option D	16,400 (3% reduction)	2,600												
Option C	14,300	5,100												

	To improve resilience of the Thames crossings and major road network.	The option would provide another crossing of the Thames and would increase network resilience. However, long distance traffic using the M25 would have a long diversion route in the event of an incident on the M25/ A282 corridor.
	To improve safety.	The option would provide limited relief along the existing M25/ A282 corridor, and therefore limited improvement in safety compared to the Without Scheme scenario.
<p>Conclusion The option would not relieve congestion at the existing crossing and provide free flowing north-south capacity. It would also have poor to low value for money, limited safety benefits, and have significant environmental impacts and would therefore not meet the current LTC scheme objectives. It is concluded that that the appraisal conclusions and assumptions from the earlier DfT studies remain valid. .</p>		

TABLE A3.1.3 - OPTION AT LOCATION E

Description of Option														
Option E would connect the M2 to the A127 via the Isle of Grain, passing east of the Isle of Grain and east of Southend, with an 8km long crossing of the River Thames. The traffic model used for the appraisal of the option was the East of England model.														
Appraisal against Scheme Objectives														
Economic	To support sustainable local development, regional economic growth in medium to long term.	Due to the limited relief provided to traffic at the existing Dartford crossing, together with the low volume of traffic predicted to use the new crossing, the economic benefits generated by Option E would be considerably less than Option C.												
	To be affordable to government and users	The cost of Option E would be around 40% more expensive than a solution at Option C, as shown in the table below. <table border="1" style="margin-left: 20px;"> <tr> <td>Option E</td> <td>3.5 - 10.5</td> </tr> <tr> <td>Option C</td> <td>2.5 - 7.5</td> </tr> </table> <p>Capital Cost (£bn)</p>	Option E	3.5 - 10.5	Option C	2.5 - 7.5								
	Option E	3.5 - 10.5												
Option C	2.5 - 7.5													
To achieve value for money.	The low level of traffic demand using the new crossing and limited relief provided at the existing crossing, together with the high scheme cost would be likely to result in poor to low value for money.													
Environment and Community	To minimise adverse impacts on health and the environment.	There would be potential direct and indirect effects on a number of international and nationally important nature conservation sites. These include: Medway Estuary and Marshes Ramsar and SSSI, Swale Ramsar site and SSSI, Foulness (Mid-Essex Coast Phase 5) Ramsar site and Special Protection Area (SPA) and the Foulness SSSI and the Essex Estuary Special Area of Conservation.												
Transport	To relieve the congested Dartford Crossing and approach roads and improve their performance by providing free flowing north-south capacity	Option E is furthest east from the existing Crossing, with very poor connections to the existing crossing and no direct connection to the M25. It would result in a small reduction in traffic at the existing crossing, and would carry a low volume of traffic, as shown in the table below. In addition, there would be substantial increases in traffic on other roads such as the A127 and the A130. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>Existing Dartford Crossing</th> <th>New Crossing</th> </tr> </thead> <tbody> <tr> <td>Do Minimum 2031</td> <td>16,900</td> <td></td> </tr> <tr> <td>Option E</td> <td>16,100</td> <td>2,900</td> </tr> <tr> <td>Option C</td> <td>14,300</td> <td>5,100</td> </tr> </tbody> </table> <p>AM Peak Flows in 2031 (pcus)</p>		Existing Dartford Crossing	New Crossing	Do Minimum 2031	16,900		Option E	16,100	2,900	Option C	14,300	5,100
		Existing Dartford Crossing	New Crossing											
Do Minimum 2031	16,900													
Option E	16,100	2,900												
Option C	14,300	5,100												
To improve resilience of the Thames crossings and major road network.	With the very poor connections to the existing crossing and no direct connection to the M25, the majority of the traffic using the existing crossing would follow the same pattern as existing traffic. Long distance traffic from the Midlands and the North would continue to use the existing Dartford Crossing, as would local traffic within a 40km radius, which includes a large built up area. The option would provide little improvement in resilience of the major road network around Dartford Crossing.													

	To improve safety.	The option would provide limited relief along the existing M25/A282 corridor, and therefore limited improvement in safety compared to the Without Scheme scenario.
<p>Conclusion The option would provide very limited relief to the existing Dartford Crossing and have potentially very significant environmental impacts. It would also have poor to low value for money and limited safety benefits and would therefore not meet the current LTC scheme objectives. It is concluded that that the appraisal conclusions and assumptions from the earlier DfT studies remain valid.</p>		



Appendix 3.2 - Options not selected for Shortlist

A3.2.1 Introduction

- A3.2.1.1 This appendix provides a summary of the description and appraisal of those pre-longlist and longlist routes which were not selected for the shortlist against the LTC scheme objectives.
- A3.2.1.2 The remaining sections of this appendix are:
- A3.2.2 Brief Route Descriptions of Routes not Selected for Shortlist
 - A3.2.3 Pre-Longlist Appraisal Location A
 - A3.2.4 Pre-Longlist Appraisal Location C
 - A3.2.5 Pre-Longlist Appraisal Location C Variant
 - A3.2.6 Summary of Pre-Longlist Appraisal
 - A3.2.7 Costs and Economic Appraisal of Longlist Routes
 - A3.2.8 First Stage Longlist Appraisal Location A
 - A3.2.9 First Stage Longlist Appraisal Location C
 - A3.2.10 Second Stage Longlist Appraisal Location A
 - A3.2.11 Second Stage Longlist Appraisal Location C
 - A3.2.12 Summary of Longlist Appraisal
- A3.2.1.3 The second stage longlist appraisal of C Variant which led to its not being selected for the shortlist is discussed in Section 3.4 of Volume 3 of the Post-Consultation SAR and is not included in this appendix.
- A3.2.1.4 Section A3.2.2 includes a brief description of the routes not selected for the shortlist. The route options selected for the shortlist are described in detail in Section 5 of Volume 3 of the Pre-Consultation SAR and are not included in the descriptions in this appendix.
- A3.2.1.5 All the route options (pre-longlist) considered are shown on **Figure A3.2.1** (Location A), **Figure A3.2.2** (Location C) and **Figure A3.2.3** (Location C Variant).

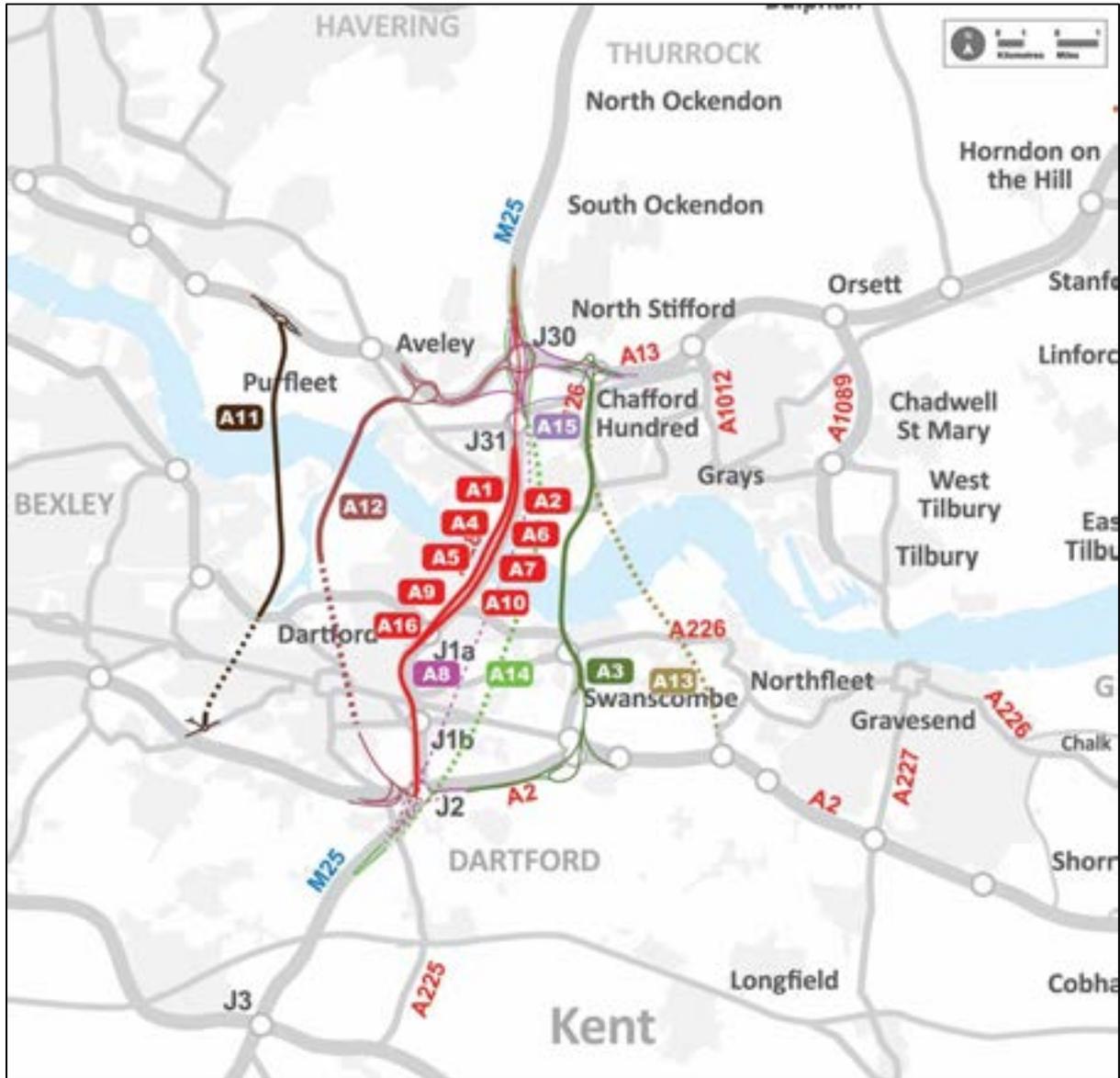


FIGURE A3.2.1 - LOCATION A - ALL ROUTE OPTIONS – PRE-LONGLIST

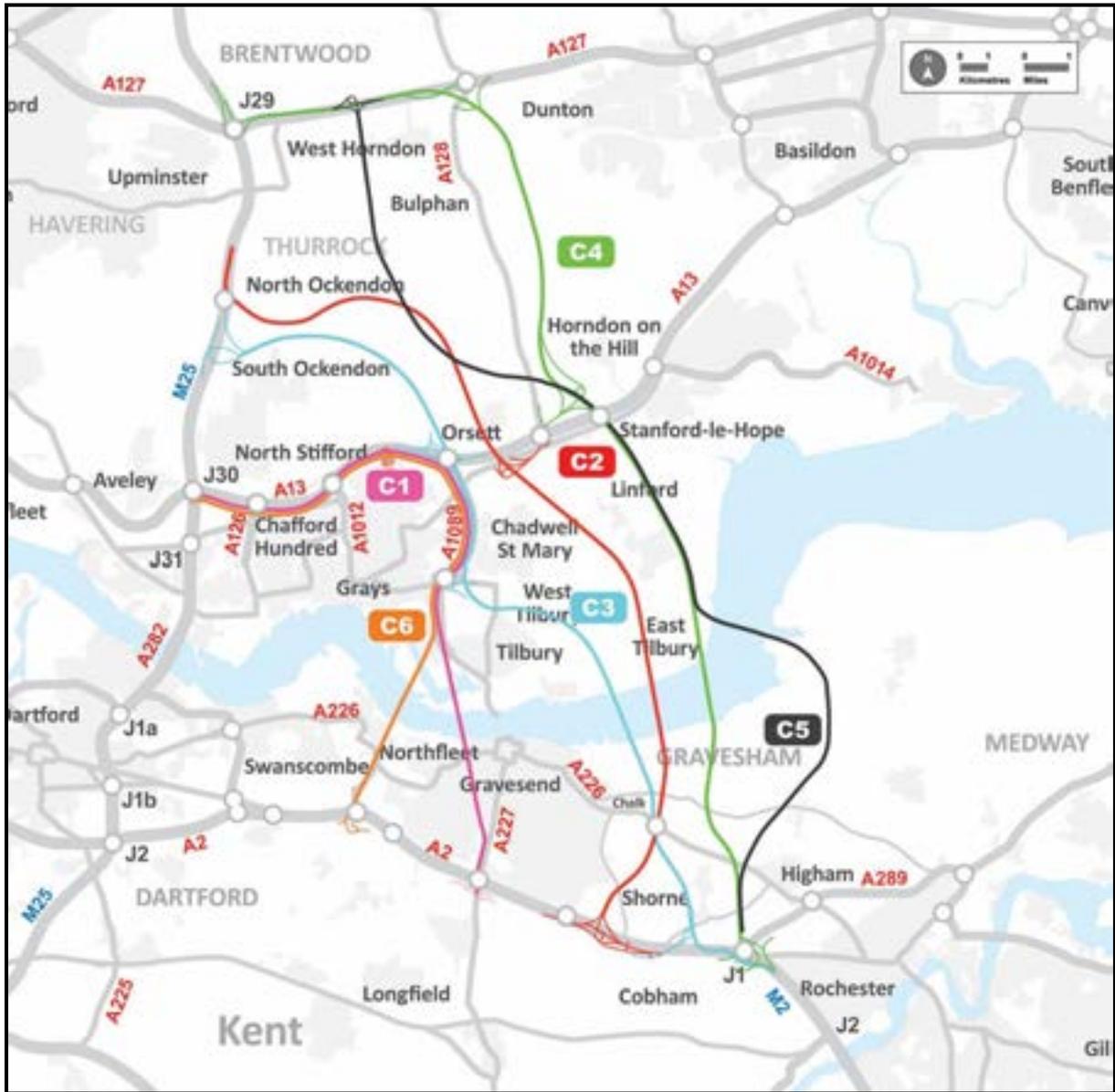


FIGURE A3.2.2 - LOCATION C - MAIN ROUTE OPTIONS – PRE-LONGLIST



FIGURE A3.2.3 - C VARIANT - ALL ROUTE OPTIONS – PRE-LONGLIST

A3.2.2 Brief Route Descriptions of Routes not Selected for Shortlist

Introduction

Route Option A2 - (Bridge - East)

- A3.2.2.1 Route Option A2 was a bridge crossing with a proposed four lane bridge for southbound traffic on the east side of the existing Dartford crossings and to the east of the existing QEII Bridge. The current arrangement for the QEII Bridge is that it carries southbound traffic, however with Route Option A2 it was proposed to carry northbound traffic and be connected to the existing northbound lanes of the A282. The existing east and west tunnels would have served local traffic by being connected to Junctions 1a and 31 and not the main four lanes of the A282.

Route Option A3 - Bridge

- A3.2.2.2 Route Option A3 was a new route from the A2/ B255 Bean Junction to the A13/ A126 junction including a new dual two-lane bridge crossing located approximately 1.6km east of the existing Dartford crossing. Improvements were also required to the A2 between M25 Junction 2 and the B255 Bean Junction (assumed two additional lanes in each direction) and the A13 between M25 Junction 30 and the A13/ A126 junction (assumed two additional lanes in each direction) including junction improvements. With Route Option A3 there was no direct connection to

the Dartford crossing, and the existing QEII Bridge, and east and west tunnels remained unchanged.

Route Option A5 - Bored Tunnel

A3.2.2.3 Route Option A5 was based on the original Option A+ option developed by AECOM/ Jacobs in their study for DfT between 2012 and 2014 (refer to Section 2.2 and Figure 2.3 of Volume 2 of this Post-Consultation SAR) with a proposed four lane single bored tunnel crossing for northbound traffic on the west side of the existing crossing (west of the existing west tunnel). Connections north and south of the River Thames were similar to Route Options A1 and A4.

A3.2.2.4 This was a large diameter single bored tunnel with a 2 x 2 stacked lane arrangement (two two-lane carriageways, one above the other) for northbound traffic. Together with the west tunnel this formed a six lane crossing for the northbound direction. Southbound traffic would have used the QEII Bridge and the existing east tunnel.

Route Option A6 - Bored Tunnel

A3.2.2.5 This route option comprised two bored tunnels, one each side of the existing crossing, each bore carrying two lanes of traffic, the one on the west being for northbound traffic and the one on the east for southbound traffic. It retained the use of the existing QEII Bridge for southbound traffic and the tunnels for northbound traffic. Tie-ins for the new tunnels to the north were into the M25 mainline and on- and off-slips south of M25 Junction 31.

Route Option A7 - Bored Tunnel

A3.2.2.6 This option was a twin-bored tunnel to the east of the existing QEII Bridge and was therefore effectively the same as Route Option A2 except for the crossing type. The traffic arrangements and connections would have been the same as for Route Option A2 with the existing tunnels being used by local traffic between Junctions 1a and 31 only.

Route Option A8 - Bored Tunnel

A3.2.2.7 Route Option A8 was a dual two lane route through a 7km long bored tunnel below the River Thames between M25 Junction 2 to the south and M25 Junction 30 to the north.

A3.2.2.8 At M25 Junction 2, there were free-flow connections to the A2 for all movements to/ from the new tunnel, except that there was no provision for:

- Southbound traffic through the tunnel to access the A2 westbound.
- A2 westbound traffic to travel northbound through the tunnel.

A3.2.2.9 At M25 Junction 30, it provided separate connections to both the M25 Junction 30 and the existing A13 eastbound and westbound, but there was no provision for A13 eastbound traffic to travel southbound through the tunnel.

Route Option A9 - Immersed Tunnel

A3.2.2.10 Route Option A9 was the same as Route Options A1 and A4 but with the crossing type being instead an immersed tunnel option proposed to carry northbound traffic on the west side of the existing Dartford crossing (west of the existing west tunnel and existing QEII Bridge). The connectivity was the same as Route Options A1 and A4 but with different horizontal and vertical alignments.

Route Option A10 - Immersed Tunnel

A3.2.2.11 Route Option A10 was a four lane immersed tube tunnel option proposed to carry southbound traffic on the east side of the existing Dartford crossing (east of the existing QEII Bridge). This option was therefore effectively the same as Route Options A2 and A7 except for the crossing type. The traffic arrangements and connections would have been the same as for Route Option A2 with the existing tunnels being used by local traffic between Junctions 1a and 31 only.

Route Option A11 - Bored Tunnel and Bridge

A3.2.2.12 Route Option A11 was the most westerly route at Location A and would have created a direct link, from the A2 to the A13 bypassing the A282. It started at the A2/ A2018 junction and then ran under the built-up area to the west of Dartford in a bored tunnel before emerging and crossing the River Thames on a bridge about 4.5km west of the existing crossing. The route terminated at a new junction with the A13 west of the existing A13/ A1306 Wennington junction. Upgrades were also required to the A2 between M25 Junction 2 and the A2/ A2018 junction (assumed two additional lanes in each direction) and to the A13 between the new junction and M25 Junction 30 (assumed two additional lanes in each direction).

Route Option A12 - Bored Tunnel and Bridge

A3.2.2.13 Route Option A12 was a new route between M25 Junctions 30 and 2 about 3.4km west of the existing crossing. It comprised a 2.9km twin-bored tunnel from the A2 south of Dartford leading to a 3km dual two-lane bridge and approach viaducts over the River Thames and then utilised the A13 eastwards to M25 Junction 30. There was no direct connection to the Dartford Crossing, which would have remained unchanged.

A3.2.2.14 Route Option A12 provided free-flow connections for all movements at M25 Junction 30. The A13 would have been widened from dual two-lane to dual four-lane between a new A13 free-flow junction and M25 Junction 30, where there would have been a two-lane merge from A13 to the northbound M25 and a two-lane southbound diverge from M25 westbound to the A13.

A3.2.2.15 At M25 Junction 2, Route Option A12 provided free-flow connections to the A2, but there was no provision for southbound traffic to access the A2 eastbound.

Route Option A13 - Bored Tunnel

A3.2.2.16 Route Option A13 was the most easterly route within Location A. This was a proposed long dual two-lane bored tunnel about 3km east of the existing Dartford crossing connecting the A2/ B259 junction to the south with the A13 at the A13/ A126 junction to the north. This option also required improvements to the A2 between M25 Junction 2 and the A2/ B259 junction (assumed two additional lanes in each direction) and the A13 between the A13/ A126 junction and M25 Junction 30 (assumed two additional lanes in each direction). This route option bypassed the existing A282, there was no direct connection to the Dartford Crossing, the existing QEII Bridge, east and west tunnels therefore remained unchanged.

Route Option A14 - Bored Tunnel

A3.2.2.17 Route Option A14 comprised a new route approximately 800m to the east of the existing QEII Bridge bypassing the existing A282, M25 Junctions 2 and 30. The route took the form of a 7.4km long dual two-lane bored tunnel with a merge and diverge directly connecting to the mainline M25 south of Junction 2 and north of M25 Junction 30. The tunnel was a dual bore until just north of Junction 31 at which point it became two single bores to pass either side of Junction 30 to then tie-in with the M25 north of Junction 30.

Route Option A15

A3.2.2.18 Route Option A15 was a partial option for the improvement of Junction 30 comprising two free-flow alternative links to Jacobs/ AECOM option E1+9 developed as part of their study for DfT between 2012 and 2014 (refer to paragraph A3.2.2.3) to cater for the north to eastbound traffic movement and west to southbound traffic movement between the A282 and the A13.

A3.2.2.19 The A282 north to A13 east link would have had an off-slip from the A282 northbound prior to Junction 30 and then crossed over the A282 before running parallel to the A1306 and climbing to cross the A13 to the west of the A126 Lakeside junction and crossing over the railway to follow a similar merge alignment to Jacobs/ AECOM option E1+9.

A3.2.2.20 The A13 west to A282 south link would have followed a similar route as the north to east link with a diverge and merge on the A13 westbound and southbound A282 mainline respectively.

A3.2.2.21 Route Option A15 was a variant rather than a standalone option, and could be combined with any route options that required capacity improvements on M25/ A282 Junction 30/ A13.

Route Option A16 – Bored Tunnel

A3.2.2.22 Route Option A16 would have provided an additional two-lane bored tunnel for northbound traffic to the west of the existing west tunnel at the Dartford Crossing. The additional two lanes would have been added at the A282 Junction 1a and dropped at M25 Junction 31.

A3.2.2.23 This route option was developed to assess implementing improvements at both Locations A and C. It could have been combined with any Location C route option.

Route Option C1

A3.2.2.24 This route option connected the A2/ A227 to the south of Gravesend to the M25 at Junction 30. The route was developed with a bored tunnel beneath Gravesend, the River Thames and Tilbury docks. The bored tunnel ended to the north of Tilbury docks where the route connected with the existing A1089. The proposal for this route was to utilise the A1089 to the intersection with the A13, where the existing junction would have been used, and the route would then have used the A13 from this junction through to Junction 30 on the M25. This route option included widening of the A1089, A13 and improvements to the existing junction on the A13/ A1089. At Junction 30 the route connected with the M25 via two slip roads on viaducts over the existing roads which provided a direct connection with the M25 without the need for traffic to go through Junction 30.

Route Option C4

A3.2.2.25 This route option connected the M2 at Junction 1 to Junction 29 on the M25 using a section of the existing A127. To the south of the river the route went from Junction 1 on the M2 between Shorne and Higham and ran north towards the river to the west of the rail depot/ sidings near Queens Farm Road. This route option was only considered with a bored tunnel crossing of the river in order to go beneath the Ramsar site on the south side of the river and Coalhouse Fort on the north side.

A3.2.2.26 On the north side of the river the route went to the east of East Tilbury towards the A13, where it intersected using a new free-flow junction. North of the A13 the route went to the east of Orsett and then ran parallel with the A128 on the east side. It was proposed to connect into the A127 with a new free-flow junction in the location of the existing grade separated junction between the A127 and A128. It was proposed to widen the A127 between the existing A127/ A128 junction and Junction 29 on the M25 to dual four lanes. At Junction 29 on the M25 a free-flow connection was proposed to enable vehicles to travel north on the M25 and also southbound vehicles on the M25 to connect onto the proposed route.

Route Option C5

A3.2.2.27 This route option was considered as an alternative to Route Option C4 where only a bored tunnel was practicable. At this location a bridge and immersed tube tunnel options were also considered as these were not practicable at the crossing location on Route Option C4 due to the constraints of the Ramsar site and Coalhouse Fort.

A3.2.2.28 The alignment to the south of the river was significantly different to Route Option C4 as it required the crossing to be further east along the river in order to avoid Coalhouse Fort. The route utilised the same junction connection with the M2 as proposed in Route Option C4 but had the river crossing in the vicinity of Cliffe Pools.

A3.2.2.29 On the north side of the river the route went to the east of East Tilbury and then north intersecting the A13 near St Cleres Hall Golf Club. North of the A13 the route went northwest to the north of Orsett and then parallel with the A128 on the east side and then connected to the A127 via a proposed free-flow junction. It was proposed to utilise the A127 to connect the route with the M25 via Junction 29 as for Route Option C4. The A127 and M25 Junction 29 would have required upgrading as part of this option, similar to the proposal in Route Option C4.

Route Option C6

A3.2.2.30 This route option connected the A2/ B259 with M25 Junction 30 utilising the A1089 north of Tilbury and to the east of Grays. The route was developed with a bored tunnel beneath Gravesend, the River Thames and Tilbury docks. The bored tunnel ended to the north of Tilbury docks where the route connected with the existing A1089. The proposal for this route was to utilise the A1089 to the intersection with the A13, where the existing junction would have been used and the route would have then used the A13 from this junction through to Junction 30 on the M25. The A1089 and A13 and associated junctions required upgrading as part of this option, similar to the proposals for Route Options C1 and C3.

Location C Combination Options – Introduction

A3.2.2.31 The Location C combination options are shown in **Figures A3.2.4 to A3.2.4.7**.

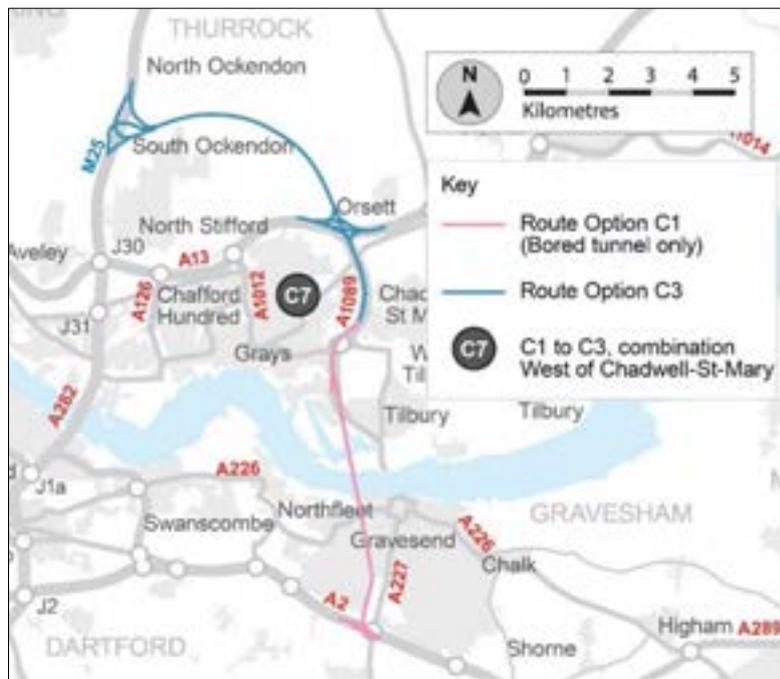


FIGURE A3.2.4 - ROUTE OPTION C1 COMBINATIONS

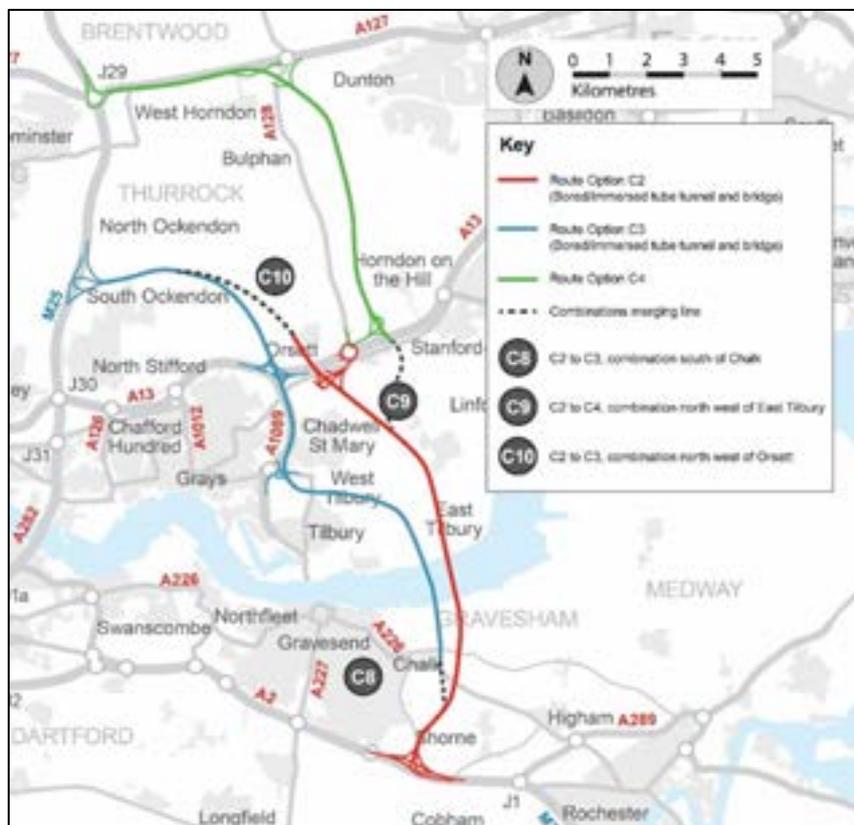


FIGURE A3.2.5 - ROUTE OPTION C2 COMBINATIONS

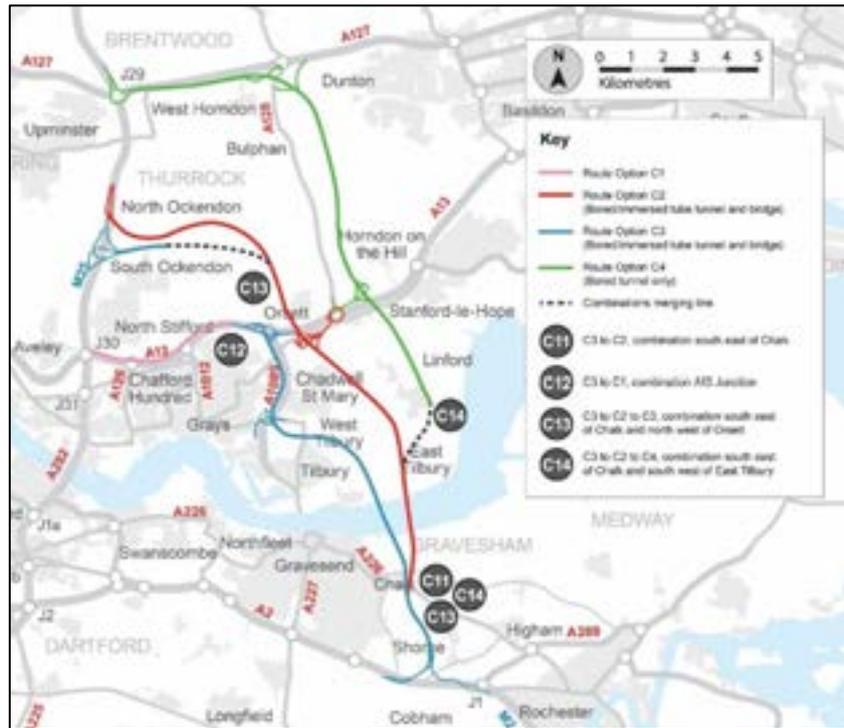


FIGURE A3.2.6 - ROUTE OPTION C3 COMBINATIONS

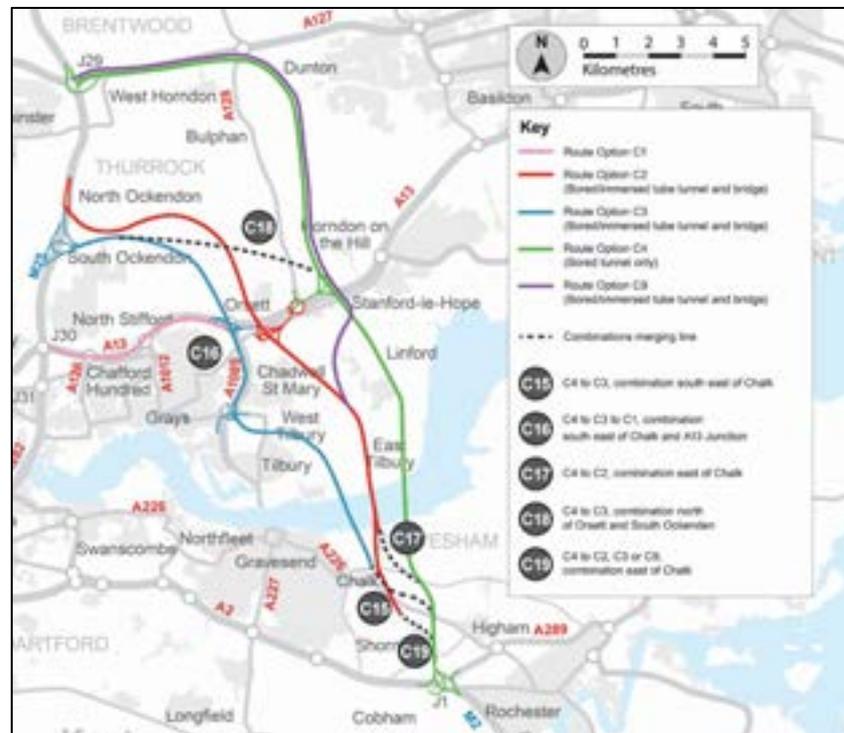


FIGURE A3.2.7 - ROUTE OPTION C4 COMBINATIONS

Combination Route Option C7

A3.2.2.32 The combination route for Route Option C7 would have had a connection with the A2 at the existing junction with the A2 and A227. The river crossing option was a bored tunnel which would have taken the route beneath Gravesend and Tilbury docks. North of Tilbury docks the route utilised a section of the A1089 between Grays and Chadwell St Mary. At the A13 the main route utilised the existing interchange and the A13 to the west of this junction to connect to Junction 30 on the M25. The A1089 and A13 required upgrading as part of this option, as proposed for Route Options C1 and C3.

Combination Route Option C8

A3.2.2.33 This combination route connected Route Options C2 and C3 to provide a new route from the proposed junction with the A2 to the east of Gravesend through to the M25 between Junctions 29 and 30. The location of the connection was south of Chalk and followed the proposed alignment for Route Option C3 north of Chalk across the river and on the north side of the river to the connection with the M25. This combination route utilised the three river crossing options, immersed tube tunnel, bored tunnel and bridge.

Combination Route Option C10

A3.2.2.34 This combination route connected Route Options C2 and C3 to the north west of Orsett. The combination route provided a new route from the proposed junction with the A2 to the east of Gravesend through to the M25 between Junctions 29 and 30 where a free-flow junction was proposed. This combination route utilised the three river crossing options, immersed tube tunnel, bored tunnel and bridge.

Combination Route Option C11

A3.2.2.35 This combination route connected Route Options C3 and C2 to provide a new route from the proposed junction with the A2 to the east of Gravesend through to the M25 between Junctions 29 and 30 where a new free-flow junction was proposed. The location of the connection was south east of Chalk and the proposed junctions would have been the same as those for Route Options C3 and C2. This combination route utilised the three river crossing options, immersed tube tunnel, bored tunnel and bridge for Route Option C2.

Combination Route Option C12

A3.2.2.36 This combination route connected Route Options C3 and C1 to provide a new route from the proposed junction with the A2 to the east of Gravesend through to the M25 Junction 30. The location of the connection was at the A13 junction and the proposed junctions were the same as those for Route Options C1 and C3. This combination route utilised the three river crossing options, immersed tube tunnel, bored tunnel and bridge for Route Option C3.

Combination Route Option C13

A3.2.2.37 This combination route connected Route Options C3, C2 and C3 to provide a new route from the proposed junction with the A2 to the east of Gravesend through to the M25 between Junctions 29 and 30. The locations of the connections were southeast of Chalk and northwest of Orsett. The junctions for this route were the same as those for Route Options C2 and C3. This combination route utilised the three river crossing options, immersed tube tunnel, bored tunnel and bridge.

Combination Route Option C14

A3.2.2.38 This combination route connected Route Options C3, C2 and C4 to provide a new route from the proposed junction with the A2 to the east of Gravesend through to Junction 29 on the M25 utilising a section of the A127. Junction 29 on the M25 and the section of the A127 required the same improvements as for Route Option C4. This combination route utilised the three river crossing options, immersed tube tunnel, bored tunnel and bridge.

Combination Route Option C15

A3.2.2.39 This combination route connected Route Options C4 and C3 to provide a new route from the proposed junction with the M2 Junction 1 through to the M25 between Junctions 29 and 30, utilising a section of the A1089 north of Tilbury to the interchange with the A13. This combination route utilised the three river crossing options, immersed tube tunnel, bored tunnel and bridge.

Combination Route Option C16

A3.2.2.40 This combination route connected Route Options C4, C3 and C1 to provide a new route from the proposed junction with the M2 Junction 1 through to Junction 30 on the M25. The proposed junctions were the same as those for Route Options C4, C3 and C1 and the route utilised the three river crossing options, immersed tube tunnel, bored tunnel and bridge.

Combination Route Option C17

A3.2.2.41 This combination route connected Route Options C4 and C2 to provide a new route from the proposed junction with the M2 Junction 1 through to the M25 between Junctions 29 and 30. The junctions for this route were the same as those for Route Options C3 and C2 and the route utilised the three river crossing options, immersed tube tunnel, bored tunnel and bridge.

Combination Route Option C18

A3.2.2.42 This combination route connected Route Options C4 and C3 to provide a new route from the proposed junction with the M2 Junction 1 through to the M25 between Junctions 29 and 30. The location of the connection was north of Orsett and South Ockendon. The junctions for this route were the same as those for Route Options C4 and C3 and the route had a bored tunnel river crossing.

Route Option CV1

- A3.2.2.43 This route option was developed using a 70mph speed limit (120 km/h design speed) on the proposed free-flow links and the A229.
- A3.2.2.44 A viaduct approximately 700m long was proposed for free-flowing traffic westbound off the M20 onto the A229 northbound. Considerable adjustments to existing local roads, footbridges and structures were also required.
- A3.2.2.45 The proposal was to widen the existing A229 to three lanes all-purpose dual carriageway with no hard shoulder both northbound and southbound along the A229. The A229 was proposed to be widened asymmetrically to the west so that the vertical and horizontal alignment fitted with the surroundings.
- A3.2.2.46 A tunnel approximately 2.2km long was required underneath the M2 in the southbound direction in order to link onto the A229. There are significant environmental constraints along the A229 relating to the Kent Downs Area of Outstanding Natural Beauty (AONB) and ancient woodland, and the gradient could have been an issue to ensure tie-in with the A229 southbound. Northbound traffic on the A229 would have required two new bridges approximately 500m long in total to connect to the M2 westbound.

Route Option CV2

- A3.2.2.47 This route option entailed a 40mph section (70 km/h design speed) which utilised the existing northbound slip road at the M20 Junction 6 (Running Horse Roundabout). It removed the need for a viaduct at Junction 6 of the M20 as proposed for Route Option CV1.
- A3.2.2.48 At the northern end a 50mph speed limit (85 km/h design speed) free-flowing link was proposed from the M2 eastbound onto a slip road that connected to the A229 southbound. No viaduct would be required for this link. In order to accommodate the proposed alignment, the following existing infrastructure would have needed to be removed:
- A229 overbridge just north of the M2.
 - A229 northbound section between the A2045 interchange and M2.
 - A2045 southbound off-slip and northbound on-slip.
 - B2097 interchange.
 - Reconfigure local roads.
- A3.2.2.49 Northbound traffic on the A229 required two new bridges approximately 500m long in total to connect to the M2 westbound.

Route Option CV3

- A3.2.2.50 At the southern end of the A229, Route Option CV1 was proposed whereby a viaduct approximately 700m long would be required for free-flowing link westbound off the M20 onto the A229 northbound.
- A3.2.2.51 At the northern end, this route option was developed using a 70mph speed limit (120 km/h design speed) free-flowing link from the M2, south of Junction 3, to the A229 via an approximately 1.1km long tunnel, and

viaducts approximately 500m and 900m long each at the northern and southern ends respectively of the proposed link.

A3.2.2.52 The existing M2 Junction 3 roundabout is in close proximity to the proposed link and therefore would have needed to be removed in order to accommodate the proposed link and meet weaving standards. Removing the existing M2 Junction 3 roundabout resulted in amendments to the M2 off-/ on-slips and the local network in order to maintain current traffic movements.

Route Option CV4

A3.2.2.53 At the southern end of the A229, Route Option CV1 was proposed whereby a viaduct approximately 700m long would be required for free-flowing link westbound off the M20 onto the A229 northbound.

A3.2.2.54 At the northern end, this option was an approximately 3.0km long free-flowing link from the M2, south of Junction 3, to the A229 and was developed using a 70mph speed limit (120 km/h design speed). It required a 1.1km long tunnel in the northbound direction and 1.5km long tunnel in the southbound direction. There was also a proposed bridge over the M2 approximately 200m long.

A3.2.2.55 As for Route Option CV3, the existing M2 Junction 3 roundabout is in close proximity to the proposed link and therefore would have needed to be removed in order to accommodate the proposed link and meet weaving standards. Removing the existing M2 Junction 3 roundabout resulted in amendments to the M2 off-/ on-slips and the local network in order to maintain current traffic movements.

A3.2.3 Pre-Longlist Appraisal Location A (Viability Check)

Introduction

A3.2.3.1 All the pre-longlist options were subject to an initial high level viability check and appraisal against the scheme objectives. Route options which performed poorly against the scheme objectives or were considered unviable (e.g. due to not being technically viable or having unacceptable environmental impacts) were not selected for the longlist.

Route Option A3

A3.2.3.2 Route Option A3 was deemed not viable since in order to cater for strategic traffic, to maintain existing local traffic links to both Bluewater and Lakeside and to utilise the existing highway corridor, it would be necessary for the majority of Route Option A3 to be on elevated structures. Consequently this would significantly increase the overall construction cost of the alignment.

A3.2.3.3 To the south at the location of the existing A2, in order to provide free-flow eastbound and westbound connectivity to the A2 the route alignment could not be accommodated without impacting the proposed 'key' development site which is currently an existing quarry.

A3.2.3.4 To the north of the River Thames there were significant issues in providing connectivity to the existing A13 and the separation of the route alignment adjacent to the A126, Chafford Hundred station and from the

existing railway which runs parallel to the A126. The proposed gradients for the slip roads to and from the A13 would have to be in excess of 6% (the desirable maximum gradient) to provide clearance above the A126 and existing railway line.

Route Option A5

- A3.2.3.5 For Route Option A5, a stacked single bore tunnel could be technically feasible and offer significant cost savings compared to a double bore tunnel, however Route Option A5 was not considered as a separate option. Instead, stacked single bore tunnels would be considered as variants to any double bore tunnel option, such as Route Option A4, that were taken forward for further development and assessment.
- A3.2.3.6 The initial assessment described below shows that this solution would have been very difficult to implement at this location without significantly more detailed design assessment.
- A3.2.3.7 On the north side of the River Thames there was a tie-in point required above the London to Southend line and below HS1. This would be difficult to achieve with a single-deck bore and was considered unrealistic with a double-deck design. The double-deck tunnel layout lowered the tunnel base by 6m. Thus the requirements for the lower section of the stacked 2 x 2 lane tunnel to meet the tie-in point was a 10% instantaneous grade, which is outside standards for tunnel vertical grades. Traffic models predicted large proportions of HGVs which, together with such a steep gradient, penalise tunnels in the form of higher ventilation costs and reduced lane capacity. The EU directive for safety in tunnels state that longitudinal gradients above 5% shall not be permitted unless no other solution is geographically possible. The alternative to this would be to continue the lower bore under the railway but this was not assessed in detail as it would have significantly increased the cost.
- A3.2.3.8 A partially investigated alternative was a loop which, even at 85kph design speed and 7% super-elevation and a 360m radius, was one step below desirable minimum and had significant impact on existing property and infrastructure the north bank of the River Thames at the crossing point.
- A3.2.3.9 Initial assessment concluded that there could be a viable alternative, however substantial further development work would be required to demonstrate that it was feasible. It would likely require an alternative double-deck arrangement of tunnel, for example lower diameter horizontal radii, but this would affect (reduce) design speed and require possible multiple departures. Based on this initial assessment the complexity of the north tie-in was not solved.

Route Option A6

- A3.2.3.10 Route Option A6 eastern tunnel would have required an approximate 30m horizontal clearance from the existing QEII Bridge and approach structures. This would have left the scheme with a sizeable footprint, significantly impacting existing roads and associated business premises to the south and north of the River Thames such as Crossways Business Park, the A206 Crossways Boulevard, St Clements Way and the existing Lafarge-Tarmac cement and aggregate plant. In addition, in order to tie-in

to the existing A282 before Junction 1a, the alignment would be required to be adjacent to the existing QEII Bridge approach structure. The proposed bore could therefore have clashed with and impacted existing foundations. Internal access roads and other roads would have required re-alignment, potentially causing significant disruption.

A3.2.3.11 To the north of the River Thames the location of the existing HS1 and London to Southend railways within 160m of each other provided a significant constraint. The route alignment would be required to provide sufficient vertical clearance under HS1 and provide vertical clearance above the existing London to Southend railway line. During the initial development of the option it was not possible to determine whether or not this was possible at this location.

A3.2.3.12 For the above reasons Option A6 was deemed not viable.

Route Option A7

A3.2.3.13 Route Option A7 was deemed not viable due to the proposed alignment significantly impacting existing roads/ structures and associated business premises to the south and north of the River Thames. The reasoning and assessment of Route Option A7 were similar to Route Option A6 and, because the proposed twin bore tunnel would be wider than the single eastern bore of option A6, the impacts described were considered to be greater and therefore more significant.

Route Option A10

A3.2.3.14 This option would have similar impacts to those described above for Route Options A6 and A7. Route Option A10 would have required an 80m horizontal clearance from the existing QEII Bridge and approach structures. This means that the impacts were likely to have been greater than those for the other two options as a larger area would be affected and the option was therefore also deemed not viable.

Route Option A11

A3.2.3.15 Route Option A11 would have required traffic to travel significant distances along both the A2 and A13 from the M25 to join the new crossing route and therefore was considered not to achieve the objective of providing an improved strategic route. In addition to this a significant part of the route was within the GLA (TfL) boundary and would potentially have an adverse impact on TfL's river crossing proposals, particularly that at Belvedere. Since Route Option A11 was within 5km of Belvedere, any crossing at this location would be likely to have impacted both project business cases. Furthermore, any junction with the A13 at the north end of the route would be located within the Wennington Marshes Site of Special Scientific Interest (SSSI). For these reasons this route was not included in the longlist.

Route Option A13

A3.2.3.16 Route Option A13 was deemed not viable due to the proposed alignment significantly impacting proposed development sites, particularly near Ebbsfleet station, and existing roads and associated business premises to the south and north of the River Thames.

- A3.2.3.17 South of the River Thames, in order to avoid existing built up areas and future development proposals the south tunnel portal area would have to be situated so far south that connectivity to the A2 would be difficult to achieve. Alternatively the alignment would restrict the proposed development adjacent to Ebbsfleet Station and potentially impact on the station car park.
- A3.2.3.18 To the north of the River Thames there were significant issues in providing connectivity to the existing A13 and the separation of the route alignment adjacent to the A126, Chafford Hundred station and from the existing railway which runs parallel to the A126.
- A3.2.3.19 The south end of this route option was also considered to be in close proximity to Option B, which was previously rejected following the public consultation in December 2013.

A3.2.4 Pre-Longlist Appraisal Location C (Viability Check)

Route Option C5

- A3.2.4.1 This option was deemed not to be viable as it was considered that the environmental impacts would be higher than for the other route options at Location C and the benefits of this option were not significantly better than the other options. Each of the proposed route options have associated environmental constraints, but this route would have affected a larger area of the Ramsar site north and south of the river and, to the south of the river, the route was within an RSPB nature reserve as well as the Ramsar site.
- A3.2.4.2 As other route options at Location C had significantly lesser environmental impact it was considered that Route Option C5 should not be included in the longlist.

Route Option C6

- A3.2.4.3 This route option was deemed not to be viable for several reasons including the connection into the existing junction, vertical alignment and proposed development areas.
- A3.2.4.4 The connection to the existing A2 junction would have been difficult due to the current arrangement. To be consistent with the other routes, a free-flow junction would have needed to be developed at this location which would have required significant modifications to the existing junction and this would be constrained by the existing route of the A2 and HS1. It would have been difficult to re-align the A2 at this location due to the existing geometry of the A2. A grade separated junction option would have had similar issues.
- A3.2.4.5 It was considered that there would be issues with the vertical alignment of the bored tunnel, especially near the junction with the A2/ B259. At this location the route would have needed to connect into the existing road network via a free-flow or grade separated junction and would then have needed to descend beneath HS1 at a sufficient depth to avoid any impact. It was considered that there was insufficient space to achieve the required geometry.

A3.2.4.6 The area that the proposed junction and new road would have been located in near the A2/ B259 is currently designated as a development zone. The proposed route would have had a significant impact on this development zone and could have prevented the future development of these sites. The previous work undertaken which looked into crossing options in Option Corridor B across the Swanscombe Peninsula concluded that any scheme in this area would have a significant detrimental impact on future developments and therefore Option Corridor B was withdrawn. Based on this decision it was considered that this route's impact on future development was significant enough to exclude it from the longlist.

A3.2.5 Pre-Longlist Appraisal C Variant (Viability Check)

Route Option CV3

A3.2.5.1 This option was deemed not viable mainly due to the proposed alignment impacting the eastern fringe of the Blue Bell Hill village. Furthermore the existing M2 Junction 3 roundabout is in close proximity to the proposed link and therefore would have needed to be removed in order to accommodate the proposed link and meet weaving standards. Removing the existing M2 Junction 3 roundabout would have resulted in amendments to the M2 off-/ on-slips and the local network in order to maintain current traffic movements. This was deemed to be unacceptable.

Route Option CV4

- A3.2.5.2 This route option was deemed not viable for several reasons, including the route's impact on the environment, buildability and excessive construction cost.
- A3.2.5.3 This route option was similar to Route Option CV3 and was subject to the same environmental constraints. It would have impacted the environment by cutting through ancient woodlands, AONB and SSSI.
- A3.2.5.4 The existing M2 Junction 3 roundabout is in close proximity to the proposed link and therefore would have needed to be removed in order to accommodate the proposed link and meet weaving standards. Removing the existing M2 Junction 3 roundabout would have resulted in amendments to the M2 off-/ on-slips and the local network in order to maintain current traffic movements. This was deemed to be unacceptable.

A3.2.6 Summary of Pre-Longlist Appraisal

A3.2.6.1 A summary of the performance of the options not selected for the longlist following the pre-longlist appraisal against the scheme objectives is presented in **Table A3.2.1**. This table also indicates whether or not the options were considered technically viable. Where options were considered to be not technically viable, or did not meet specific LTC scheme objectives the text is highlighted in red.

TABLE A3.2.1 – SUMMARY OF APPRAISAL OF PRE-LONGLIST ROUTES NOT SELECTED FOR LONGLIST AGAINST SCHEME OBJECTIVES

Objectives		Pre-Longlist Options Not Selected for Longlist										
		A3	A5	A6	A7	A10	A11	A13	C5	C6	CV3	CV4
Technical Viability		Technically viable	Not technically viable	Technically viable	Technically viable	Technically viable	Technically viable	Technically viable	Technically viable	Not technically viable	Technically viable	Technically viable
Economic	To support sustainable local development and regional economic growth in the medium to long term	Significant impact on Eastern Quarry development site	Similar to options A1/ A4 but potential impact on existing development from complex connections to lower deck tunnel	Significant impact on existing development to east of existing crossing both north and south of river	Significant impact on existing development to east of existing crossing both north and south of river. Potentially greater than Option A6	Significant impact on existing development to east of existing crossing both north and south of river. Potentially greater than Option A7	Limited potential for local development as quite far west of existing crossing. Also potential impact on TfL proposals	Significant impact on development sites near Ebbsfleet station. Also close to previously dropped Option B	Likely to provide similar development benefits to other Location C options	Significant impact on development sites near Ebbsfleet station. Also close to previously dropped Option B	Likely to provide limited additional development benefits compared to Option C alone	Likely to provide limited additional development benefits compared to Option C alone
	To be affordable to Government and users	High construction cost due to high complex structural content	Potential cost saving relative to Option A4	Cost likely similar to Option A4	Cost likely slightly more than Option A4	Cost likely slightly more than Options A4 and A9	High cost due to tunnel under Dartford and bridge crossing of river	High construction cost due to long bored tunnel	Construction cost likely to be higher than other Location C options as longer	High construction cost due to long bored tunnel including under Tilbury docks	High construction cost due to inclusion of tunnels	High construction cost due to inclusion of tunnels
	To achieve value for money	Likely to offer poor or low value for money due to high cost	Reduced cost could provide better value for money than Options A1/ A4	Value for money likely similar to Option A4	Likely to offer poor to low value for money (similar to but slightly lower than Option A2)	Likely to offer poor to low value for money (similar to but slightly lower than Option A2)	Likely to offer poor to low value for money due to distance from existing crossing and poor connectivity and high cost	Likely to offer poor or low value for money due to high cost	Likely to offer lower value for money due to higher cost and longer length	Likely to offer poor or low value for money due to high cost	Likely to lead to reduced value for money when combined with main Location C option due to higher construction cost	Likely to lead to reduced value for money when combined with main Location C option due to higher construction cost
Environment and Community	To minimise adverse impacts on health and the environment	Significant major construction adjacent to Bluewater and Lakeside shopping centres. Limited impact on designated sites	Increase in traffic on A282 would lead to worsening of noise and air quality in Dartford. Limited impact on designated sites	Increase in traffic on A282 would lead to worsening of noise and air quality in Dartford. Limited impact on designated sites	Increase in traffic on A282 would lead to worsening of noise and air quality in Dartford. Limited impact on designated sites	Increase in traffic on A282 would lead to worsening of noise and air quality in Dartford. Limited impact on designated sites	Northern junction at Wennington within SSSI	Significant major construction adjacent to Ebbsfleet station and Lakeside shopping centre. Limited impact on designated sites	Significantly higher environmental impacts on designated sites than other Location C options	Limited impact on designated sites but some impact from construction along existing A1089 and A13	Significant impacts on AONB, SSSIs and ancient woodland	Significant impacts on AONB, SSSIs and ancient woodland
Transport	To relieve the congested Dartford Crossing and approach roads and improve their performance by providing free flowing north-south capacity	Would provide some relief to existing crossing but require use of sections of A2 and A13	Some relief due to additional crossing capacity but limited overall relief due to use of existing A282/ M25 corridor	Some relief due to additional crossing capacity but limited overall relief due to use of existing A282/ M25 corridor	Some relief due to additional crossing capacity but limited overall relief due to use of existing A282/ M25 corridor. Relief also limited by	Some relief due to additional crossing capacity but limited overall relief due to use of existing A282/ M25 corridor. Relief also limited by	Would provide some relief to existing crossing but potentially limited due to distance from crossing. Would require	Would provide some relief to existing crossing but require use of sections of A2 and A13	Would provide similar relief to existing crossing as other Location C options	Would provide similar relief to existing crossing as other Location C options	As for other C Variant options would provide limited additional relief to existing crossing compared to Option C alone	As for other C Variant options would provide limited additional relief to existing crossing compared to Option C alone

Objectives		Pre-Longlist Options Not Selected for Longlist										
		A3	A5	A6	A7	A10	A11	A13	C5	C6	CV3	CV4
					segregation of local and strategic traffic	segregation of local and strategic traffic	use of sections of A2 and A13					
	To improve resilience of the Thames crossings and major road network	Would provide alternative crossing	Would not provide alternative crossing	Would not provide alternative crossing	Would not provide alternative crossing	Would not provide alternative crossing	Would provide alternative crossing	Would provide alternative crossing	Would provide alternative crossing	Would provide alternative crossing but requires use of existing A1089 and A13	N/A	N/A
	To improve safety	Potential improvement on A282 due to relief but complex and potentially sub-standard connections to A2 and A13 could have safety impacts	Slight increase in predicted accident rate as Options A1/A4. Also potential issue due to steep/sub-standard connections to lower deck tunnel	Slight increase in predicted accident rate as Options A1/A4.	Slight increase in predicted accident rate as Options A1/A4.	Slight increase in predicted accident rate as Options A1/A4.	Potential improvement on A282 due to relief	Potential improvement on A282 due to relief but complex and potentially sub-standard connections to A2 and A13 could have safety impacts	Likely to lead to improvement in accident rate as for other Location C options	Could lead to improvement in accident rate as for other Location C options but reduced due to use of existing A1089 and A13	Impact on safety unlikely to be significantly different to Option C alone	Impact on safety unlikely to be significantly different to Option C alone
Summary of key reasons for non-selection		High cost and complexity of construction directly impacting access to Bluewater and Lakeside shopping centres, and impact on new Eastern Quarry housing development	Technical non-viability; insufficient space to create effective connections to existing roads	Significant impact on existing development north and south of the river east of existing crossing	Significant impact on existing development north and south of the river east of existing crossing	Significant impact on existing development north and south of the river east of existing crossing	Didn't solve strategic traffic problem, too far from Dartford and too close to proposed TfL Belvedere crossing	Impact on new development (London Resort Holding Company's site and Ebbsfleet Garden City)	Significant environmental impacts on protected ecological sites (Ramsar, Special Protection Area (SPA)) and Cliffe Pools (RSPB)	Technical non-viability due to insufficient space to effectively connect to A2 and impact on new development (Ebbsfleet Garden City)	Impact on Blue Bell Hill village and construction impact at M2 Junction 3	Significant environmental impact and high cost of tunnels

A3.2.7 Costs and Economic Appraisal of Longlist Routes

- A3.2.7.1 Following the appraisal of the pre-longlist the longlist options were appraised in two stages (refer to Section 3.3 of Volume 3 of the SAR).
- A3.2.7.2 The estimated construction costs and economic appraisals for the longlist routes are set out in **Tables A3.2.2 to A3.2.6**. It is noted that these used the data available at the time the appraisal was carried out, including the Version 1 traffic model as described in the Post-Consultation SAR Volume 5.

Location A

A3.2.7.3 The costs for the Location A longlist options as assessed by Highways England Commercial Services Division are set out in **Table A3.2.2** below. All costs are at a price base of Q2, 2011 prior to the application of inflation which has been applied from Q2, 2011 to the planned spend date.

TABLE A.3.2.2 - ASSESSED ESTIMATED COSTS FOR LOCATION A LONGLIST ROUTE OPTIONS

OPTION	A1 (bridge west with E1+9)	A1 (bridge west with A15) **	A2 (bridge east with E1+9) *	A4 (bored tunnel west with E1+9)	A4 (bored tunnel west with A15) **	A8 (long bored tunnel M25 J2 to J30)	A9 (immersed tunnel west with E1+9)	A9 (immersed tunnel west with A15) **	A12 (West Route)	A14 (long bored tunnel)	A16 (2-lane bored tunnel west)
Base estimate (£b)	1.40	1.19	1.52	1.63	1.42	3.30	1.42	1.20	4.25	3.16	0.82
Unscheduled items (£b)	0.06	0.05	0.07	0.08	0.07	0.19	0.07	0.05	0.24	0.19	0.04
Risk Adjustment and uncertainty allowance (£b)	0.30	0.26	0.33	0.35	0.31	0.70	0.36	0.31	0.90	0.67	0.17
CESS Subtotal (£b)	1.77	1.49	1.92	2.07	1.79	4.19	1.84	1.57	5.40	4.01	1.03
Inflation adjustment (£b)	0.79	0.65	0.83	0.97	0.83	2.30	0.85	0.71	2.86	2.21	0.48
Portfolio office risk adjustment (£b)	0.17	0.14	0.18	0.20	0.17	0.40	0.18	0.15	0.52	0.38	0.10
RET Adjustment subtotal (£b)	0.96	0.79	1.01	1.17	1.00	2.70	1.03	0.86	3.37	2.59	0.58
ESTIMATED OUT-TURN (£b)	2.73	2.28	2.94	3.24	2.79	6.89	2.87	2.43	8.77	6.60	1.62

* Route Option A2 was only assessed with an earlier (unmodified) version of E1+9 at Junction 30

** The version of Route Option A15 assessed by Highways England Commercial Services Division was an earlier version with only a one-way eastbound connection. The later version described elsewhere in this appendix was a two-way connection. HHJV have assessed the additional out-turn cost of this option (based on the information provided by Highways England Commercial Services Division) to be almost £0.5b making the cost of this option when combined with Route Options A1, A4 and A9 virtually the same as with E1+9.

Location C

A3.2.7.4 The costs for the Location C longlist options as assessed by Highways England Commercial Services Division are set out in **Table A3.2.3** below. All costs are at a price base of Q2, 2011 prior to the application of inflation which has been applied from Q2, 2011 to the planned spend date. Combination options at Location C other than Route Option C9 and C19 are not included as they have not been separately appraised. Only one representative C Variant option (an optimised combination of CV1 and CV2) is included.

TABLE A3.2.3 - ASSESSED ESTIMATED COSTS FOR LOCATION C LONGLIST OPTIONS

OPTION	C1 (bored tunnel)	C2 (bridge)	*C2 (bored tunnel)	C2 (immersed tunnel)	C3 (bridge)	C3 (bored tunnel)	C3 (immersed tunnel)	C4 (bored tunnel)	C9 (bridge)	C9 (bored tunnel)	C9 (immersed tunnel)	C19 (bridge)	C19 (bored tunnel)	C19 (immersed tunnel)	C variant
Base estimate (£b)	2.18	1.44	1.54	1.53	1.58	1.58	1.61	2.33	1.72	1.82	1.81	1.84	1.87	1.96	0.25
Unscheduled items (£b)	0.12	0.07	0.09	0.09	0.08	0.09	0.09	0.13	0.09	0.10	0.10	0.09	0.10	0.11	0.01
Risk Adjustment and uncertainty allowance (£b)	0.46	0.30	0.32	0.32	0.33	0.33	0.34	0.49	0.36	0.38	0.38	0.39	0.39	0.41	0.05
CESS Subtotal (£b)	2.76	1.81	1.95	1.94	1.99	2.00	2.04	2.95	2.16	2.30	2.29	2.33	2.36	2.48	0.31
Inflation adjustment (£b)	1.49	0.93	1.00	0.98	1.01	1.02	1.02	1.49	1.08	1.15	1.13	1.16	1.18	1.22	0.11
Portfolio office risk adjustment (£b)	0.26	0.17	0.18	0.18	0.19	0.19	0.19	0.28	0.20	0.22	0.22	0.22	0.22	0.23	0.03
RET Adjustment subtotal (£b)	1.75	1.10	1.18	1.16	1.20	1.21	1.21	1.76	1.29	1.37	1.38	1.38	1.41	1.46	0.14
ESTIMATED OUT-TURN (£b)	4.51	2.91	3.13	3.09 *	3.19	3.21	3.25 *	4.71	3.45	3.67	3.64 *	3.71	3.77	3.94 *	0.45

* Immersed tube tunnel costs for Route Options C2, C3, C9 and C19 include cut and cover tunnelling under the Ramsar site. Significant cost savings can be achieved if this is not required.

A3.2.7.5 **Table A3.2.4** below presents the benefits and costs in discounted present values for the three Location A options not selected following the first stage of the longlist appraisal (refer to Section A3.2.8). It is noted that wider impact benefits were not assessed for these three options.

TABLE A3.2.4 – ECONOMIC APPRAISAL RESULTS FOR OPTIONS A8, A12 AND A14

	Option		
	A8	A12	A14
PVB (£b)	2.69	1.52	1.53
PVC (£b)	3.55	4.90	3.55
NPV (£b)	-0.86	-3.38	-2.02
BCR	0.8	0.3	0.4

A3.2.7.6 The results of the user and wider impact benefit assessments and costs in discounted present values for the remaining longlist options are set out in **Table A3.2.5** below. This table includes the results, as assessed using the data available at the time of the longlist appraisal, for the longlist options that were selected for the shortlist for comparative purposes.

A3.2.7.7 It is noted that the economic appraisal of Options A1, A4 and A9 reported is for the versions incorporating E1+9 (refer to paragraph A3.2.2.18) for the improvement of Junction 30. The appraisal of the versions incorporating the alternative Option A15 for the improvement of Junction 30 is not reported as their costs are virtually the same as E1+9 (refer to footnote to **Table A3.2.2**).

TABLE A3.2.5 – ECONOMIC APPRAISAL RESULTS FOR OTHER LONGLIST OPTIONS

OPTION	Options assessed in Second Stage Appraisal – Sheet 1												
	A1 (bridge west)	A2 (bridge east)	A4 (bored tunnel)	A9 (immersed tunnel)	C1 (bored tunnel)	C2 (bridge)	C2 (bored tunnel)	C2 (immersed tunnel)	C3 (bridge)	C3 (bored tunnel)	C3 (immersed tunnel)	C4 (bored tunnel)	C variant - C2 bored tunnel
Construction duration (years)	4.0	4.0	4.5	4.0	6.25	4.50	5.25	4.00	4.50	5.00	4.00	5.50	5.25
ESTIMATED OUT-TURN (£b)	2.73	2.94	3.24	2.87	4.51	2.91	3.13	3.09 *	3.19	3.21	3.25 *	4.71	3.58
PVB (excluding WEBS) (£b)	1.62	1.28	1.62	1.62	1.98	2.46	2.46	2.46	3.53	3.53	3.53	4.41	3.09
PVC (£b)	1.30	1.49	1.62	1.41	2.08	1.24	1.32	1.37	1.32	1.30	1.39	2.28	1.61
NPV (£b)	0.32	-0.22	0.00	0.21	-0.10	1.22	1.14	1.09	2.21	2.23	2.14	2.14	1.48
Initial BCR**	1.2	0.9	1.0	1.1	1.0	2.0	1.9	1.8	2.7	2.7	2.5	1.9	1.9
WIs (£b)	0.54	0.49	0.54	0.54	0.91	1.05	1.05	1.05	1.23	1.23	1.23	1.50	1.16
PVB (including WIs) (£b)	2.16	1.77	2.16	2.16	2.89	3.51	3.51	3.51	4.76	4.76	4.76	5.91	4.25
PVC (£b)	1.30	1.49	1.62	1.41	2.08	1.24	1.32	1.37	1.32	1.30	1.39	2.28	1.61
NPV (£b)	0.86	0.28	0.54	0.75	0.81	2.27	2.19	2.14	3.44	3.46	3.37	3.63	2.64
Adjusted BCR**	1.7	1.2	1.3	1.5	1.4	2.8	2.7	2.6	3.6	3.7	3.4	2.6	2.6

* Immersed tube tunnel costs for Route Options C2, C3 and C9 include cut and cover tunnelling under the Ramsar site. Significant cost savings can be achieved if this is not required.

** Initial BCR excludes Wider Impact benefits (WIs). Adjusted BCR includes WIs.

OPTION	Options assessed in Second Stage Appraisal – Sheet 2							
	C4 + A16 single bore tunnel	C2 bored tunnel differential charging	C9 (bridge)	C9 (bored tunnel)	C9 (immersed tunnel)	C19 (bridge)	C19 (bored tunnel)	C19 (immersed tunnel)
Construction duration (years)	5.50	5.25	4.50	5.25	4.00	4.50	5.25	4.0
ESTIMATED OUT-TURN (£b)	6.33	3.13	3.45	3.67	3.64 *	3.71	3.77	3.94
PVB (excluding WEBS) (£b)	4.61	2.65	3.08	3.08	3.08	4.13	4.13	4.13
PVC (£b)	3.22	1.85	1.52	1.62	1.68	1.64	1.63	1.83
NPV (£b)	1.39	0.80	1.56	1.47	1.41	2.49	2.50	2.30
Initial BCR**	1.4	1.4	2.0	1.9	1.8	2.5	2.5	2.3
WIs (£b)	1.59	1.13	1.26	1.26	1.26	1.48	1.48	1.48
PVB (including WIs) (£b)	6.20	3.78	4.34	4.34	4.34	5.61	5.61	5.61
PVC (£b)	3.22	1.85	1.52	1.62	1.68	1.64	1.63	1.83
NPV (£b)	2.98	1.93	2.82	2.72	2.66	3.97	3.98	3.78
Adjusted BCR**	1.9	2.0	2.9	2.7	2.6	3.4	3.4	3.1

* Immersed tube tunnel costs for Route Options C2, C3 and C9 include cut and cover tunnelling under the Ramsar site. Significant cost savings can be achieved if this is not required.

** Initial BCR excludes Wider Impact benefits (WIs). Adjusted BCR includes WIs.

A3.2.8 First Stage Longlist Appraisal Location A

Introduction

A3.2.8.1 The longlist appraisal was carried out in two stages. The first stage was a high level appraisal against a limited number of criteria. The second stage was a more detailed appraisal against a wider range of criteria of the options which could not be differentiated on the basis of the initial limited criteria. Refer to Section 3.3 of Volume 3 of the SAR for more details.

Route Option A8

A3.2.8.2 The total estimated cost of Route Option A8 using the data available at the time of the longlist appraisal was approximately £6.9bn which was more than double the total estimated cost of Options A1/ A4 at that stage of appraisal.

A3.2.8.3 The estimated BCR (excluding Wider Impact benefits which were not assessed for this option) was about 0.8 which is poor value for money.

A3.2.8.4 The new tunnel bypassing the existing crossing would have improved resilience at the Dartford Crossing although such a long tunnel could be susceptible to incidents.

A3.2.8.5 This option would have reduced flows on the M25 and resulted in a reduction in flows at the existing Dartford Crossing and on the A282 compared to the Without Scheme scenario.

A3.2.8.6 The option would have had limited environmental impacts. Two areas of ancient woodland would potentially have been affected adjacent to the A13 and the entrance and exit of the tunnel would have been located within areas of Flood Zone 3. There would have been some improvement in air quality and noise levels on the A282 as a result of the reduction in traffic flows on the A282.

A3.2.8.7 Route Option A8 would not have catered for all traffic movements at M25 Junctions 2 and 30. Construction of viaducts and tunnels over and under the existing A2, M25 and A13 would have presented practical challenges and increased the delivery risk. There would have been significant impacts on existing property at these locations. Further design would have been required before the connections to M25 Junction 30 would be deliverable to acceptable standards.

A3.2.8.8 Route Option A8 was not selected for the shortlist because of the high cost, the complex junctions at A2 and A13 with high delivery risk and the impact on property at these locations.

Route Option A12

A3.2.8.9 The total estimated cost of Route Option A12 using the data available at the time of the longlist appraisal was approximately £8.8bn which was about three times the total estimated cost of Options A1/ A4 at that stage of appraisal.

A3.2.8.10 The estimated BCR (excluding Wider Impact benefits which were not assessed for this option) was about 0.3 which is poor value for money.

- A3.2.8.11 The new route bypassing the existing crossing would have improved resilience at the Dartford Crossing although a long tunnel could be susceptible to incidents.
- A3.2.8.12 This option would have reduced flows on the M25 and resulted in a reduction in flows at the existing Dartford Crossing and on the A282 compared to the Without Scheme scenario.
- A3.2.8.13 This option would have had a number of potential environmental impacts. Increased traffic flows on the A13 would impact on the western edge of the Thurrock AQMA and the connection with the A2 could impact the Dartford Borough Council AQMA. Reductions in flows on the A282 would lead to some improvement to air quality and noise levels.
- A3.2.8.14 There would have been a direct impact on the nationally important Inner Thames Marshes SSSI through permanent habitat loss. The construction of a bridge over the river could also have impacted the Thames Estuary recommended Marine Conservation Zone and there could also have been an impact on the Thames Estuary and Marshes SPA through disturbance of qualifying species.
- A3.2.8.15 There are several scheduled monuments, Grade I, II* and II listed buildings and a conservation area close to Purfleet close to the route on the north bank of the River Thames.
- A3.2.8.16 The route on the north bank of the river would have been within Flood Zone 2 and the connection with the M25 would have been located within Source Protection Zone 1/ 2. Bridge supports could have had a negative impact on the River Thames and Mardyke hydrodynamic regime.
- A3.2.8.17 The bridge would have landed on the north bank of the river in a former VOSA site which has been sold to Thurrock Council for high quality residential development. The impact on this site would have been significant and unacceptable.
- A3.2.8.18 Route Option A12 would not have catered for all traffic movements at the existing M25 Junction 2. Construction of viaducts and tunnels over and under the existing A2 and M25 at Junction 2 would have presented practical challenges and increased the delivery risk.
- A3.2.8.19 Route Option A12 was not selected for the shortlist because of the very high cost and poor economic benefits, the potential impact on the Inner Thames Marshes SSSI and the unacceptable impact on the development site in Purfleet.
- Route Option A14**
- A3.2.8.20 The total estimated cost of Route Option A14 using the data available at the time of the longlist appraisal was approximately £6.6bn which was more than double the total estimated cost of Options A1/ A4 at that stage of appraisal.
- A3.2.8.21 The estimated BCR (excluding Wider Impact benefits which were not assessed for this option) was about 0.4 which is poor value for money.
- A3.2.8.22 The new tunnel bypassing the existing crossing would have provided some improvement to resilience at the Dartford Crossing although such a

long tunnel could be susceptible to incidents. The additional resilience would have been limited due to the lack of connection with the A13 and A2. For example, in the event of a closure of the QEII Bridge, traffic would have needed to be diverted to circulate around Junction 29 and Junction 3 to access the long tunnel, leading to substantial congestion of the network.

A3.2.8.23 The 7.4km long tunnel was predicted to carry relatively low levels of traffic compared to the total flow across the Dartford Crossing. **Figure A3.2.8** shows predicted traffic flows in vehicles per hour in 2025, both with Option A14 and without the option. Whilst the capacity of the new tunnels would be 8,000 vehicles per hour, the forecast usage in the peak hours would be only 3,400-3,700 vehicles in 2025. This is because the long tunnel would not have had connections with M25/ A282 junctions between Junction 2 and Junction 30, and would therefore only be attractive to long-distance traffic; in particular, traffic joining the M25 at Junction 2 (A2) and Junction 30 (A13) would not be connected to the new tunnel.

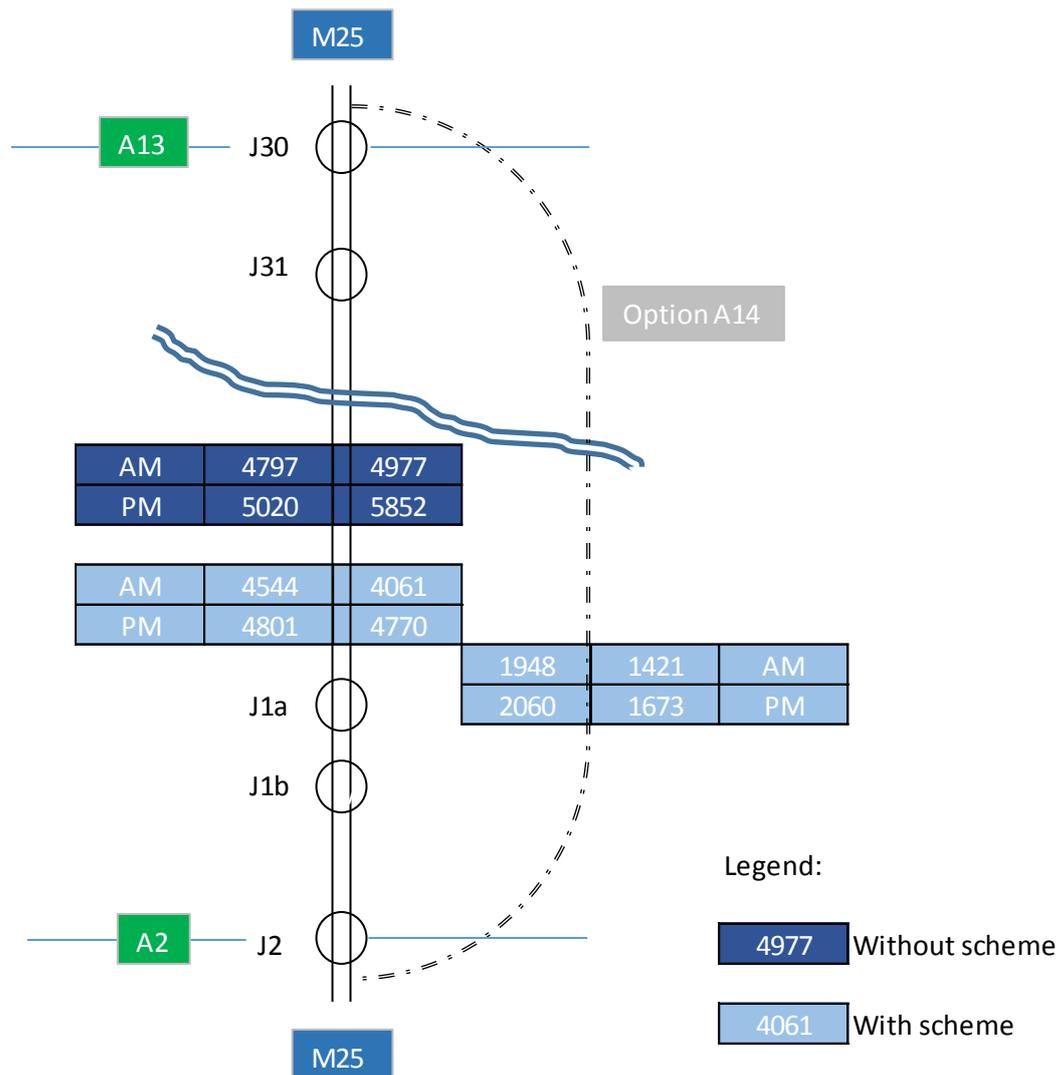


FIGURE A3.2.8 - OPTION A14 2025 PEAK HOUR TRAFFIC FLOWS (VEH/HR)

A3.2.8.24 High flow levels would have remained on the existing M25/ A282 corridor between Junction 2 and Junction 30, and flows on the A2 and A13 would not be relieved.

A3.2.8.25 The option would have provided limited improvement in safety for traffic using the existing M25/ A282 corridor.

A3.2.8.26 This option would have had very limited environmental impacts. The entrance and exit of the tunnel would have been located within areas of Flood Zone 2. There would have been limited improvements in air quality and noise impacts along the M25/ A282 corridor.

A3.2.8.27 Route Option A14 was not selected for the shortlist because it performed very poorly against the transport and economic scheme objectives due to the high cost and poor economic benefits due to the limited attraction to traffic.

A3.2.9 First Stage Longlist Appraisal Location C

Route Option C3 (southern connection to A2)

- A3.2.9.1 The southern connection to the A2 was deemed not to be viable due to the significant environmental constraints in the vicinity. The proposed junction in the vicinity of Shorne Woods Country Park would have resulted in permanent land take from, and direct impact on, SSSI and ancient woodland at Shorne/ Brewers Wood. The alignment would also have cut through a local wildlife site on the outskirts of Shorne.
- A3.2.9.2 Connection with the A2 was almost entirely within the Kent Downs AONB. The NPSNN dictates that alternatives should be sought rather than develop infrastructure within an AONB. Given that there were feasible alternatives to connect with the A2, this connection would be unacceptable.

Combination Route Options C11 to C14

- A3.2.9.3 These combination route options were not developed as the southern junction at the A2 on Route Option C3 was not selected due to the significant environmental constraints.

A3.2.10 Second Stage Longlist Appraisal Location A

Route Option A2

- A3.2.10.1 Route Option A2 had poor economic benefits, providing approximately two-thirds of the economic benefits of route options involving new crossings on the west side of the existing crossing. This route option separated strategic and local traffic, with strategic traffic using the new and existing bridges, and local traffic using the existing tunnels. It is considered that this was the principal reason for the poor economic performance.
- A3.2.10.2 Route Option A2 would have had a significant impact on commercial property to the south of the river both in terms of cost and potential impact on local jobs and the community. Properties affected included the Hilton Hotel Dartford Bridge and a number of businesses in the Crossways Business Park (Dachser, British Gas, Vital, Yodel and Thermo Fisher). To the north, this option would have had a significant impact on the Lafarge-Tarmac cement and aggregate plant. The site is unique with both a safeguarded jetty for the import/ export of sea dredged aggregate supplying the London construction market and a rail siding used to transport cement. It is highly unlikely that this industry could be relocated elsewhere along the river. Tunnel options that would enable the route to be located beneath in particular the Lafarge-Tarmac site (A8/ A14) and avoid impacting its operation were not selected as discussed in Section A3.2.8.
- A3.2.10.3 In addition this route option could have impacted upon the nationally important West Thurrock Lagoon and Marshes SSSI (through disturbance of qualifying species) on the north bank of the river more than other route options at Location A. Any bridge structure would have been required to run along the western boundary of the SSSI.

Route Option A9

- A3.2.10.4 Immersed tube construction at this location was assessed as having greater impact on the river operations and carried far higher levels of engineering risk compared to construction of bridge or bored tunnel solutions (Route Options A1 and A4). This option was therefore not selected in favour of the bridge and bored tunnel options, these being assessed as most likely to provide better value and a lower risk of unacceptable impacts at this location.
- A3.2.10.5 The level of disruption to river traffic during construction may have been expected to be high during excavation of the trench, immersion and placing of tunnel elements and backfilling. During these periods one-way operation of the navigation channel would be necessary together with a series of 24-hour closures during element placing operations. The river at Location A is narrow compounding disruption effects. There are also a number of busy jetties directly adjacent to the works where access would be constrained for considerable periods affecting commercial operations. Discussion was held with the Port of London Authority (PLA) who had firmly rejected immersed tunnel construction at Location A in their 2013 consultation and whose views remained one of strong objection to such a solution.
- A3.2.10.6 Construction of an immersed tunnel at this location would have presented considerable engineering challenges. Alignment constraints mean construction would have had to be carried out in a narrow corridor passing between the existing road tunnels on the eastern side and the existing cable tunnel from Littlebrook Power Station on the western side. Of particular concern was the potential for the trench excavation to reduce overburden cover to these tunnels thereby inducing uplift stresses in the existing linings. This could potentially lead to damage of the tunnel's linings which could not be assessed without considerable further work. Substantial deep-founded canal structures were proposed as the best way to construct the end sections of tunnel. These structures would be complex, affect the river hydrodynamics (flooding and environmental impacts) and navigation as they would extend part way into the river. Only with considerable further work would it have been possible to quantify the engineering and construction uncertainty and even then many of the more difficult risks would remain.

Route Option A15

- A3.2.10.7 Route Option A15 would have had a considerable impact on a wide range of receptors during the construction works. The impact would be seen in land take, impact on businesses and local amenities, major service diversions and disruption to all road users. The challenge of diverting approximately 800m of existing pylons would have been extremely difficult and costly to relocate cables and pylons. The diversion of these pylons and cables would have a significant lead time of 4 to 5 years.
- A3.2.10.8 Route Option A15 would have had impacts on a number of businesses along its route, notably Harvey's, Essex Arena and potentially Smyth toy superstore. In addition Thurrock services would be significantly impacted

due to complex traffic management and diversions which would be in place for long periods on the existing Arterial Road and the southbound approach link.

A3.2.10.9 The impact on Junction 31 during the works would also have been substantial. At Junction 31 major works would be required not just to the junction itself but to the main approach road from the east, Arterial Road. This would be likely to impact traffic exiting the roundabout to the east and thus cause further delays on a junction already congested with complex traffic management arrangements. This would also be likely to have an impact back onto the A282/ M25 both northbound and southbound and potentially onto the A13.

A3.2.10.10 In reviewing the assessment criteria and construction challenges of Route Option A15, the total HHJV cost estimate for E1+9 (refer to paragraph A3.2.2.18) prepared for the purposes of the longlist appraisal and A15 were approximately the same magnitude. However, the total construction costs for A15 could increase after a further detailed assessment of land take, traffic management and diversion of major services. Route Option A15 did not therefore provide best value for the benefits generated compared to the alternative option E1+9.

Route Option A16

A3.2.10.11 Route Option A16 (with Route Option C4) – a Location C route option (C4) combined with a two-lane tunnel northbound at Dartford (to unlock the capacity constraint provided by the existing tunnels which are sub-standard) had a very high capital cost approximately 25% more than Route Option C4 without providing commensurate incremental benefit over Route Option C4. This route option did not therefore provide best value for the benefits that the option generated. It is noted that Route Option C4 was used for this combination appraisal as it had the highest benefits of the options under consideration at that time.

A3.2.11 Second Stage Longlist Appraisal Location C

Route Option C1

A3.2.11.1 This route option was deemed not to be viable for a number of reasons. Feedback from bilateral meetings with both SAP members and industry did not favour Route Option C1 due to concerns relating to lack of resilience around the A13 and M25 Junction 30. There were additional technical challenges with this option with the presence of 30m deep piles within the dock area of the Port of Tilbury which the tunnel would have to pass below. The Port of Tilbury are currently constructing a distribution park to the north of the docks with plans to extend this significantly over the next 2-3 years. To reduce impacts on the proposed development the tunnel portal would need to be located outside of the relevant area.

A3.2.11.2 This option had a very high capital cost (estimated out-turn cost about 40% higher than Options C2 and C3) and poor economic benefits (BCR without wider impact benefits of 0.95). The requirement for a major junction improvement at M25 Junction 30 and widening of the A13 would

reduce the option's resilience, particularly once further planned development of London Gateway Port and Port of Tilbury takes place.

- A3.2.11.3 Although the option avoided the Ramsar site, there would have been significant environmental impacts including a direct impact on Orsett Cropmarks nationally designated scheduled monument, potential direct impact on Chadwell Place Grade II listed building, setting impacts potentially to several Grade II listed buildings north and south of the River Thames and direct impacts on 3 to 4 areas of nationally important ancient woodland along the existing A1089 and A13.

Route Option C4

- A3.2.11.4 This route option was deemed not viable as it had a very high capital cost associated with construction of a long bored tunnel (estimated out-turn cost nearly 50% higher than Options C2 and C3), although it did provide high economic benefits (direct benefits 79% higher than Option C2 and 25% higher than Option C2). There were other alternative Location C route options which provided good economic benefits at lower cost.

- A3.2.11.5 In addition following discussion with English Heritage, the area containing the tunnel portal on the northern side of the River Thames could potentially have been within an area of importance due to the nearby scheduled monuments.

Combination Route Option C7

- A3.2.11.6 This route option was not developed because Route Option C1 was not selected as discussed above.

Combination Route Options C8 and C10

- A3.2.11.7 The design of the Location C routes taken forward to the shortlist was based on a single river crossing location, taking account of community, environmental and other physical constraints. As a result, combination options C8 and C10 (which included parts of Options C2 and C3) became redundant.

Combination Route Options C15

- A3.2.11.8 Route Option C15 had a similar alignment south of the river to Route Option C19 which was selected for the shortlist and it was considered that the Route Option C19 alignment was preferable and that only one such alignment should be shortlisted

Combination Route Option C16

- A3.2.11.9 Route Option C16 included part of Route Option C1 using the A13 and was therefore not selected.

Combination Route Options C17 and C18

- A3.2.11.10 Route Options C17 and C18 included the long tunnel section of Route Option C4 (the principal reason that it was not selected) and were therefore not included in the shortlist.

A3.2.12 Summary of Longlist Appraisal

- A3.2.12.1 A summary of the performance of the options not selected following the longlist appraisal against the scheme objectives is presented in **Table A3.2.6**. The Location C combination options are not included in this table. Their performance would be similar to the base options on which they were based. Those objectives that the options were considered not to meet are highlighted in red.
- A3.2.12.2 The element of Option C4 that resulted in its high cost and impact on the historic environment was the very long tunnel under the Ramsar site emerging close to Coalhouse Fort. The southern section of this option connecting to Junction1 of the M2 and the northern section running parallel to the A128 and then joining and widening the A127 were recognised as the reason that Option C4 had the highest economic benefits of all the Location C options (refer to **Table A3.2.5**). These sections were included in combination options C9 and C19 which were therefore included in the shortlist.
- A3.2.12.3 Following the longlist appraisal the Route Options selected for the shortlist were A1, A4, C2, C3 (as modified to include the southern section of Route Option C2 – refer to paragraph A3.2.12.4 below), C9 and C19.
- A3.2.12.4 Following the decision not to select the southern section of Route Option C3 through Shorne Country Park the route was modified to retain the same alignment north of the River Thames and include the same southern alignment and A2 junction as Route Option C2 but the designation of the option was kept as Route Option C3.

TABLE A3.2.6 – SUMMARY OF APPRAISAL OF LONGLIST ROUTES NOT SELECTED FOR SHORTLIST AGAINST SCHEME OBJECTIVES

Objectives		Longlist Options Not Selected for Shortlist									
		A2	A8	A9	A12	A14	A15	A16 (with Option C4)	C1	C3(S)	C4
Economic	To support sustainable local development and regional economic growth in the medium to long term	Economic benefits 21% lower than Options A1/ A4. Significant impact on existing development to east of existing crossing both north and south of river	Economic benefits 66% more than Options A1/ A4	Economic benefits same as Options A1/ A4. Potential impact on commercial river operations during construction.	Economic benefits 6% lower than Options A1/ A4. Significant impact on high quality development in Purfleet	Economic benefits 6% lower than Options A1/ A4.	Economic benefits similar to alternative Junction 30 improvement (E1+9). Significant impact on commercial properties and HV cable route	Economic benefits 5% more than Option C4 alone	Economic benefits 20% less than Option C2 and 44% less than Option C3. Potential impacts on Tilbury docks from tunnelling underneath	Economic benefits similar to Option C3 as modified	Economic benefits 79% higher than Option C2 and 25% higher than Option C3
	To be affordable to Government and users	Cost 8% higher than Option A1	Cost more than double Options A1/ A4	Cost 5% more than Option A1 and 11% less than Option A4	Cost about three times Options A1/ A4	Cost more than double Options A1/ A4	Cost similar to or slightly higher than alternative Junction 30 improvement (E1+9)	Cost of tunnel about 75% of twin bore tunnel and total cost combined with Option C4 34% higher	Cost about 40% higher than Options C2/ C3	Cost similar to Options C2/ C3 (as modified)	Cost nearly 50% higher than Options C2/ C3
	To achieve value for money	Poor to low value for money due to segregation of local and strategic traffic	Excluding wider impact benefits offers poor value for money	Offers low to medium value for money	Offers poor value for money	Offers poor value for money	Offers no better value for money than alternative Junction 30 improvement (E1+9)	Reduces value for money by about 25% compared to Option C4 alone (low to medium value for money)	Poor value for money without wider impact benefits and low value for money with wider impact benefits	Value for money similar to Options C2/ C3 (as modified) giving medium to high value for money	Medium value for money without wider impact benefits and high value for money with wider impact benefits
Environment and Community	To minimise adverse impacts on health and the environment	Increase in traffic on A282 would lead to worsening of noise and air quality in Dartford. Potential impact on West Thurrock Lagoon and Marshes SSSI	Limited environmental impact including on designated sites. There would be some improvements in air quality and noise impacts along the M25/ A282 corridor.	Potential environmental impacts on downstream designated sites (Ramsar/ SPA/ SSSI) due to significant work in river	Direct impact on Inner Thames Marshes SSSI and potential impacts on heritage assets in Purfleet	Limited environmental impact including on designated sites. There would be limited improvements in air quality and noise impacts along the M25/ A282 corridor.	Significant disruptive construction close to commercial property including Thurrock services	Increase in traffic on A282 would lead to worsening of noise and air quality in Dartford. Limited other environmental impacts	Avoids impacts on Ramsar site but has other environmental impacts particularly on heritage assets and ancient woodland	Construction almost entirely in Kent Downs AONB. Also direct impacts on SSSI and ancient woodland at Shorne/ Brewers Wood	Long tunnel avoids direct impacts on Ramsar site and SPA but potential impact on heritage assets around Coalhouse Fort
Transport	To relieve the congested Dartford Crossing and approach roads and improve their performance by providing free flowing north-south capacity	Some relief due to additional crossing capacity but limited overall relief due to use of existing A282/ M25 corridor. Relief also limited by segregation of local and strategic traffic	Relief provided by alternative route but limited to some extent as not all movements are catered for at Junctions 2 and 30	Some relief due to additional crossing capacity but limited overall relief due to use of existing A282/ M25 corridor	Relief provided by alternative route but limited to some extent as not all movements are catered for at Junction 2 and use of section of A13 west of J30	Some relief provided by alternative route but extent limited by relatively low long distance flows from south of J2 to north of J30. High flows remain on M25/ A282 between J2 and J30. No relief to A2 or A13.	Provides no more relief than alternative Junction 30 improvement (E1+9)	Would provide relief through the provision of 2 crossings but would also attract additional traffic to existing A282 without providing any additional capacity apart from at crossing	Likely to provide similar relief to other Location C options	Would provide similar relief to Option C2	Likely to provide similar relief to other Location C options
	To improve resilience of the Thames	Would not provide	Would provide alternative crossing	Would not provide	Would provide alternative crossing	Would provide alternative crossing and	N/A	Would provide alternative crossing in	Would provide alternative crossing but	Would provide alternative crossing	Would provide alternative crossing

Objectives		Longlist Options Not Selected for Shortlist									
		A2	A8	A9	A12	A14	A15	A16 (with Option C4)	C1	C3(S)	C4
crossings and major road network	alternative crossing		alternative crossing		provide some improvement in network resilience, but limited due to the lack of connection with A13 and A2.		combination with Location C option	concerns about overall resilience due to use of existing A1089 and A13			
To improve safety	Slight increase in predicted accident rate as Options A1/ A4.	Potential slight improvement in accident rate due to relief of existing crossing. Complex and potentially sub-standard layouts at Junctions 2 and 30 could have safety implications	Slight increase in predicted accident rate as Options A1/ A4	Potential slight improvement in accident rate due to relief of existing crossing	Potential slight improvement in accident rate due to relief of existing crossing	Safety performance likely to be similar to than alternative Junction 30 improvement (E1+9). Potential safety implications from complex construction traffic management at Junction 31	Additional traffic on A282 without widening could lead to increase in accident rate	Likely to lead to improvement in accident rate as for other Location C options	Likely to lead to improvement in accident rate as for other Location C options	Likely to lead to improvement in accident rate as for other Location C options	
Summary of key reasons for non-selection	Low value for money. Significant impact on commercial property north and south of the river east of existing crossing. Impact on SSSI	Cost approximately more than twice A1. Very complex junctions required to connect A2 and A13 traffic with significant impact on existing property	High technical risks, significantly more difficult to construct than other options. Impact on river/ jetty operations unlikely to be acceptable to owners/ operators PLA	Cost approximately three times A1. Poor economic benefits, significant impact on planned development at Purfleet. Potential impact on a SSSI	Cost approximately more than twice A1. Poor level of economic benefit due to limited attraction of traffic	Significant impact on commercial property around Junction 31. Major high voltage overhead cable diversions required.	Reduces value for money compared to the C option on its own. High cost solution with limited additional economic benefits	Low value for money. Poor resilience due to use of A13. Potential impacts on Tilbury Docks from tunnelling under existing structures	Environmental impact on an AONB, SSSI and ancient woodland. Reasonably practicable alternative available (southern section of C2)	High cost. Impact on scheduled monuments. There were better, lower cost options available	

Appendix 3.3 - Approach to consultation and feedback

A3.3.1 Introduction

- A3.3.1.1 Effective public consultation is one of the most important aspects of the development of a major project. The involvement of local communities, local authorities, landowners, businesses, environmental and public bodies adds considerable knowledge and brings significant benefits to the development of a major project. It means that Highways England can access local knowledge and identify the issues that are important to local communities. Major projects are shown to be more successful when they are developed with effective consultation and Highways England set out to undertake the consultation on this basis.
- A3.3.1.2 Another important part of the approach to consultation was to make sure that those affected by the congestion and the issues with the existing crossing, as well as those potentially affected by any new crossing, were informed and had the opportunity to have their say to contribute to the route selection process.

A3.3.2 Planning the consultation

- A3.3.2.1 Highways England used best practice and lessons learned from other recent major projects in devising the consultation, as well as seeking advice from the Consultation Institute and the independent analysis company Ipsos MORI.
- A3.3.2.2 Highways England's intention was to hold a fair, transparent and accessible consultation, giving consultees enough information and time to respond. Highways England wanted as many people to respond as possible, representing national, regional and local interests.
- A3.3.2.3 The consultation was designed with the following features so that as many people as possible could have their say:
- Held during a period not affected by major events (e.g. Christmas/ New Year, summer school holidays, local election campaigns) with a duration of eight weeks allowing people time to review the proposals and to provide feedback.
 - Easy-to-read consultation materials along with detailed technical reports made available online and in print at all of Highways England's 24 public information events and at local libraries.
 - Public information events held in the areas directly affected by the proposals as well as neighbouring areas, with experts on hand to answer questions.
 - Consultation responses collected online or by printed questionnaire using a freepost address, with email and postal response channels also available.

- Provision for consultation materials to be produced in alternative formats or adjusted to accommodate requests in other languages and for those with disabilities, impairments or without English as a first language.

A3.3.3 Assurance of compliance with consultation principles

A3.3.3.1 Highways England undertook a process of planning for the 2016 LTC consultation using the following principles. This provided the assurance of compliance with legal and organisational requirements. Highways England also sought and considered advice provided by the Consultation Institute and experience gained from other infrastructure projects during this phase.

Equality Act 2010

A3.3.3.2 The Equality Act 2010 requires public authorities, including Highways England, to have due regard to or think about the need to do following:

- Eliminate unlawful discrimination.
- Advance equality of opportunity between people who share a protected characteristic and those who don't.
- Foster or encourage good relations between people who share a protected characteristic and those who don't.

A3.3.3.3 Having due regard means Highways England must consciously consider or think about the need to do these three things as part of consultation on the proposed scheme. Highways England must also think about the need to:

- Remove or reduce disadvantages suffered by people because of a protected characteristic.
- Meet the needs of people with protected characteristics.
- Encourage people with protected characteristics to participate in public life and other activities.

Government Consultation Principles

A3.3.3.4 The overarching guidance for consultation is set out in the Government Principles published on 14 January 2016.¹ The principles stress that, “Consultation forms part of wider engagement and decisions on whether and how to consult should in part depend on the wider scheme of engagement.” The main principles are:

- Consultations should be clear and concise
- Consultations should have a purpose
- Consultations should be informative

¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/492132/20160111_Consultation_principles_final.pdf

- Consultations are only part of a process of engagement
- Consultations should last for a proportionate amount of time
- Consultations should be targeted
- Consultations should take account of the groups being consulted
- Consultations should be agreed before publication
- Consultation should facilitate scrutiny
- Consultation exercises should not generally be launched during local or national election periods

Government Digital Strategy

A3.3.3.5 The Government’s Digital Strategy (December 2013)² sets out the principle of “digital by default”, providing digital services that are so straightforward and convenient that all those who can use them will choose to do so whilst those who cannot are not excluded. The objectives aim to increase the number of people who use digital services and provide consistent services for people who have rarely or never been online. At the time of the strategy’s publication, the vast majority (82%) of the UK population was online but rarely use online government services.

A3.3.3.6 Conducting consultations online has a number of advantages:

- Achieving greater value for money, as delivering information and enabling responses online saves time and reduces cost.
- Allows improved access to the consultation on a 24 hour (7 day week) basis, including the use of “assisted digital”, to those who would struggle to access a traditional consultation due to time and mobility difficulties.
- Ensures the security of personal data by facilitating the consultation response submission via encrypted portals directly to the consultation analysis service provider – reducing risk of misdirected responses via post or unsecured email.

A3.3.3.7 Many people who are offline will keep using services in non-digital ways, such as face-to-face meetings and events. Increasing the scale of online consultation will allow the traditional elements, including events, to be much more closely focused on the specific needs of community members who are not online.

Highways England Project Control Framework

A3.3.3.8 Highways England’s Major Projects Control Framework provides further guidance that is specific to consultation on highways schemes:

- Only sustainable options are presented for public consultation – ensuring options present a clear choice between routes and that the reasons for rejecting alternative options are explained.

² <https://www.gov.uk/government/publications/government-digital-strategy/government-digital-strategy>

- Consultation questions are designed to enable consultees to express their views on the proposals and alternative options, also allowing Highways England to monitor their effectiveness in consulting the whole community (including hard to reach groups).
- Methods of consultation are appropriate to the scale and potential impact of the scheme, considering any previous consultations, demographic characteristics and hard to reach groups.
- Events are held in proximity of the options and are accessible to all.
- Consultation material is made available online.
- Responses are conscientiously considered before proposals are finalised.
- Information collected is handled in a way that complies with the Data Protection Act, Freedom of Information Act and Environmental Information Regulations.

A3.3.4 How Highways England undertook the consultation

A3.3.4.1 Highways England's aim was to ensure that a wide range of people were aware of the consultation, to ensure that it was easy to find out more about it and that it was easy for people to participate and have their say.

A3.3.4.2 The LTC project website address (www.lower-thames-crossing.co.uk) and telephone number were published on all printed promotional materials. Highways England also encouraged people to attend the public information events in their local area to talk to members of the LTC project team.

Publicity and advertising

A3.3.4.3 From launch week and throughout the consultation period Highways England used the following methods to raise awareness,:

- Advertising (newspaper, posters and digital). Example posters are shown in **Figure A3.3.1** and **A3.3.2**
- Leafleting, mail-outs and emails
- Press releases
- Pre-existing channels (for example through local authorities and business organisations)
- Social media

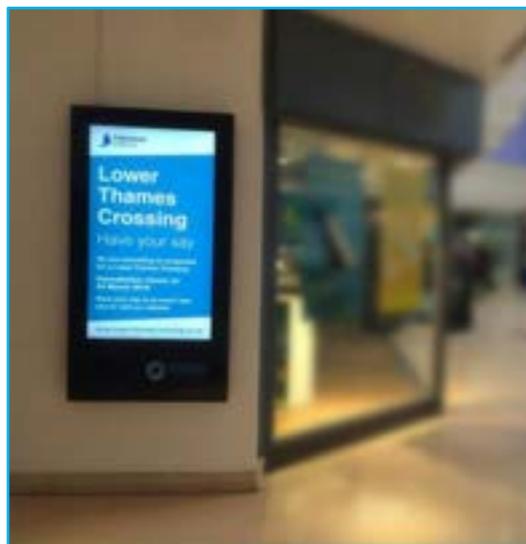


FIGURE A3.3.1 - EXAMPLE OF POSTER ADVERTISING

Advertising

A3.3.4.4 Adverts were placed in 12 local and regional newspapers over a period of six weeks. Adverts were also placed in two national newspapers in the week of launch. Bus stop and roadside posters were placed in Grays, Dartford and Gravesend, digital screens positioned in petrol stations and posters displayed in shopping centres for four weeks. Digital banner adverts and paid search were used to ensure those searching on related terms could find information about the consultation quickly, by taking visitors directly to the LTC website. A summary of the advertising is provided in **Table A3.3.1**.

TABLE A3.3.1 - SUMMARY OF ADVERTISING

Press	Poster sites	Digital
<p>Local and regional newspapers in impacted and neighbouring areas, using a mixture of free and paid weeklies.</p> <p>Advertising in a total of 12 titles during the weeks commencing 25 January and 15 February 2016.</p> <p>For the regional newspapers, which are weekly papers, there was advertising for one day on two subsequent weeks. The national newspapers had advertising for one day only in the week commencing 15 February 2016. Different regional newspapers were used for the first and second round of advertising.</p> <p>Included: Gravesend and Dartford Messenger and Essex Chronicle.</p>	<p>Bus stop and roadside posters used from 15 to 18 February 2016 at 18 sites each in Dartford and Gravesend, and 37 sites in Thurrock; and from 29 February until 13 March 2016 using 11 sites in Dartford, 9 sites in Gravesend, and 24 sites in Thurrock.</p>	<p>During consultation, advertising on Facebook targeted users in Thurrock, Dartford, Gravesend, Brentwood, Havering, Basildon, Medway, Maidstone and Bexley. Advertising live between 09 February 2016 and 23 March 2016.</p>
<p>A one-off advertisement in two national daily publications (Daily Express, Daily Telegraph) on 29 January 2016.</p>	<p>During consultation, digital posters were placed in 10 petrol station forecourts: four in Dartford, four in Gravesend and two in Grays.</p>	<p>Banner advertising through Google targeted search words relating to the LTC scheme in Thurrock, Dartford, Gravesend, Brentwood, Havering, Basildon, Medway, Maidstone, Bexley. Advertised live between 11 February 2016 and 23 March 2016.</p>

Leafleting, notification letters and emails

A3.3.4.5 Information about the consultation was distributed to households and businesses in a 2km area around Locations A, C and C Variant. Analysis of postcode sectors identified over 246,000 residential properties and over 10,000 businesses within this area.

A3.3.4.6 Highways England sent two mailouts to these residential properties and businesses:

- Notification letter: sent in the week the consultation launched.
- Leaflet showing a calendar of the consultation events: sent in the second week of consultation, in advance of the events.



FIGURE A3.3.2 – EXAMPLE OF POSTER ADVERTISING

A3.3.4.7 Highways England also sent personalised letters to landowners or occupiers of properties potentially directly affected by the LTC proposals. The letter informed them of the consultation and that their property could be affected or needed for the construction of the road. It also gave information on how to find further information and invited them to come to a public information event to speak to one of our land and property specialists. The letter also gave information on how to respond to the consultation. An example notification letter is shown in **Figure A3.3.3** and the consultation leaflet is shown in **Figure A3.3.4**.

A3.3.4.8 Emails were sent to over 900,000 Dart Charge account holders, as well as approximately 11,500 subscribers who had signed up for updates on the proposals via the gov.uk website. Two email notifications were sent, one at the beginning of the consultation and another within two weeks of the end of the consultation.



JANUARY 2016

Dear Resident

Lower Thames Crossing Route Consultation 2016 – Have Your Say
Consultation closes on Thursday 24 March 2016

We are consulting on proposals for a Lower Thames Crossing, a new road crossing of the River Thames connecting Kent and Essex.

Our proposal is for a new road which would connect the A2/M2 in Kent with a tunnel crossing east of Gravesend and Tilbury, in the 2013 consultation known as Option C, before joining the M25 between junctions 29 and 30. There are three route options north of the river in Essex and two south of the river in Kent.

Find out more and have your say

This is your opportunity to let us know your views before we make our recommendations to the Department for Transport later this year.

Visit our website www.lower-thames-crossing.co.uk where you can view and download maps and other information about our proposals, and provide your views by completing our **online questionnaire**.

Join us at one of our events where members of our team will be on hand to answer your questions.

View the proposals at a location in your area where copies of consultation materials, maps and questionnaires are available.

Alternatively, call us on 0300 123 5000.

Your views are important to us. Please get involved and provide your response by **24 March 2016**. We look forward to receiving your response.

Yours faithfully

A handwritten signature in black ink, appearing to read "M. Potts".

Martin Potts
Consultation Manager
Highways England

www.lower-thames-crossing.co.uk

0300 123 5000

@lowerthamescrossing

FIGURE A3.3.3 - EXAMPLE OF NOTIFICATION LETTER

Why the crossing is needed

For over 50 years, the Dartford Crossing has provided the only road link across the River Thames east of London. It provides a key route for local, national and international traffic.

It is one of the busiest roads in the country. It is already used 50 million times a year and traffic volumes are forecast to increase.

A new crossing is needed to reduce congestion at the existing crossing and support economic growth, including new homes and jobs in the region.

Find out more and have your say

To find out more about our proposals and to provide your views you can:

- Visit our website**
View and download our booklet and you can provide your views by completing the questionnaire online at www.lower-thames-crossing.co.uk
- View the proposals**
Copies of the consultation materials, maps and questionnaires will be available at the events and at various locations in your local area.
- Join us at one of our events**
Members of our team will be on hand to answer your questions.

www.lower-thames-crossing.co.uk
0300 123 5000*



Lower Thames Crossing Have your say

Highways England is consulting on proposals for a new road crossing of the River Thames connecting Kent and Essex. This is your opportunity to give your view on our proposals.

Consultation closes on 24 March 2016



What we are consulting on

Our proposal is for a new road which would connect the A250 in Kent with a tunnel crossing east of Gravesend and Tilbury (shown as Option C in the 2013 consultation), before joining the M25 between sections 29 and 30.

There are three route options north of the river in Essex and two south of the river in Kent (shown on the map on the front cover).

Your views will inform the Government's decision on which route should be built. This decision is expected later this year.

Location	Date	Time
Oswell Hall, Prince Charles Avenue, Oswell, Essex, RM16 34S	Wednesday 3 February	11.00am – 7.00pm
Cascade Leisure Centre, Thong Lane, Gravesend, Kent, DA12 4LG	Thursday 4 February	11.00am – 7.00pm
Riverside Community Hall, Riverside Centre, Dickens Road, Gravesend, Kent, DA12 2JY	Friday 5 February	11.00am – 7.00pm
Shorne Village Hall, 16 The Street, Shorne, Kent, DA12 3EA	Saturday 6 February	10.30am – 4.00pm
The Culver Centre, Daiglen Drive, South Ockendon, Essex, RM15 5FR	Monday 8 February	11.00am – 7.00pm
Thurrock Council for Voluntary Services, The Beehive Resource Centre, West Street, Grays, Essex, RM17 6XP	Thursday 11 February	11.00am – 7.00pm
Gravesend Borough Council Civic Centre, Windmill Street, Gravesend, Kent, DA12 1AU	Friday 12 February	11.00am – 7.00pm
Uplimster Junior School, St Mary's Lane, Uplimster, Essex, RM14 3SS	Saturday 13 February	10.30am – 4.00pm
East Tilbury Primary School, Princess Margaret Road, East Tilbury, Essex, RM16 6SB	Monday 15 February	11.00am – 7.00pm
East and West Hamdon Village Hall, Thornton Avenue, West Hamdon, Bleanwood, CM13 3TP	Tuesday 16 February	11.00am – 7.00pm
East and West Hamdon Village Hall, Thornton Avenue, West Hamdon, Bleanwood, CM13 3TP	Wednesday 17 February	11.00am – 7.00pm
Lamdowne Primary Academy, Lamdowne Road, Tilbury, Essex, RM16 7GB	Thursday 18 February	11.00am – 7.00pm

Location	Date	Time
Blunwater Shopping Centre, Blunwater Parkway, Greenhithe, Kent, DA9 9ST	Friday 19 February	11.00am – 7.00pm
	Saturday 20 February	10.30am – 4.00pm
Hurst Community Centre, Hurst Place, Hurst Road, Beley, DA5 3LH	Monday 22 February	11.00am – 7.00pm
Eastgate Events Venue, Eastgate, 141 Springhead Parkway, Northfleet, Gravesend, DA11 6AD	Tuesday 23 February	11.00am – 7.00pm
Temple Hill Community Centre, Temple Hill Square, Dartford, DA1 9HY	Friday 26 February	11.00am – 7.00pm
Orchard Shopping Centre, High St, Dartford, Kent, DA1 1DN	Saturday 27 February	10.30am – 4.00pm
The Towngate Theatre, St Martin's Square, Basildon, Essex, SS14 1DL	Tuesday 1 March	11.00am – 7.00pm
Thurrock Council for Voluntary Services, The Beehive Resource Centre, West Street, Grays, Essex, RM17 6XP	Thursday 3 March	11.00am – 7.00pm
Lakeside Shopping Centre, West Thurrock Way, Grays, Essex, RM20 2ZP	Friday 4 March	11.00am – 7.00pm
	Saturday 5 March	10.30am – 4.00pm
Kent County Council Offices, Maidstone House, King Street, Maidstone, ME15 6JQ	Monday 7 March	11.00am – 7.00pm
The Corn Exchange, Northgate, Rochester, Medway ME1 1LS	Tuesday 8 March	11.00am – 7.00pm

FIGURE A3.3.4 - CONSULTATION LEAFLET

Wider publicity

A3.3.4.9 Highways England also sent information to a number of organisations, businesses and membership bodies including county councils, local authorities and the local Chambers of Commerce. Highways England encouraged them to raise awareness of the consultation using their existing communication channels.

Launch event

A3.3.4.10 Local, regional and national media were invited to an event on the day the consultation began in order to publicise the consultation widely. Highways England then held a session with representatives of the local authorities in order to brief them in more detail on the proposals.

Press activity and media coverage

A3.3.4.11 Extensive press and media engagement was undertaken during the consultation. Press releases were issued on the morning on which the consultation began, with further press releases at the halfway point, reminding people that they still had time to have their say, and on the final day. Media facilities were set up at the launch day event and at a number of events throughout consultation, where members of the team were available for press interviews.

A3.3.4.12 Highways England representatives gave 18 radio and TV interviews and participated in one live recorded debate arranged by BBC Kent. The consultation generated a high amount of press coverage, with almost 400 news items in print and broadcast media over the eight week consultation period, particularly in the regional media.

Social media

A3.3.4.13 Twitter was the main social media channel used by Highways England during the consultation, using the handle @lowerthames, along with existing Highways England twitter handles. Highways England tweeted daily to ensure ongoing awareness of consultation and the events, directing people to specific areas of the website - such as the events calendar, the materials and the questionnaire - and to let people know about approaching deadlines such as the end of the public information events and the end of consultation. Each event was tweeted in advance and on the day with directions, sometimes including photos of the venue.

A3.3.4.14 Highways England responded to tweets only to correct factual inaccuracies or to signpost further information or an event. Highways England did not engage in debate or opinion via social media. Over 3,500 tweets mentioned the LTC in some way during the consultation.

Highways England Customer Contact Centre

A3.3.4.15 The Highways England Customer Contact Centre operates 24 hours a day, seven days a week. Their phone number was published on all promotional materials, and both the phone number and email address were published on consultation materials (such as the booklet) and on our website. The Contact Centre team were briefed to provide information

about the consultation events, where local copies of the consultation materials could be found and to respond to requests for hard copies of consultation materials to be sent directly. The Contact Centre received over 1,300 telephone and email queries about the LTC during the consultation period.

Website

- A3.3.4.16 An LTC website at the address www.lower-thames-crossing.co.uk was created. The site included a searchable events calendar along with the schedule and locations of all our public information events. Videos and links to the consultation documents and the questionnaire were prominently displayed.
- A3.3.4.17 Almost 300,000 visits to the website were recorded over the eight week consultation period.

Consultation materials

- A3.3.4.18 Highways England provided a range of written information, the most popular being an easily readable brochure-style document that gave the reader background information to the proposals, a summary of the appraisal process that had taken place so far and an overview of the proposals. The brochure, along with the printed questionnaire, was the most requested document during the consultation.
- A3.3.4.19 Highways England made the detailed background technical reports available for people to review. Our objective was to make sure that everyone could access information on the proposals easily, whatever their level of knowledge or experience of a major infrastructure project.
- A3.3.4.20 Highways England's Pre-Consultation Scheme Assessment Report was available as part of the suite of consultation documents. This provided the technical assessment on the engineering, safety, operational, traffic, economic, social and environmental appraisal of the shortlisted routes for the LTC. The Report was published in a series of volumes grouped by topic and made available online and in print at libraries and at our public events. **Figure A3.3.5** shows the consultation materials.



FIGURE A3.3.5 - CONSULTATION MATERIALS

A3.3.4.21 A brief description of the consultation materials and their availability is listed in **Table A3.3.2**.

A3.3.4.22 There were many ways of accessing the consultation materials. Hardcopies were made available at local libraries in the areas potentially affected by the proposed scheme and at the 24 public information events held across the region. Most of the documents were available to take away from the events and local libraries but some of the larger more detailed technical documents were for reference only. All documents were made available to download from the LTC website.

A3.3.4.23 Local libraries reported significant interest in the consultation documents. Stock checks were conducted at regular intervals and stocks were replenished as required.

A3.3.4.24 Hardcopies were also provided to people on request. A substantial number of requests resulted in a large volume of documents being sent via post to individuals and organisations. During the consultation period a request for Braille and Large Print format documents was fulfilled.

A3.3.4.25 A copy of the Lower Thames Crossing consultation questionnaire is included in Annex A3.3.1. The consultation questionnaire also included the opportunity to comment on other routes that people might favour, thus providing an opportunity to state a preference for options at Location A or elsewhere. Comments on options at Location A could be based on the information included in the consultation materials. This included information in the Pre-Consultation Scheme Assessment Report on the appraisal carried out, to the same level of detail as that for the Location C options, and the reasons for not presenting these options in the public consultation.

TABLE A3.3.2 - CONSULTATION MATERIALS AND AVAILABILITY

Title	Description	Available online	Available at Public Information Events
Lower Thames Crossing Route Consultation 2016 - booklet	A plain English summary of the need for a new crossing, scheme history, appraisal of options, including Route 1 at Location A, description of shortlisted options, identified proposed scheme and indicative future development of the scheme.	Extracts of copy images presented on Citizen Space landing page. Citizen Space: full PDF version available to download from 26 January 2016 onwards.	Copies available for distribution from 3 February 2016 (Orsett Hall public information event) onwards.
Lower Thames Crossing Summary Business Case	A plain English summary of the “Five Case” business case for the LTC scheme: <ul style="list-style-type: none"> • Strategic Case • Economic Case • Commercial Case • Financial Case • Management Case 	Citizen Space: full PDF version available to download from 26 January 2016 onwards.	Copies available for distribution from 3 February 2016 onwards.
Lower Thames Crossing Pre-Consultation Scheme Assessment Report (SAR) <ul style="list-style-type: none"> • Volumes 1 – 7 • Volume 2 Appendices • Volume 3 Appendices • Volume 4 Appendices • Volume 5 Appendices • Volume 6 Appendices • Volume 7 Appendices • Change Log 	A series of technical volumes reporting on the engineering, safety, operational, traffic, economic, social and environmental appraisal of the shortlist routes for the Lower Thames Crossing, including Route 1 at Location A. A limited number of formatting and editorial changes were made to some volumes and appendices during the consultation period. These changes were published in the Change Log made available online.	Citizen Space: available as a series of PDF files to download from 26 January 2016 onwards. To assist with accessibility and in response to feedback from consultees, the detailed maps contained in the Volume 3 Appendices were also made available to download as separate PDF files from 11 February 2016 onwards.	Copies available for viewing: Volumes 1 – 7 from 5 February 2016 (Riverside Centre) onwards. Appendices 2 – 7 from 8 February 2016 (Culver Centre) onwards.

Title	Description	Available online	Available at Public Information Events
<p>Lower Thames Crossing Factsheet series:</p> <ol style="list-style-type: none"> 1. Biodiversity, Cultural Heritage and Landscape 2. Water, Air, Noise and Vibration 3. Land and Property 4. Minimising Construction Impacts 5. Traffic Modelling 	<p>A series of concise plain English summaries of information contained within the Scheme Assessment Report, divided into popular topic areas.</p>	<p>Citizen Space: available as a series of PDF files to download from 4 February 2016 onwards.</p>	<p>Copies available for distribution from 05 February 2016 (Riverside Centre) onwards.</p>
<p>Highways England Property Booklet series:</p> <ol style="list-style-type: none"> 1. Your property and our road proposals 2. Your property and blight 	<p>Note: not part of LTC consultation material – Highways England policy information only.</p> <p>A series of concise plain English booklets setting out information about Highways England’s policies and statutory processes relating to the promotion of road proposals, managing effects on property, compulsory purchase and processing claims for compensation.</p>	<p>Citizen Space: available as a series of PDF files to download from 14 February 2016 onwards.</p>	<p>Copies available for distribution from 5 February 2016 (Riverside Centre) onwards.</p>

Title	Description	Available online	Available at Public Information Events
<p>“Big Map” series:</p> <ul style="list-style-type: none"> Route 2 Route 3 Route 4 	<p>A series of large poster-style drawings depicting the proposed northern route alignments on Ordnance Survey maps with:</p> <ul style="list-style-type: none"> CGI artist impressions inset at corresponding points in the alignment. Key environmental and heritage constraints shown. Both southern route options on all maps. 	<p>Citizen Space: available as a series of PDF files to download after receiving feedback from events - from 11 February 2016 onwards.</p>	<p>Copies available for viewing laid flat on tables – 3 February 2016 (Orsett Hall) onwards.</p>
<p>Schedules:</p> <ul style="list-style-type: none"> Public Information Events Deposit Locations 	<p>A schedule of dates and locations of Public Information Events held during the consultation.</p> <p>A schedule of Deposit Locations where consultation material is available.</p>	<p>Citizen Space: available as PDF files to download from 26 January 2016 onwards.</p>	<p>Copies available for distribution from 4 February 2016 (Cascade Leisure Centre) onwards.</p>
<p>Lower Thames Crossing Consultation Questionnaire</p>	<p>The questionnaire seeking public views on the proposed scheme. To be returned directly to Ipsos MORI for independent analysis.</p>	<p>Citizen Space: online questionnaire format, each submission generating a unique reference number and email confirmation (if email address provided).</p>	<p>iPads available for submission via Citizen Space.</p> <p>Hard copy version and freepost envelopes available for distribution from 3 February 2016 (Orsett Hall) onwards.</p>

Public information events

A3.3.4.26 Highways England held 24 events over a six-week period from 3 February 2016 to 8 March 2016 in Kent, Essex and the London Boroughs of Bexley and Havering. Highways England ensured that local communities, organisations and members of the public had the opportunity to speak with our experts and to access all the consultation materials in order to be able to respond fully to the consultation. The events were attended by approximately 12,785 people.

A3.3.4.27 Venues were selected primarily for their proximity to the potentially affected areas but the following factors were also taken into account:

- Accessibility (including step-free access)
- Health and safety
- Access by public transport (where this was possible)
- Capacity
- Opening times
- Availability during consultation period

A3.3.4.28 Highways England also held events in locally prominent venues where there would be significant footfall. These events were held in Bluewater, the Intu Lakeside and Dartford shopping centres, popular regional shopping and entertainment venues.

A3.3.4.29 Wherever possible, Highways England sought to hold the events between 11:00am-7:00pm during the week and from 10:30am-4:00pm on Saturdays. The attendance figures for each event are listed in **Table A3.3.3**.

TABLE A3.3.3 - ATTENDANCE FIGURES FOR PUBLIC INFORMATION EVENTS

Venue	Date and timing	Attendance
Orsett Hall Prince Charles Avenue, Orsett, Essex, RM16 3HS	Wednesday 3 February 11.00am – 7.00pm	1187
Cascade Leisure Centre Thong Lane, Gravesend, Kent, DA12 4LG	Thursday 4 February 11.00am – 7.00pm	1351
Riverside Community Hall Riverside Centre, Dickens Road, Gravesend, Kent, DA12 2JY	Friday 5 February 11.00am – 7.00pm	219
Shorne Village Hall 16 The Street, Shorne, Kent, DA12 3EA	Saturday 6 February 10.30am – 4.00pm	1013
The Culver Centre, Daiglen Drive, South Ockendon, Essex, RM15 5RR	Monday 8 February 11.00am – 7.00pm	362

Venue	Date and timing	Attendance
Thurrock Council for Voluntary Services The Beehive Resource Centre, West Street, Grays, Essex, RM17 6XP	Thursday 11 February 11.00am – 7.00pm	267
Gravesham Borough Council Civic Centre Windmill Street, Gravesend, Kent, DA12 1AU	Friday 12 February 11.00am – 7.00pm	534
	Saturday 13 February 10.30am – 4.00pm	422
Upminster Junior School, St Mary's Lane, Upminster, Essex, RM14 3BS	Monday 15 February 11.00am – 7.00pm	557
East Tilbury Primary School Princess Margaret Road, East Tilbury, Essex, RM18 8SB	Tuesday 16 February 11.00am – 7.00pm	521
East and West Horndon Village Hall Thorndon Avenue, West Horndon, Brentwood, CM13 3TP	Wednesday 17 February 11.00am – 7.00pm	287
Lansdowne Primary Academy Lansdowne Road, Tilbury, Essex, RM18 7QB	Thursday 18 February 11.00am – 7.00pm	156
Bluewater Shopping Centre Bluewater Parkway, Greenhithe, Kent, DA9 9ST	Friday 19 February 11.00am – 7.00pm	1236
	Saturday 20 February 10.30am – 4.00pm	1571
Hurst Community Centre, Hurst Place, Hurst Road Bexley, DA5 3LH	Monday 22 February 11.00am – 7.00pm	72
Eastgate Events 141 Springhead Parkway, Northfleet, Gravesend, DA11 8AD	Tuesday 23 February 11.00am – 7.00pm	122
Temple Hill Community Centre Temple Hill Square, Dartford, DA1 5HY	Friday 26 February 11.00am – 7.00pm	112
Orchard Shopping Centre High St, Dartford, Kent, DA1 1DN	Saturday 27 February 10.30am – 4.00pm	517
The Towngate Theatre St. Martin's Square, Basildon, Essex, SS14 1DL	Tuesday 1 March 11.00am – 7.00pm	154
Thurrock Council for Voluntary Services The Beehive Resource Centre, West Street, Grays, Essex, RM17 6XP	Thursday 3 March 11.00am – 7.00pm	66
Lakeside Shopping Centre, West Thurrock Way, Grays, Essex, RM20 2ZP	Friday 4 March 11.00am – 7.00pm	648

Venue	Date and timing	Attendance
	Saturday 5 March 10.30am – 4.00pm	774
Kent County Council Sessions House, County Hall, Maidstone ME14 1XQ	Monday 7 March 11.00am – 7.00pm	110
The Corn Exchange Northgate, Rochester, Medway, ME1 1LS	Tuesday 8 March 11.00am – 7.00pm	527
	Total	12785

Staffing

A3.3.4.30 Technical experts were available at every event. Members of the Highways England Land and Property team along with representatives from the project's technical team, including experts in environment and ecology, engineering design and traffic modelling, were available to answer questions and explain the information.

Accessibility adapted events – British Sign Language

A3.3.4.31 In response to a request from members of the public with hearing difficulties, an additional session at the public information event held at the Towngate Theatre in Basildon on 1 March 2016 was translated into British Sign Language (BSL). Two BSL interpreters presented to seven hearing impaired attendees helping them to ask questions of members of the LTC project team.

Presentations made to other forums

A3.3.4.32 During the consultation, LTC project team members were available to meet with local stakeholder organisations, regional forums and political representatives. During the consultation, members of the team attended public meetings organised by Shorne Parish Council, Thurrock Council, the Gravesham Neighbourhood Forum and Higham Parish Council. The list of meetings attended is contained in **Table A3.3.4**.

TABLE A3.3.4 – PRESENTATIONS MADE TO OTHER FORUMS

Category	Organisation/ Title
Local authorities	Leader of Gravesham Borough Council Leader of London Borough of Havering Kent County Council Thurrock Council, Scrutiny Committee Southend-on-Sea Borough Council Castle Point Council
Statutory (and other) environmental bodies	Natural England Historic England Environment Agency Royal Society for the Protection of Birds
Members of Parliament (MPs)	Stephen Metcalfe, MP for South Basildon & East Thurrock Adam Holloway, MP for Gravesham Angela Watkinson, MP for Hornchurch and Upminster Jackie Doyle-Price, MP for Thurrock (at a public information event)
Other forums and debates	Essex Chamber of Commerce Kent Invicta Chamber of Commerce Thames Gateway Kent Partnership South East Local Enterprise Partnership Gravesham Neighbourhood Forum Bluewater Forum Tilbury Terminal Public Meeting (Thurrock Council) BBC Radio Kent debate Shorne Village Hall meeting

A3.3.5 Late responses and late transmitted responses

- A3.3.5.1 Responses were not accepted for analysis by Ipsos MORI if they were sent to Ipsos MORI after the closing date of the consultation on 24 March 2016. To qualify as 'late' it had to be clear that the response was dated after the consultation closing date.
- A3.3.5.2 Ipsos MORI received a total of 768 late responses. In addition, 1,122 forms were submitted consisting of blank response forms with a sticker on them stating; "Failure to consult", and were dated after the consultation closed. Though the anonymous sender or senders of the forms took issue with the print questionnaire, it was one of many channels people could use to respond to consultation.
- A3.3.5.3 Though the late responses were not included in the independent Ipsos MORI analysis report, they were considered as part of Highways England's analysis. They did not raise any new issues beyond those already identified in the consultation responses submitted before the deadline.

- A3.3.5.4 Late transmitted responses are responses from either the public or organisations and groups that were completed within the consultation period but were not delivered to the official postal address. At the launch of consultation, Highways England informed people that Highways England could not accept responsibility for responses that are sent to any address other than the official postal address.
- A3.3.5.5 An internal cut-off date of 29 April 2016, 36 days after the close of the consultation, was allocated for the receipt of responses redirected from other addresses. 14 responses were completed on time but were sent to other addresses during the consultation period and were not delivered to Ipsos MORI in time to meet the internal cut-off date for inclusion in the main report. The 14 late responses were considered by Ipsos MORI and the findings are provided in the Ipsos MORI Summary Report – Addendum.

A3.3.6 Comments on the consultation

- A3.3.6.1 Highways England also gave people the opportunity to provide comments on the consultation process itself, including the events that were held, the information provided and the way the consultation was advertised.

General comments

- A3.3.6.2 A total of 2,070 respondents gave positive comments about the consultation process. 242 respondents felt the consultation was good, helpful or useful; and 219 felt it was well thought out, thorough or comprehensive.
- A3.3.6.3 A total of 4,948 respondents gave negative views about the consultation, the most frequently cited reason being perceived bias, the results being a ‘done deal’ or already decided (1,369 responses). 1,479 respondents gave negative comments about the publicity, with 1,144 commenting that there was a lack of advance notice, publicity or advertising about the consultation. A lack of options being presented at consultation was a reason cited by 767 respondents. Some also mentioned that the eight week consultation period was too short and that the consultation relied too much on the use of the internet.
- A3.3.6.4 Respondents who disagreed with the proposed scheme were more likely to provide negative feedback on the consultation than those who agreed with the proposed scheme.

Consultation materials

- A3.3.6.5 Some people felt the consultation material was inaccurate and that information was presented in a confusing and manipulative manner, with some suggesting that the information was not easily accessible and that requests for hardcopies were processed too slowly.

Public information events

- A3.3.6.6 Feedback on the public information events from respondents was mixed. 128 comments were positive about the public information events, 54 saying they attended a good event or that it was well organised. Negative

responses totalled 896 and the most frequently cited comment was a lack of local events (456), particularly in places such as Higham and Chalk.

Staff

- A3.3.6.7 For comments relating to staff, 184 responses made positive comments, the majority (119) said consultation staff were knowledgeable and/ or demonstrated their expertise. Negative comments about staff were given in 536 responses, of those 429 felt staff lacked knowledge or expertise.

Route 1 at Location A

- A3.3.6.8 During the consultation some people said that they were confused as to whether Route 1 at Location A was a part of the consultation. They said that Route 1 was reintroduced after the start but no like-for-like assessment was provided and therefore the consultation was flawed.

A3.3.7 Summary

- A3.3.7.1 The overriding aim of the consultation was to engage with all those affected by the issues with the existing crossing and all those potentially affected by the proposals, to inform them of the proposals and give them an opportunity to have their say and contribute to the route selection process.
- A3.3.7.2 Highways England received 47,034 responses to the consultation, the largest number of consultation responses ever received for a UK road project.
- A3.3.7.3 The responses to the consultation fed into the route selection appraisal process and were an important component in making the recommendation to the Secretary of State on the choice of route.
- A3.3.7.4 Highways England will take into account the feedback on the consultation when planning future events and the statutory pre-application consultation.

Annex A3.3.1: Consultation questionnaire



Lower Thames Crossing Consultation questionnaire

Highways England is consulting on proposals for a Lower Thames Crossing – a new road crossing of the River Thames connecting Kent and Essex.

A new crossing is needed to reduce congestion at the existing Dartford crossing and to provide free-flowing north-south capacity. Unlocking economic growth and supporting the development of new homes and jobs in the region is also a priority.

Following a series of studies and a public consultation in 2013, the Government commissioned Highways England to carry out a more detailed assessment of two location options. These are shown on the map, at the site of the current crossing, known as Location A, or a new crossing further east, known as Location C.

We have completed our assessment and are seeking your views on our proposals. Route options are shown on the map to the right.



Have your say

Please get involved and tell us your views before consultation closes on **24 March 2016**. We will review the responses and report our final recommendation to the Department for Transport. The Government is expected to decide on the location, route and type of crossing later this year.

Further information and how to respond

We recommend that you read our booklet *Lower Thames Crossing, Route Consultation 2016* before completing this questionnaire. We are also holding a series of events where our team will be available to answer your questions.

You can complete this questionnaire online at www.lower-thames-crossing.co.uk. You can also complete this questionnaire online at our events.

Please tick the box(es) as appropriate and write your responses clearly in black ink within the appropriate sections. If your response is too large to fit into the boxes, please attach additional evidence. If you do so, please make it clear which questions you are answering and number any additional pages you send. Send your completed questionnaire free of charge to our address below:

Lower Thames Crossing Consultation, Freepost RTTH-GRYG-SCXZ, PO Box 1188, Harrow, HA1 9NU

We cannot accept responsibility for responses that are sent to any address other than the one stated above. Thank you for your participation.



About you

The following questions will help us to understand the range of people and organisations who have responded to this consultation and to identify local issues. The information you provide will not be used for any purpose other than assessing responses to this consultation and for other reasons explained in this questionnaire.

1. Name (optional)

2. Postcode

3. Email address or postal address

This is optional but providing your email or postal address will allow us to update you with any news on this consultation.

4. Are you responding on your own behalf or on behalf of an organisation or group?

- Providing my own response
- Providing a response on behalf of an organisation or group

Crossing location

5. Our proposal is a crossing at Location C, east of Gravesend and Tilbury.

For more information see pages 16 – 17 of our booklet

On balance, do you agree or disagree with our proposal for the location of a crossing, at Location C?

- Strongly agree
- Tend to agree
- Neither agree nor disagree
- Tend to disagree
- Strongly disagree
- Don't know





Please provide the reasons for your response to question 5.

Routes north of the river

6. There are three route options north of the river in Essex – Routes 2, 3 and 4.

For more information see pages 19 – 22 of our booklet

Where do you think the route should be located north of the river?

- Route 2
- Route 3
- Route 4
- Another route
- None of these
- Don't know

Please provide the reasons for your response to question 6.

7. Thinking about the three route options north of the river, on balance do you agree or disagree with our proposal for each of these?

	Strongly agree	Tend to agree	Neither agree nor disagree	Tend to disagree	Strongly disagree	Don't know
Route 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Route 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Route 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





Routes south of the river

8. There are two route options south of the river in Kent – the Western Southern Link and the Eastern Southern Link.

For more information see pages 20 – 22 of our booklet

Where do you think the route should be located south of the river?

- Western Southern Link
- Eastern Southern Link
- Another route
- None of these
- Don't know

Please provide the reasons for your response to question 8.

9. Thinking about the two route options south of the river, on balance do you agree or disagree with our proposal for each of these?

	Strongly agree	Tend to agree	Neither agree nor disagree	Tend to disagree	Strongly disagree	Don't know
Western Southern Link	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eastern Southern Link	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





The proposed scheme

10. Having evaluated the options, our proposed scheme is a new bored tunnel road crossing at Location C, following Route 3 north of the river and the Eastern Southern Link south of the river.
For more information see page 24 of our booklet

On balance, do you agree or disagree with our proposed scheme?

- Strongly agree
- Tend to agree
- Neither agree nor disagree
- Disagree
- Strongly Disagree
- Don't know

Please provide the reasons for your response to question 10.

Additional junctions

11. We are proposing to create junctions with existing roads including the M2/A2, A226, A13 and M25.
We would like to hear your views on whether you believe additional junctions would be beneficial.

We would welcome any comments you may have on our proposals for junctions.





Any other comments

We would welcome any other comments you may have on our proposals. (Please continue on a separate sheet if necessary).

Feedback on this consultation

13. How did you hear about this consultation? (Please select all that apply)

- | | |
|---|--|
| <input type="checkbox"/> Received a letter or a leaflet from Highways England | <input type="checkbox"/> TV or radio |
| <input type="checkbox"/> Received an email | <input type="checkbox"/> Social media (e.g. Facebook or Twitter) |
| <input type="checkbox"/> Received an email as a Dart Charge account holder | <input type="checkbox"/> Other online/website source(s) |
| <input type="checkbox"/> Posters or other outdoor advertising | <input type="checkbox"/> Word-of-mouth |
| <input type="checkbox"/> Newspapers or magazines | <input type="checkbox"/> Local authority |
| | <input type="checkbox"/> Other source (please specify) |

14. Do you have any feedback on this consultation – events, information provided, advertising, etc.?





More about you

15. If you represent an organisation please complete all questions in this section. If you are a member of the public please answer question 17 only.

Position in the organisation

Name of the group or organisation

Please use the space below to provide further detail about your role or organisation

16. What category of organisation or group are you representing?

- | | |
|--|---|
| <input type="checkbox"/> Academic | <input type="checkbox"/> Local Government |
| <input type="checkbox"/> Action group | <input type="checkbox"/> Transport, infrastructure or utility organisation |
| <input type="checkbox"/> Business | <input type="checkbox"/> Statutory agency |
| <input type="checkbox"/> Elected representative | <input type="checkbox"/> Other category of organisation or group (please specify) |
| <input type="checkbox"/> Environment, heritage, amenity or community group | <input type="checkbox"/> Prefer not to say |

17. How often, if at all, do you use the Dartford Crossing, either by driving or being driven?

- | | | |
|--|--|--|
| <input type="checkbox"/> Daily | <input type="checkbox"/> Several times a week | <input type="checkbox"/> About once a week |
| <input type="checkbox"/> About once a fortnight | <input type="checkbox"/> About once a month | <input type="checkbox"/> About once every three months |
| <input type="checkbox"/> About once every six months | <input type="checkbox"/> About once a year or less | <input type="checkbox"/> Never |



Equality and Diversity

To help ensure that we are meeting our obligations under the Equality Act 2010 we would be grateful if you could fill in the following diversity survey. Completing the survey is voluntary and is not a requirement for your response to be accepted. The survey will not be linked to the information you have provided in your response and we will not share the information with anyone else. We will use the survey results to provide a summary of the types of people and organisations who responded to this consultation. It will not identify individuals.

18. What is your gender?

Male Female Prefer not to say

19. Do you consider yourself as a person with a disability?

Yes No Prefer not to say

20. Please describe your ethnic background

Asian/Asian British White Black/Black British
 Chinese Mixed Ethnic background Gypsy or Irish Traveller
 Other ethnic group Prefer not to say

21. Age Under 25 25-45 46-60 61+ Prefer not to say

If you need help accessing this or any other Highways England information, please call 0300 123 5000

Website www.lower-thames-crossing.co.uk

An Equality Impact Assessment has been completed for this consultation in compliance with the Equality Act 2010.

Highways England will process your personal data in accordance with the Data Protection Act 1988 (DPA) and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties.

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This document is also available on our website at www.gov.uk/highways

If you have any enquiries about this publication email info@highwaysengland.co.uk or call **0300 123 5000**. Please quote the Highways England publications code **PR115/15**

Highways England Creative job number S150543

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These rules apply to calls from any type of line including mobile, BT, other fixed line or payphone. Calls may be recorded or monitored.

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 Highways England Company Limited registered in England and Wales number 09346363

Appendix 3.4 - Further appraisal of Location A options undertaken post-consultation

A3.4.1 Introduction

A3.4.1.1 Following public consultation further appraisal of three of the Location A route options that had not been selected for the shortlist was undertaken. This work was carried out due to the interest shown in these options during the consultation.

A3.4.1.2 The three route options appraised were:

- Option A2, a bridge to the east of the existing crossing which included changing the existing tunnels so that they only connected to A282 Junctions 1a and 31 and therefore only catered for local traffic whilst the existing QEII Bridge and new bridge catered for longer distance traffic.
- Option A8, a long tunnel connecting M25 Junction 2 to M25 Junction 30.
- Option A14, a longer tunnel from south of Junction 2 to north of Junction 30.

A3.4.1.3 The results of the appraisal of these options, including their performance against the scheme objectives as set out in **Table A3.4.1** below, are summarised in the following sections.

TABLE A3.4.1 - SCHEME OBJECTIVES

Scheme Objectives	
Transport	Tr1 To relieve the congested Dartford Crossing and approach roads and improve their performance by providing free flowing north-south capacity.
	Tr2 To improve resilience of the Thames crossings and major road network.
	Tr3 To improve safety.
Economic	Ec1 To support sustainable local development and regional economic growth in the medium to long term.
	Ec2 To be affordable to Government and users.
	Ec3 To achieve value for money.
Environment and Community	En1 To minimise adverse impacts on health and the environment.

A3.4.2 Route Option A2 (Option for separating local traffic)

A3.4.2.1 In combination with a new crossing at Location A, separating local traffic from regional and national traffic was considered by using the existing tunnels exclusively for local traffic. This could be achieved by not allowing traffic to join or leave the M25/ A282 at Junctions 1a and 31, as shown in **Figure A.3.4.1**. For safety reasons each tunnel would need to be one-way, one northbound one southbound.

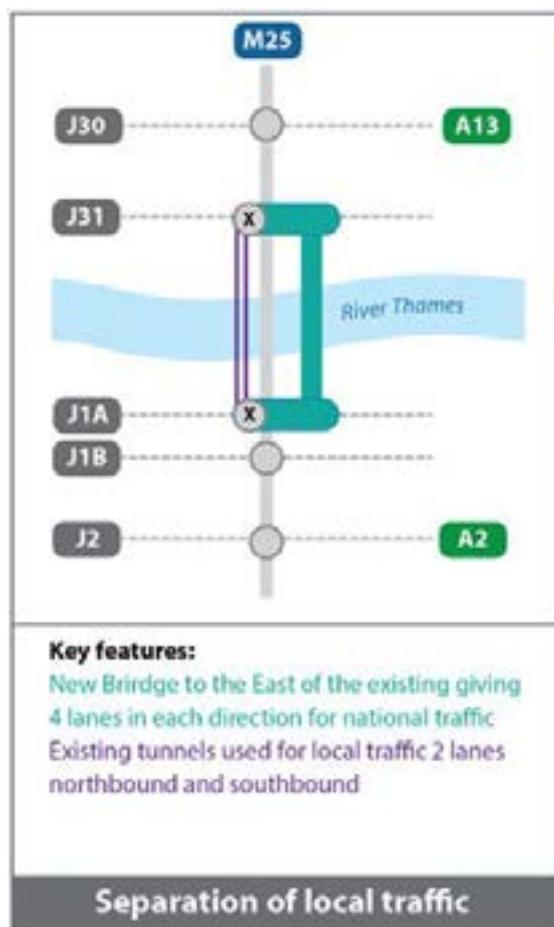


FIGURE A.3.4.1 – OPTION A2 SCHEMATIC

A3.4.2.2 By closing Junctions 1a and 31, local traffic wanting to travel to regional and national destinations would have to make longer journeys along local roads which are already congested to access the network at Junction 30 or Junction 1b or Junction 2. These regional/ national journeys account for nearly a third of all journeys, as highlighted by the orange shaded areas in **Figure A.3.4.2**.

A3.4.2.3 In this option the existing tunnels would serve 6% of journeys, highlighted in green in **Figure A.3.4.2**, whereas currently they serve half of all journeys made through the crossing. The tunnels would therefore be under-used compared to today.

Peak traffic flows

(%age of total flow)

	Local North (Jn 31)	Essex Regional (A13/Jn 30)	M25 The North (Beyond Jn29)
Local South (Jn 1a and Jn 1b)	6%	8%	6%
Kent Regional (A2/ M2 and M20)	11%	16%	16%
M25 The South (Beyond Jn 3)	6%	18%	12%

FIGURE A.3.4.2 – OPTION A2 ORIGIN/ DESTINATION MATRIX

A3.4.2.4 In order to accommodate these altered journeys, the network of roads that serve the local communities would need significant changes and investment. These changes are estimated to increase the volume of traffic using the A2 and A13 junctions with the M25 by around 60%. Each of these existing junctions is complex:

- The A2 connecting to the M25/ A282 is a dual 4 lane trunk road and is the busiest A road section in the UK. To increase the capacity to the required level would require extensive and expensive remodeling, with significant impacts on property to the west and north of the existing junction.
- The A13 connection to the M25 at Junction 30 is entirely elevated. Increasing the capacity by 60% would also be expensive.

A3.4.2.5 Overall, separating local traffic and routing it through the existing tunnels would be a poor allocation of capacity to demand; the benefits of such a scheme and the value for money offered are poor. There are also concerns about the deliverability of a scheme to meet air quality standards in this corridor.

Summary

A3.4.2.6 In summary Option A2 performed poorly against scheme objectives Tr1, Tr2, Ec1 and Ec3 (refer to **Table A3.4.1**) because:

- Local tunnels would only cater for 6% of traffic, but currently support 50% of journeys, and would be under used
- There would be additional traffic and congestion on radial routes and the local road network. requiring significant further investment
- A separate crossing would not be provided requiring traffic to use the existing A282/ M25 corridor.
- Costs would be disproportionate to benefits
- Significant impact on commercial property north and south of the river east of existing crossing.

A3.4.3 Route Option A8 (Regional Bypass Tunnel)

A3.4.3.1 The regional by-pass tunnel option (Route Option A8) is illustrated in **Figure A.3.4.4** below and provides an alternative to the existing M25/ A282 corridor. In order to collect and disperse regional traffic, the tunnels would connect to regional and local roads at Junctions 2 and 30 of the M25. Through these connections, the by-pass tunnels would serve approximately 60% of journeys, highlighted in green in **Figure A.3.4.3**. These connections would serve road users connecting from the A2 and A13.

Peak traffic flows

(%age of total flow)

	Local North (Jn 31)	Essex Regional (A13/Jn 30)	M25 The North (Beyond Jn29)
Local South (Jn 1a and Jn 1b)	6%	8%	6%
Kent Regional (A2/ M2 and M20)	11%	16%	16%
M25 The South (Beyond Jn 3)	6%	18%	12%

FIGURE A.3.4.3 – OPTION A8 ORIGIN/ DESTINATION MATRIX - 1

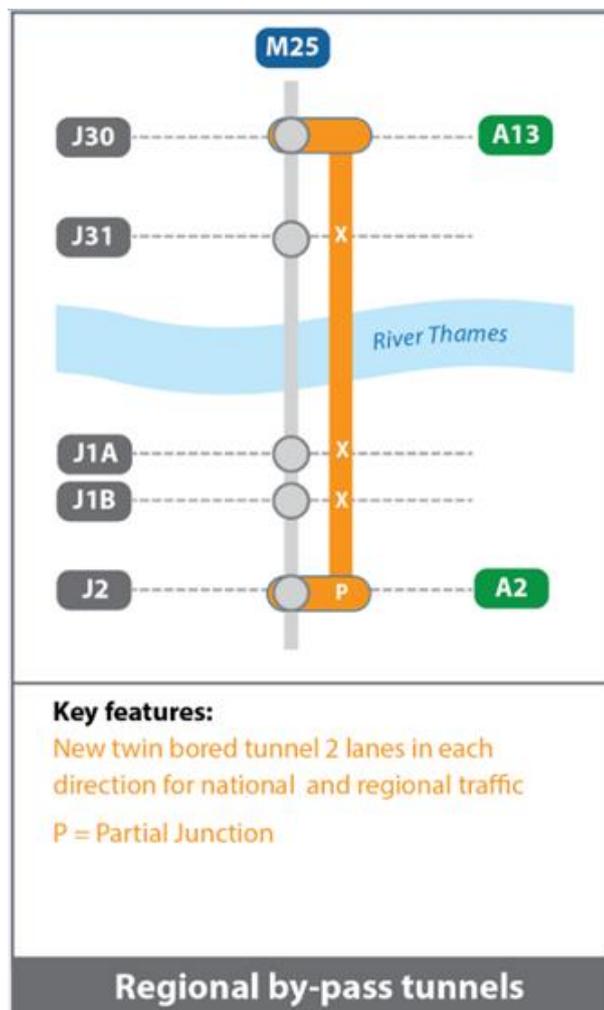


FIGURE A.3.4.4 – OPTION A8 SCHEMATIC

A3.4.3.2 The tunnels would be approximately 5 miles long and would provide two lanes in each direction, and would be capable of carrying all vehicle types, i.e. there would no restrictions as is the case with the existing tunnels at Dartford. Junctions 2 and 30 would both require extensive, expensive and disruptive remodeling (elevated at the A13 and partly elevated at the A2). Additionally, because of physical restrictions (residential areas nearby and road alignments and gradients), provision cannot be made to enable traffic to flow to and from the A2 westbound to the new tunnel; this is one of the most important connections for Kent traffic travelling west on the A2 wanting to use the new tunnels to head north. The road users affected by this are highlighted in orange in **Figure A.3.4.5**.

Peak traffic flows

(%age of total flow)

	Local North (Jn 31)	Essex Regional (A13/Jn 30)	M25 The North (Beyond Jn29)
Local South (Jn 1a and Jn 1b)	6%	8%	6%
Kent Regional (A2/ M2 and M20)	11%	16%	16%
M25 The South (Beyond Jn 3)	6%	18%	12%

FIGURE A.3.4.5 – OPTION A8 ORIGIN/ DESTINATION MATRIX - 2

A3.4.3.3 There would be some air quality benefits at the existing crossing and the approaches as traffic was diverted from the surface corridor. However, the subsequent growth of traffic at Dartford would negate some of this benefit.

A3.4.3.4 Overall, the benefits of such a scheme are poor in relation to costs (with a Benefit to Cost Ratio (BCR) excluding wider impact benefits of approximately 0.8). The costs of such a scheme are high because of the long bored tunnels and the extensive junction modifications. The scheme was not pursued because the economic benefits were low relative to the costs, as well as the complexities of the junctions at both the A2 and A13.

Summary

A3.4.3.5 In summary Option A8 would offer limited value for money, as investment is high due to junction complexity and practical constraints limit connectivity to A2. This also constrains the benefits. This option would therefore perform poorly against scheme objectives Tr1, Ec2 and Ec3 (refer to **Table A3.4.1**).

A3.4.4 Route Option A14 (Long tunnels to by-pass the Dartford Crossing)

A3.4.4.1 Long tunnels to by-pass the existing crossing and regional connecting roads were considered. The tunnels would connect the M25 south of Junction 2 with the M25 north of Junction 30, as shown in **Figure A.3.4.6**. They would service national/ long distance traffic and accommodate approximately 12% of journeys, highlighted in green in **Figure A.3.4.7**.

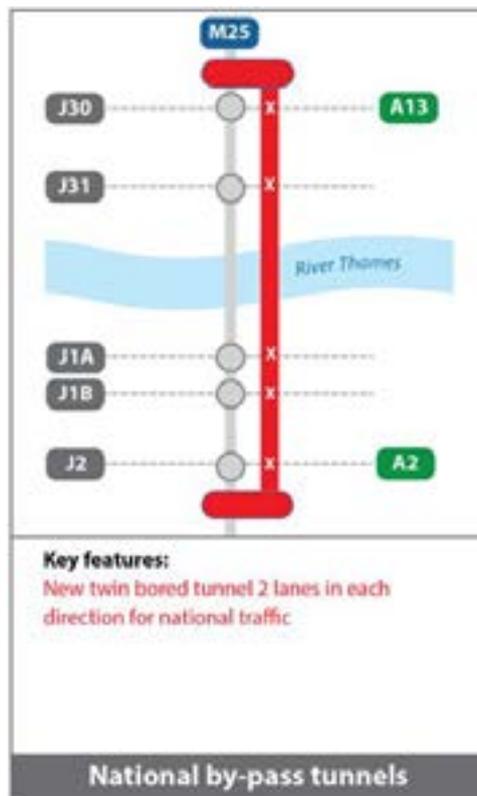


FIGURE A.3.4.6 – OPTION A14 SCHEMATIC

Peak traffic flows

(%age of total flow)

	Local North (Jn 31)	Essex Regional (A13/Jn 30)	M25 The North (Beyond Jn29)
Local South (Jn 1a and Jn 1b)	6%	8%	6%
Kent Regional (A2/ M2 and M20)	11%	16%	16%
M25 The South (Beyond Jn 3)	6%	18%	12%

FIGURE A.3.4.7 – OPTION A14 ORIGIN/ DESTINATION MATRIX

A3.4.4.2 The tunnels would be approximately 6 miles long and provide two lanes in each direction, and would be capable of carrying all vehicle types. Because there would only be on and off slips to/ from the M25, there would be no connection to the A2 and A13 and consequently the transport benefits would be limited. There would be some air quality benefits at the existing crossing and the approaches because traffic would be diverted from the existing surface corridor. However, the subsequent growth of traffic at Dartford would negate some of these benefits.

A3.4.4.3 Overall the benefits of such a scheme are poor in relation to costs (with a BCR excluding wider impact benefits of about 0.4). The costs of such a scheme are high because of the long bored tunnels. The scheme was not pursued because the economic benefits were low relative to the costs.

Summary

A3.4.4.4 In summary Option A14 would perform poorly against scheme objectives Tr1, Ec1, Ec2 and Ec3 (refer to **Table A3.4.1**) because:

- The long tunnels would only cater for 12% of traffic.
- Long tunnels are costly and a significant investment for limited benefit.

Appendix 3.5

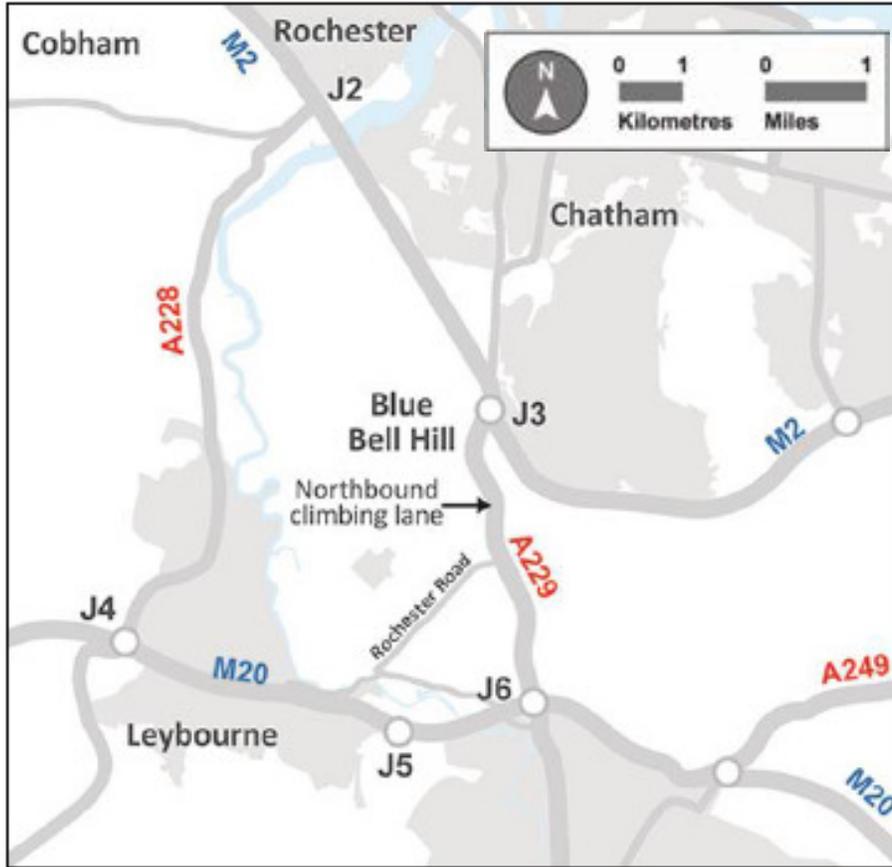
Congestion Reference Flow Analysis

TABLE A.3.5.1: CONGESTION REFERENCE FLOW COMPARED TO 2 WAY ANNUAL AVERAGE DAILY TRAFFIC, 2025 AND 2041 CORE SCENARIO ROUTE 3 WITH WSL AND ROUTE 3 WITH ESL

		2025		2041	
Carriageway link		CRF	2way AADT	CRF	2way AADT
Route 3 with WSL	A229: M20 J6 - Rochester Rd.	89,976	75,954	92,231	78,581
	A229: Rochester Rd. - M2 J3	84,768	75,817	86,388	78,866
	M2 J3 - J2	172,727	131,685	176,988	137,194
	M2 J2 - J1	178,118	124,492	185,289	131,165
	M2 J1 - LTC	168,807	151,763	174,493	158,388
	LTC: A2 - A226	93,567	74,551	98,191	85,140
	LTC: A226 - A13 (S)	84,530	83,742	84,567	96,184
	LTC: A13 (S) - A13 (N)	103,711	53,582	102,937	61,444
	LTC: A13 (N) - M25	90,592	62,257	94,223	67,702
	LTC - M25 J29	214,310	201,125	219,591	213,861
	M25 J29 - J28	211,222	197,067	208,870	208,542
	M25 J28 - J27	199,689	191,507	202,041	203,156
	M25 J27 - J26	222,595	185,430	223,615	197,059

		2025		2041	
Carriageway link		CRF	2way AADT	CRF	2way AADT
Route 3 with ESL	A229: M20 J6 - Rochester Rd.	91,877	78,351	92,851	80,669
	A229: Rochester Rd. - M2 J3	86,731	78,510	88,523	81,246
	M2 J3 - J2	169,572	138,542	173,104	144,633
	M2 J2 - LTC	176,501	135,411	181,213	143,229
	LTC: M2 - A226	90,593	74,980	91,828	81,556
	LTC: A226 - A13 (S)	83,969	82,825	85,823	94,271
	LTC: A13 (S) - A13 (N)	102,333	54,916	103,365	62,024
	LTC: A13 (N) - M25	91,578	63,340	94,994	68,604
	LTC - M25 J29	215,404	201,841	220,211	214,441
	M25 J29 - J28	209,833	197,701	209,168	209,049
	M25 J28 - J27	199,544	192,242	199,859	203,714
	M25 J27 - J26	222,902	185,860	223,918	197,347

* The A229 includes a climbing lane northbound between Rochester Road and J3 of the M2 (See Figure 1 below) and therefore the CRF calculation has been split into two sections.

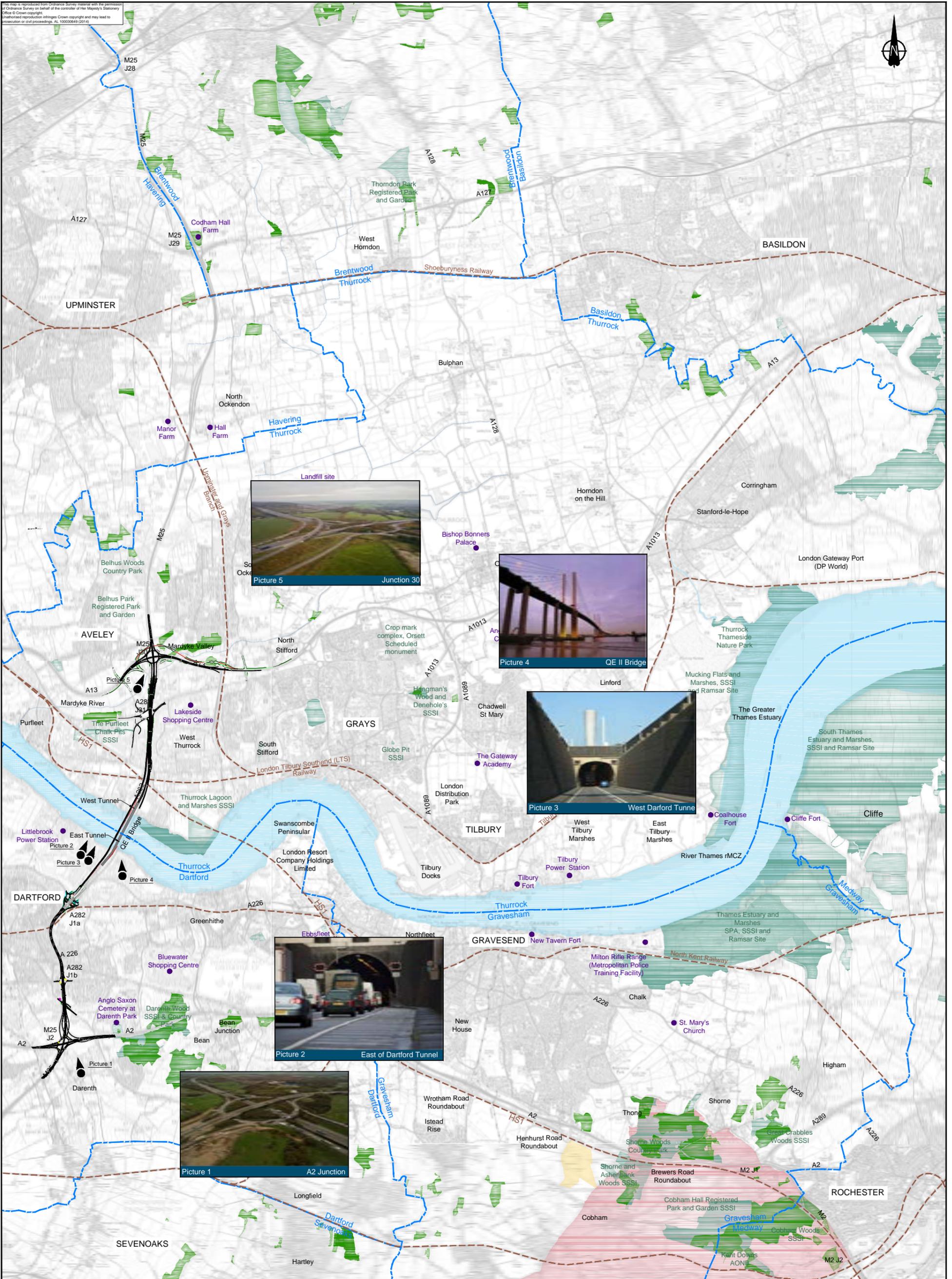


FigureA3.5.1 – A229 BETWEEN M20 JUNCTION 6 AND M2 JUNCTION 3

Appendix 3.6 - Route 1 Plan and Profile Drawings

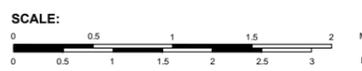
Route 1 Consultation Plan
Route 1 Bridge General Layout Plan
Route 1 General Plan Sheet 1 of 5
Route 1 Bridge Plan and Profile Sheet 2 of 5
Route 1 Bridge Plan and Profile Sheet 3 of 5
Route 1 Bridge Plan and Profile Sheet 4 of 5
Route 1 Bridge Plan and Profile Sheet 5 of 5
Route 1 Junction 30 and 31 General Plan Layout

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Lower Thames Crossing Route Consultation 2016 Route 1

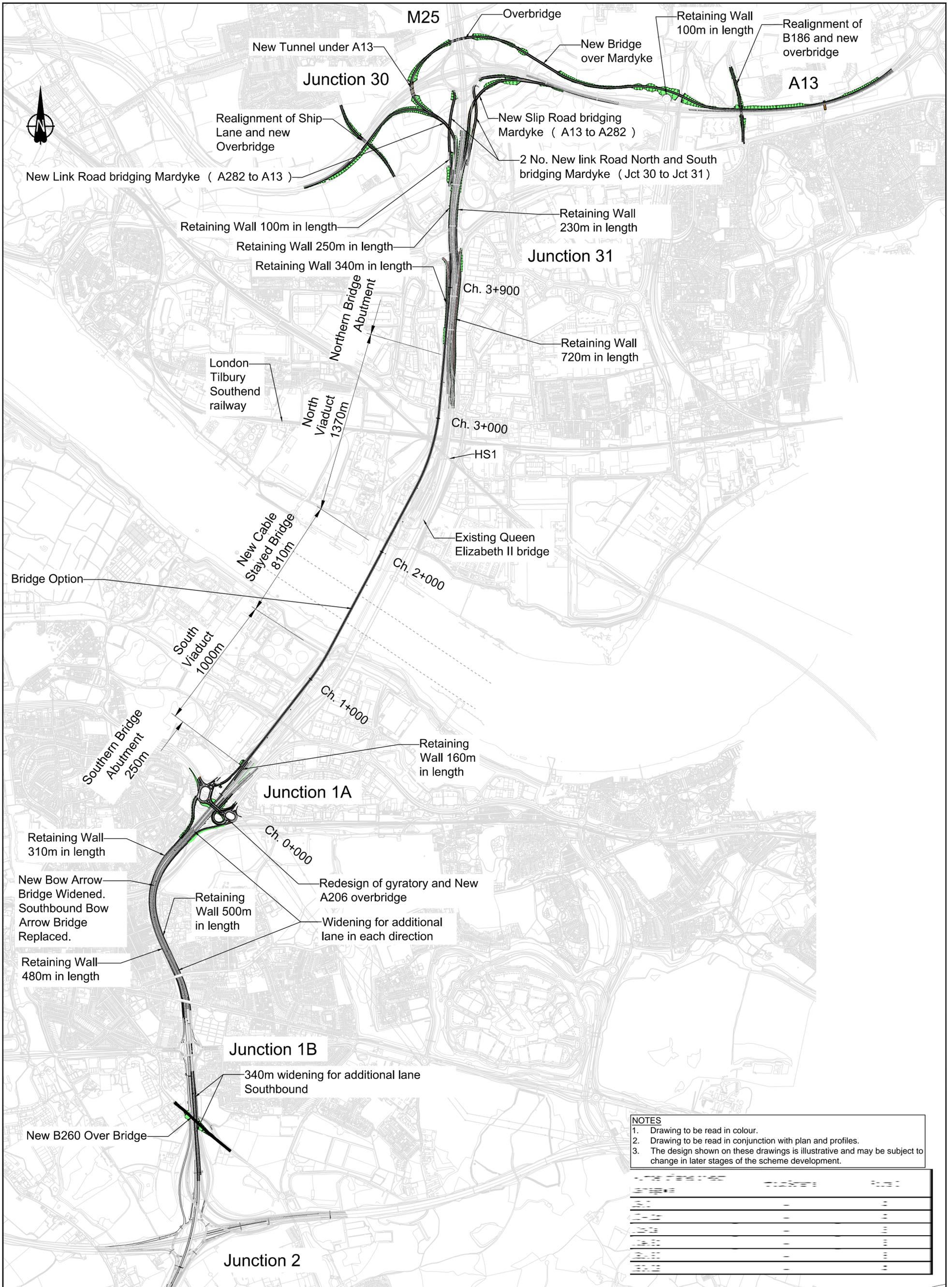
- LEGEND:**
- AONB (Area of Outstanding Natural Beauty)
 - Ancient Woodland



**ILLUSTRATIVE
DESIGN**

The design is illustrative and may be subject to change in later stages of the scheme development.





NOTES
 1. Drawing to be read in colour.
 2. Drawing to be read in conjunction with plan and profiles.
 3. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

P02	S5	12-08-16	Post Consultation SAR Issue	BDC	MR	GH
P01	S5	15-01-16	SAR Issue	PMN	LG	KC
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Apprv'd

**ILLUSTRATIVE
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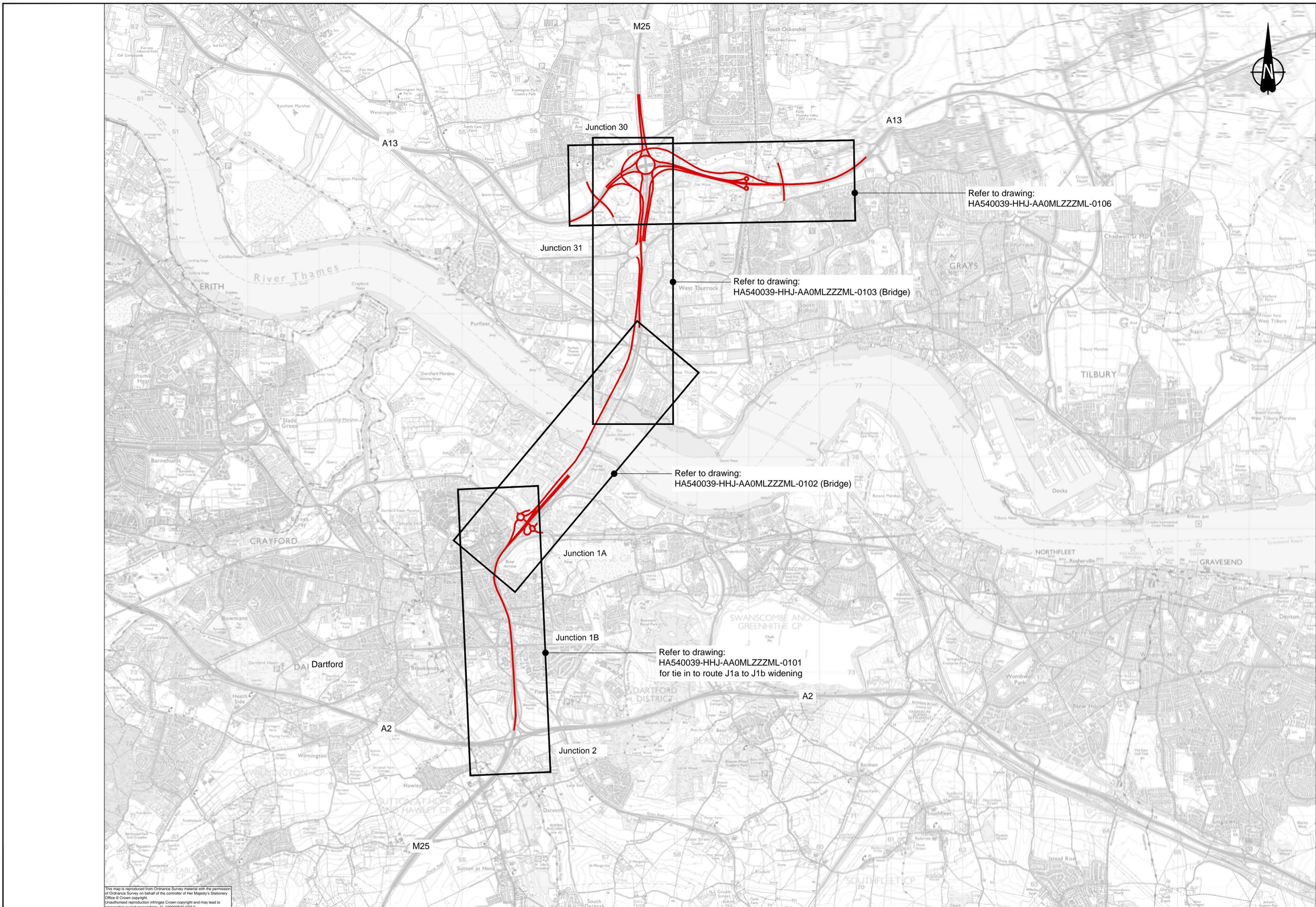
Project

**LOWER THAMES
CROSSING**

Drawing title

**Location A
Route 1 (Bridge)
General Layout Plan**

Status	S5	Revision	P01	
Scale	NTS	Date -	15-01-16	
Drawn By	P. McNulty			
Checked By	L. Gocool			
Approved By	K. Chapman			
Project No.	HA PIN HA540039	Originator	HHJ	
Drawing number	HML-AA0MLZZZML-DR-RD-0092		Original Size	A1



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LEGEND
— Route 1 (Bridge)

ILLUSTRATIVE
DESIGN

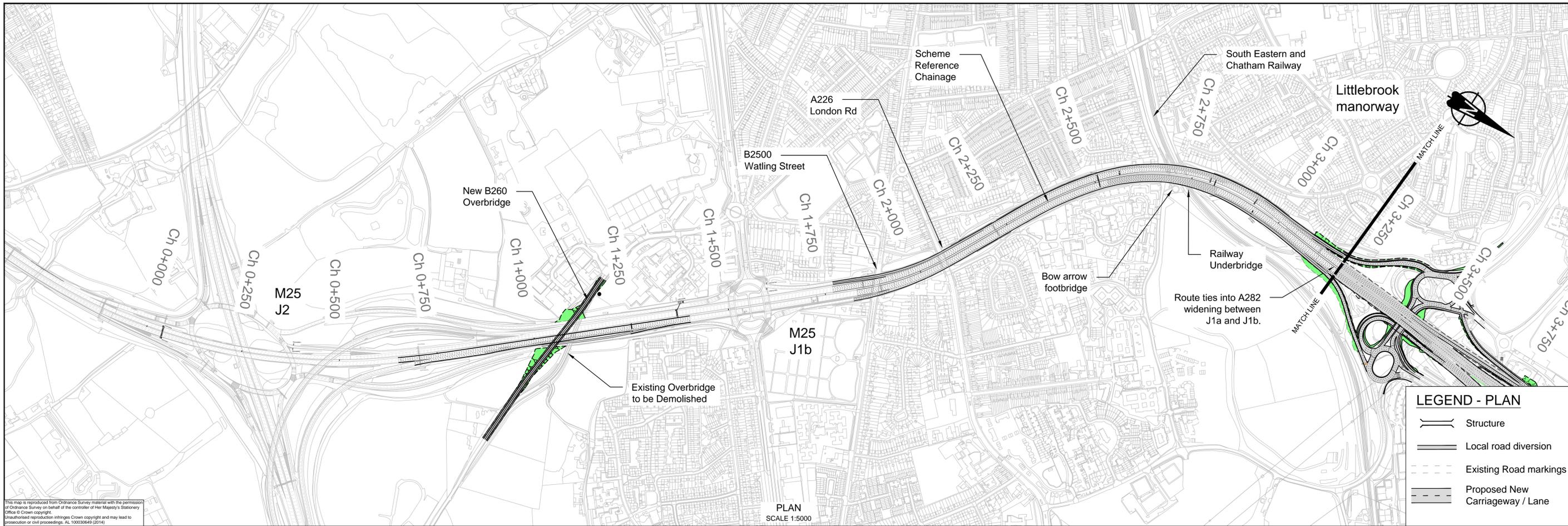
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P01	S5	15-01-16	SAR Issue	PMN	LG	KC
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Client **highways england**

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Project	LOWER THAMES CROSSING
Drawing title	Route 1 General Plan Sheet 1 of 5

Status	S5	Revision	P01
Scale	AS SHOWN	Date	28-05-15
Drawn By	P McNulty	Checked By	L. Gocool
Approved By	K. Chapman	Project No.	HA PIN HA540039
Originator	HHJ	Original Size	A1
Drawing number	HML-AZZMLZZZML-DR-RD-0100		



LEGEND - PLAN

	Structure
	Local road diversion
	Existing Road markings
	Proposed New Carriageway / Lane

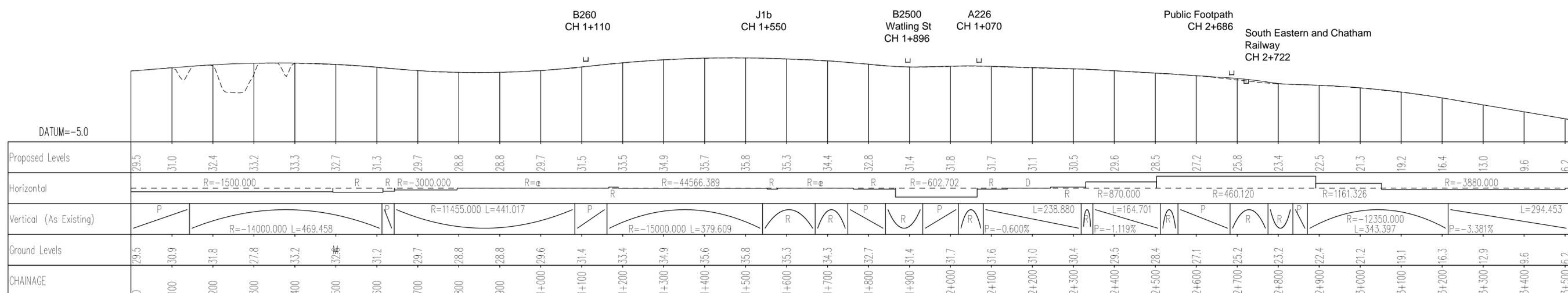
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PLAN
SCALE 1:5000

PROFILE MA00
H:V SCALE 1:5000 - 1:500

LEGEND - PROFILE

	LTC Vertical Alignment
	Existing ground profile
	Structure location

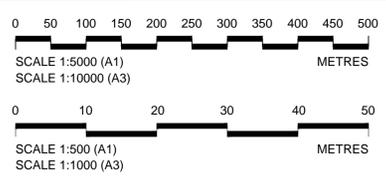


ROUTE 1 BRIDGE PROFILE

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P01	SS	15-01-16	SAR Issue	PMN	LG	KC

Client
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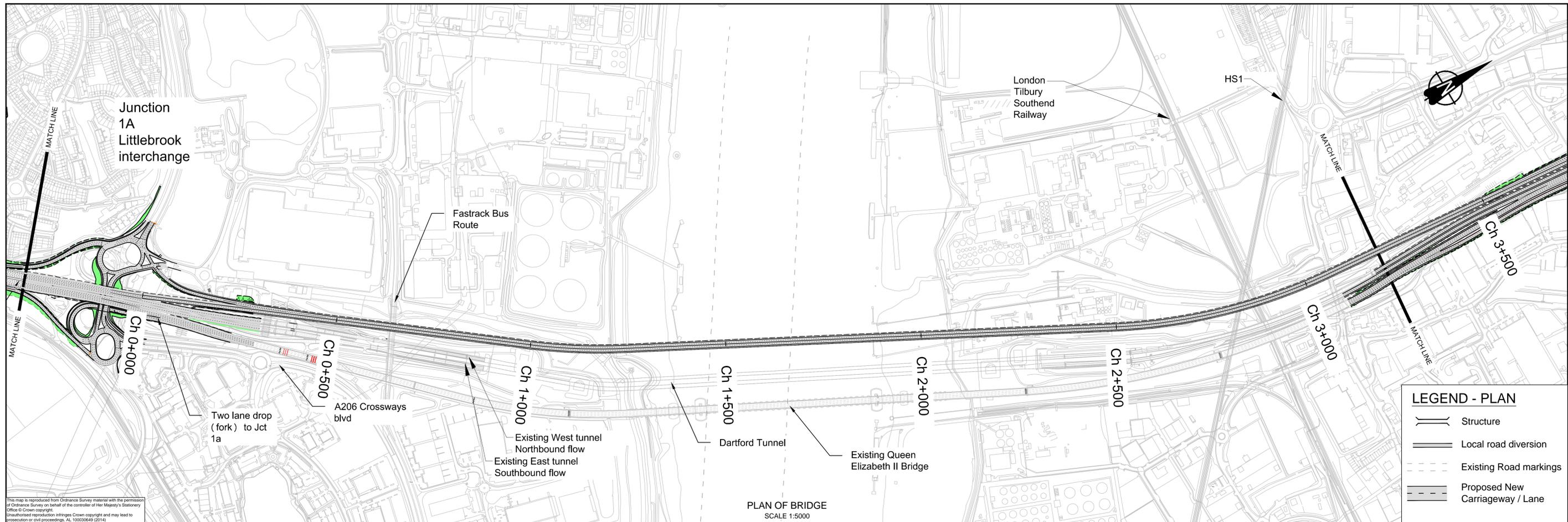
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Halcrow Hyder

Project
LOWER THAMES CROSSING

Drawing title
Route 1 Bridge Plan & Profile Sheet 2 of 5

Status	S5	Revision	P01
Scale	As Shown	Date -	14-10-15
Drawn By	P. McNulty		
Checked By	L. Gocool		
Approved By	K. Chapman		
Project No.	HA PIN HA540039	I Originator	HHJ
Original Size			A1
Drawing number	HML-AZZMLZZML-DR-RD-0101		

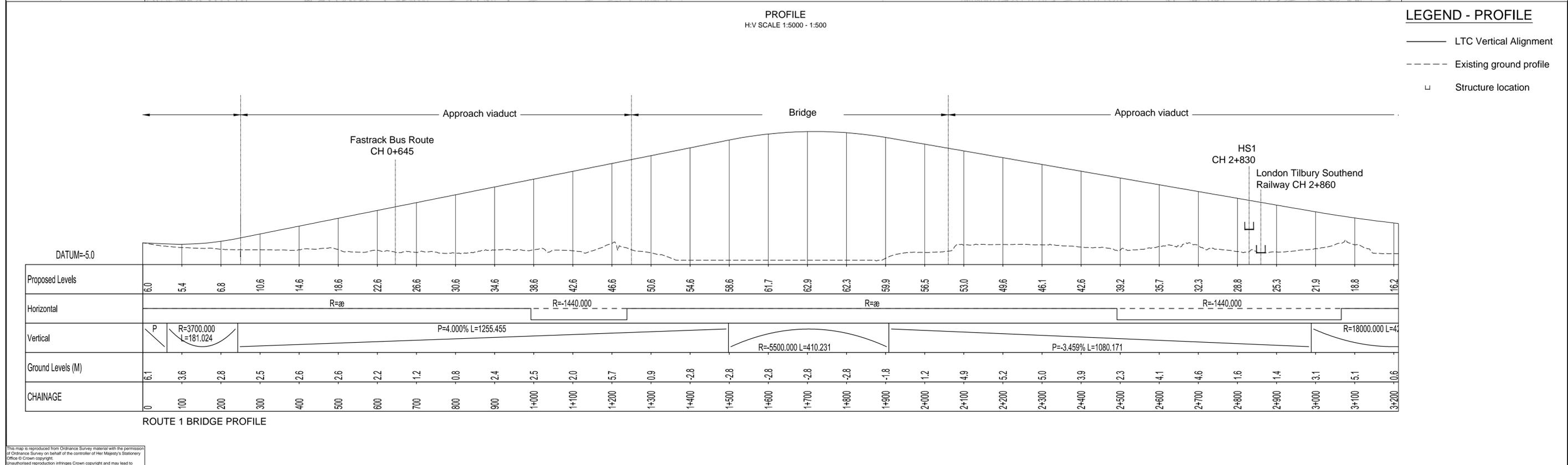


LEGEND - PLAN

- Structure
- Local road diversion
- Existing Road markings
- Proposed New Carriageway / Lane

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PLAN OF BRIDGE
SCALE 1:5000



LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

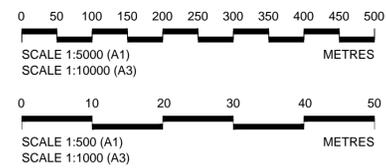
PROFILE
H:V SCALE 1:5000 - 1:500

ROUTE 1 BRIDGE PROFILE

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Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd

Client **highways england**

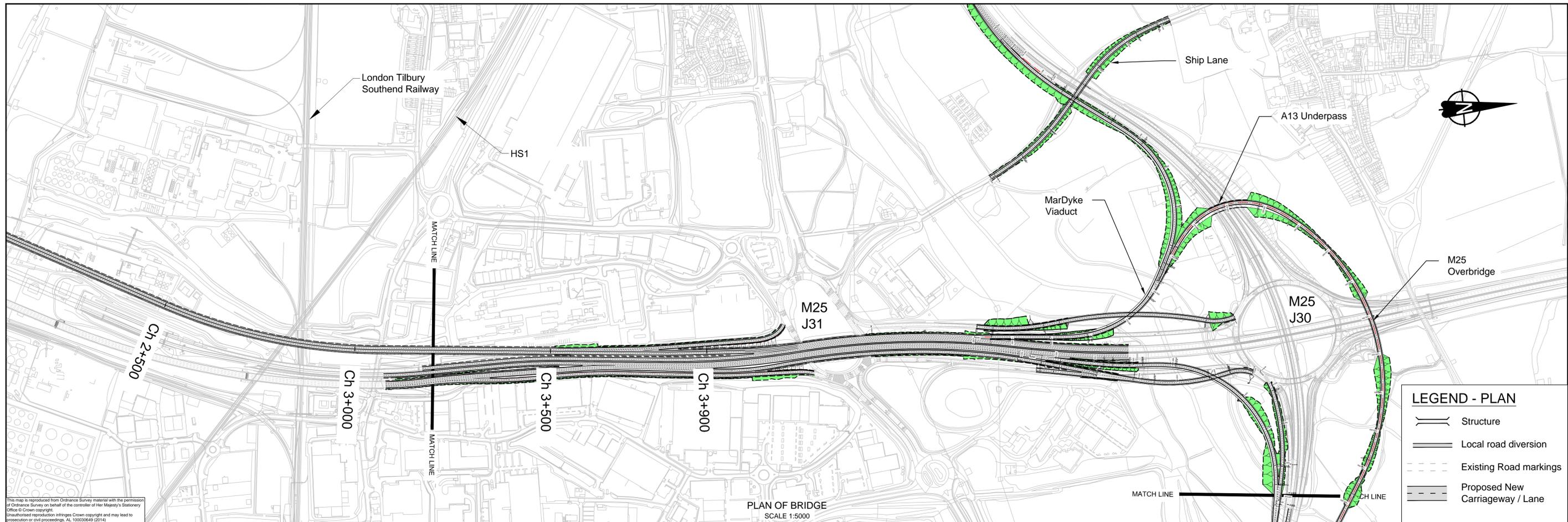
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Project **LOWER THAMES CROSSING**

Drawing title **Route 1 Bridge Plan & Profile Sheet 3 of 5**

Status	S5	Revision	P01
Scale	As Shown	Date	14-10-15
Drawn By	P. McNulty		
Checked By	L. Gocool		
Approved By	K. Chapman		
Project No.	HA PIN HA540039	Originator	HHJ
Drawing number	HML-AA0MLZZZML-DR-RD-0102		
		Original Size	A1



LEGEND - PLAN

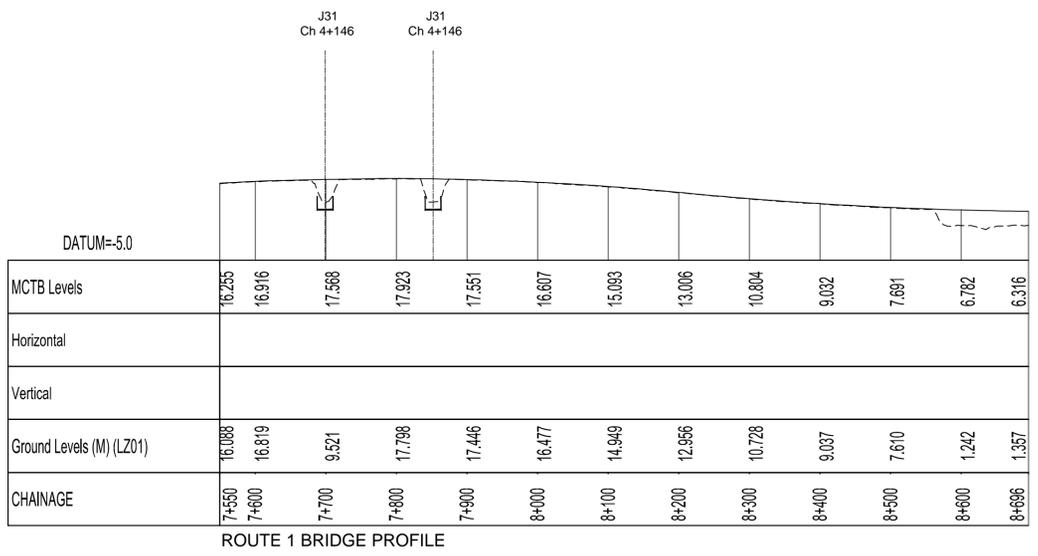
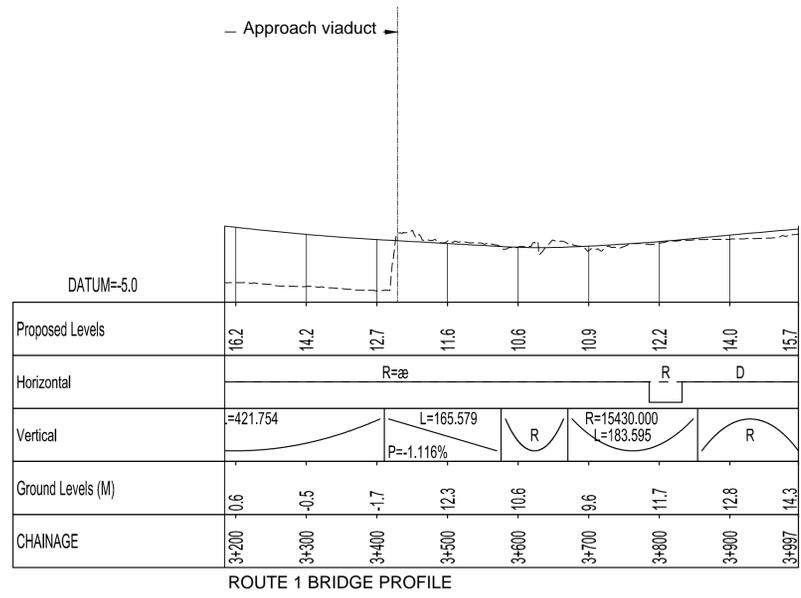
- Structure
- Local road diversion
- Existing Road markings
- Proposed New Carriageway / Lane

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PROFILE
H:V SCALE 1:5000 - 1:500

LEGEND - PROFILE

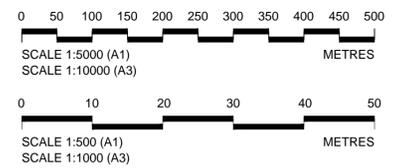
- LTC Vertical Alignment
- Existing ground profile
- Structure location



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Client **highways england**

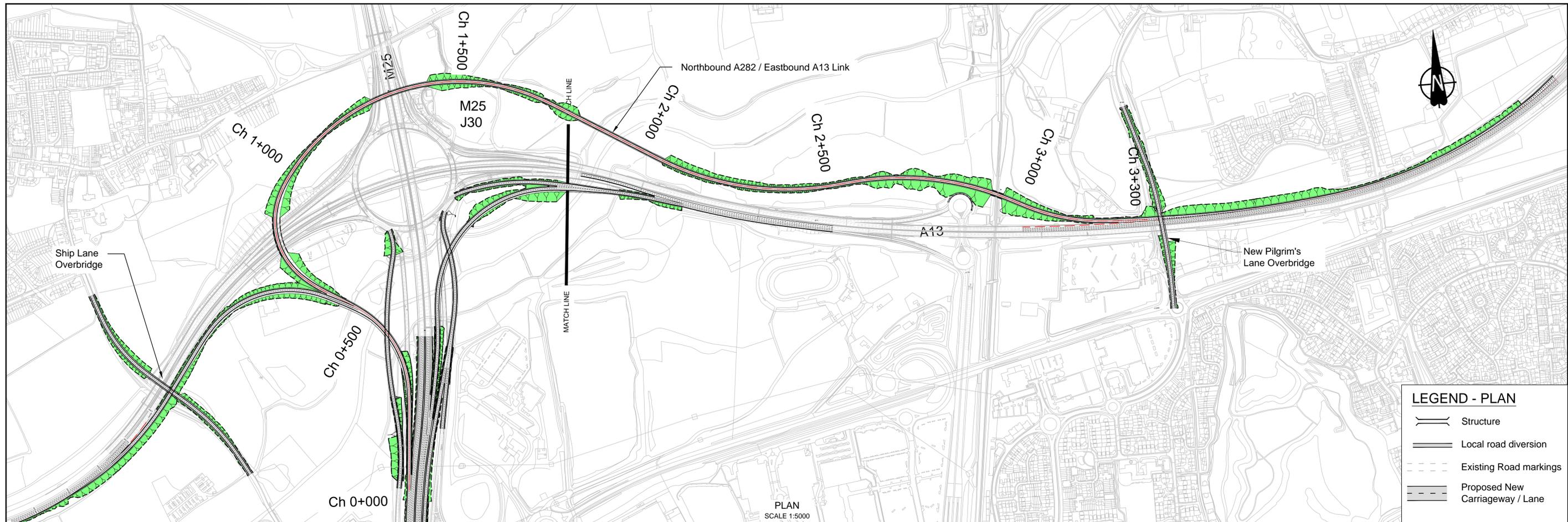
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Project **LOWER THAMES CROSSING**

Drawing title **Route 1 Bridge Plan & Profile Sheet 4 of 5**

Status	S5	Revision	P01
Scale	As Shown	Date	14-10-15
Drawn By	P. McNulty		
Checked By	L. Gocool		
Approved By	K. Chapman		
Project No.	HA PIN HA540039	Originator	HHJ
Drawing number	HML-AA0MLZZZML-DR-RD-0103		
Original Size	A1		



LEGEND - PLAN

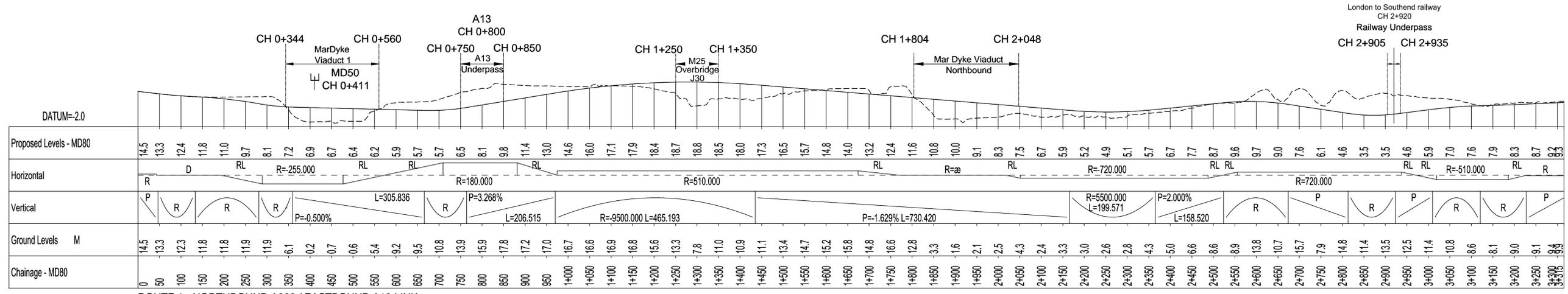
- Structure
- Local road diversion
- Existing Road markings
- Proposed New Carriageway / Lane

PLAN
SCALE 1:5000

PROFILE MD80
H:V SCALE 1:5000 - 1:500

LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

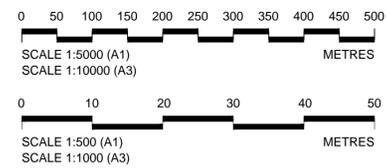


ROUTE 1 - NORTHBOUND A282 / EASTBOUND A13 LINK

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Project: **LOWER THAMES CROSSING**

Drawing title: **Route 1 Bridge Plan & Profile Sheet 5 of 5**

Status	S5	Revision	P01
Scale	As Shown	Date	14-10-15
Drawn By	P. McNulty		
Checked By	L. Goccol		
Approved By	K. Chapman		
Project No.	HA PIN HA540039	Originator	HHJ
Drawing number	HML-AZZMLZZML-DR-RD-0106		
Original Size	A1		

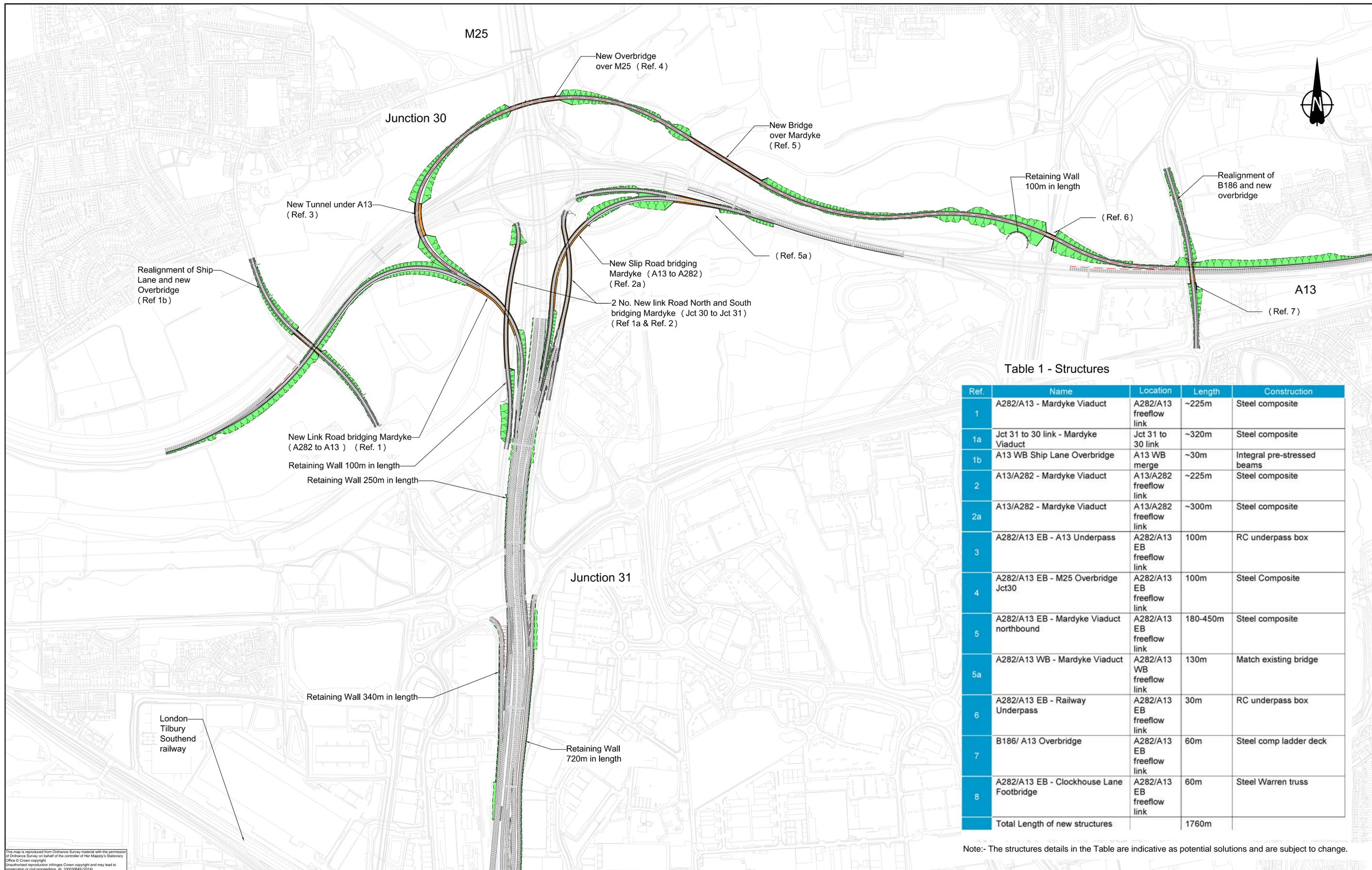


Table 1 - Structures

Ref.	Name	Location	Length	Construction
1	A282/A13 - Mardyke Viaduct	A282/A13 freeflow link	~225m	Steel composite
1a	Jct 31 to 30 link - Mardyke Viaduct	Jct 31 to 30 link	~320m	Steel composite
1b	A13 WB Ship Lane Overbridge	A13 WB merge	~30m	Integral pre-stressed beams
2	A13/A282 - Mardyke Viaduct	A13/A282 freeflow link	~225m	Steel composite
2a	A13/A282 - Mardyke Viaduct	A13/A282 freeflow link	~300m	Steel composite
3	A282/A13 EB - A13 Underpass	A282/A13 EB freeflow link	100m	RC underpass box
4	A282/A13 EB - M25 Overbridge Jct30	A282/A13 EB freeflow link	100m	Steel Composite
5	A282/A13 EB - Mardyke Viaduct northbound	A282/A13 EB freeflow link	180-450m	Steel composite
5a	A282/A13 WB - Mardyke Viaduct	A282/A13 WB freeflow link	130m	Match existing bridge
6	A282/A13 EB - Railway Underpass	A282/A13 EB freeflow link	30m	RC underpass box
7	B186/ A13 Overbridge	A282/A13 EB freeflow link	60m	Steel comp ladder deck
8	A282/A13 EB - Clockhouse Lane Footbridge	A282/A13 EB freeflow link	60m	Steel Warren truss
Total Length of new structures			1760m	

Note:- The structures details in the Table are indicative as potential solutions and are subject to change.

NOTES

1. This drawing to be viewed in colour.
2. For Key Plan refer to drawing HHJ-HML-AZZMLZZML-DR-RD-0100
3. Illustrative Design note to be agreed and added.

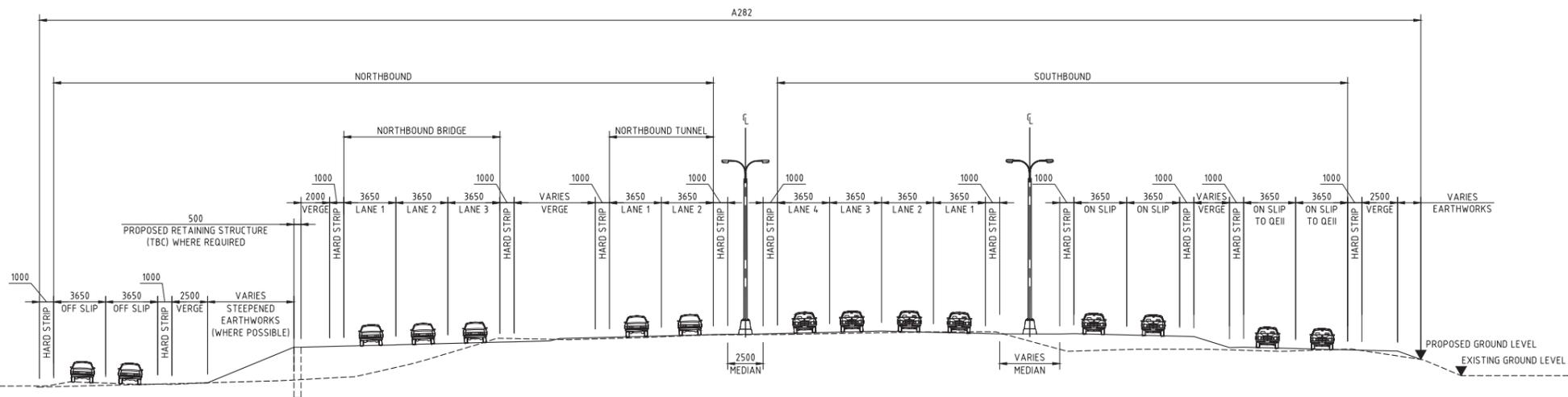
ILLUSTRATIVE
DESIGN

P01	S5	15-01-16	SAR Issue	PMN	LG	KC
Rev	Status	Rev. Date	Purpose of revision	Drawn	Checked	Approved

Client		Project	LOWER THAMES CROSSING	Status	S5	Revision	P01
		Drawing title	Location A Route 1 Junction 30 and 31 General Plan Layout	Scale	NTS	Date	15-01-16
				Drawn By	P. McNulty		
				Checked By	L. Gocool		
				Approved By	K. Chapman		
				Project No.	HA 540039	Originator	HHJ
				Original Size			A1
				Drawing number	HML-AA0JCZZML-SK-RD-0001		

Appendix 3.7 - Route 1 Typical Cross Section Drawings

Route 1 Typical Cross Sections Sheet 1 of 3
Route 1 Typical Cross Sections Sheet 2 of 3
Route 1 Typical Cross Sections Sheet 3 of 3

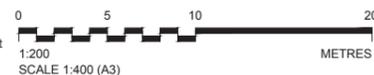


TYPICAL SECTION NORTH OF THE RIVER THAMES APPROACHING JUNCTION 31

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NOTES

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P01	S5	18/01/2015	SAR Issue	CLM	LG	KC
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Client

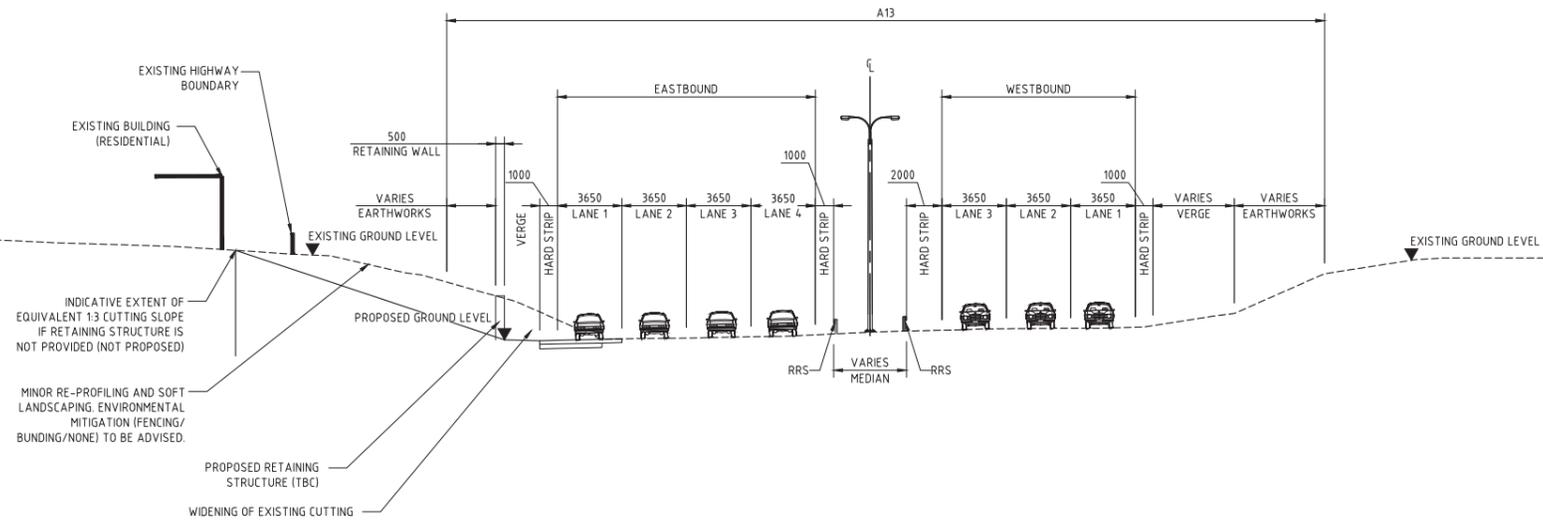
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Project LOWER THAMES CROSSING

Drawing title

Route 1
Typical Cross Sections
Sheet 2 of 3

Status	S5	Revision	P01
Scale	1:200	Date	-
Drawn By	C. Matthews		
Checked By	L. Gocool		
Approved By	K. Chapman		
Project No.	HA PIN HA540039	Originator	HHJ
Original Size	A1		
Drawing number	HML-AZZMLZZZML-SK-RD-0002		



TYPICAL SECTION A13 AND PROPOSED A13 EASTBOUND LINK

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Burderop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project LOWER THAMES CROSSING

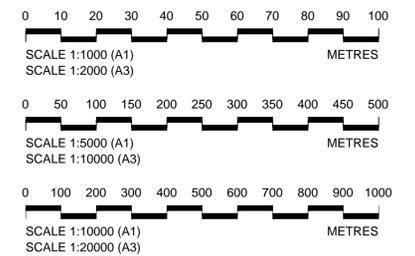
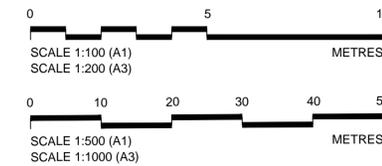
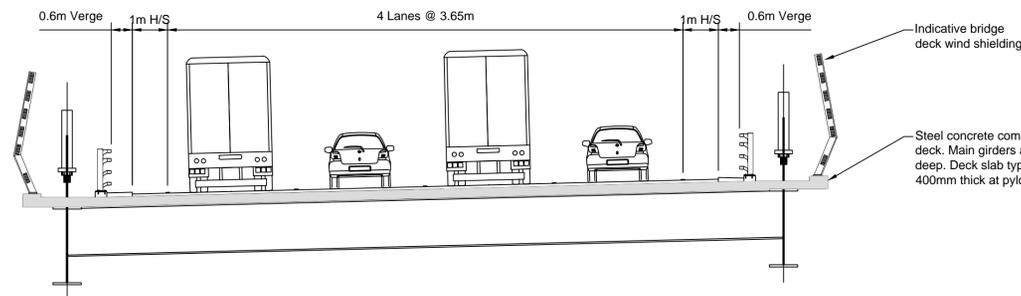
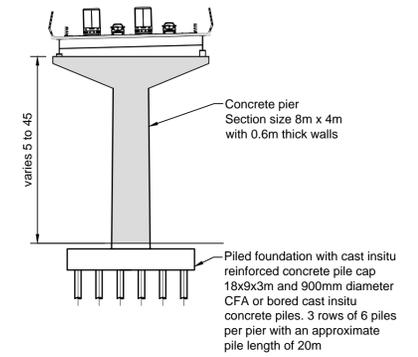
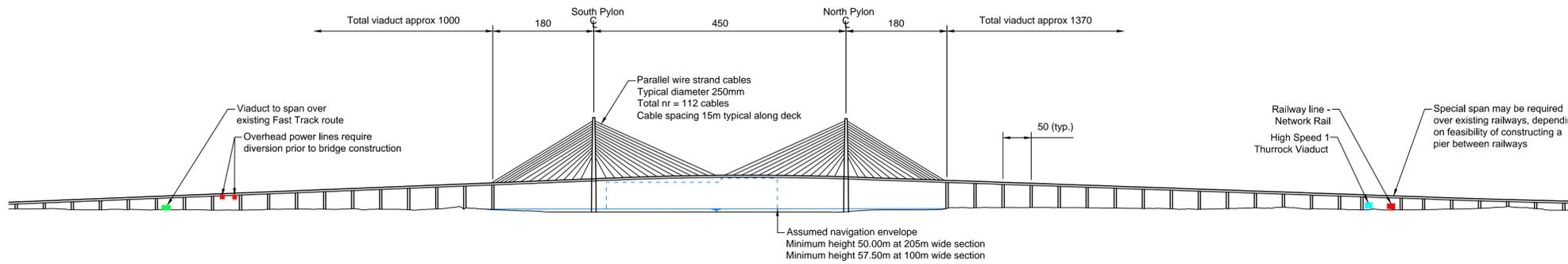
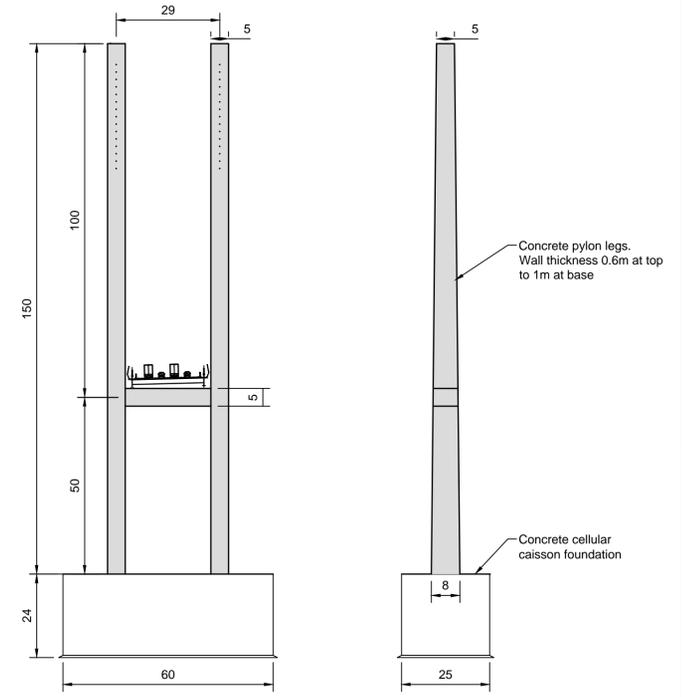
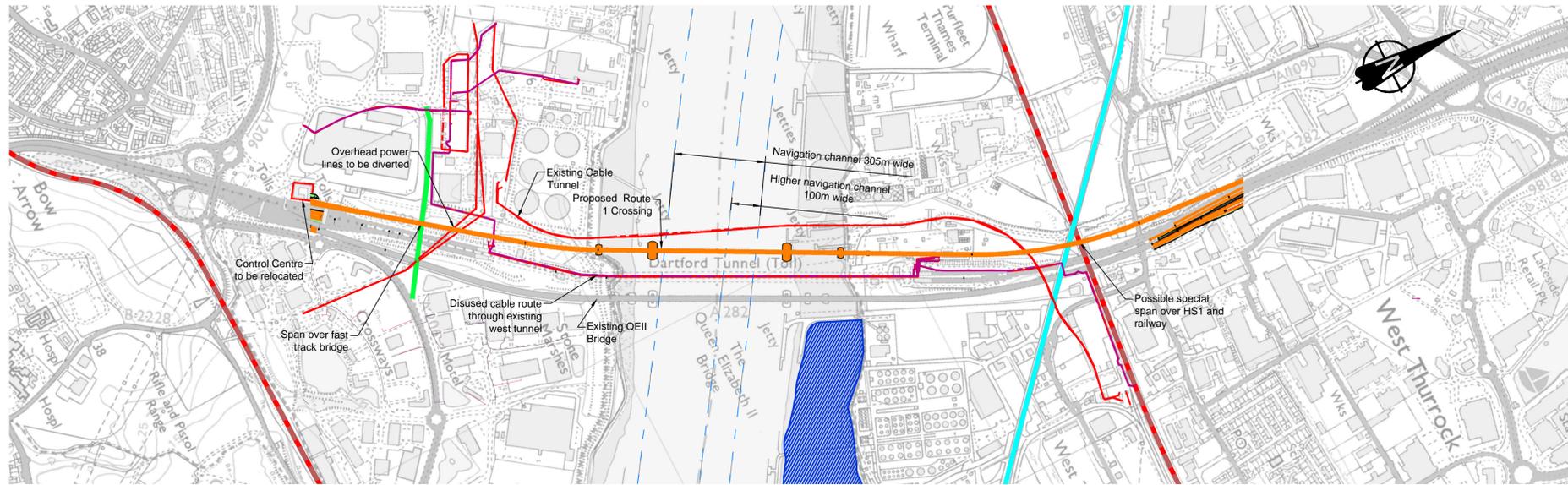
Drawing title

Route 1
Typical Cross Sections
Sheet 3 of 3

Status	S5	Revision	P01
Scale	1:200	Date	-
Drawn By	C. Matthews		
Checked By	L. Gocool		
Approved By	K. Chapman		
Project No.	HA PIN	Originator	Original Size
	HA540039	HHJ	A1
Drawing number	HML-AZZMLZZZML-SK-RD-0003		

Appendix 3.8 - Route 1 Bridge General Arrangement Drawing

Route 1 Bridge Crossing General Arrangement



NOTES

- All dimensions in metres unless shown otherwise.
- All dimensions and structural details are indicative.
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

LEGEND

- Proposed crossing structure
- Railway line - Network Rail
- Railway line - High Speed 1 (HS1)
- Existing Fast Track Route
- - - Disused cable route
- - - Overhead power lines
- - - Existing cable tunnel
- ▨ SSSI

ILLUSTRATIVE DESIGN

P01	S0	30-09-15	SAR Draft Issue	DM	NSK	SIW
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Apprv'd

Client **highways england**

Halcrow Hyder Joint Venture
Burderop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Halcrow **Hyder**

Project **LOWER THAMES CROSSING**

Drawing title **Route 1 Bridge Crossing General Arrangement**

Status	S0	Revision	P01
Scale	AS SHOWN	Date	30-09-15
Drawn By	DM	Checked By	NSK
Approved By	SIW	Project No.	HA PIN 1
Project No.	HA PIN 1	Originator	HHJ
Drawing number	HA540039-HHJ-SBR-AA0MCZZZBR-DR-ST-0010	Original Size	A1

Appendix 3.9 – Routes 3 and 4 Plan and Profile Drawings

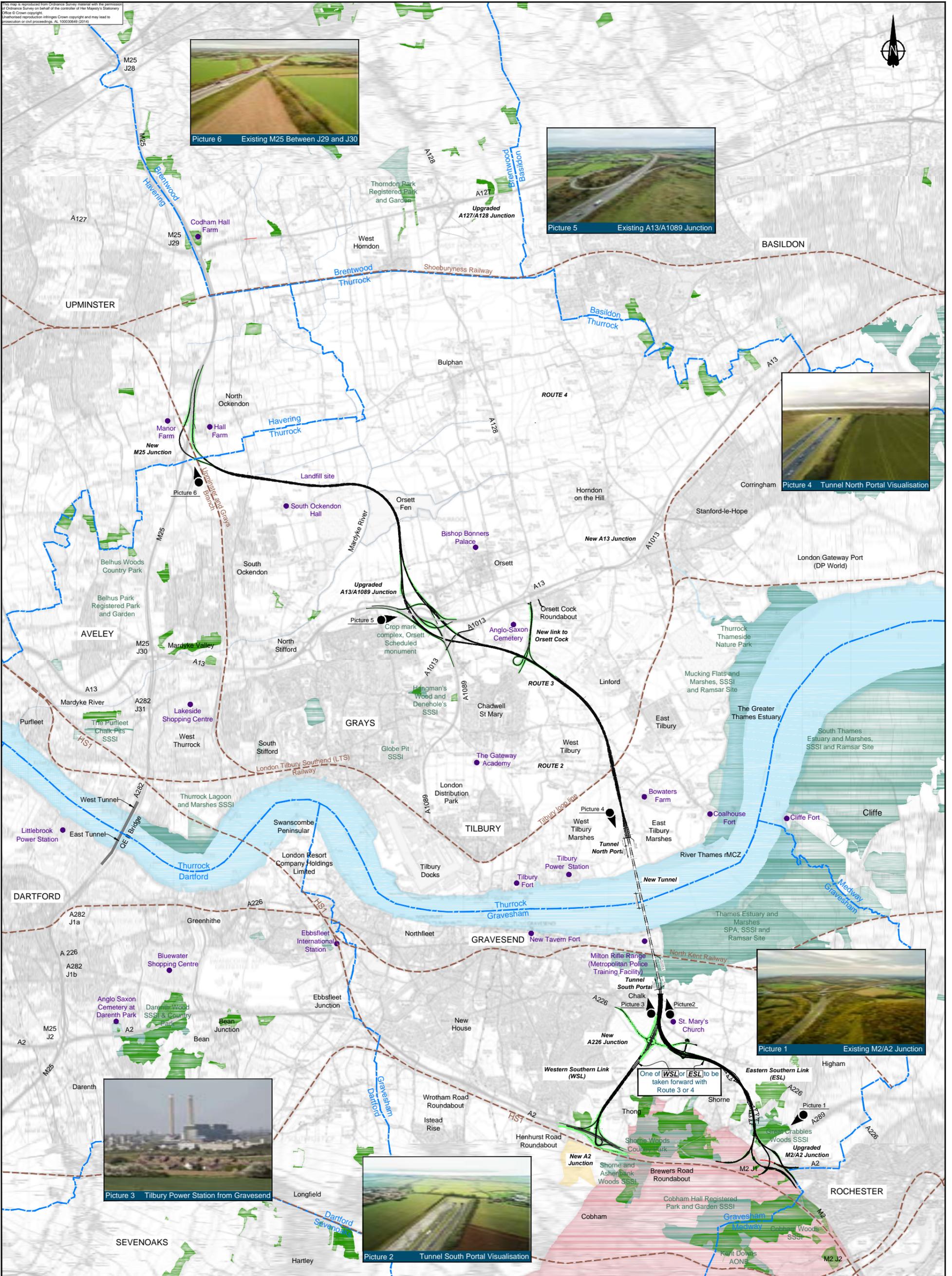
Route 3 Consultation Plan
Route 4 Consultation Plan
Route 3 and 4 General Plan

Western Southern Link Plan and Profile Sheet 1 of 4
Western Southern Link Plan and Profile Sheet 2 of 4
Western Southern Link Plan and Profile Sheet 3 of 4
Western Southern Link Plan and Profile Sheet 4 of 4

Route 3 Plan and Profile Sheet 1 of 17
Route 3 Plan and Profile Sheet 2 of 17
Route 3 Plan and Profile Sheet 3 of 17
Route 3 Plan and Profile Sheet 4 of 17
Route 3 Plan and Profile Sheet 5 of 17
Route 3 Plan and Profile Sheet 6 of 17
Route 3 Plan and Profile Sheet 7 of 17
Route 3 Plan and Profile Sheet 8 of 17
Route 3 Plan and Profile Sheet 9 of 17
Route 3 Plan and Profile Sheet 10 of 17
Route 3 Plan and Profile Sheet 11 of 17
Route 3 Plan and Profile Sheet 12 of 17
Route 3 Plan and Profile Sheet 13 of 17
Route 3 Plan and Profile Sheet 14 of 17
Route 3 plan and Plan and Profile 15 of 17
Route 3 plan and Plan and Profile 16 of 17
Route 3 plan and Plan and Profile 17 of 17

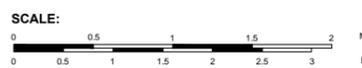
Route 4 Plan and Profile Sheet 1 of 12
Route 4 Plan and Profile Sheet 2 of 12
Route 4 Plan and Profile Sheet 3 of 12
Route 4 Plan and Profile Sheet 4 of 12
Route 4 Plan and Profile Sheet 5 of 12
Route 4 Plan and Profile Sheet 6 of 12
Route 4 Plan and Profile Sheet 7 of 12
Route 4 Plan and Profile Sheet 8 of 12
Route 4 Plan and Profile Sheet 9 of 12
Route 4 Plan and Profile Sheet 10 of 12
Route 4 Plan and Profile Sheet 11 of 12
Route 4 Plan and Profile Sheet 12 of 12

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**Lower Thames Crossing
Route Consultation 2016
Route 3
Route would include either WSL or ESL**

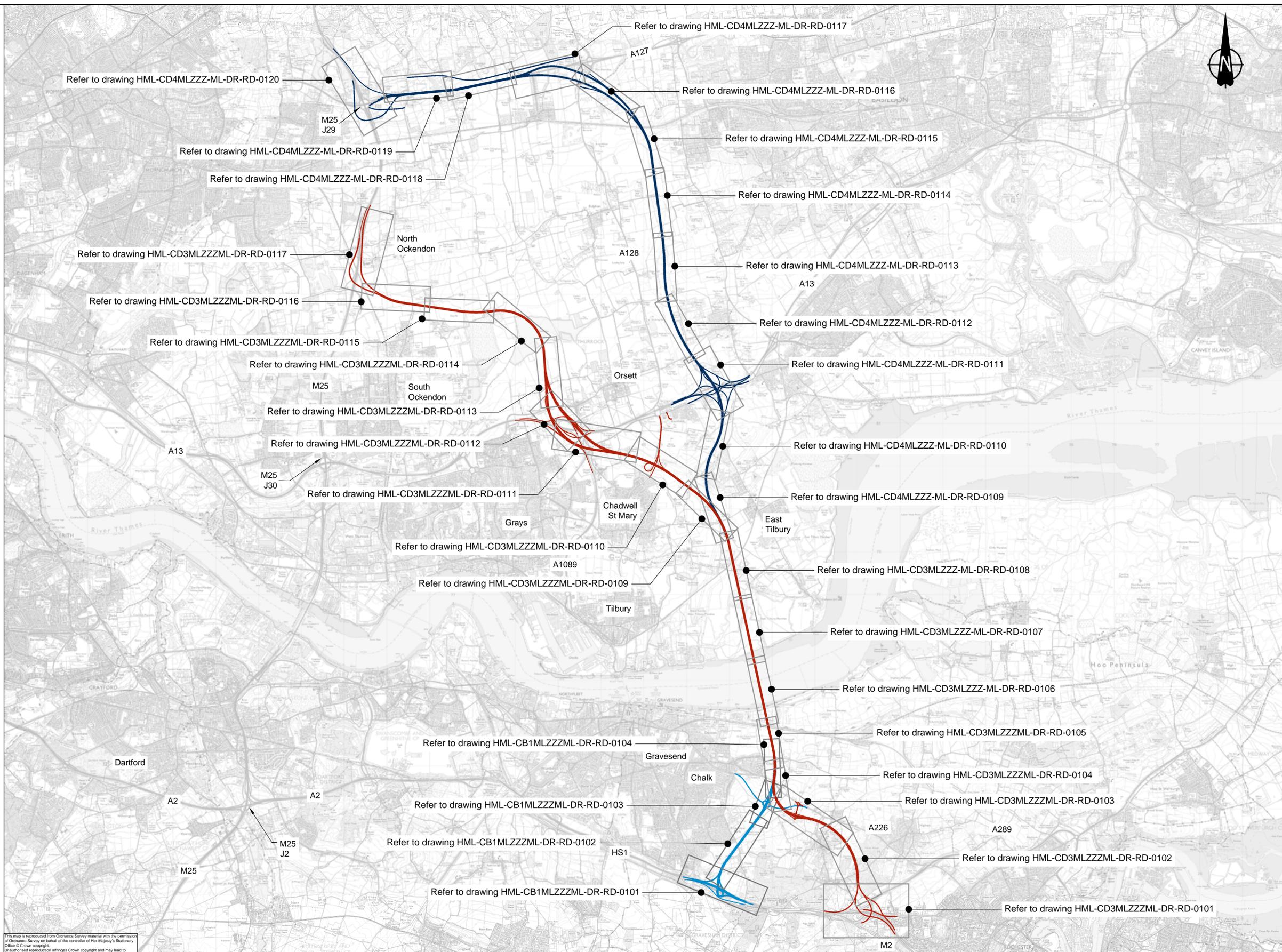
- LEGEND:**
- AONB (Area of Outstanding Natural Beauty)
 - Ancient Woodland



**ILLUSTRATIVE
DESIGN**

The design is illustrative and may be subject to change in later stages of the scheme development.





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NOTES

1. This drawing to be viewed in colour.
2. The design shown is what was issued in the SAR. The exception to this is the bored tunnel alignment which has been changed to a three lane tunnel.

LEGEND

- Route 3 Bored tunnel
- Route 4 Bored tunnel
- Western Southern Link Bored tunnel

ILLUSTRATIVE
DESIGN

Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH

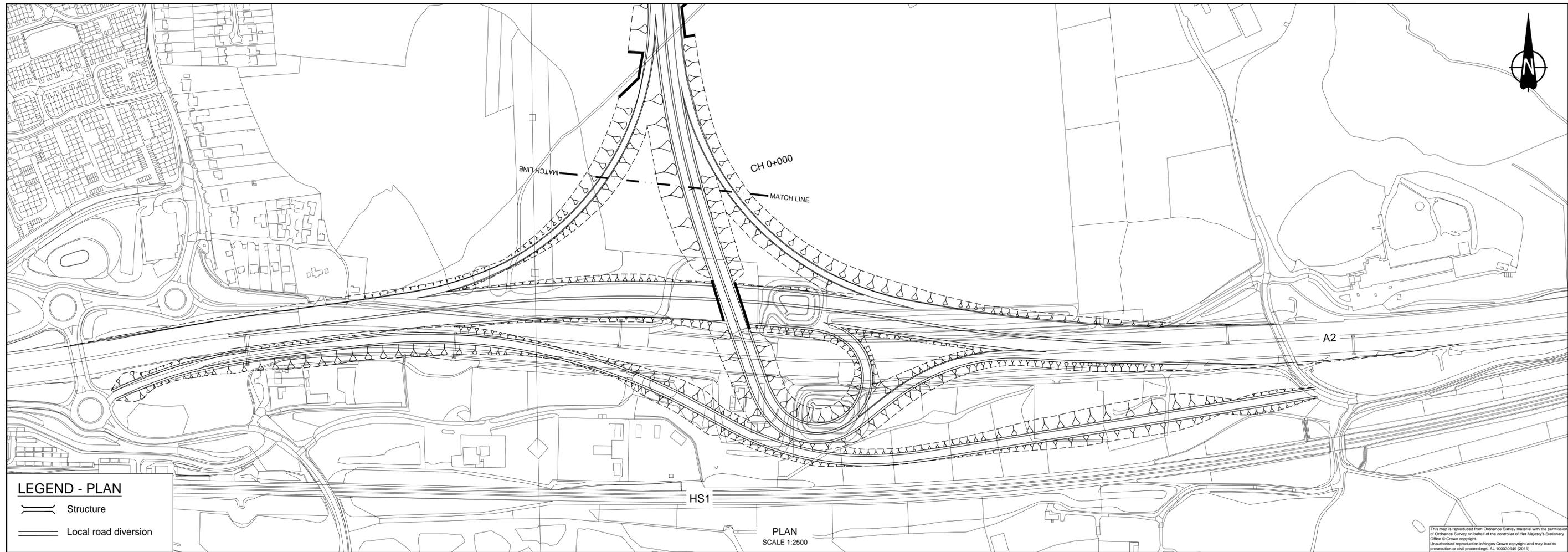
Client

Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Route 3 & Route 4 General Plan**

Status	S2	Revision	P02
Scale	NTS	Date	12-08-16
Drawn By	A Garcia	Checked By	M Robinson
Approved By	G Hodge	Project No.	HA PIN
Originator	HHJ	Original Size	A1
Drawing number	HML-CD3MLZZZML-DR-RD-0100		



LEGEND - PLAN

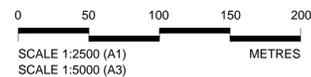
-  Structure
-  Local road diversion

PLAN
SCALE 1:2500

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NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100.
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH

Client



Halcrow Hyder Joint Venture
Burderop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479



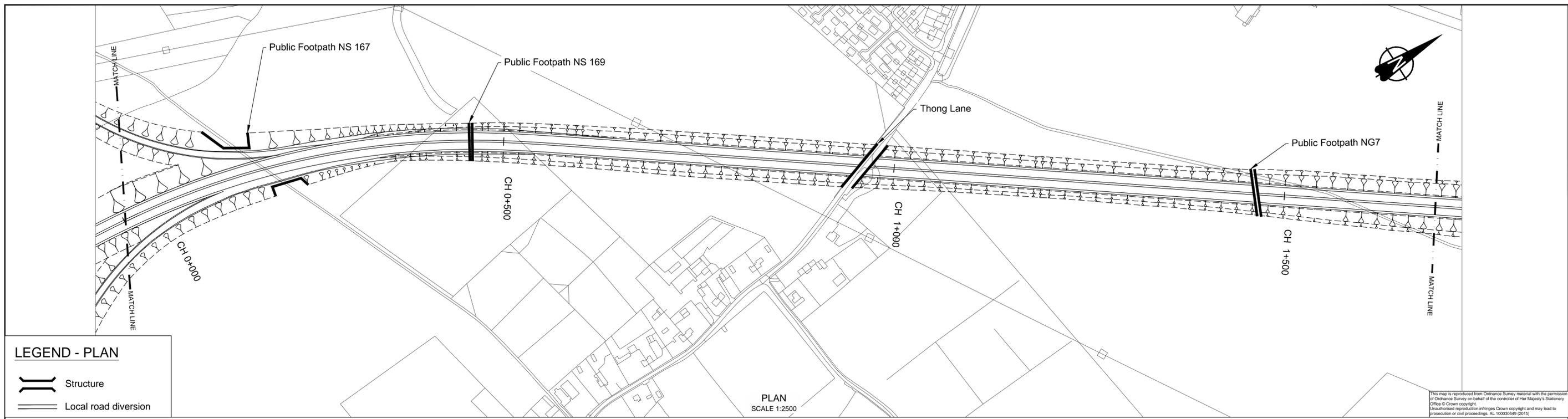

Project

**LOWER THAMES
CROSSING**

Drawing title

**Western Southern Link
Plan & Profile
Sheet 1 of 4**

Status	Revision
S2	P02
Scale	Date - 12-08-16
As Shown	
Drawn By	A Garcia
Checked By	M Robinson
Approved By	G Hodge
Project No.	HA PIN
HA540039	Originator
HHJ	Original Size
	A1
Drawing number	HML-CB1MLZZZML-DR-RD-0101



LEGEND - PLAN

- Structure
- Local road diversion

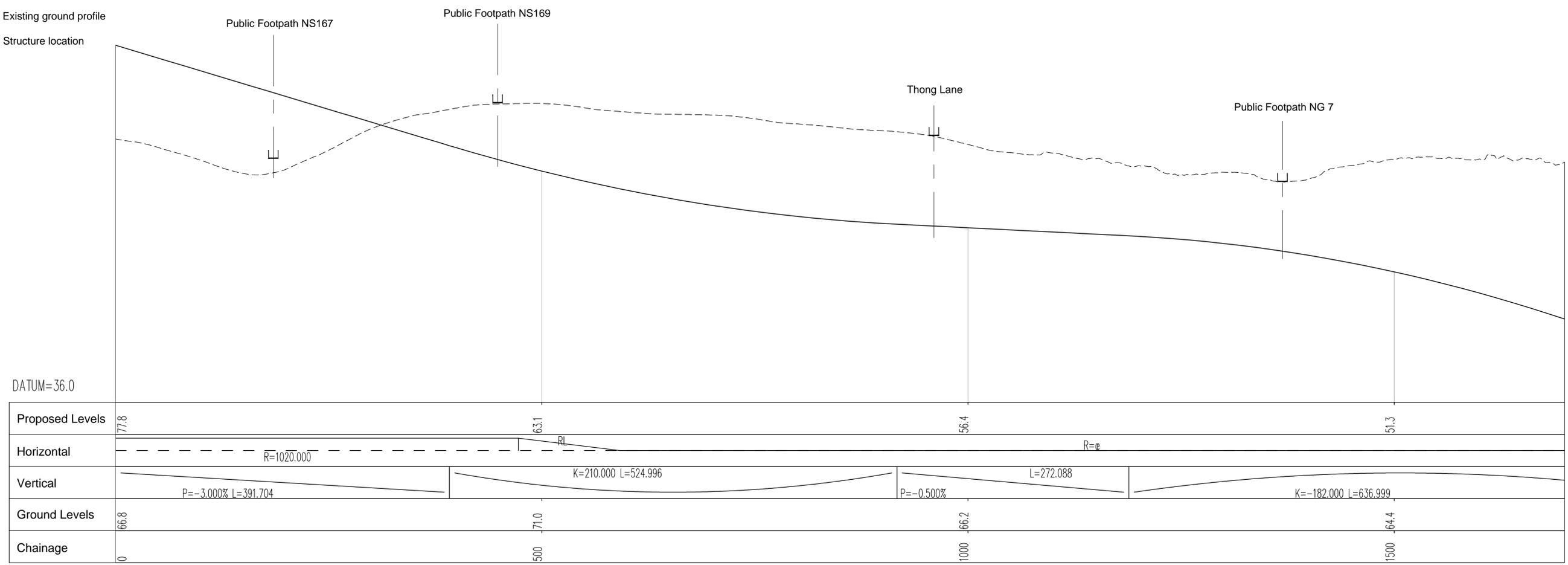
PLAN
SCALE 1:2500

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LEGEND - PROFILE

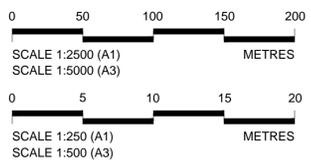
- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250



NOTES

1. For Key Plan refer to drawing HML-CB3MLZZZML-DR-RD-0100.
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE DESIGN

Client

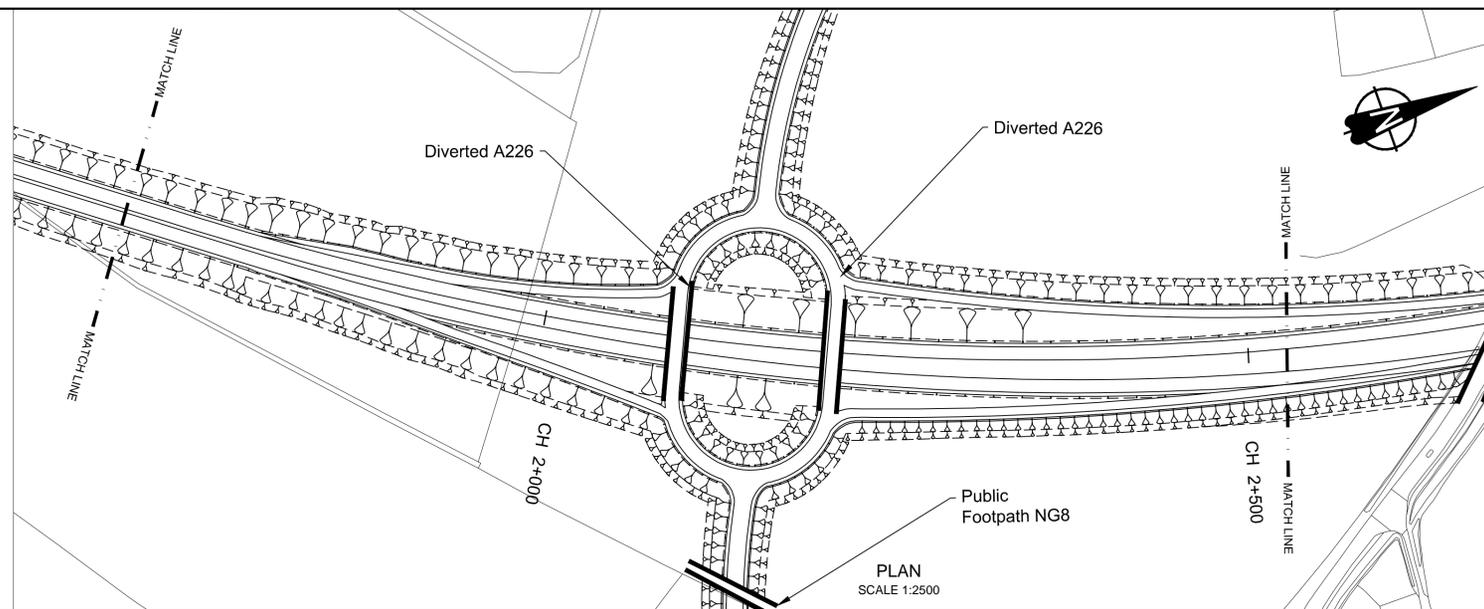
Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project LOWER THAMES CROSSING

Drawing title Western Southern Link Plan & Profile Sheet 2 of 4

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN HA540039	I Originator	HHJ
Drawing number	HML-CB1MLZZZML-DR-RD-0102		
Original Size	A1		

P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd



LEGEND - PLAN

- Structure
- Local road diversion

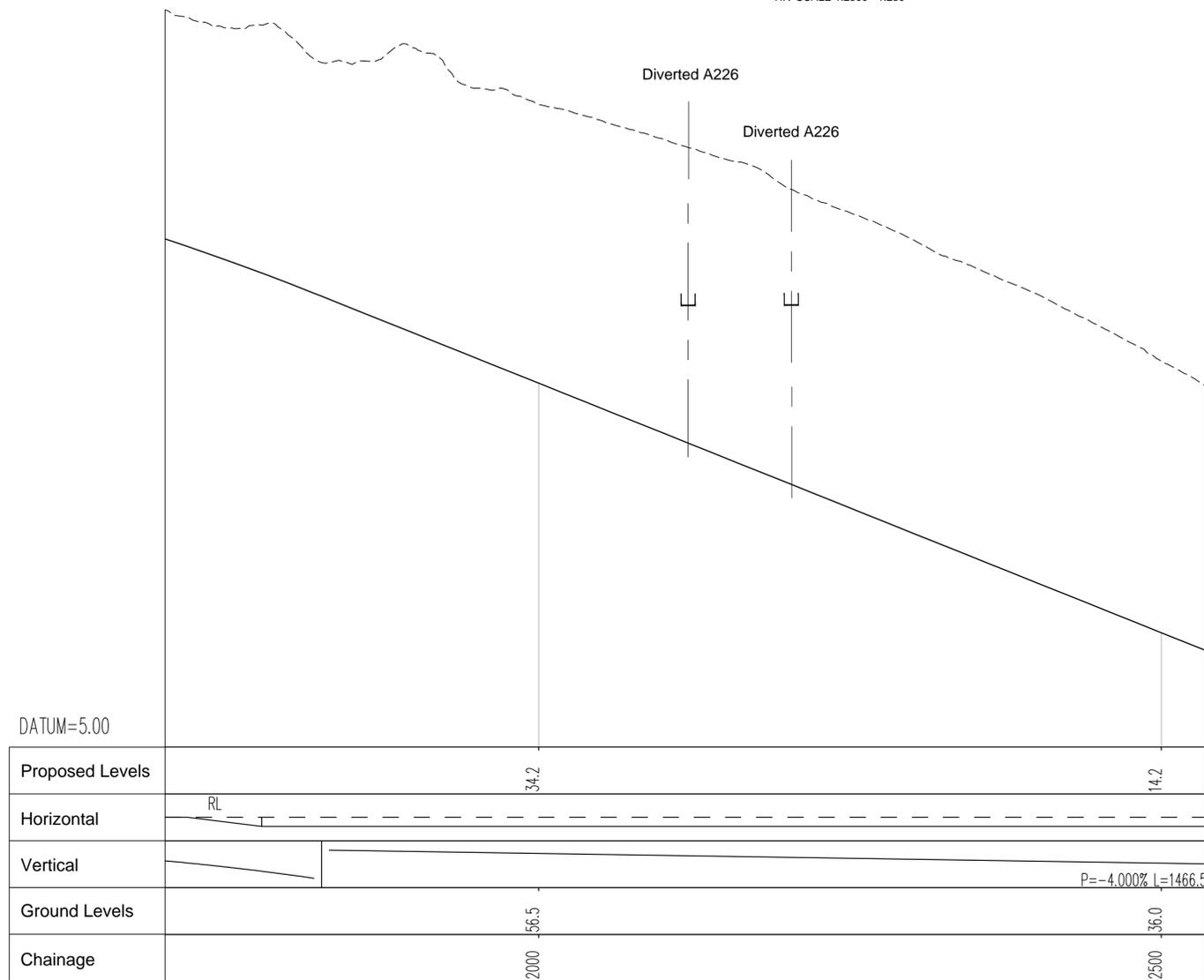
PLAN
SCALE 1:2500

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LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250

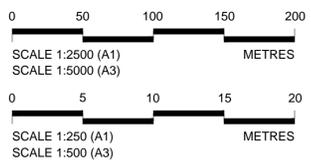


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P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd

NOTES

- For Key Plan refer to drawing HML-CD3MLZZZML-DR-RD-0100.
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



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DESIGN

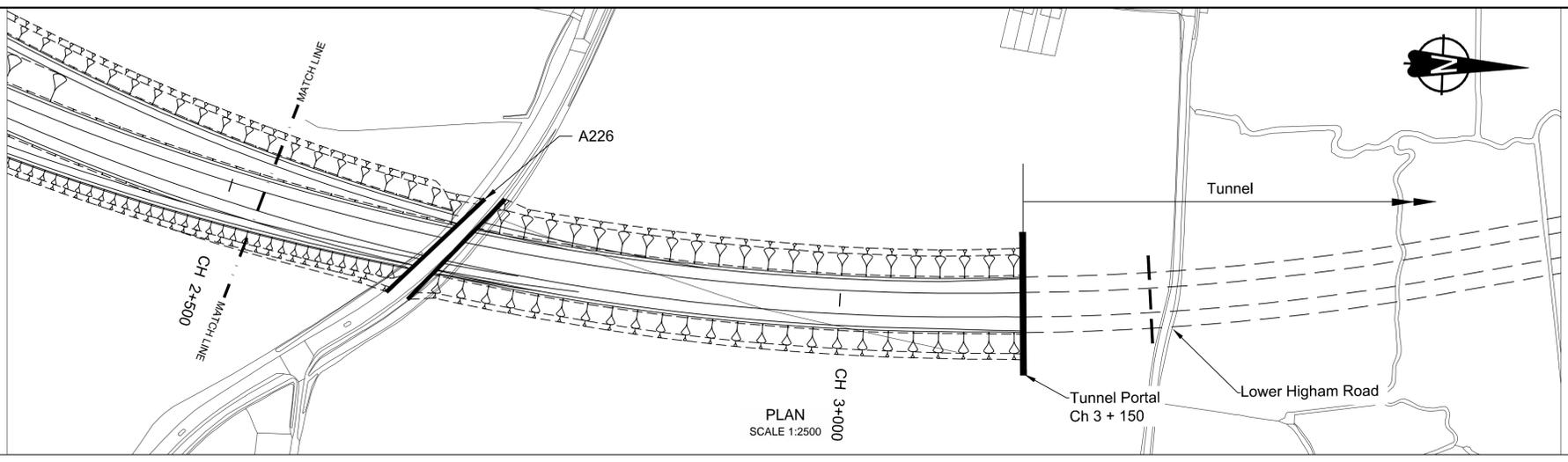
Client

Halcrow Hyder Joint Venture
Burdorpe Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Western Southern Link Plan & Profile Sheet 3 of 4**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN HA540039	Originator	HHJ
Drawing number	HML-CB1MLZZZML-DR-RD-0103		
Original Size	A1		



LEGEND - PLAN

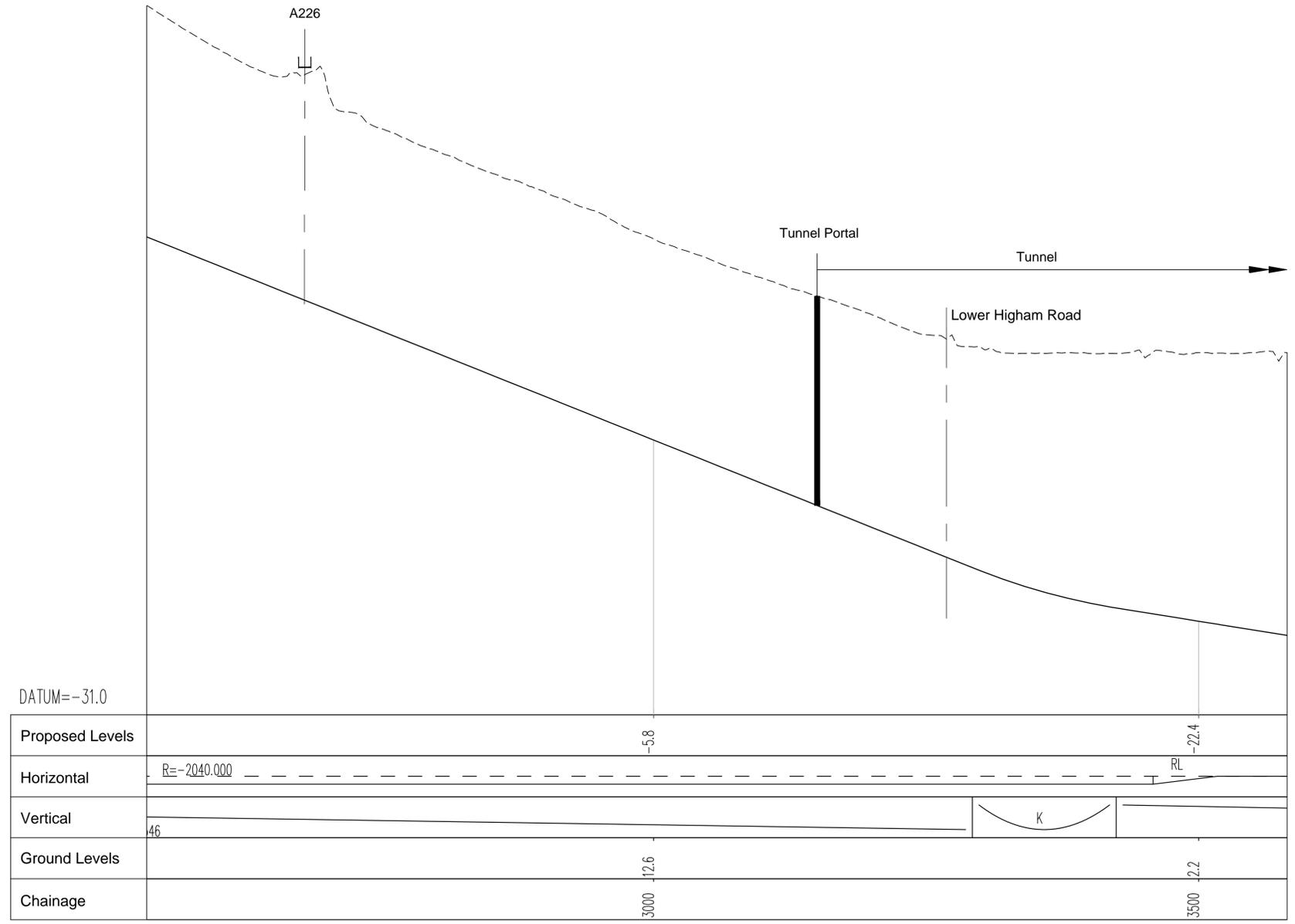
- Structure
- Local road diversion

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LEGEND - PROFILE

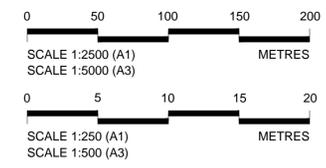
- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250



NOTES

1. For Key Plan refer to drawing HML-CD3MLZZZML-DR-RD-0100.
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



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Client **highways england**

Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
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Project **LOWER THAMES CROSSING**

Drawing title **Western Southern Link Plan & Profile Sheet 4 of 4**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN HA540039	Originator	HHJ
Original Size			A1
Drawing number	HML-CB1MLZZZML-DR-RD-0104		

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Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd

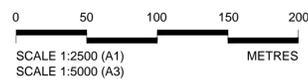


LEGEND - PLAN

-  Structure
-  Local road diversion

NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd

Client



Halcrow Hyder Joint Venture
 Burderop Park
 Swindon, SN4 0QD
 Tel. +44(0)1793 812479



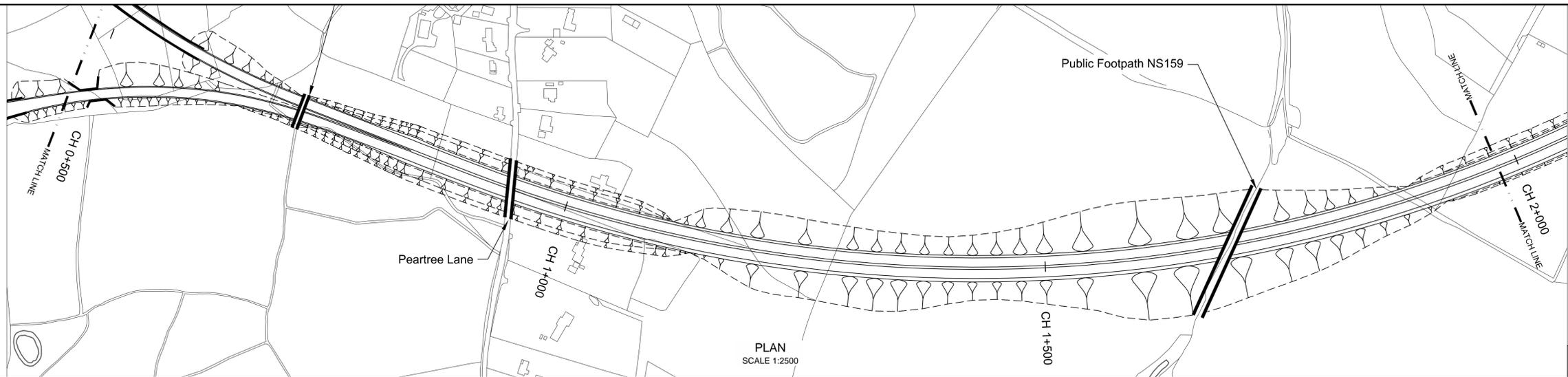

Project

**LOWER THAMES
CROSSING**

Drawing title

**Route 3
Plan & Profile
Sheet 1 of 17**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0101		
Original Size	A1		



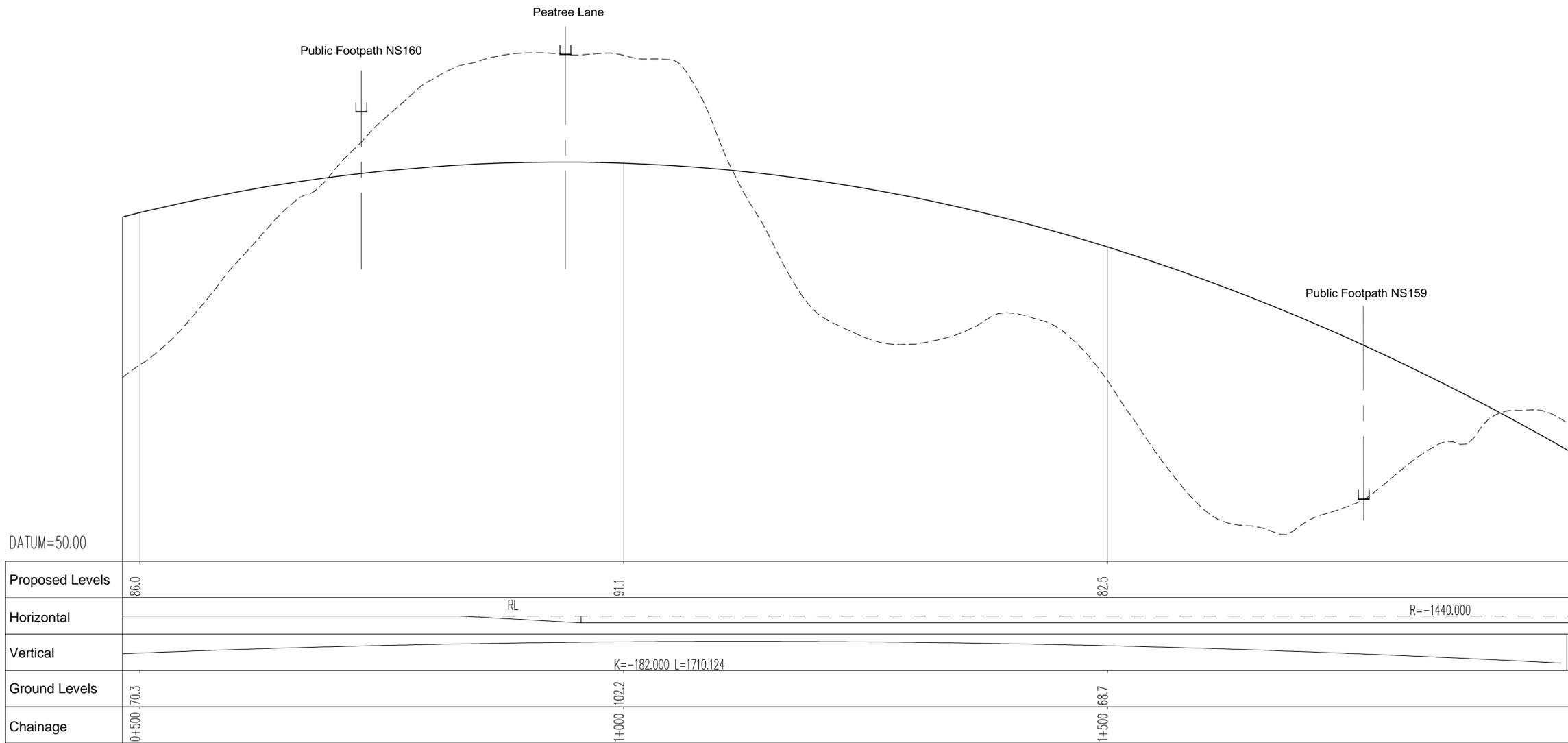
LEGEND - PLAN

- Structure
- Local road diversion

PROFILE
H:V SCALE 1:2500 - 1:250

LEGEND - PROFILE

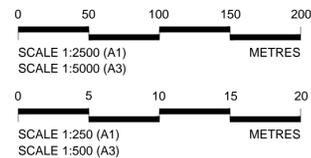
- LTC Vertical Alignment
- Existing ground profile
- Structure location



DATUM=50.00

NOTES

1. For Key Plan refer to drawing HHJ-HML-CD3MLZZZML-DR-RD-0100.
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE DESIGN

Client



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Burderop Park
Swindon, SN4 0QD
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Project

LOWER THAMES CROSSING

Drawing title

**Route 3
Plan & Profile
Sheet 2 of 17**

Status

S2

Revision

P02

Scale

As Shown

Date

12-08-16

Drawn By

A Garcia

Checked By

M Robinson

Approved By

G Hodge

Project No.

HA PIN

Originator

HHJ

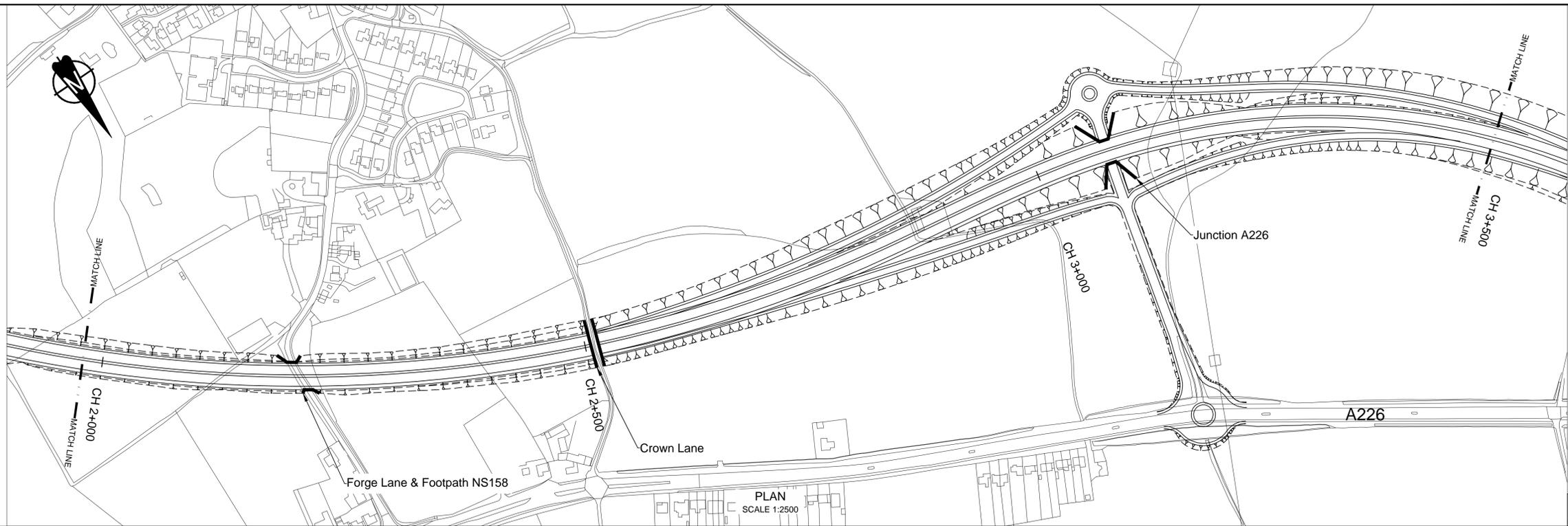
Original Size

A1

Drawing number

HML-CD3MLZZZML-DR-RD-0102

P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Apprv'd



LEGEND - PLAN

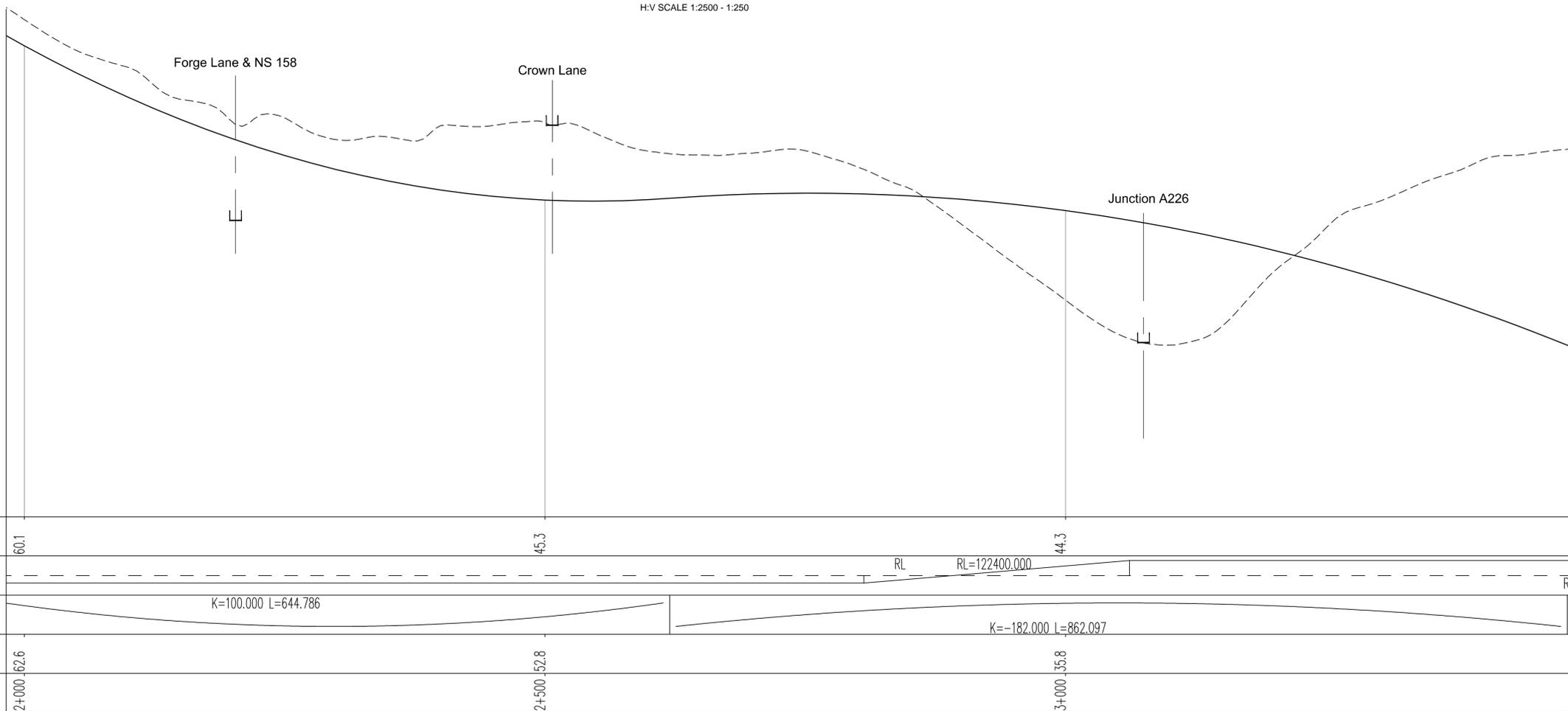
- Structure
- Local road diversion

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LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250

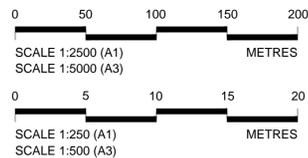


DATUM=15.00

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Vertical	K=100.000 L=644.786		K=-182.000 L=862.097
Ground Levels	62.6	52.8	35.8
Chainage	2+000	2+500	3+000

NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Apprv'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH

Client

Halcrow Hyder Joint Venture
Burdorpe Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

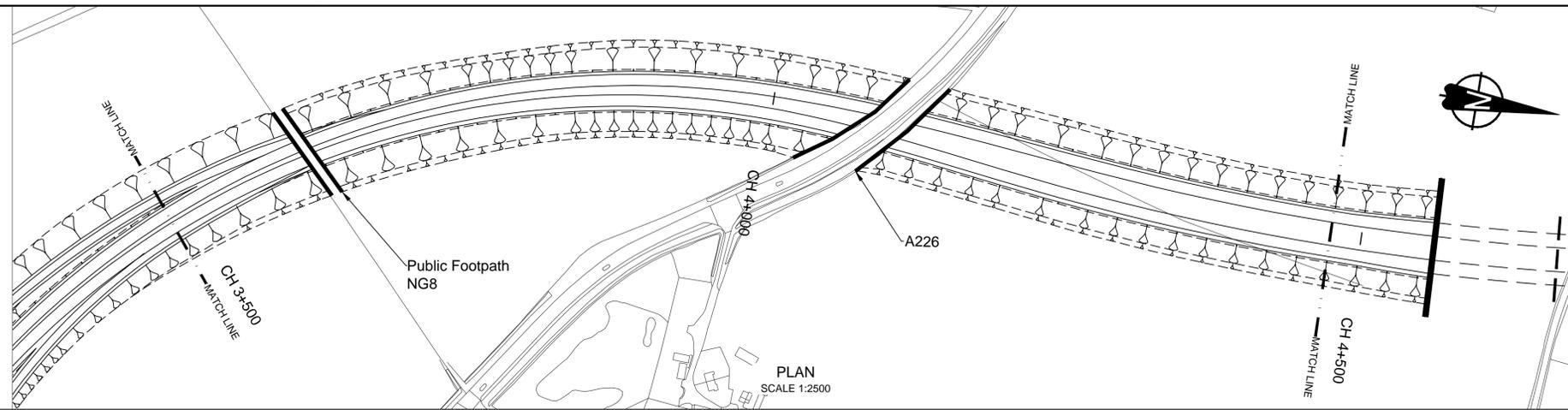
Project LOWER THAMES CROSSING

Drawing title Route 3 Plan & Profile Sheet 3 of 17

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0103		
		Original Size	A1

LEGEND - PLAN

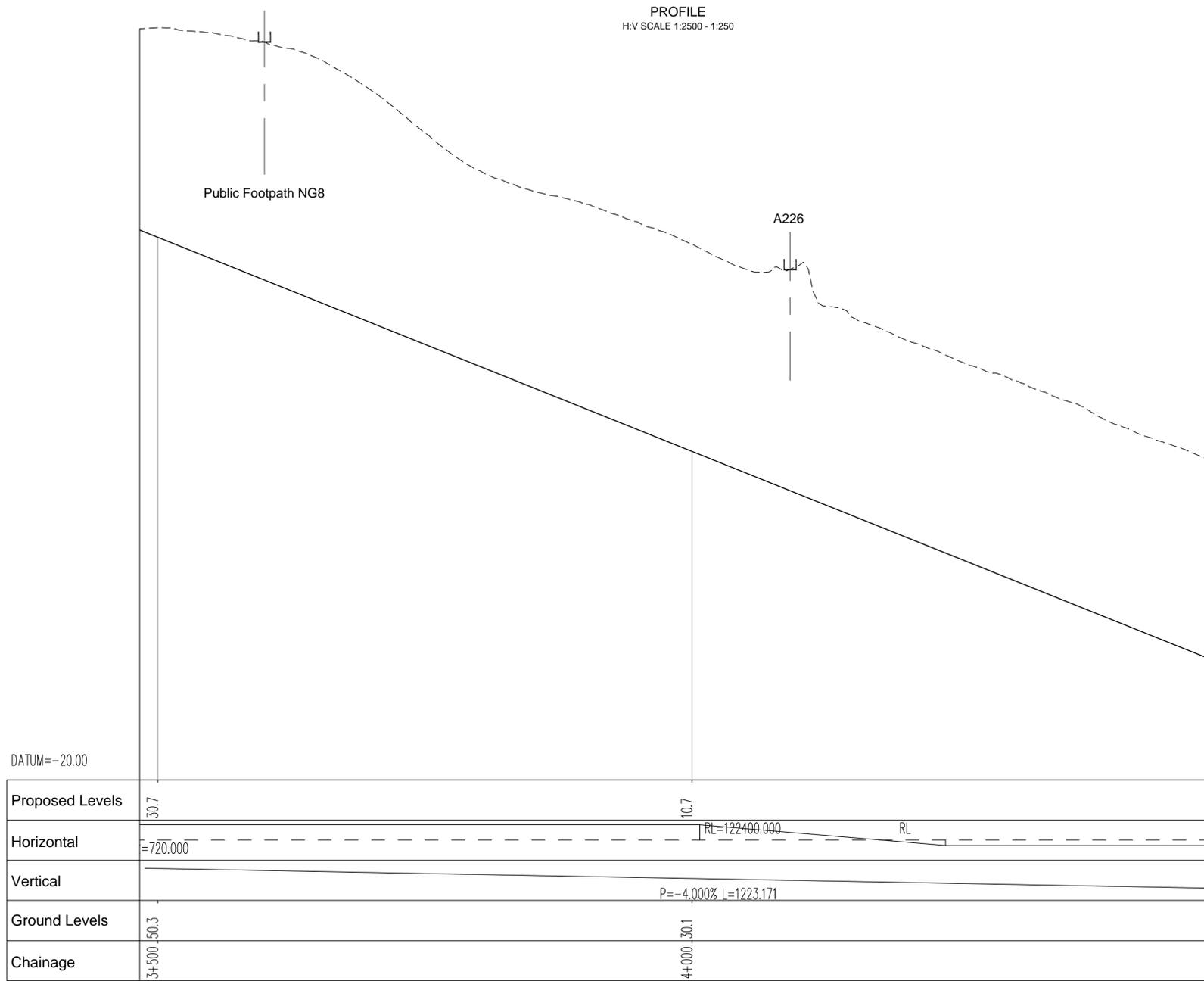
-  Structure
-  Local road diversion



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LEGEND - PROFILE

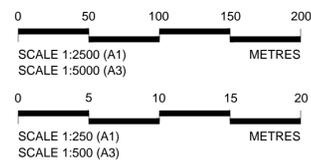
-  LTC Vertical Alignment
-  Existing ground profile
-  Structure location



Proposed Levels	30.7	10.7
Horizontal	720.000	RL=122400.000
Vertical	P=-4.000% L=1223.171	
Ground Levels	30.3	30.1
Chainage	3+500	4+000

NOTES

- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE DESIGN

Client **highways england**

Halcrow Hyder Joint Venture
 Burderop Park
 Swindon, SN4 0QD
 Tel. +44(0)1793 812479



Project **LOWER THAMES CROSSING**

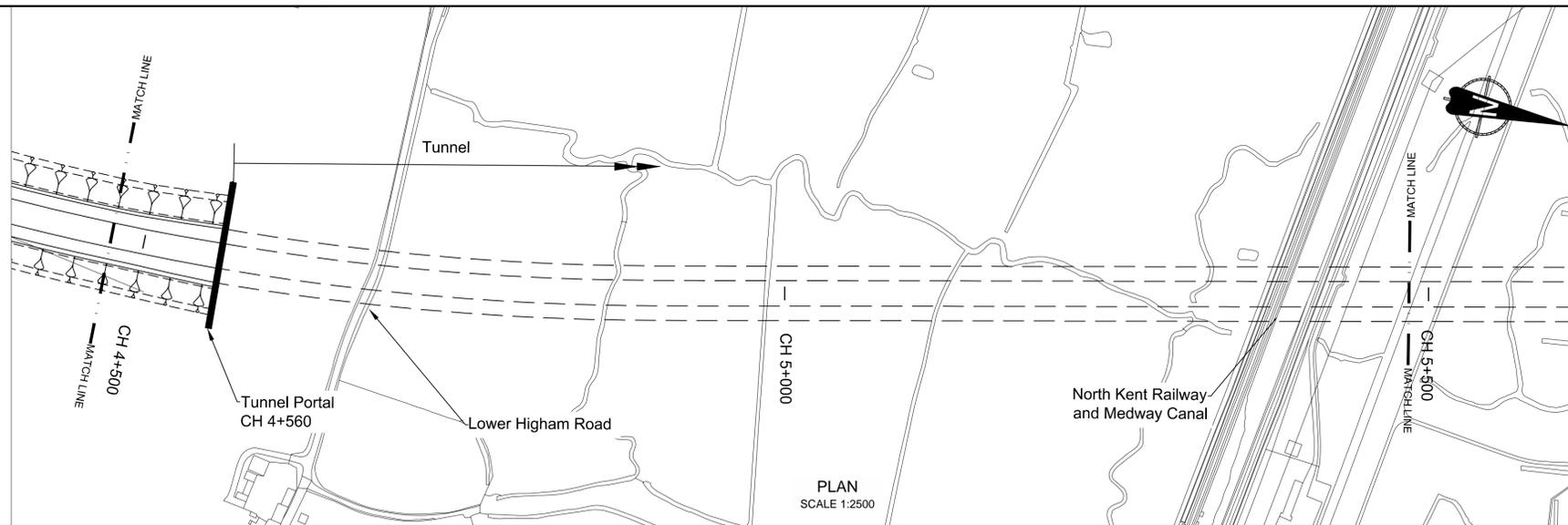
Drawing title **Route 3 Plan & Profile Sheet 4 of 17**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0104		
Original Size	A1		

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH

LEGEND - PLAN

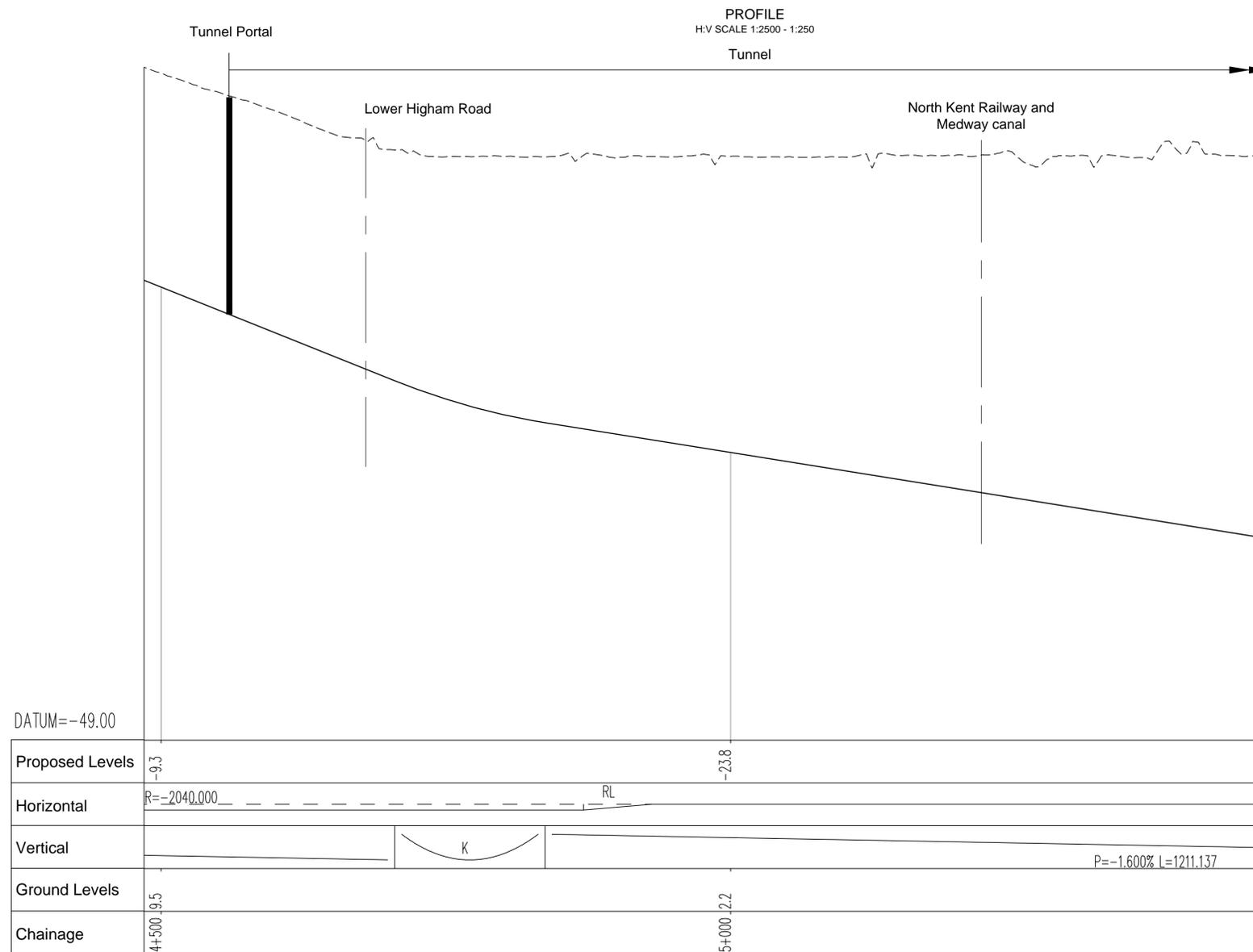
-  Structure
-  Local road diversion



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LEGEND - PROFILE

-  LTC Vertical Alignment
-  Existing ground profile
-  Structure location

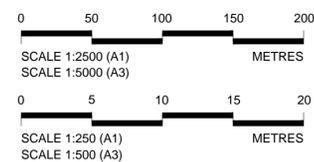


DATUM = -49.00

Proposed Levels	-9.3	-23.8
Horizontal	R = -2040.000	
Vertical	K	
Ground Levels	-9.5	-2.2
Chainage	4+500	5+000
		P = -1.600% L = 1211.137

NOTES

- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE DESIGN

Client



Halcrow Hyder Joint Venture
 Burderop Park
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Project

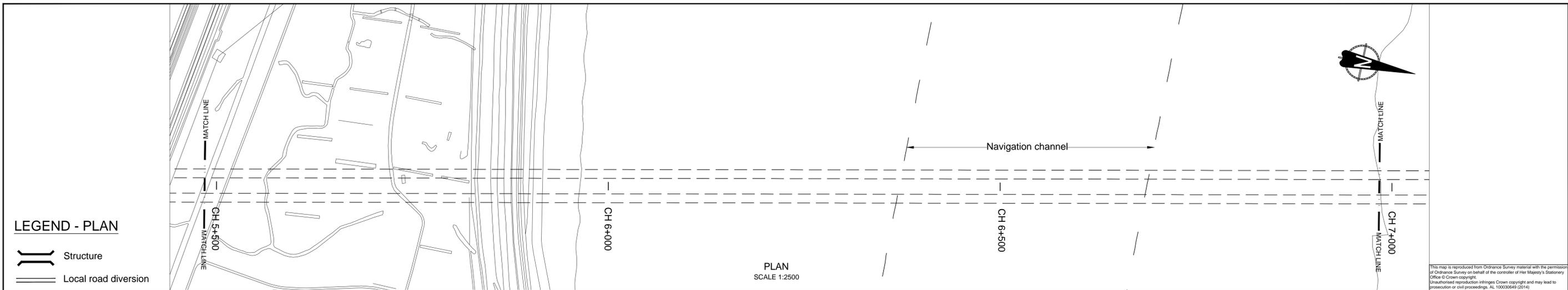
LOWER THAMES CROSSING

Drawing title

**Route 3
Plan & Profile
Sheet 5 of 17**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0105		
		Original Size	A1

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH



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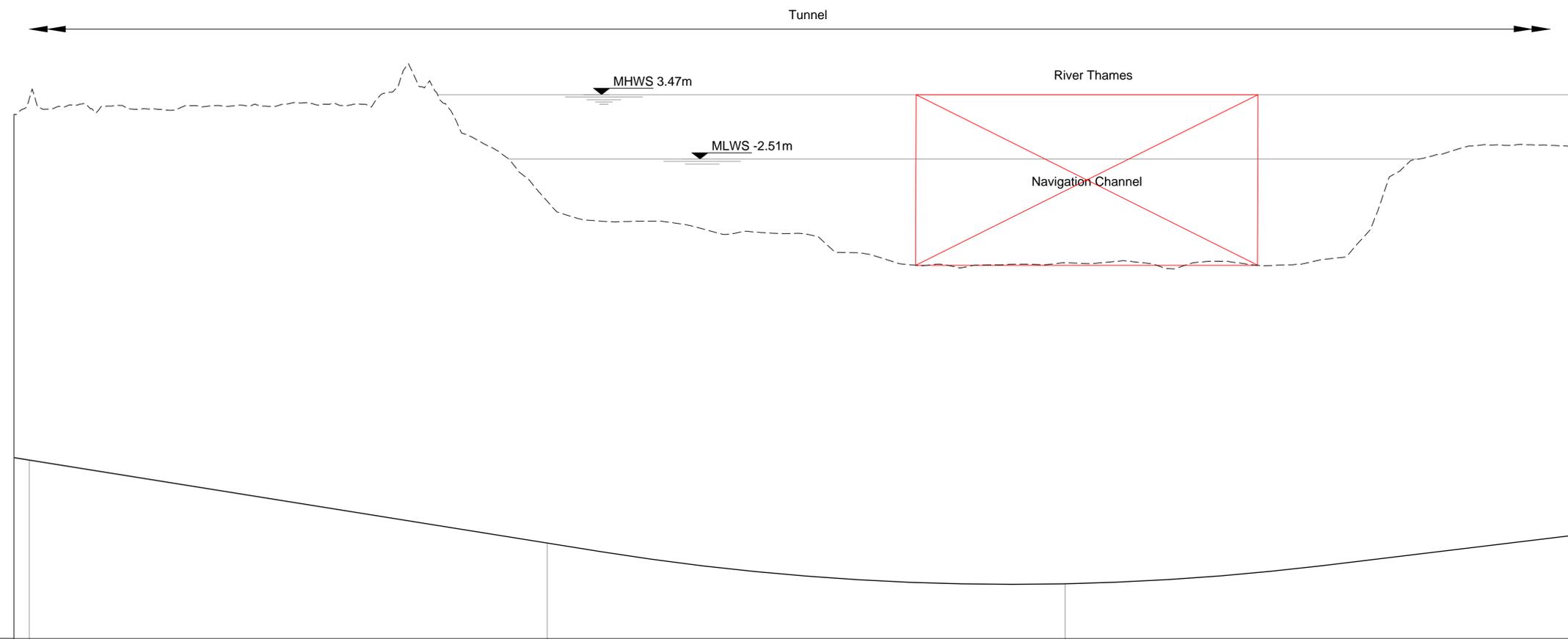
LEGEND - PLAN

- Structure
- Local road diversion

LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

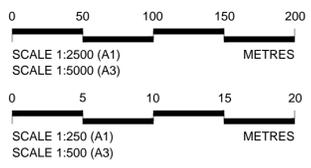
PROFILE
H:V SCALE 1:2500 - 1:250



Proposed Levels	-31.8	-39.8	-43.7	
Horizontal				R=∞
Vertical	K=250.000 L=700.075		P=1.200% L=365.503	
Ground Levels	3.0	-2.8	-2.8	
Chainage	5+500	6+000	6+500	

NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

Client

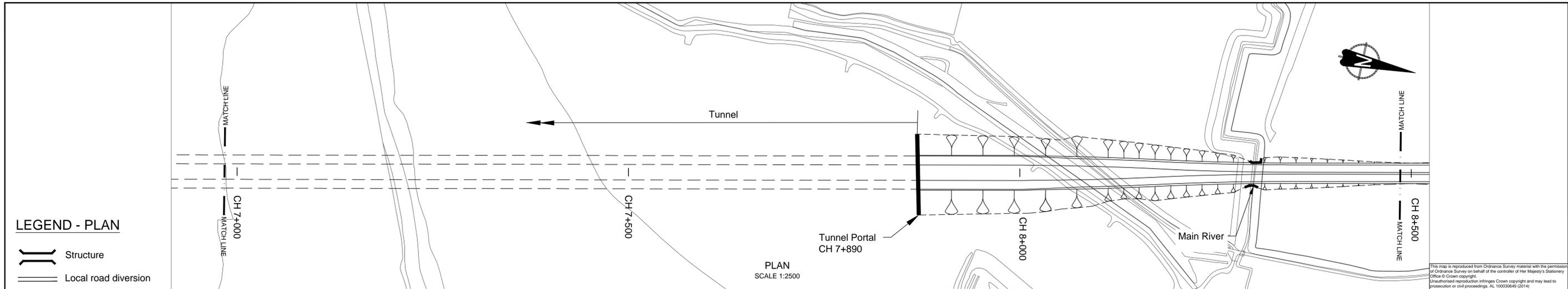
Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project LOWER THAMES CROSSING

Drawing title Route 3 Plan & Profile Sheet 6 of 17

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0106		
		Original Size	A1

P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd



LEGEND - PLAN

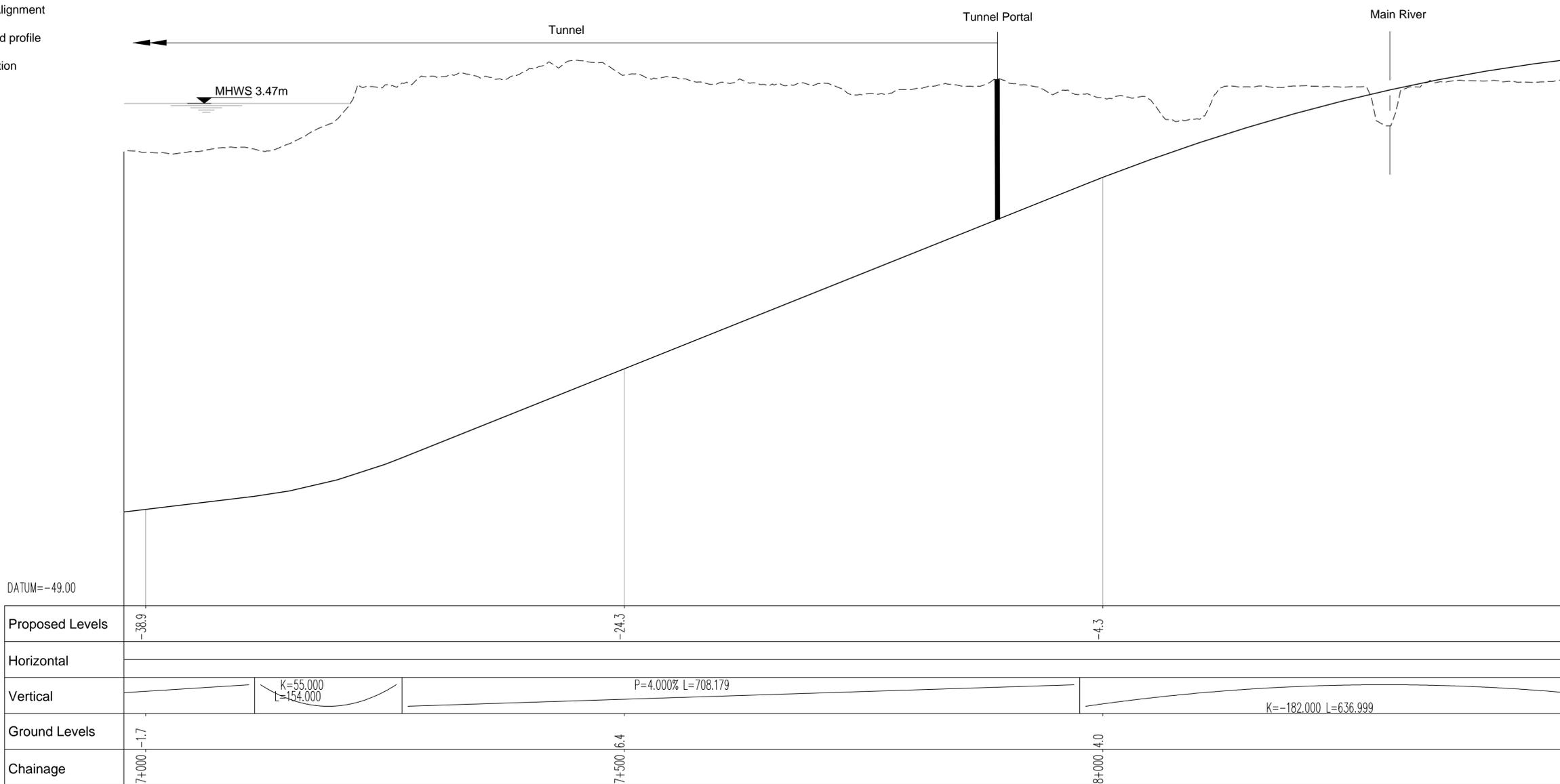
- Structure
- Local road diversion

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LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250

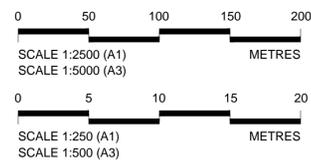


DATUM = -49.00

Proposed Levels	-38.9	-24.3	-4.3
Horizontal			
Vertical	K=55.000 L=154.000		K=-182.000 L=636.999
Ground Levels	-1.7	-6.4	-4.0
Chainage	7+000	7+500	8+000

NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd
-----	--------	-----------	---------------------	-------	-------	---------

P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
-----	----	----------	-----------------------------	----	----	----

Client

Halcrow Hyder Joint Venture
Burdorpe Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

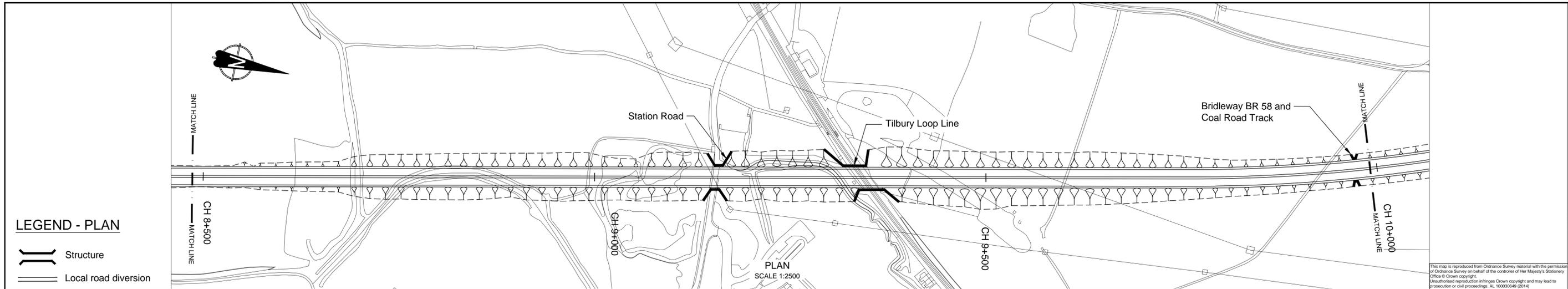
Project

**LOWER THAMES
CROSSING**

Drawing title

**Route 3
Plan & Profile
Sheet 7 of 17**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Original Size			A1
Drawing number	HML-CD3MLZZZML-DR-RD-0107		



LEGEND - PLAN

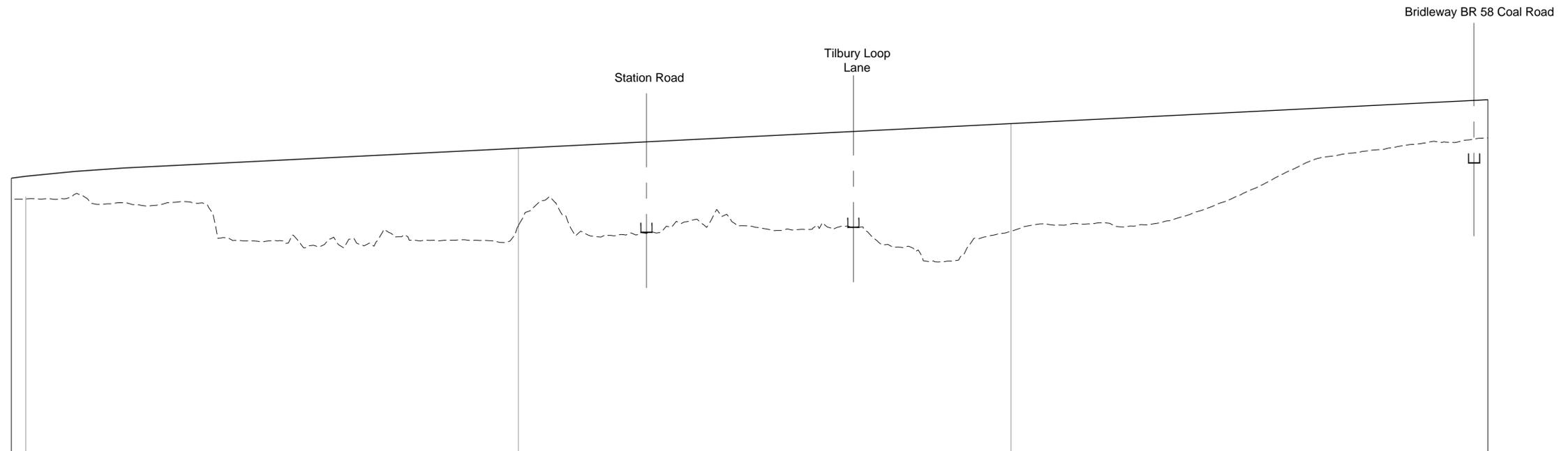
- Structure
- Local road diversion

LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250

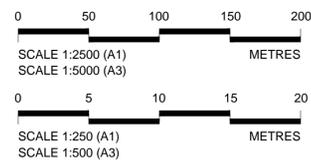
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Proposed Levels	8.2	11.0	13.5	RL
Horizontal	-----			
Vertical	P=0.500% L=387.059		P=0.5% L=2954.2	
Ground Levels	5.9	3.2	2.6	
Chainage	8+500	9+000	9+500	

NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH

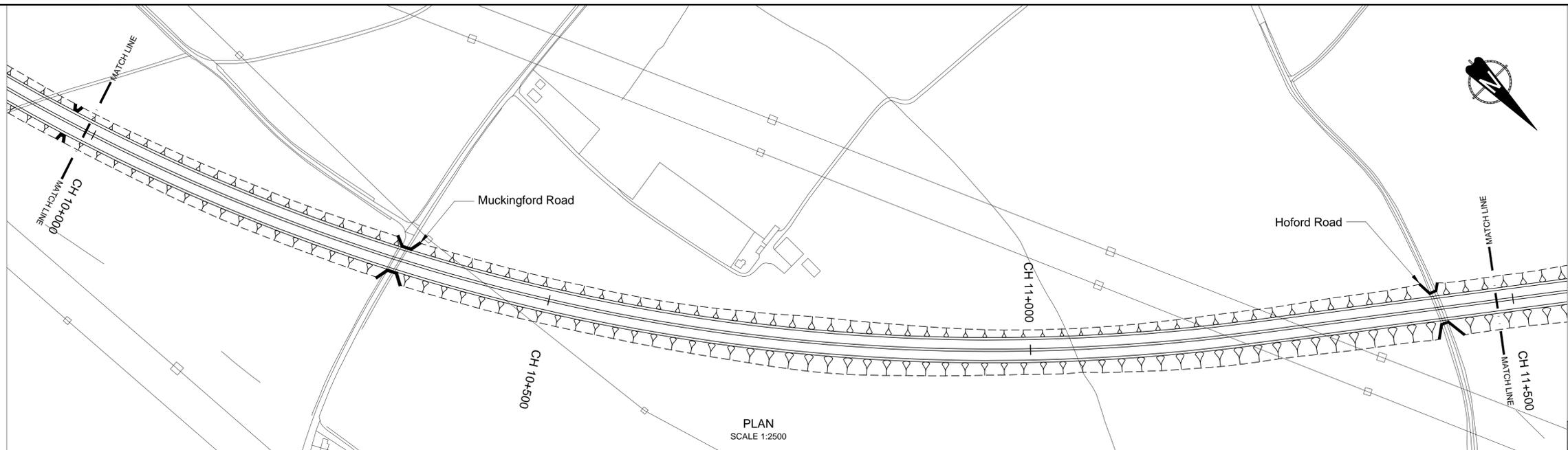
Client

Halcrow Hyder Joint Venture
Burdorpe Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project LOWER THAMES CROSSING

Drawing title Route 3 Plan & Profile Sheet 8 of 17

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0108		
		Original Size	A1



LEGEND - PLAN

- Structure
- Local road diversion

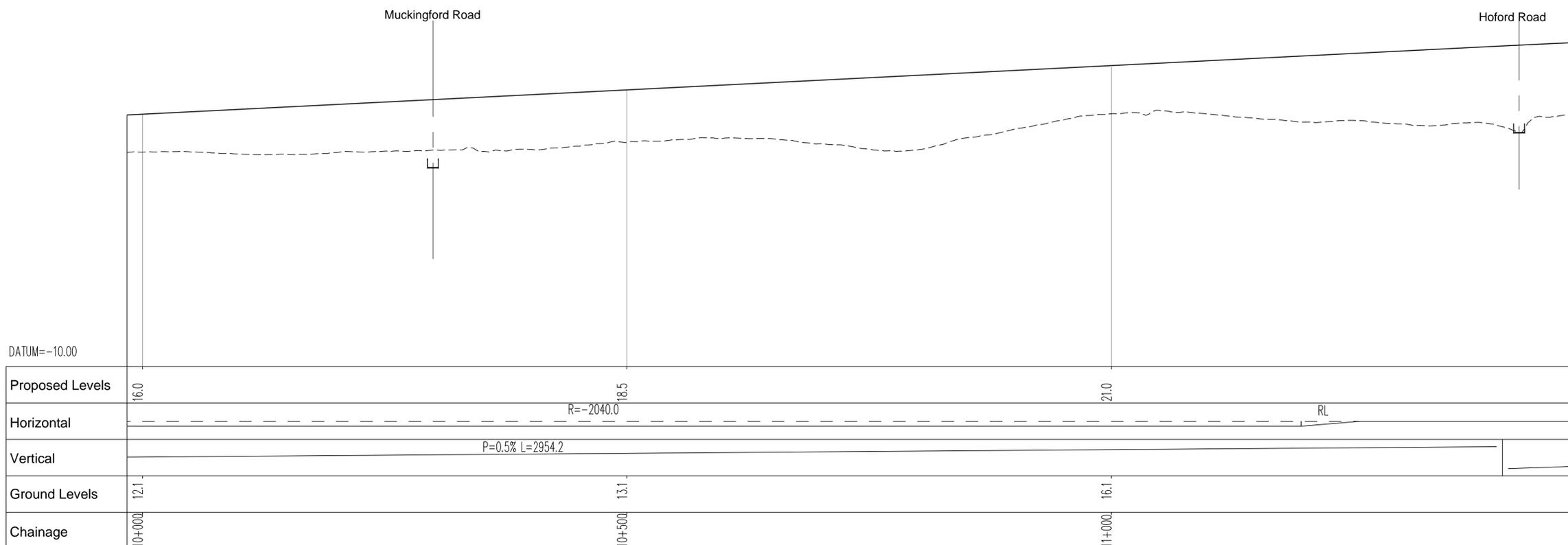
PLAN
SCALE 1:2500

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LEGEND - PROFILE

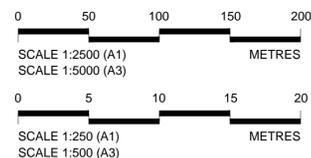
- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250



NOTES

- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE DESIGN

Client

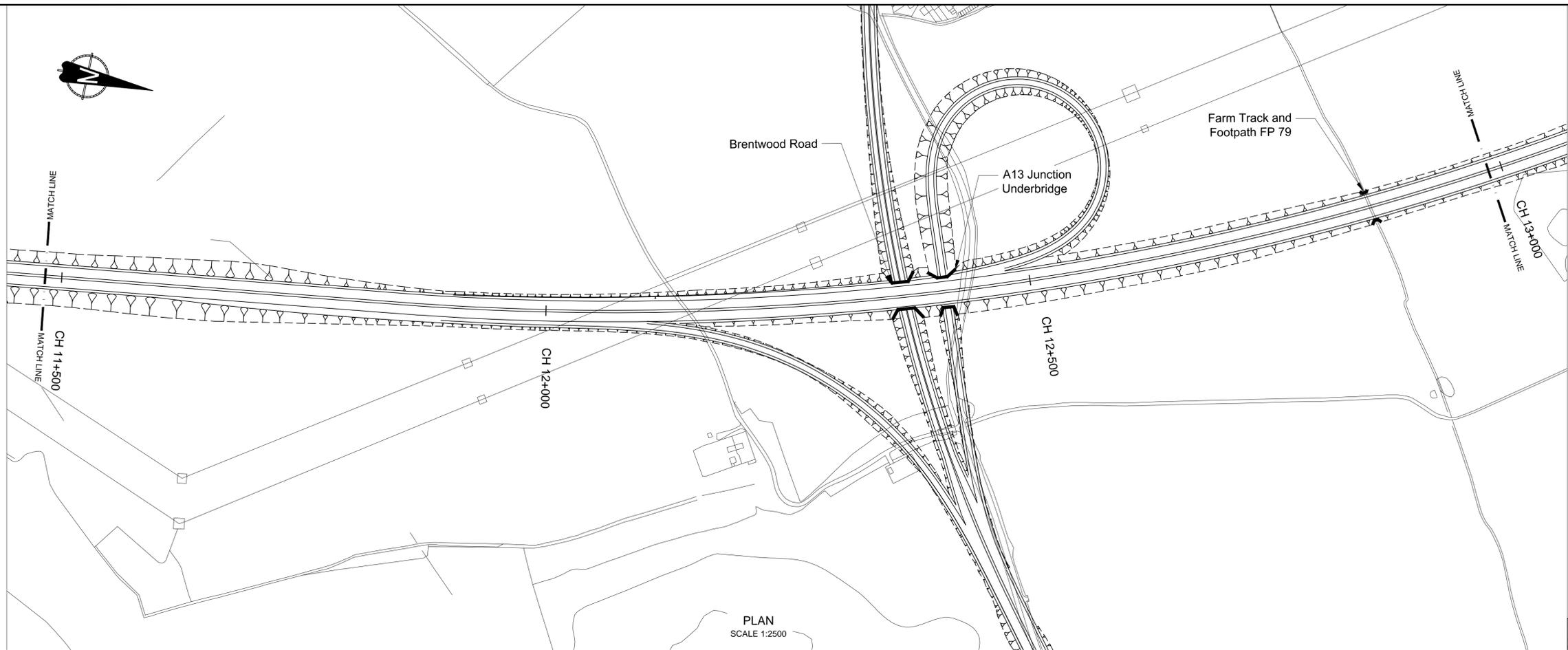
Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Route 3 Plan & Profile Sheet 9 of 17**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0109		
		Original Size	A1

Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Apprv'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH



LEGEND - PLAN

- Structure
- Local road diversion

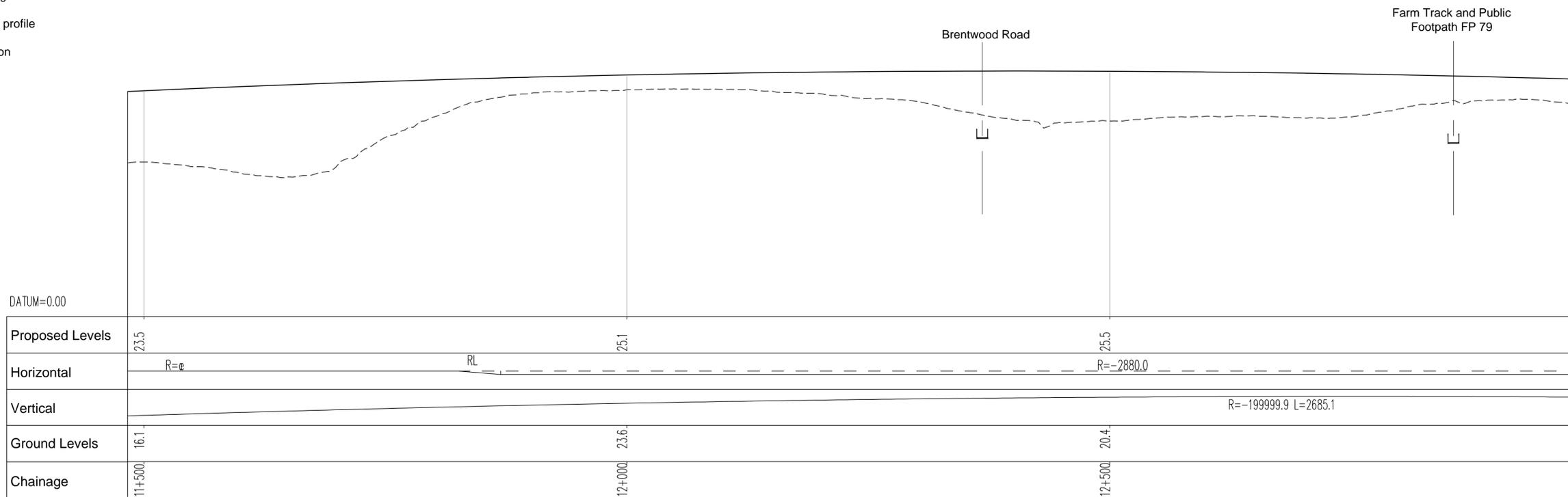
PLAN
SCALE 1:2500

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LEGEND - PROFILE

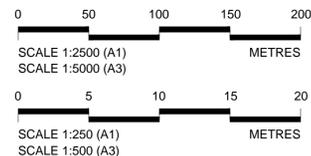
- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250



NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown is what was issued in the SAR. The exception to this is the bored tunnel alignment which has been changed to a three lane tunnel.



ILLUSTRATIVE
DESIGN

Client

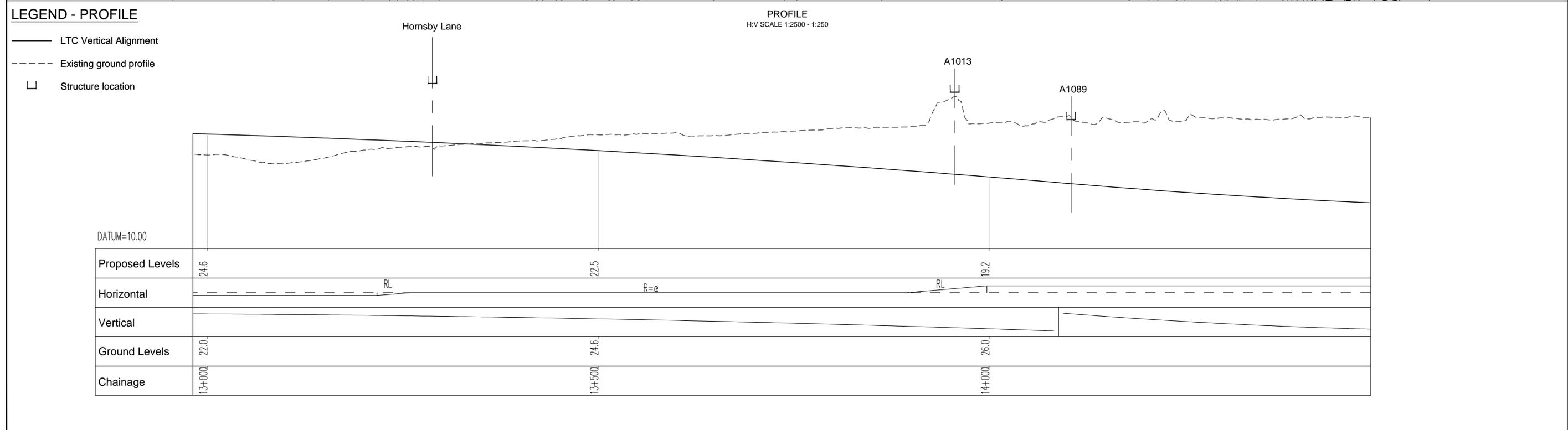
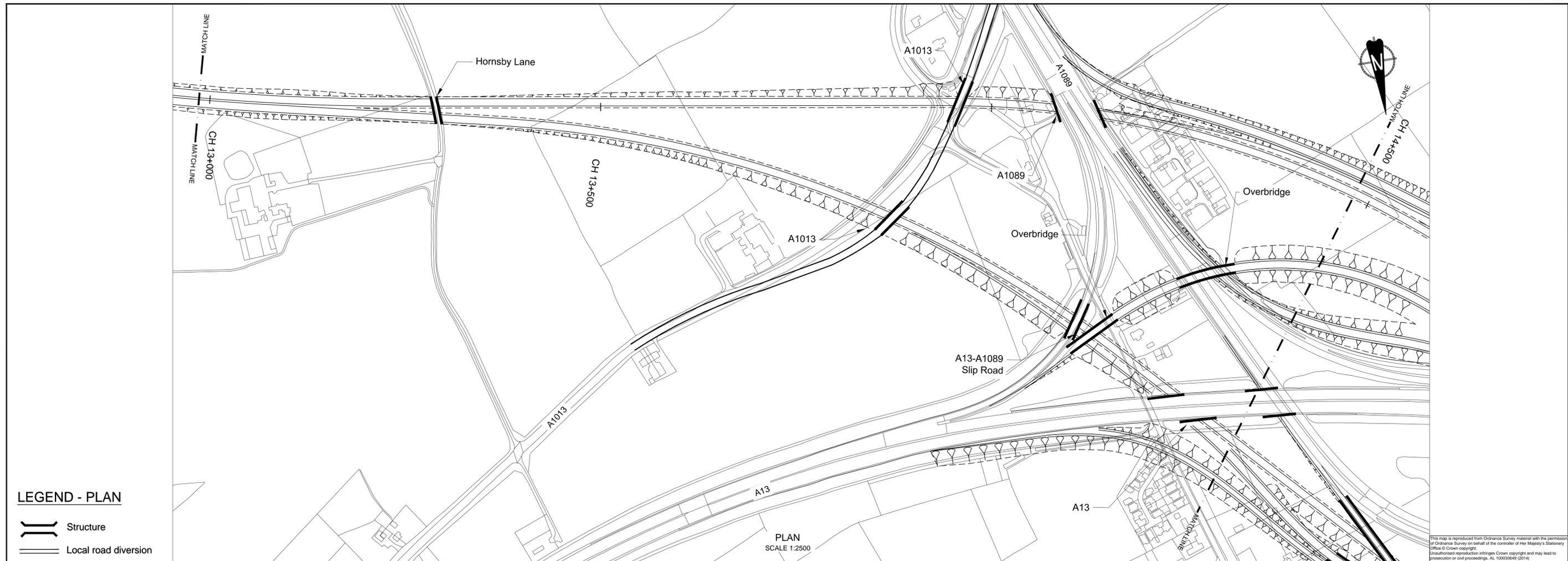
Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Route 3 Plan & Profile Sheet 10 of 17**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0110		
		Original Size	A1

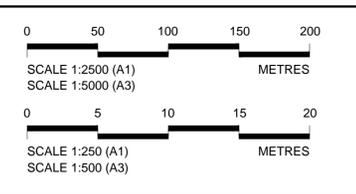
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH



P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd

NOTES

- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE DESIGN

Client

Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

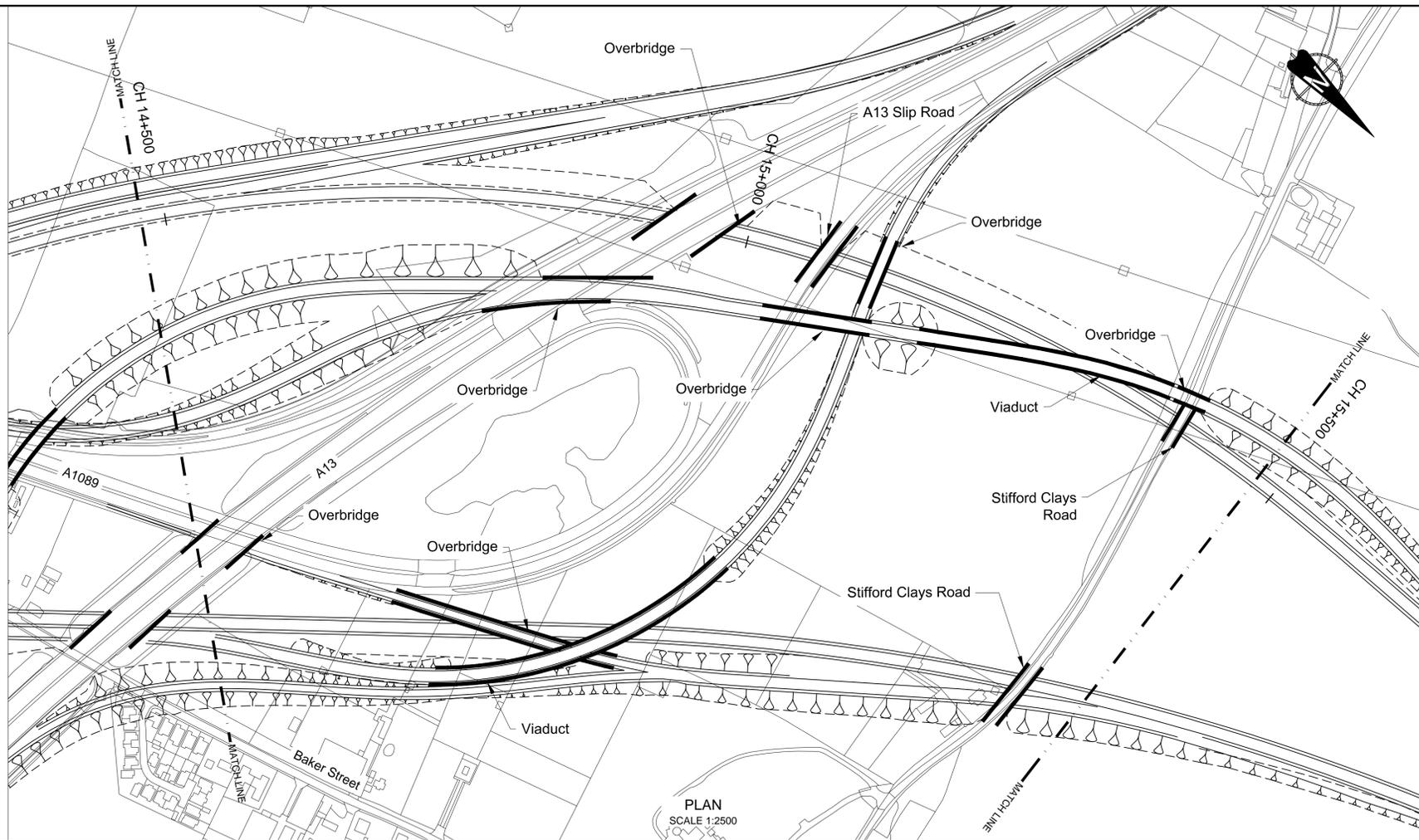
Project

LOWER THAMES CROSSING

Drawing title

**Route 3
Plan & Profile
Sheet 11 of 17**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0111		
		Original Size	A1



LEGEND - PLAN

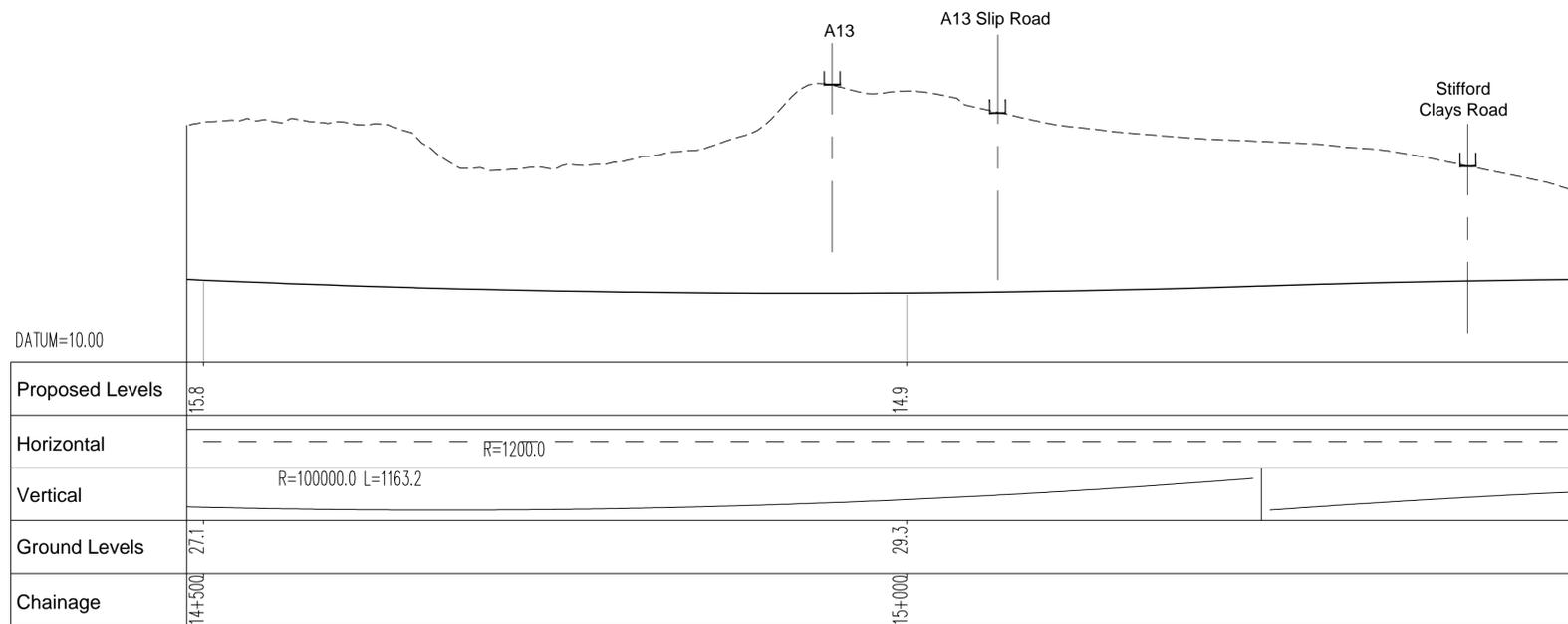
- Structure
- Local road diversion

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LEGEND - PROFILE

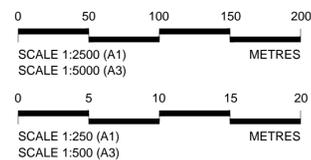
- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250



NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE DESIGN

Client **highways england**

Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Route 3 Plan & Profile Sheet 12 of 17**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0112		
		Original Size	A1

Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH



LEGEND - PLAN

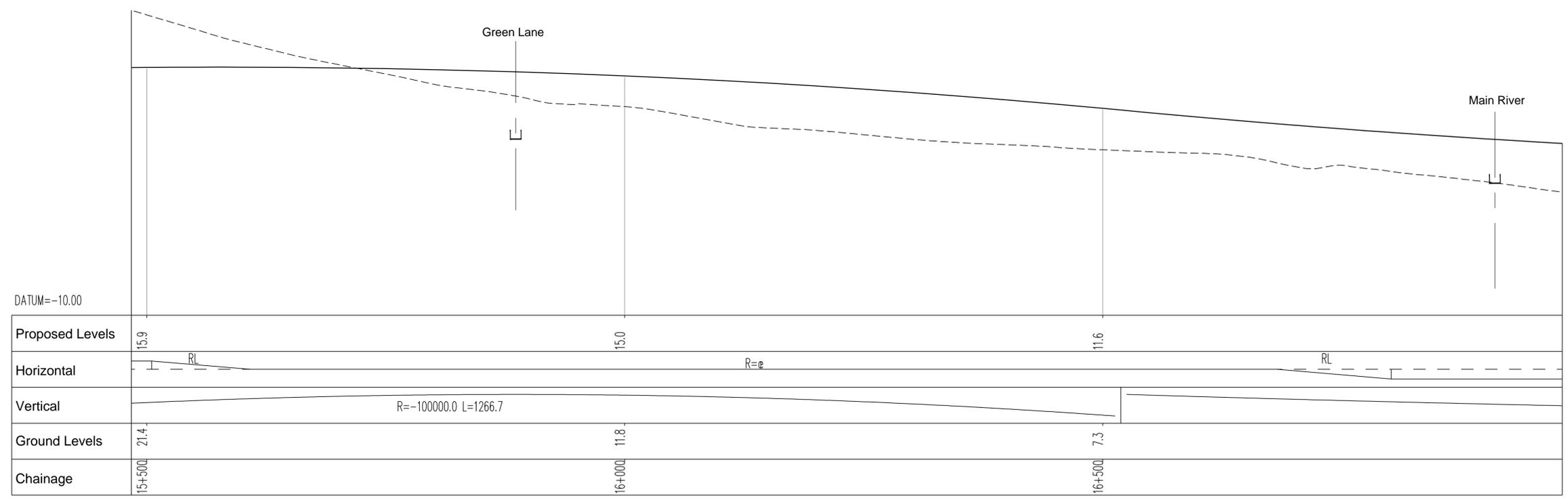
- Structure
- Local road diversion

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LEGEND - PROFILE

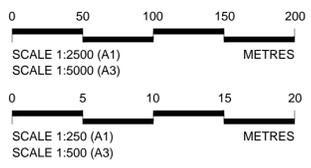
- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250



NOTES

- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE DESIGN

Client

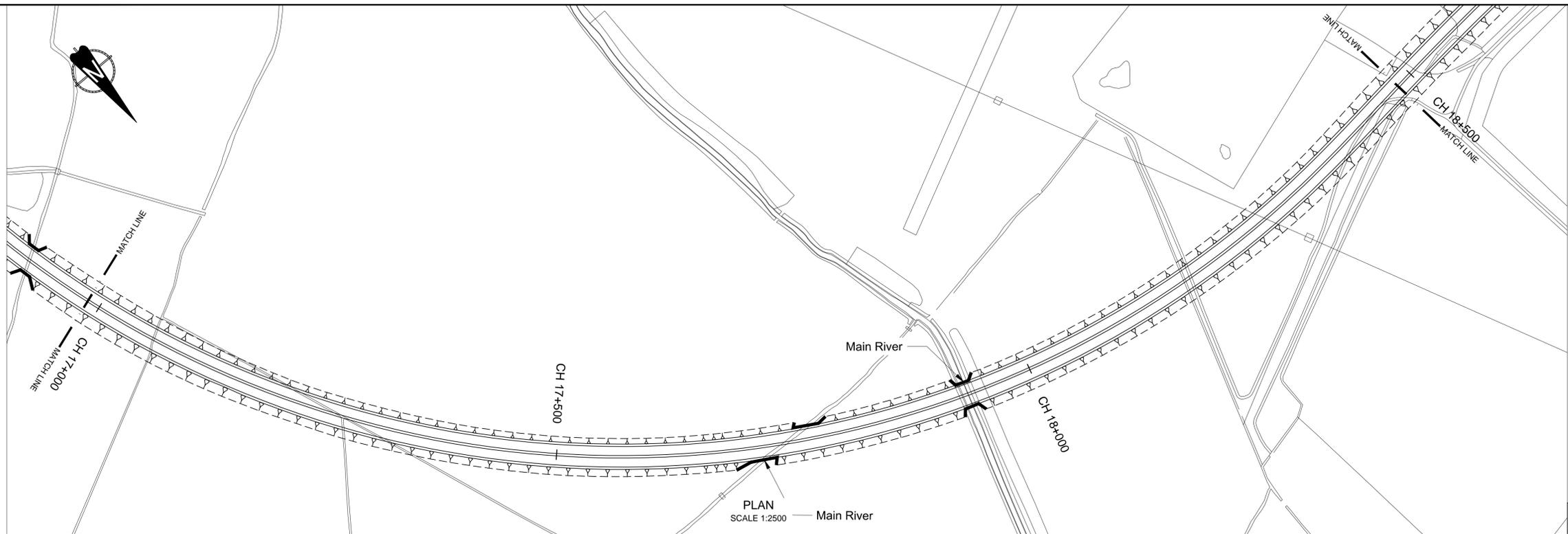
Halcrow Hyder Joint Venture
Burdorpe Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project LOWER THAMES CROSSING

Drawing title Route 3 Plan & Profile Sheet 13 of 17

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0113		
		Original Size	A1

P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd



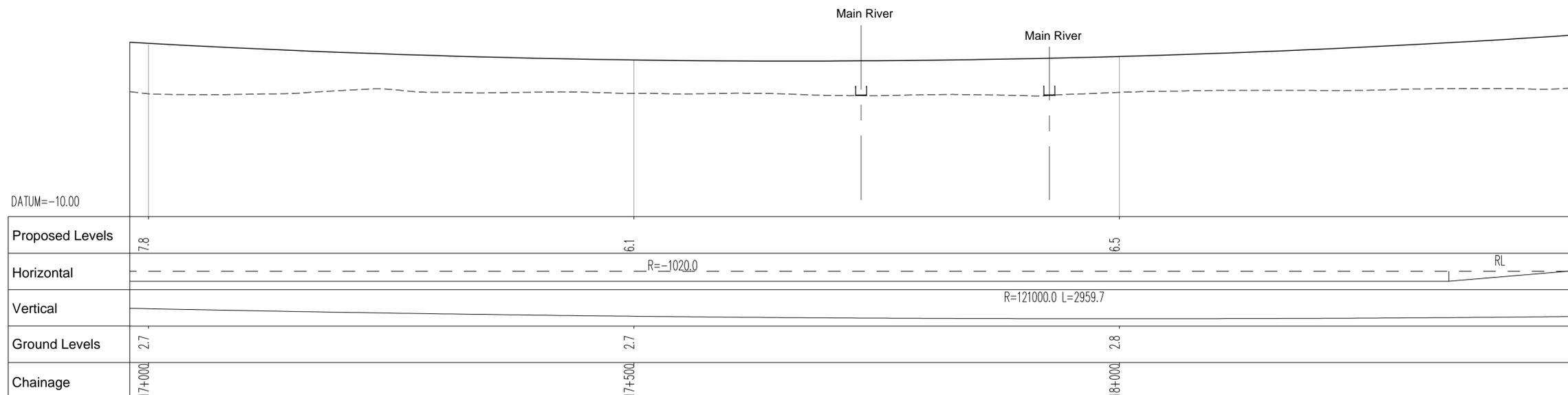
LEGEND - PLAN

- Structure
- Local road diversion

LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

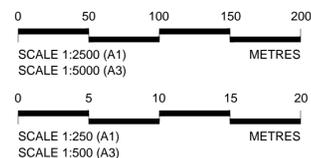
PROFILE
H:V SCALE 1:2500 - 1:250



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NOTES

- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

Client

Halcrow Hyder Joint Venture

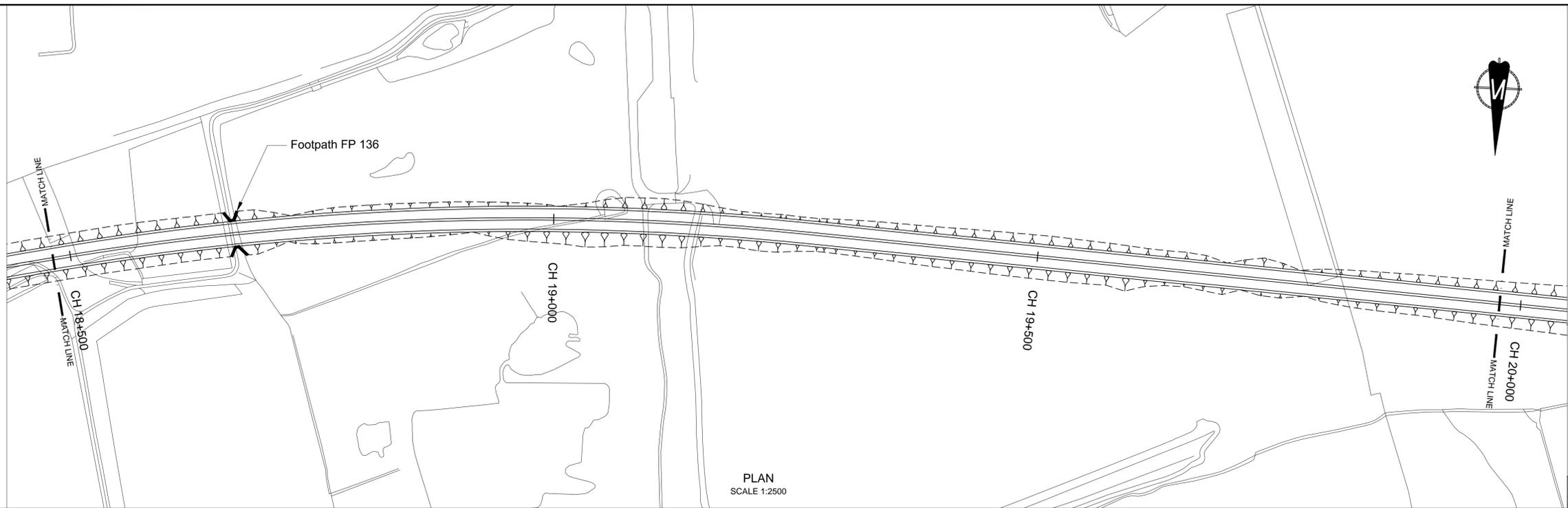
Burderop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project LOWER THAMES CROSSING

Drawing title Route 3 Plan & Profile Sheet 14 of 17

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0114		
		Original Size	A1

Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Apprv'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH



LEGEND - PLAN

- Structure
- Local road diversion

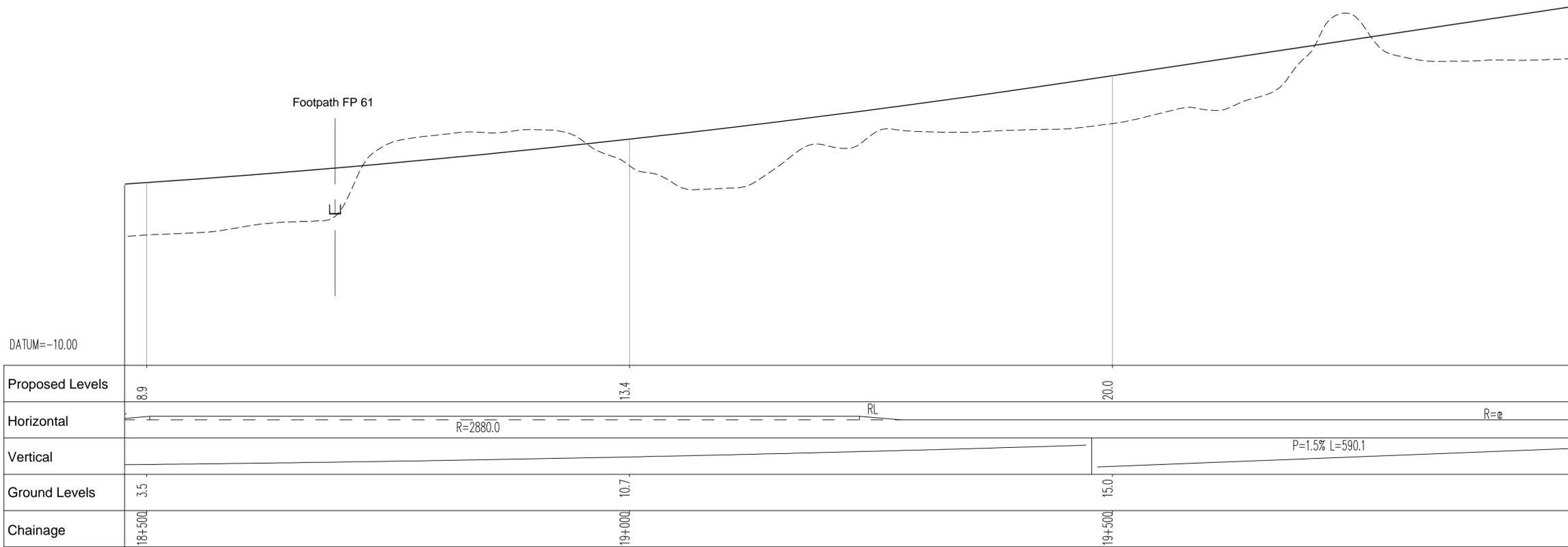
PLAN
SCALE 1:2500

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LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

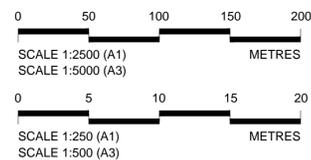
PROFILE
H:V SCALE 1:2500 - 1:250



Proposed Levels	8.9	13.4	20.0
Horizontal	R=2880.0		R=∞
Vertical	P=1.5% L=590.1		
Ground Levels	3.5	10.7	15.0
Chainage	18+500	19+000	19+500

NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

Client

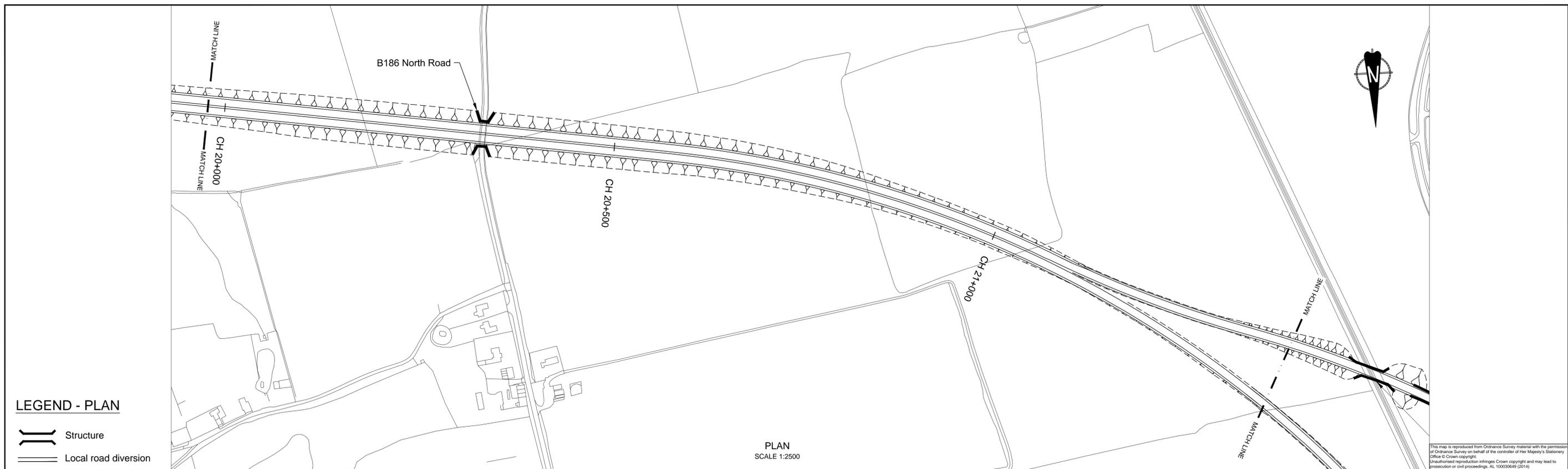
Halcrow Hyder Joint Venture
Burderop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Route 3 Plan & Profile Sheet 15 of 17**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0115		
		Original Size	A1

P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Apprv'd



LEGEND - PLAN

- Structure
- Local road diversion

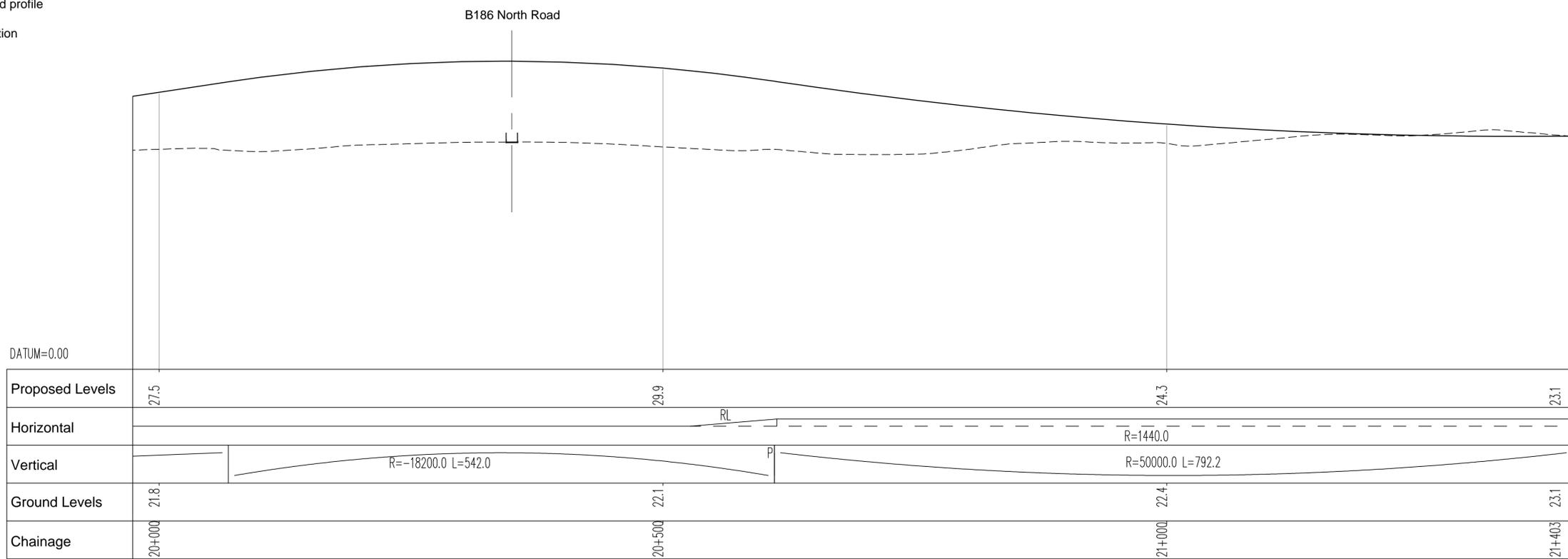
PLAN
SCALE 1:2500

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LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

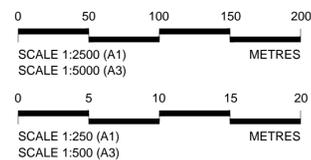
PROFILE
H:V SCALE 1:2500 - 1:250



DATUM=0.00

NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd
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P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
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Client

Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

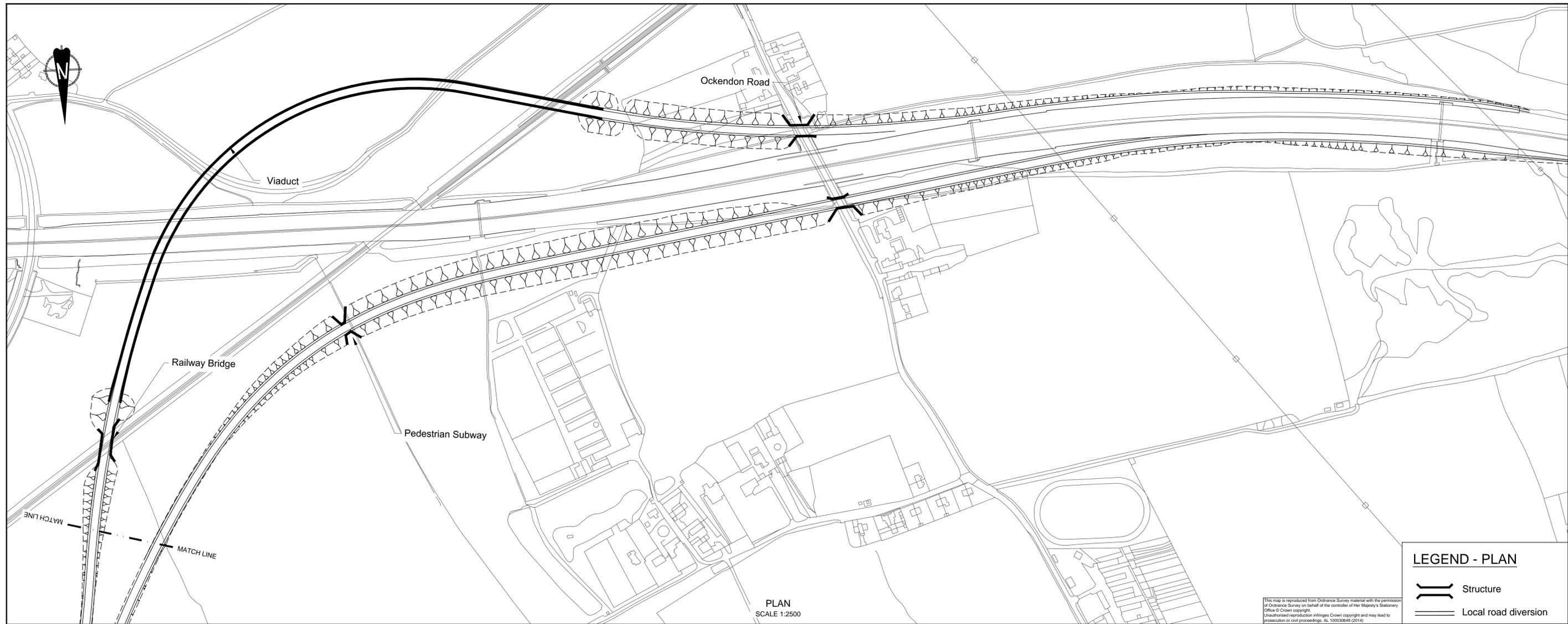
Project

**LOWER THAMES
CROSSING**

Drawing title

**Route 3
Plan & Profile
Sheet 16 of 17**

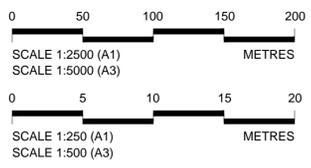
Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0116		
		Original Size	A1



P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd

NOTES

- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

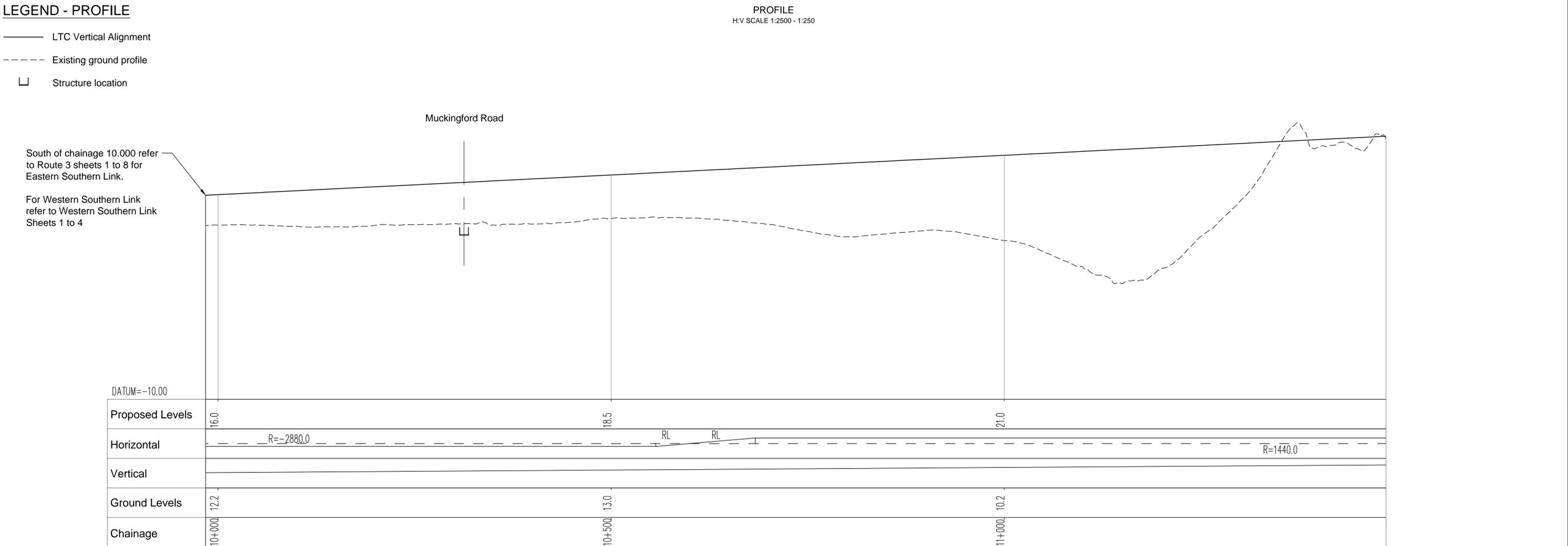
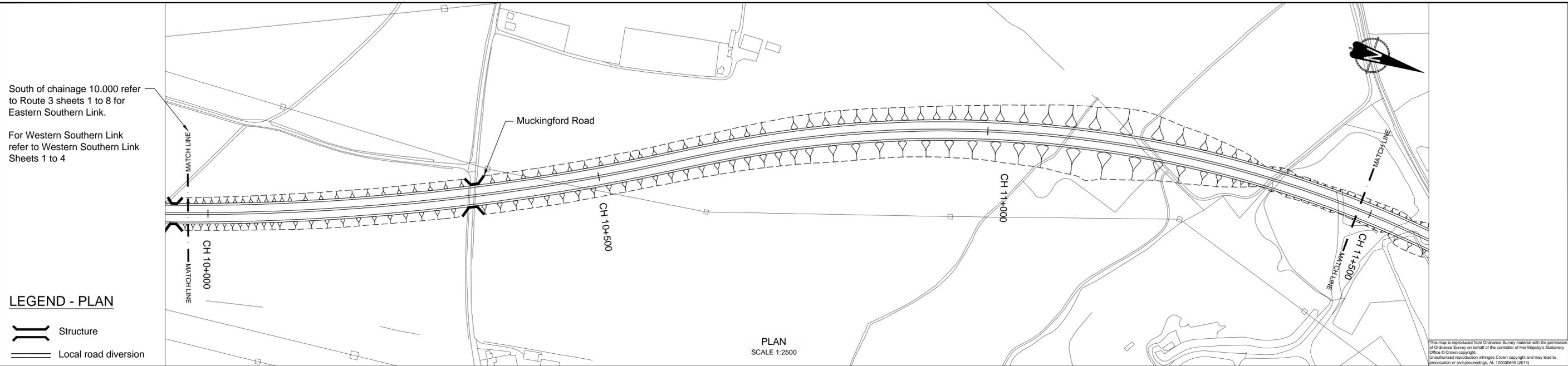
Client

Halcrow Hyder Joint Venture
 Burderop Park
 Swindon, SN4 0QD
 Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Route 3 Plan & Profile Sheet 17 of 17**

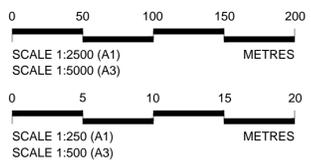
Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD3MLZZZML-DR-RD-0117		
Original Size	A1		



P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd

NOTES

- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



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DESIGN

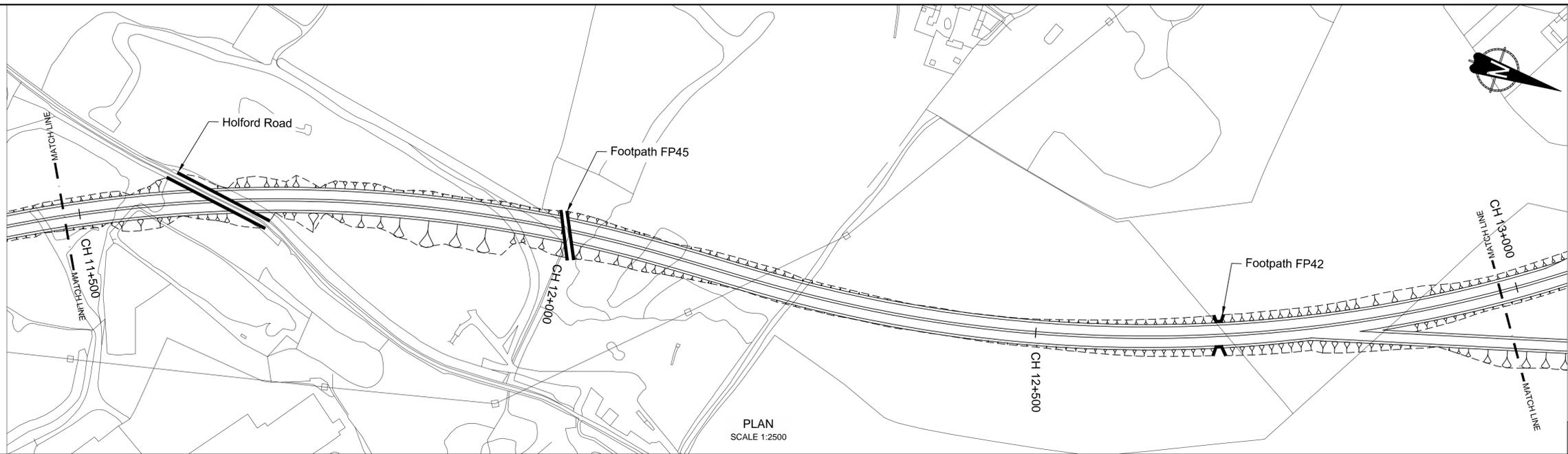
Client

Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project LOWER THAMES CROSSING

Drawing title Route 4 Plan & Profile Sheet 1 of 12

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN HA540039	Originator	HHJ
Original Size			A1
Drawing number	HML-CD4MLZZZML-DR-RD-0109		



LEGEND - PLAN

- Structure
- Local road diversion

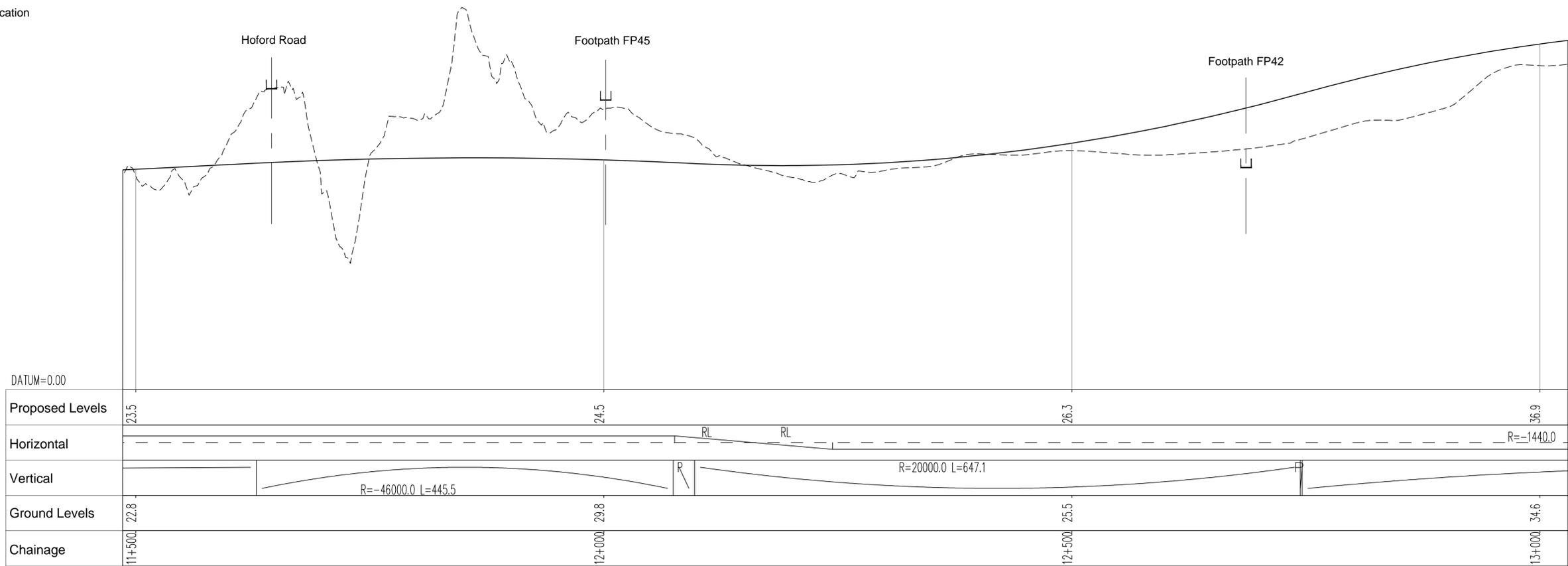
PLAN
SCALE 1:2500

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LEGEND - PROFILE

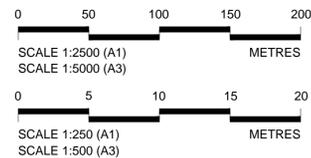
- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250



NOTES

- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

Client

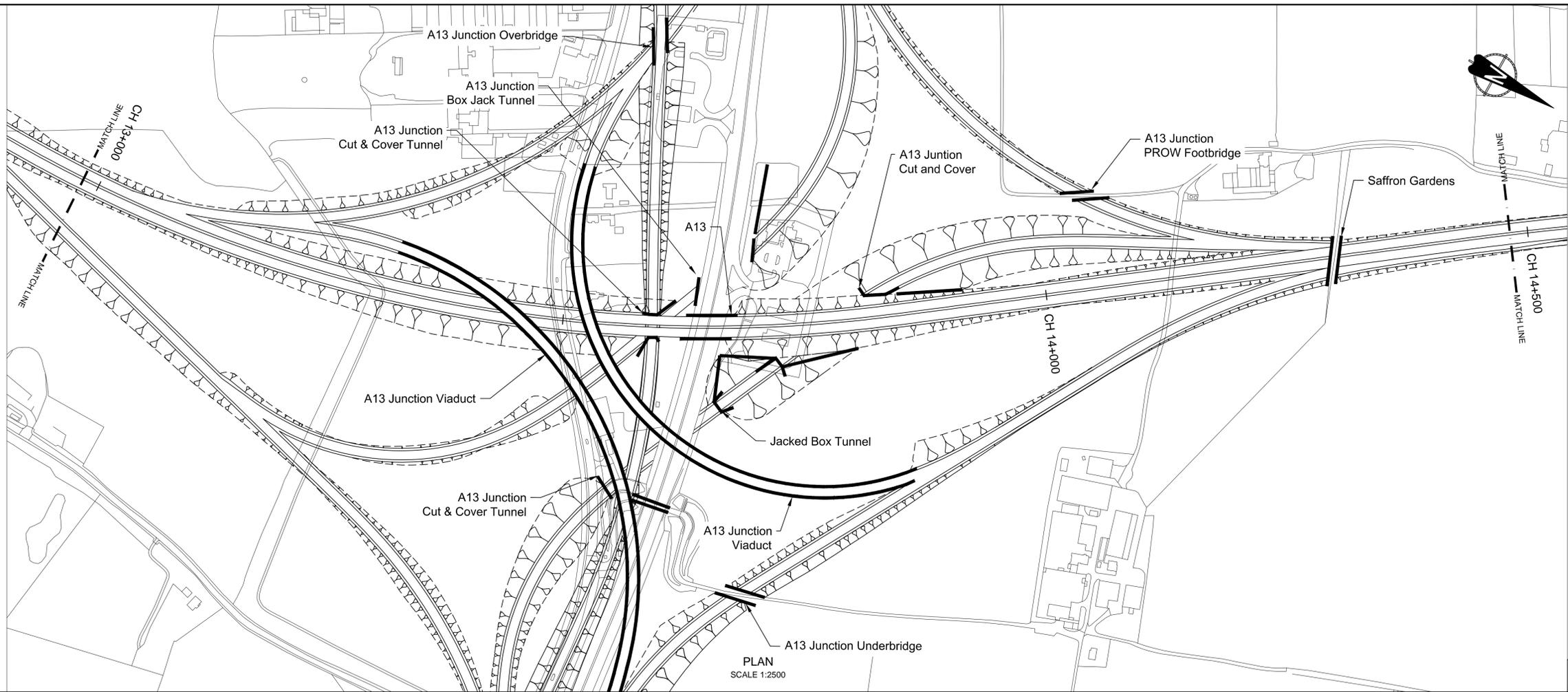
Halcrow Hyder Joint Venture
Burdorpe Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project LOWER THAMES CROSSING

Drawing title Route 4 Plan & Profile Sheet 2 of 12

Status	S2	Revision	P02
Scale	As Shown	Date	02-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN HA540039	Originator	HHJ
Drawing number	HML-CD4MLZZZML-DR-RD-0110		
		Original Size	A1

P02	S5	02-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd



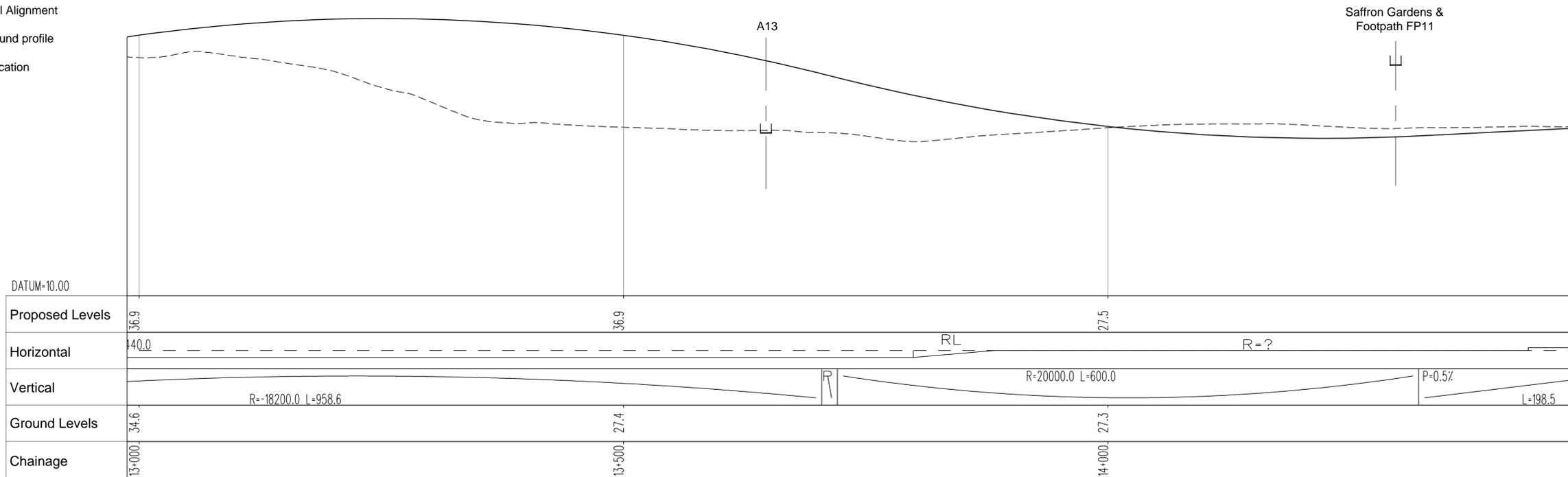
LEGEND - PLAN

- Structure
- Local road diversion

LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

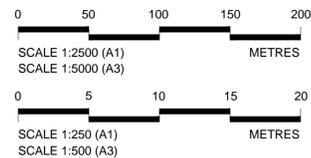
PROFILE
H:V SCALE 1:2500 - 1:250



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NOTES

- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100



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Client

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Burdorpe Park
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Project **LOWER THAMES CROSSING**

Drawing title **Route 4 Plan & Profile Sheet 3 of 12**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN HA540039	Originator	HHJ
Drawing number	HML-CD4MLZZZML-DR-RD-0111		
		Original Size	A1

P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd



LEGEND - PLAN

- Structure
- Local road diversion

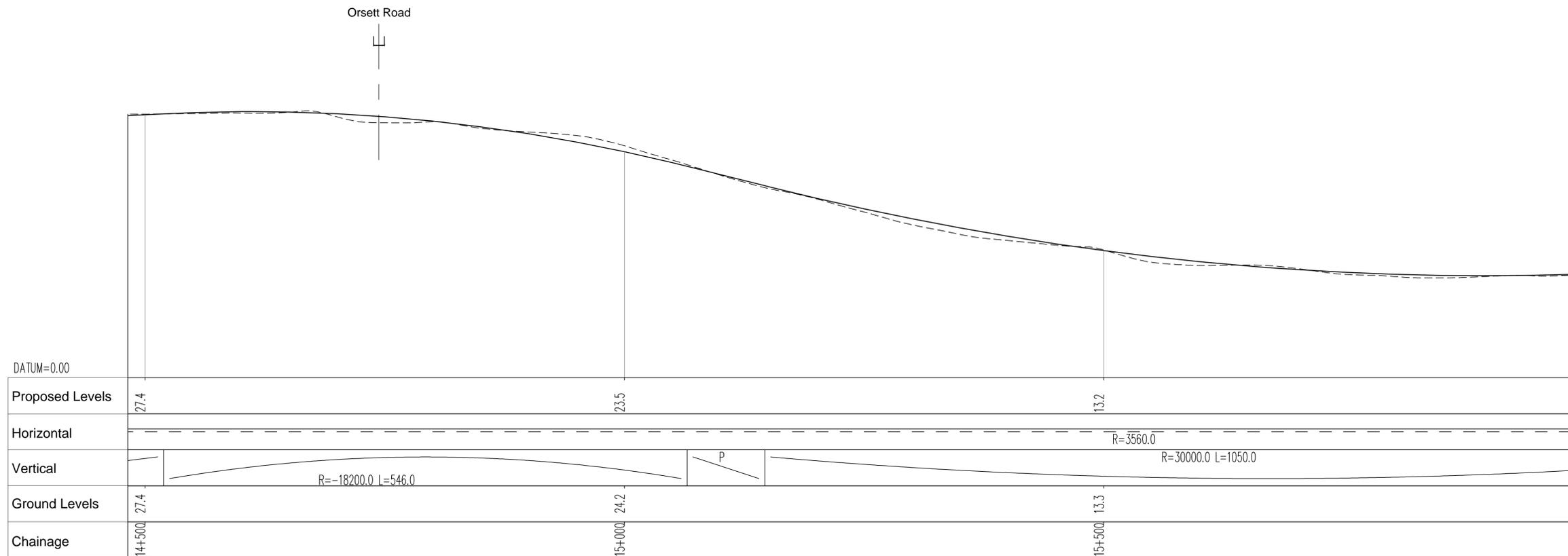
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SCALE 1:2500

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LEGEND - PROFILE

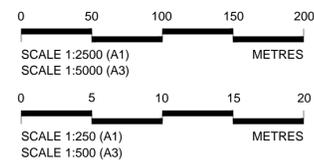
- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250



NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



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Client

Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
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Project **LOWER THAMES CROSSING**

Drawing title **Route 4 Plan & Profile Sheet 4 of 12**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN HA540039	Originator	HHJ
Original Size			A1
Drawing number	HML-CD4MLZZZML-DR-RD-0112		

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH



LEGEND - PLAN

- Structure
- Local road diversion

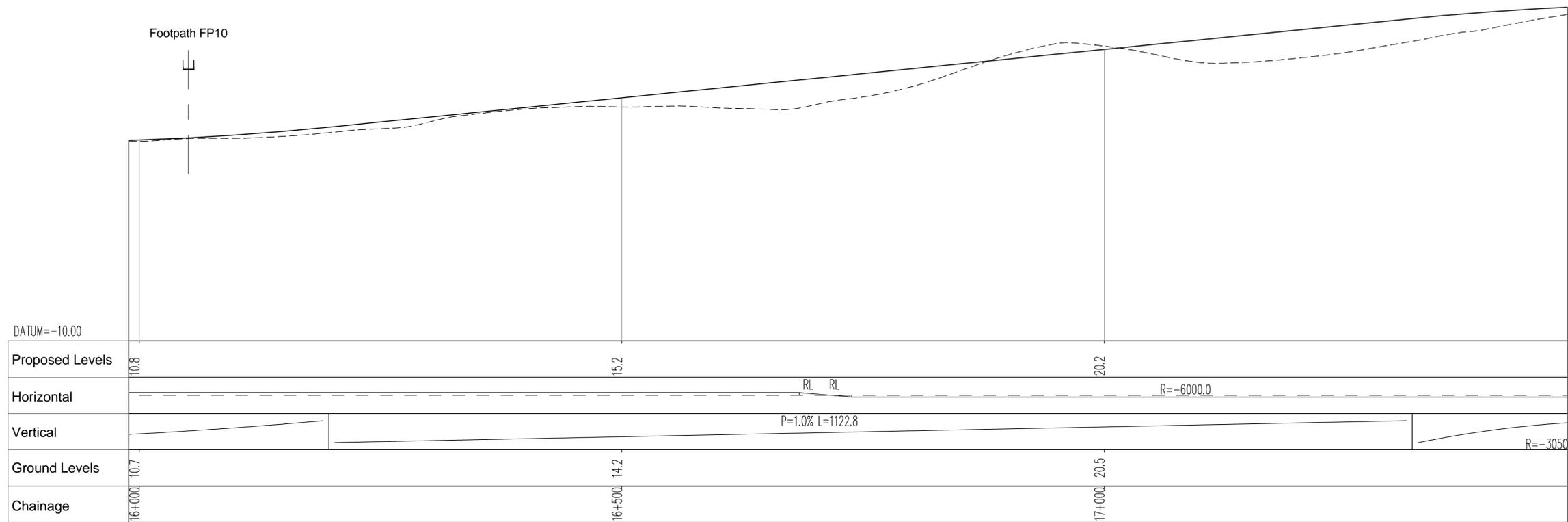
PLAN
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LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

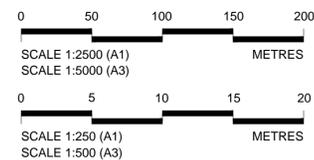
PROFILE
H:V SCALE 1:2500 - 1:250



Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH

NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



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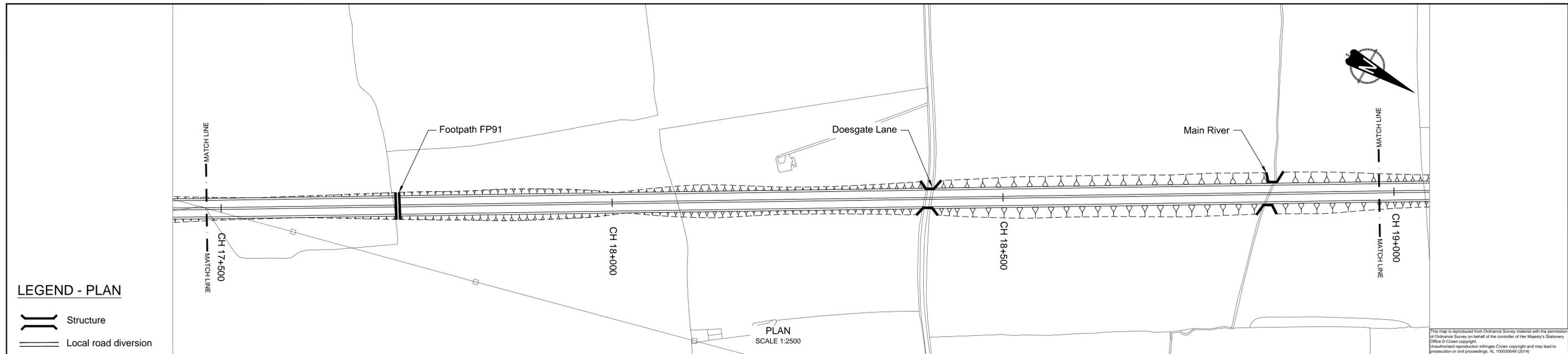
Client

Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Route 4 Plan & Profile Sheet 5 of 12**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Original Size			A1
Drawing number	HML-CD4MLZZZML-DR-RD-0113		



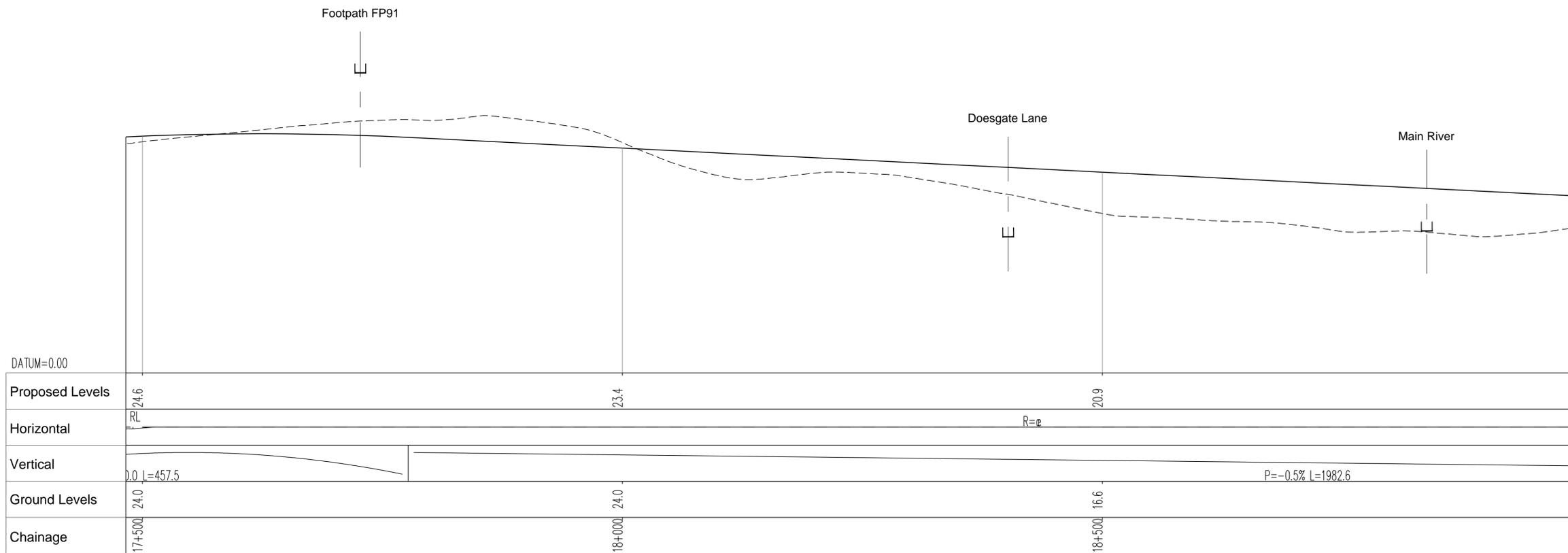
LEGEND - PLAN

- Structure
- Local road diversion

LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

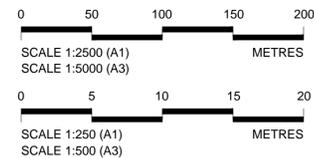
PROFILE
H:V SCALE 1:2500 - 1:250



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P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Apprv'd

- NOTES**
- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
 - The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



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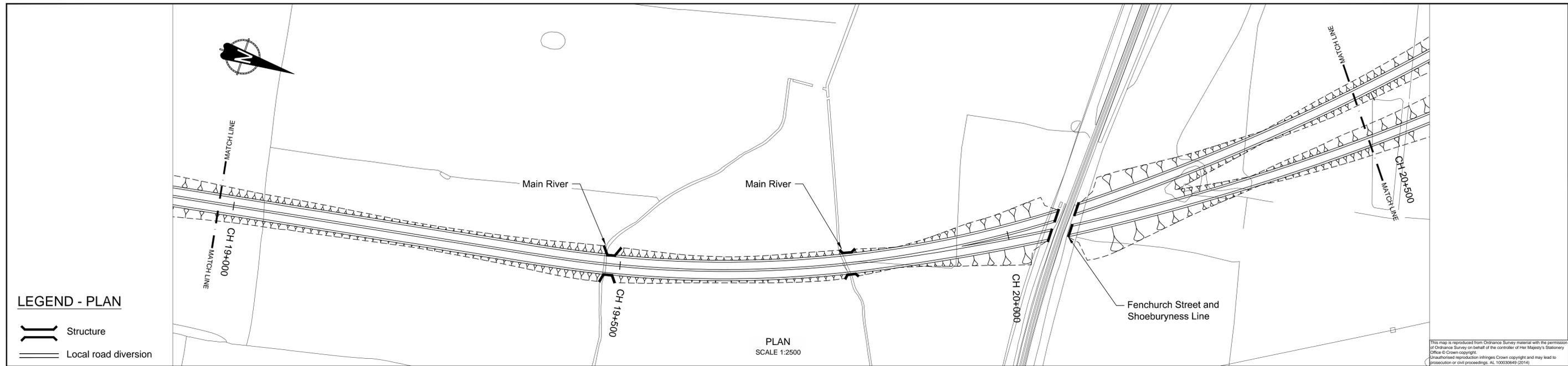
Client

Halcrow Hyder Joint Venture
Burderop Park
Swindon, SN4 0QD
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Project LOWER THAMES CROSSING

Drawing title Route 4 Plan & Profile Sheet 6 of 12

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Original Size			A1
Drawing number	HML-CD4MLZZZML-DR-RD-0114		



LEGEND - PLAN

- Structure
- Local road diversion

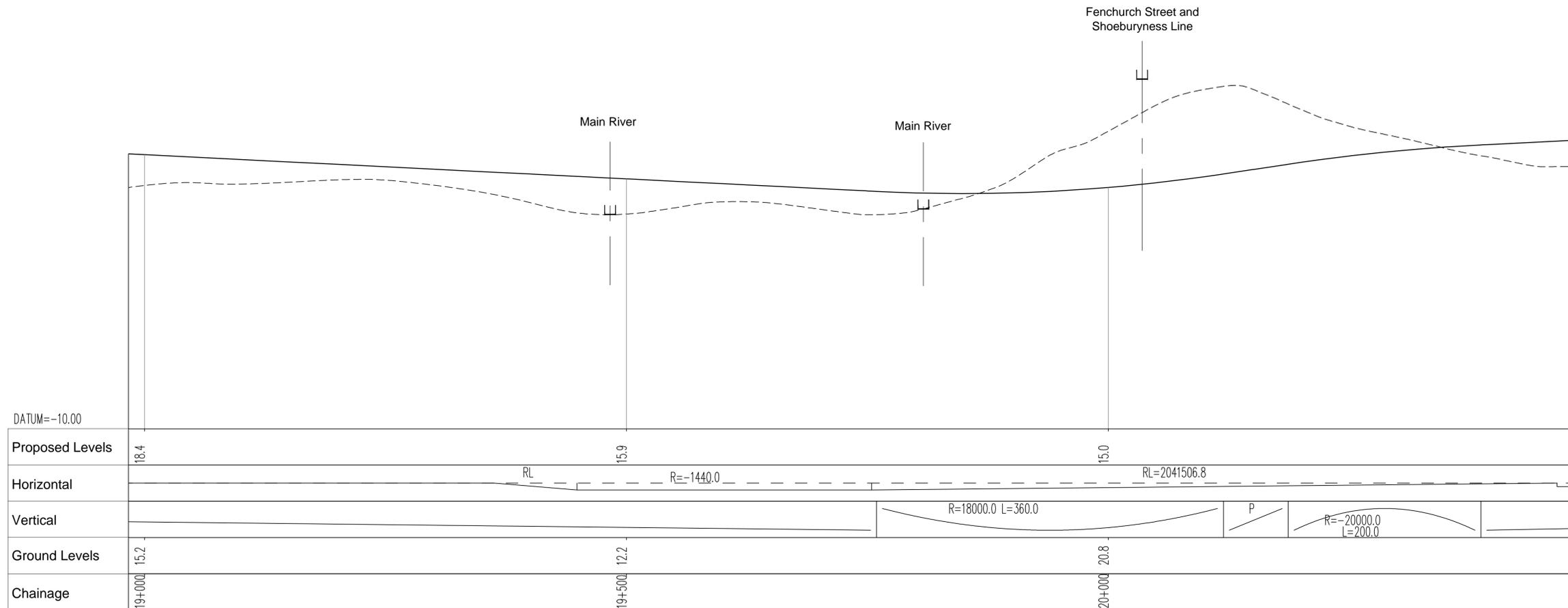
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LEGEND - PROFILE

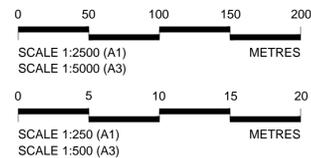
- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250



NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



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Client

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Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project

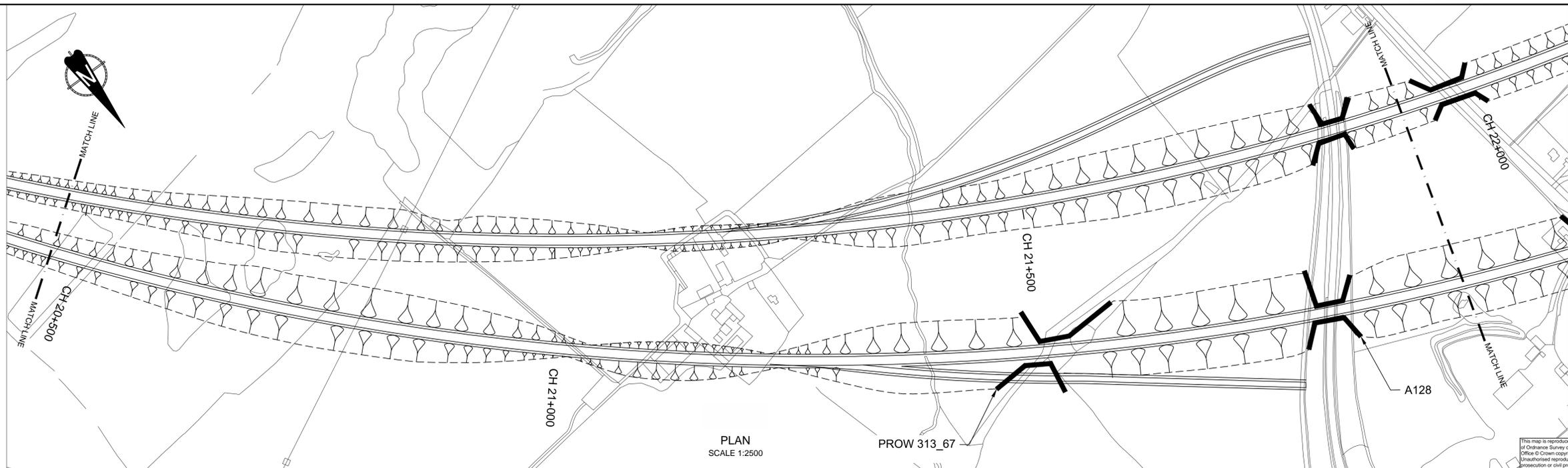
LOWER THAMES CROSSING

Drawing title

**Route 4
Plan & Profile
Sheet 7 of 12**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD4MLZZZML-DR-RD-0116		
		Original Size	A1

P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd



LEGEND - PLAN

- Structure
- Local road diversion

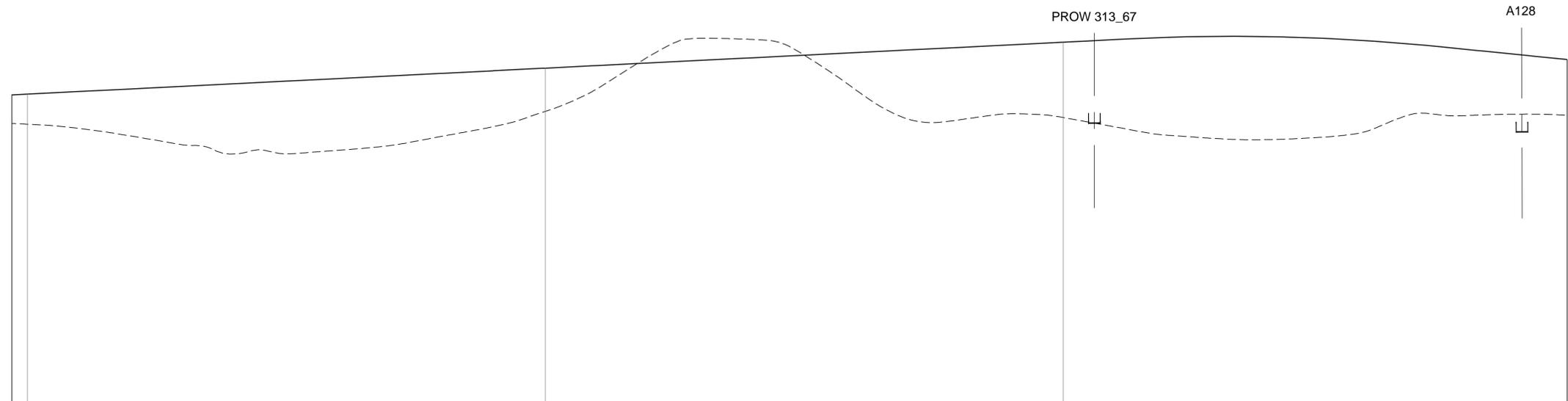
PLAN
SCALE 1:2500
PROW 313_67

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LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250

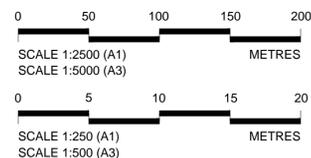


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Vertical	P=0.5% L=1176.5			
Ground Levels	17.1	18.3	17.7	P=
Chainage	20+500	21+000	21+500	

NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



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DESIGN

Client

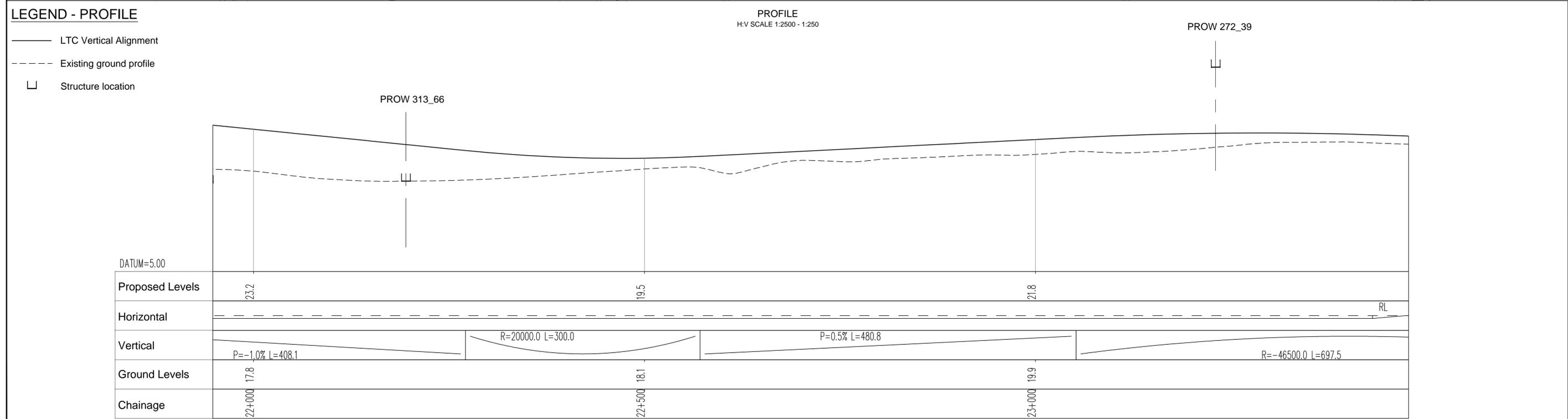
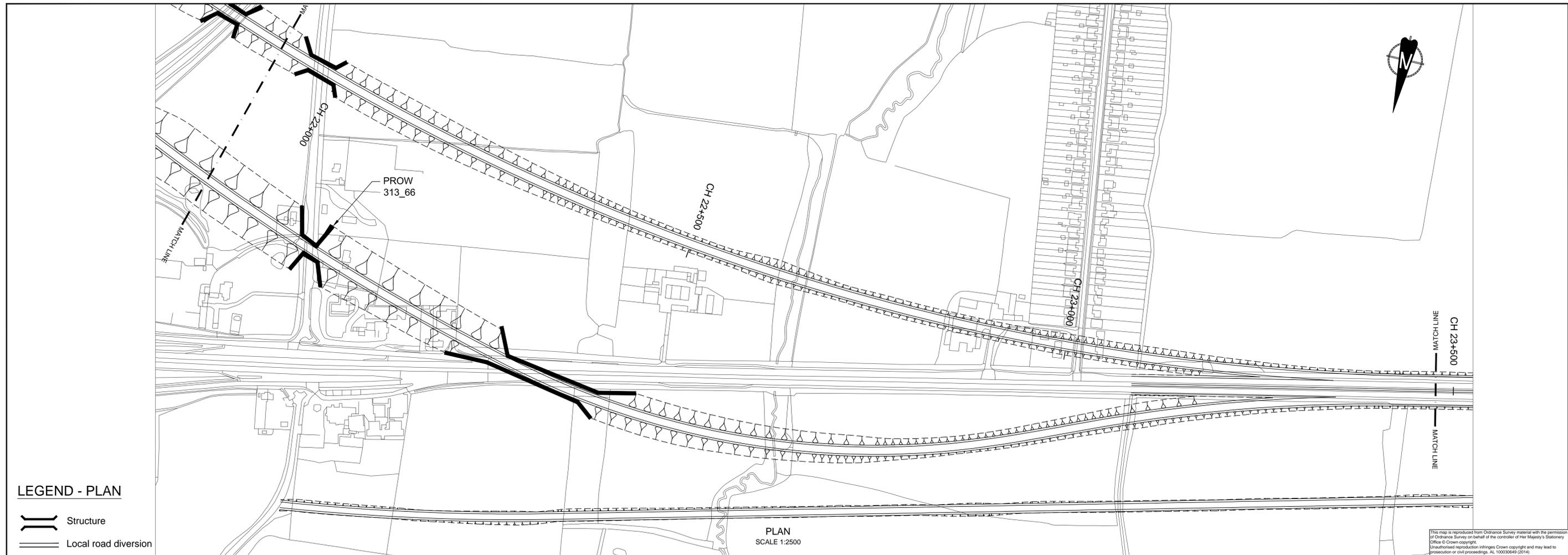
Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Route 4 Plan & Profile Sheet 8 of 12**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD4MLZZZML-DR-RD-0117		
		Original Size	A1

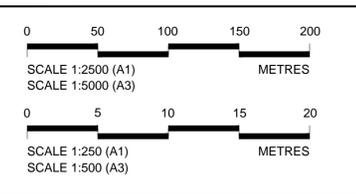
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd



PO2	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd

NOTES

- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
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Client

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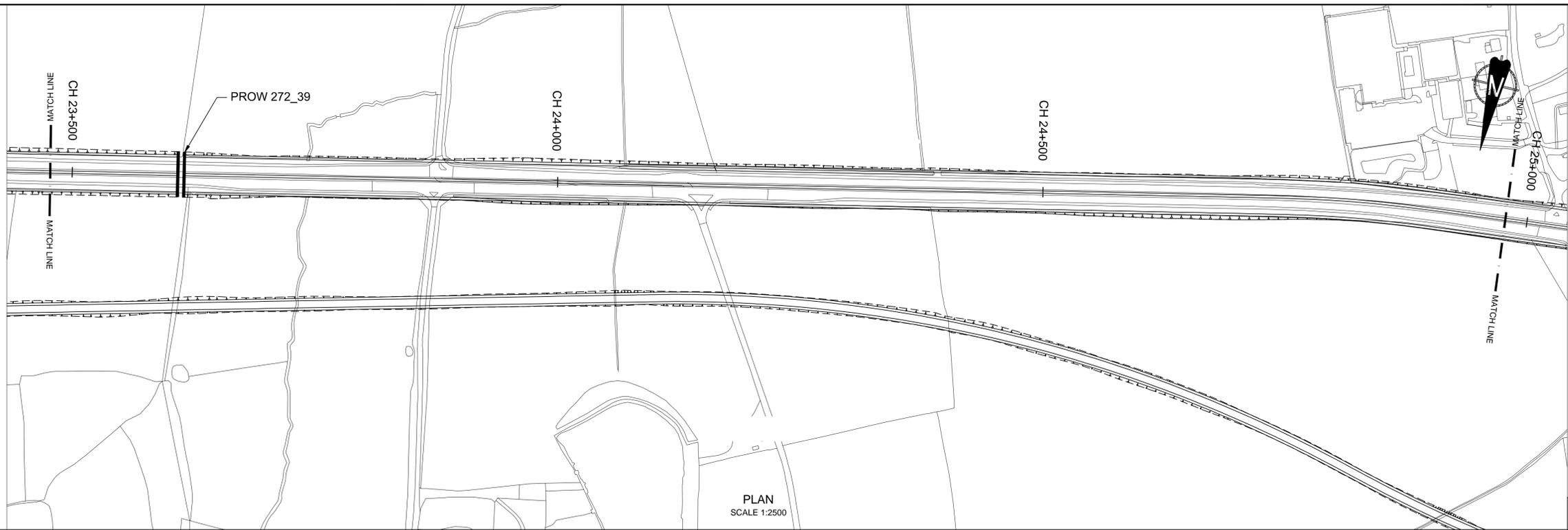
Project

LOWER THAMES CROSSING

Drawing title

**Route 4
Plan & Profile
Sheet 9 of 12**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD4MLZZZML-DR-RD-0118		
		Original Size	A1



LEGEND - PLAN

- Structure
- Local road diversion

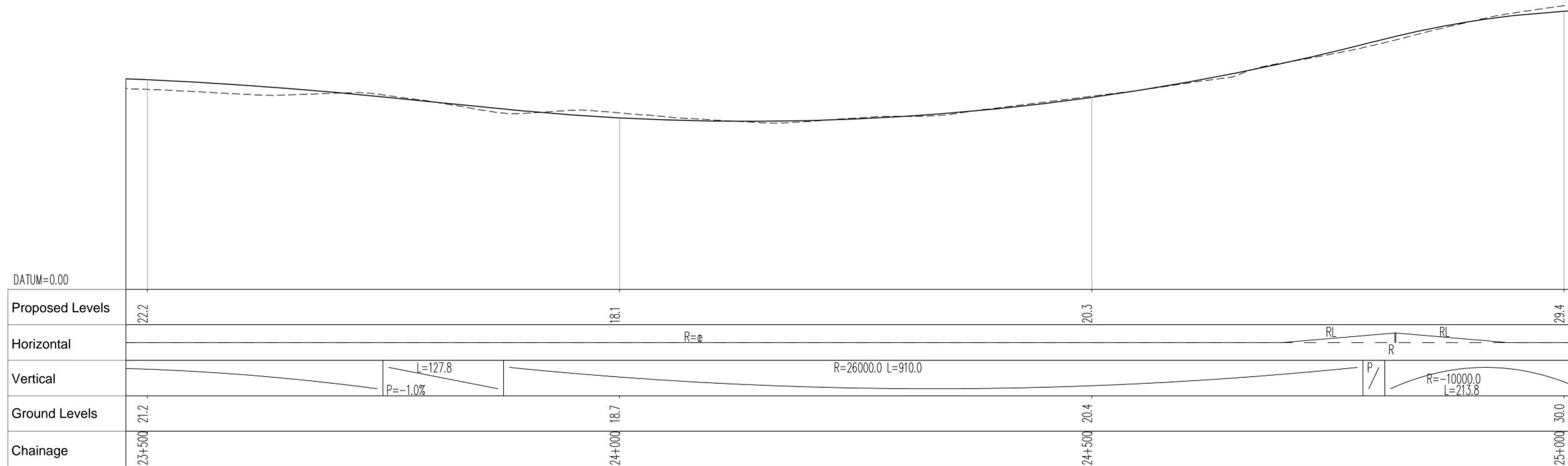
PLAN
SCALE 1:2500

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LEGEND - PROFILE

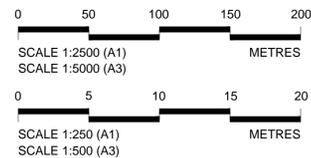
- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250



NOTES

- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

Client

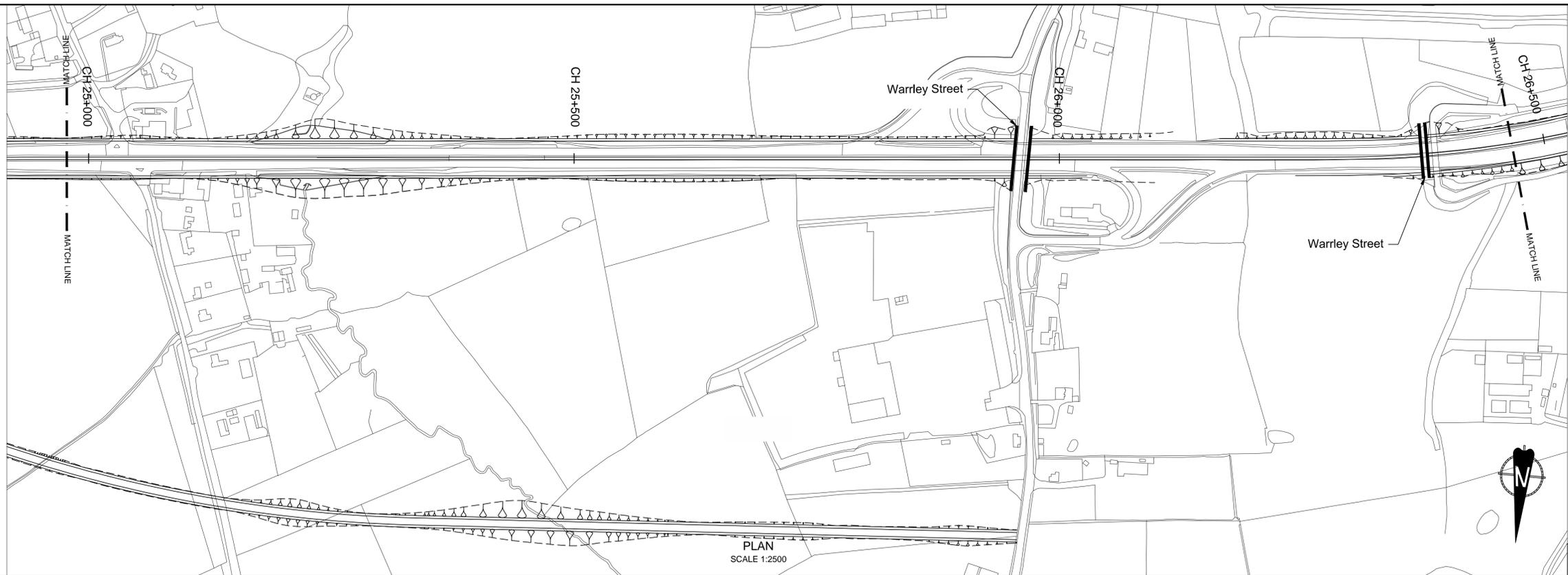
Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Route 4 Plan & Profile Sheet 10 of 12**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD4MLZZZML-DR-RD-0119		
		Original Size	A1

P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd



LEGEND - PLAN

- Structure
- Local road diversion

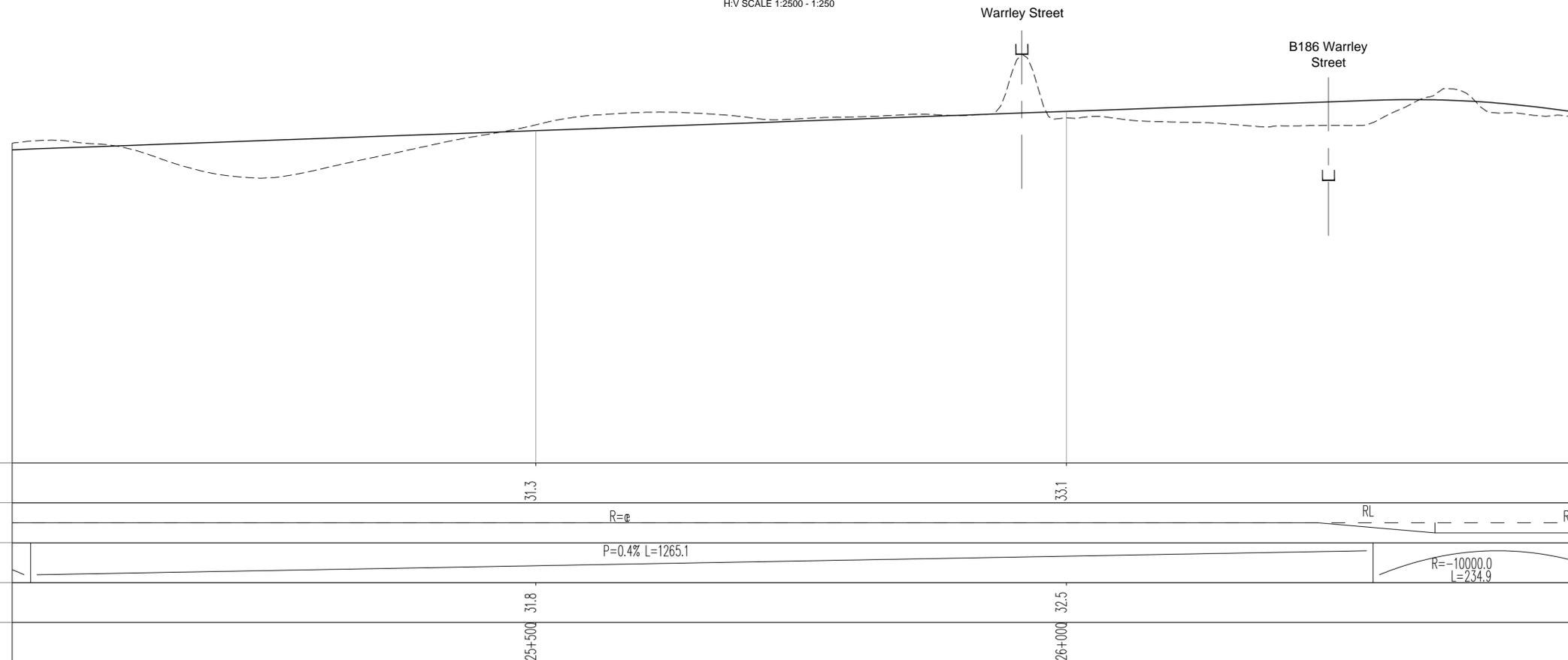
PLAN
SCALE 1:2500

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LEGEND - PROFILE

- LTC Vertical Alignment
- Existing ground profile
- Structure location

PROFILE
H:V SCALE 1:2500 - 1:250

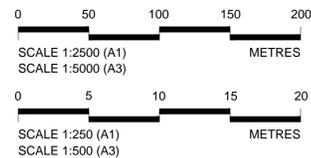


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Vertical	$P=0.4\% \quad L=1265.1$		
Ground Levels	31.8	32.5	$R=-10000.0 \quad L=234.9$
Chainage	25+500	26+000	

NOTES

1. For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
2. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Apprv'd
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P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
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Client

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Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

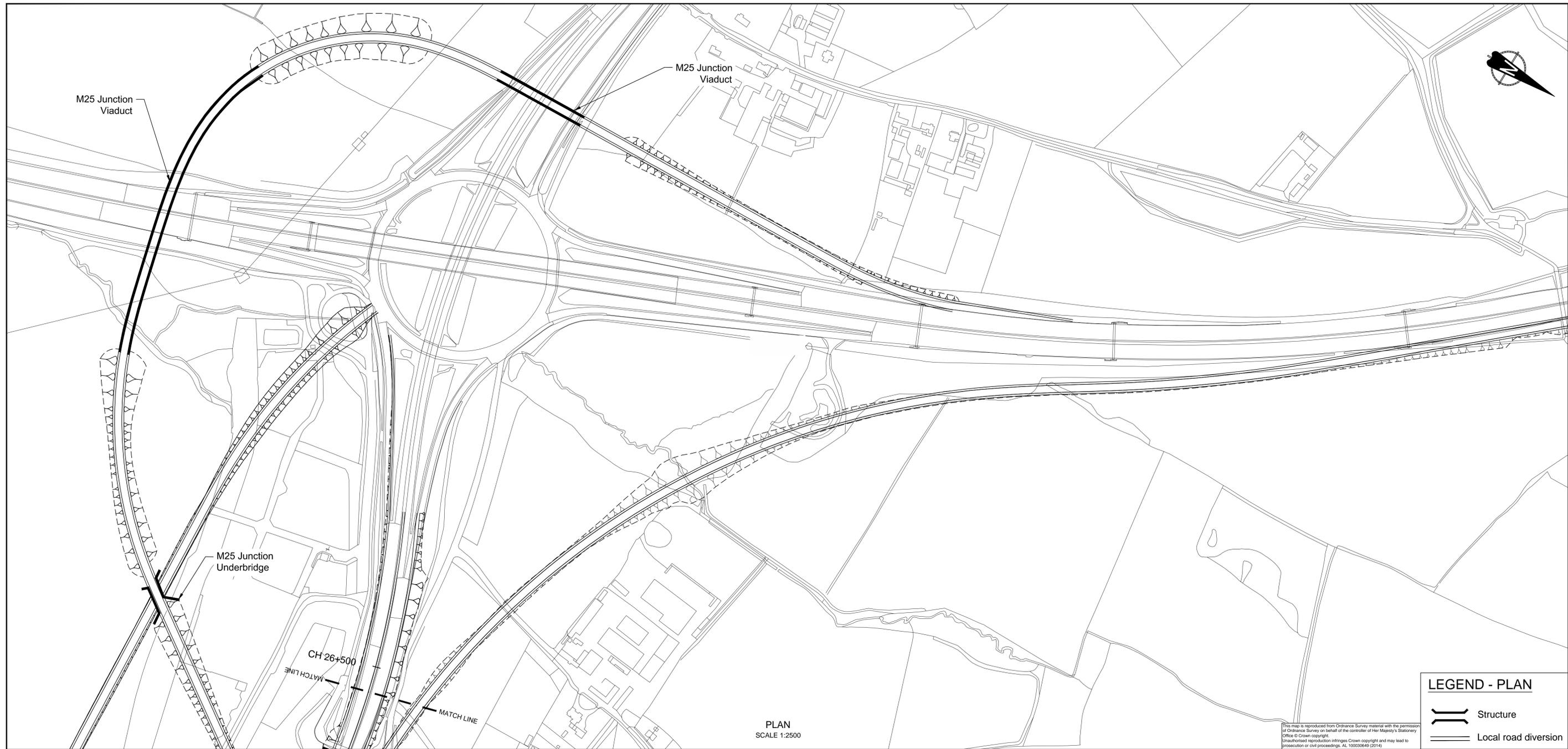
Project

LOWER THAMES CROSSING

Drawing title

**Route 4
Plan & Profile
Sheet 11 of 12**

Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD4MLZZZML-DR-RD-0120		
		Original Size	A1



PLAN
SCALE 1:2500

LEGEND - PLAN

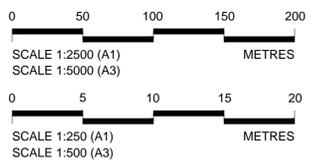
Structure

Local road diversion

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P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd

- NOTES**
- For key plan refer to drawing HML-CD3MLZZZML-DR-RD-0100
 - The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
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Client

Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project

LOWER THAMES CROSSING

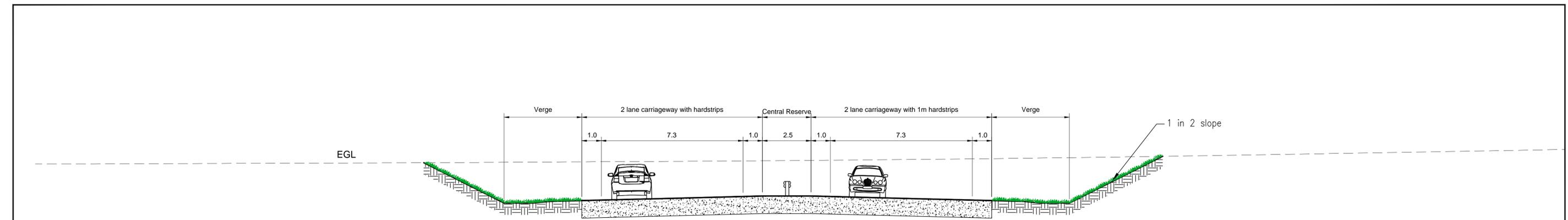
Drawing title

**Route 4
Plan & Profile
Sheet 12 of 12**

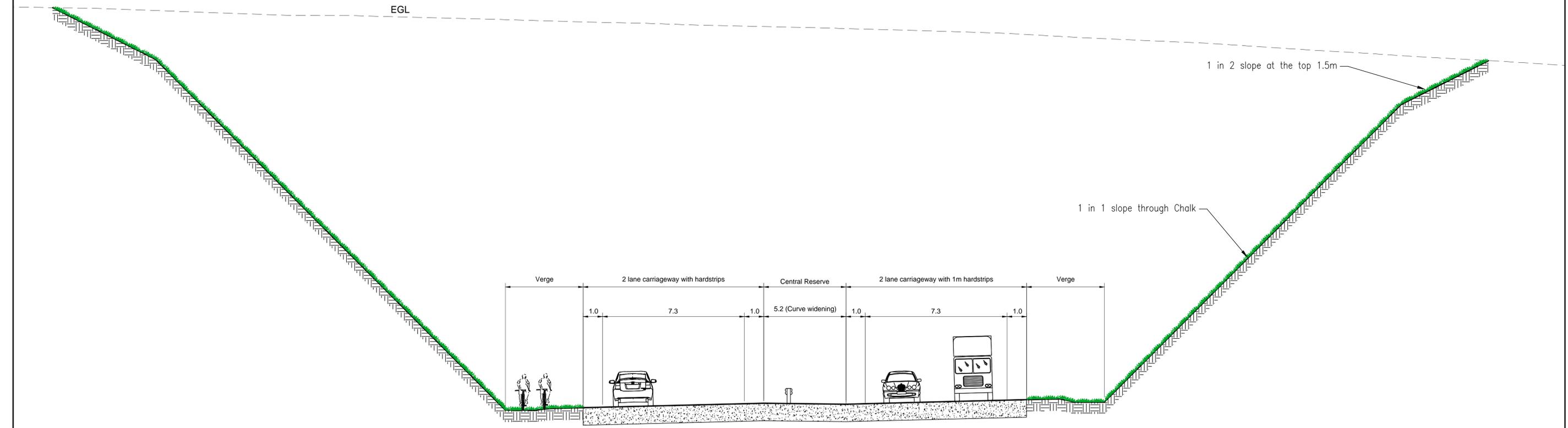
Status	S2	Revision	P02
Scale	As Shown	Date	12-08-16
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN 496945	Originator	HHJ
Drawing number	HML-CD4MLZZZML-DR-RD-0120		
		Original Size	A1

Appendix 3.10 – Routes 3 and 4 Typical Cross Sections

Routes 3 and 4 Typical Cross Section Sheet 1 of 4
Routes 3 and 4 Typical Cross Section Sheet 2 of 4
Routes 3 and 4 Typical Cross Section Sheet 3 of 4
Routes 3 and 4 Typical Cross Section Sheet 4 of 4



Typical section
South of river in shallow cut

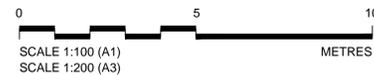


Typical section south of river
Tunnel approach through chalk

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NOTES

- All distances measured in metres.
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



**ILLUSTRATIVE
DESIGN**

Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	RV	MR	GH
P01	S5	18-01-16	SAR ISSUE	AS	MR	GH

Client

Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

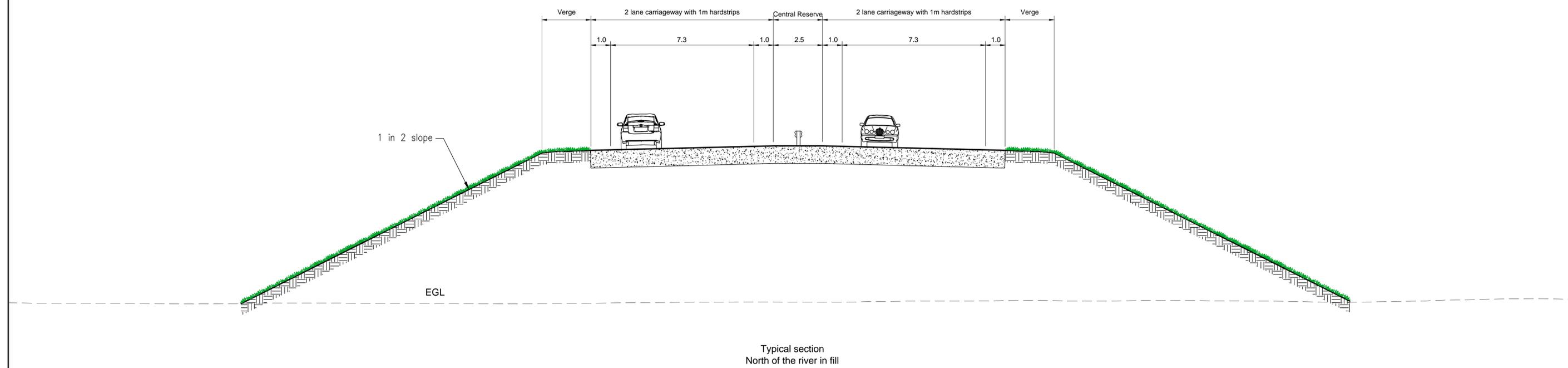
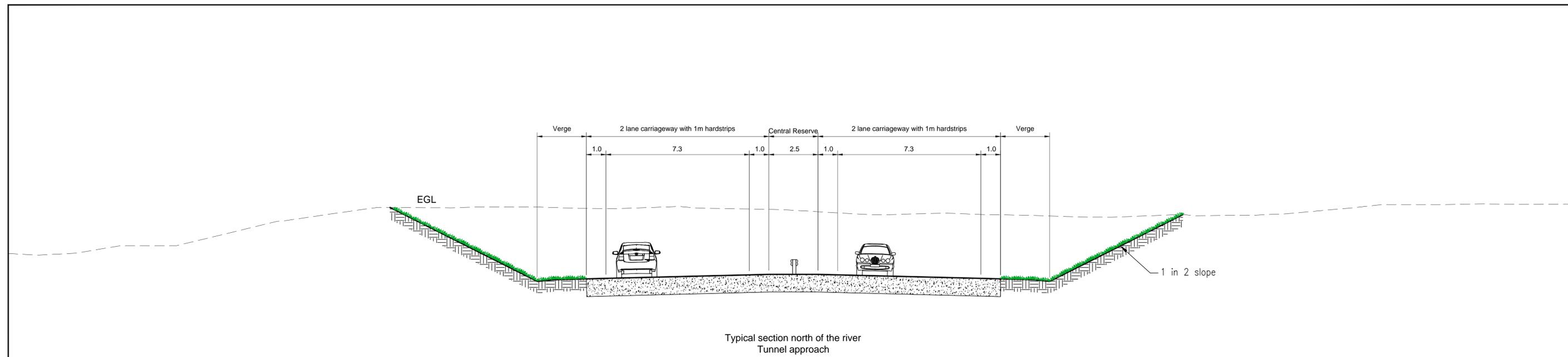
Project

**LOWER THAMES
CROSSING**

Drawing title

**Routes 3 and 4
Typical Cross Section
Sheet 1 of 4**

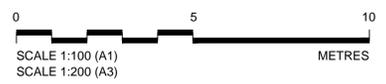
Status	Revision
S5	P02
Scale	1:100
Drawn By	A Sánchez Muñoz
Checked By	M Robinson
Approved By	G Hodge
Project No.	HA PIN Originator
HA540039	HHJ
Original Size	A1
Drawing number	HML-CZZMLZZZML-DR-RD-0010



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NOTES

- All distances measured in metres.
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE
DESIGN

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	RV	MR	GH
P01	S5	18-01-16	SAR ISSUE	AS	MR	GH

Client

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Burdorop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

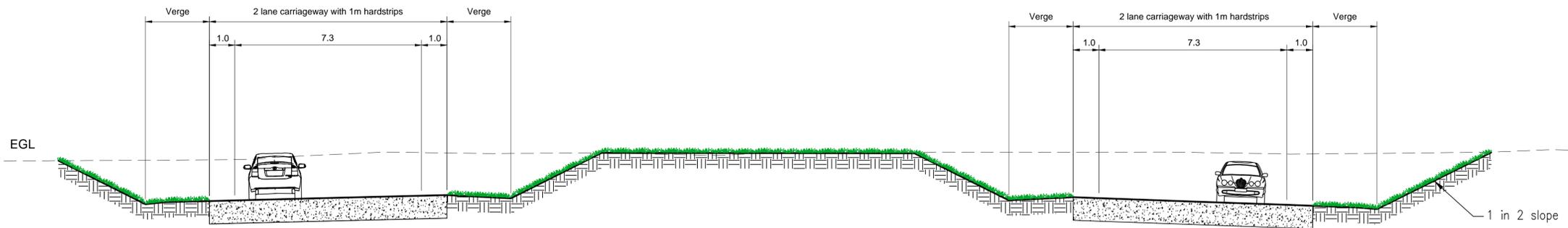
Project

**LOWER THAMES
CROSSING**

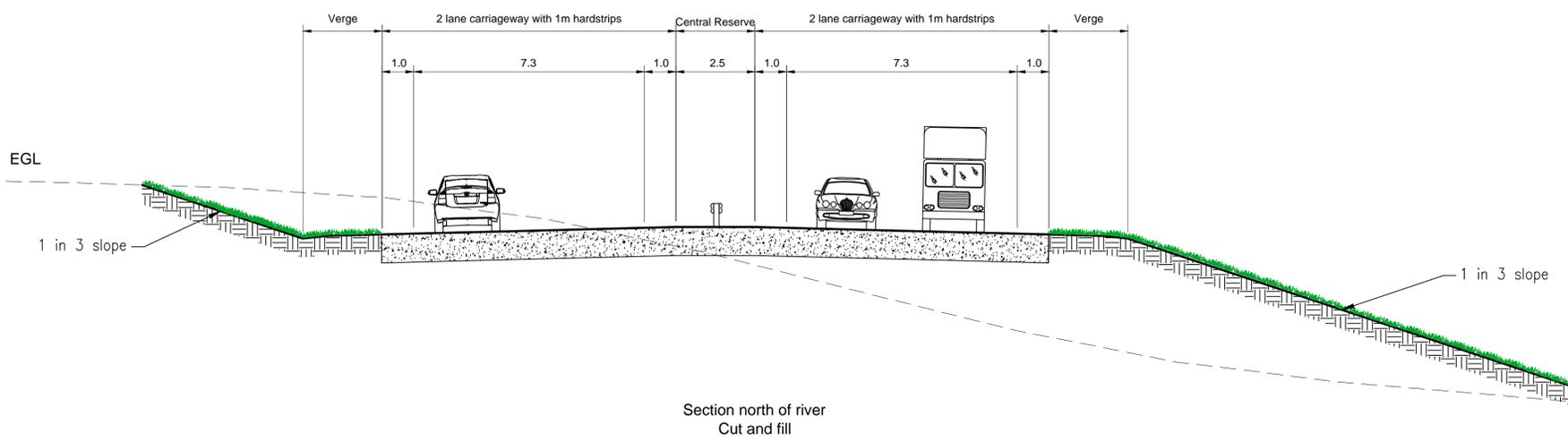
Drawing title

**Routes 3 and 4
Typical Cross Section
Sheet 2 of 4**

Status	Revision
S5	P02
Scale	1:100
Drawn By	A Sánchez Muñoz
Checked By	M Robinson
Approved By	G Hodge
Project No.	HA PIN
Originator	HHJ
Original Size	A1
Drawing number	HML-CZZMLZZZML-DR-RD-0011



Route 3 approach to A13
Carriageway split

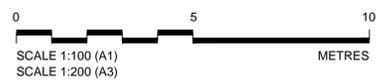


Section north of river
Cut and fill

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NOTES

- All distances measured in metres.
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



**ILLUSTRATIVE
DESIGN**

Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	RV	MR	GH
P01	S5	18-01-16	SAR ISSUE	AS	MR	GH

Client

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Burdorpe Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

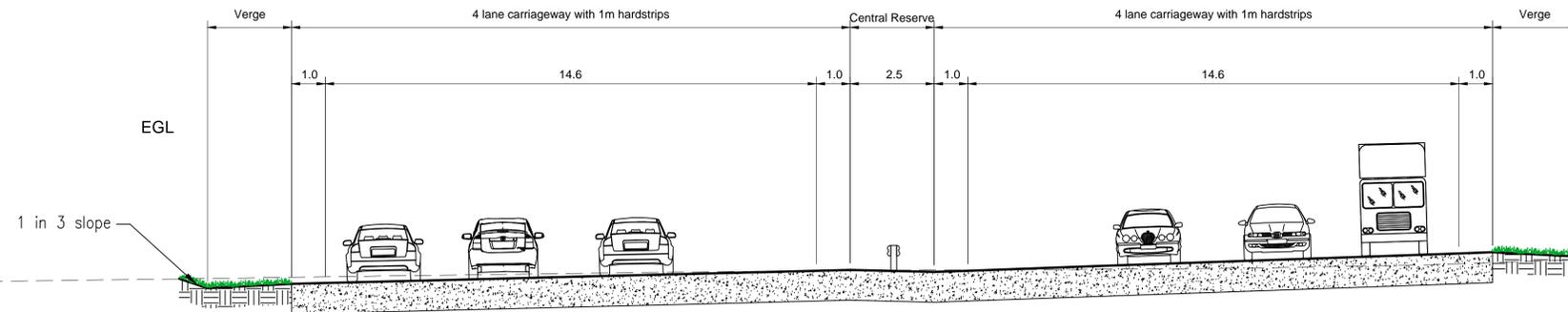
Project

**LOWER THAMES
CROSSING**

Drawing title

**Routes 3 and 4
Typical Cross Section
Sheet 3 of 4**

Status	S5	Revision	P02
Scale	1:100	Date	24-07-15
Drawn By	A Sánchez Muñoz		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN HA540039	Originator	HHJ
Original Size	A1		
Drawing number	HML-CZZMLZZZML-DR-RD-0012		

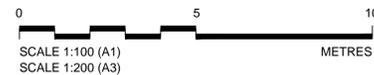


Route 4 approach to A127

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NOTES

- All distances measured in metres.
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.



ILLUSTRATIVE DESIGN

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Appr'd
P02	S5	12-08-16	POST CONSULTATION SAR ISSUE	RV	MR	GH
P01	S5	18-01-16	SAR ISSUE	AS	MR	GH

Client

Halcrow Hyder Joint Venture
 Burderop Park
 Swindon, SN4 0QD
 Tel. +44(0)1793 812479

Project

LOWER THAMES CROSSING

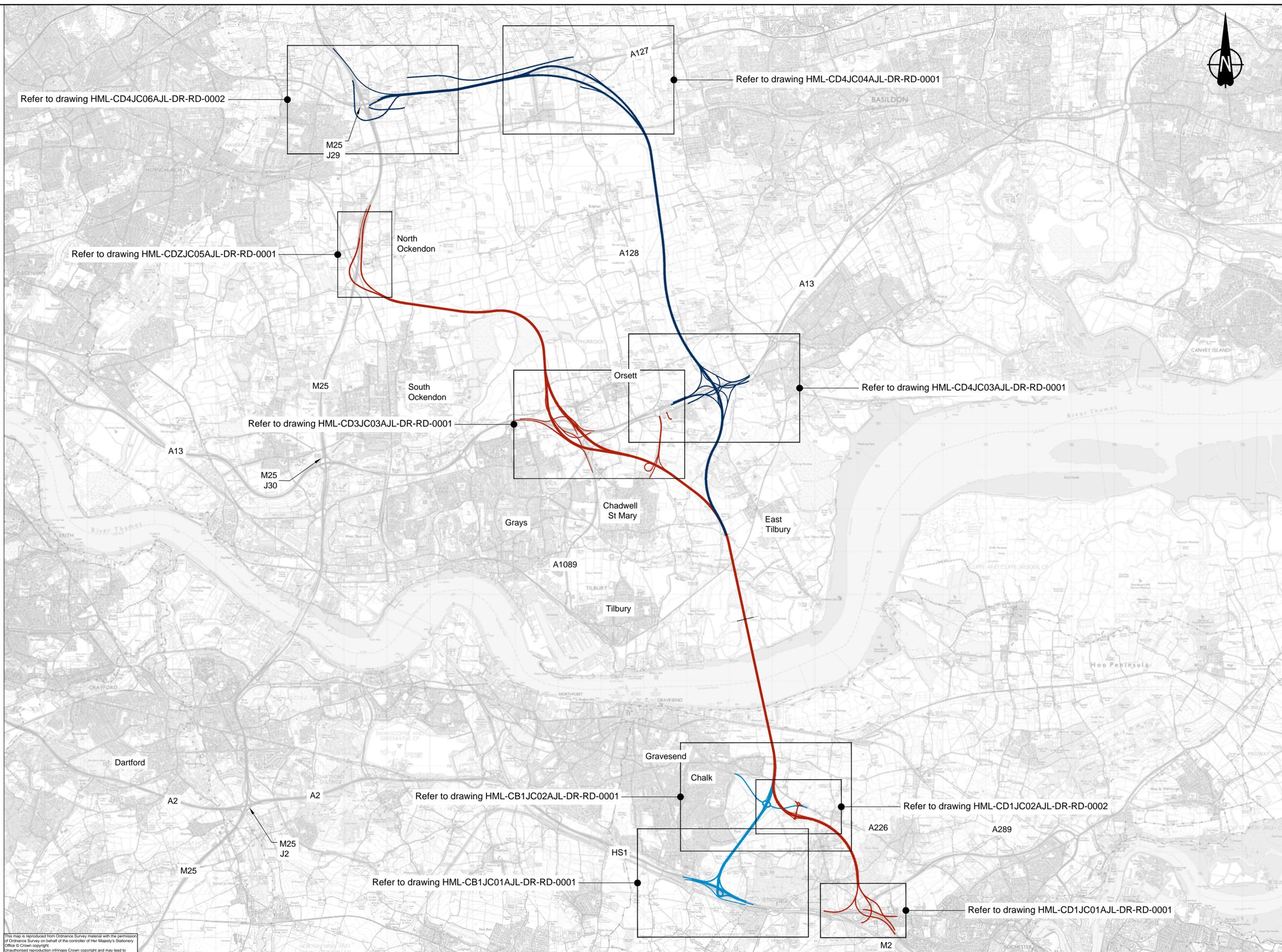
Drawing title

**Routes 3 and 4
 Typical Cross Section
 Sheet 4 of 4**

Status	Revision
S5	P02
Scale	1:100
Drawn By	A Sánchez Muñoz
Checked By	M Robinson
Approved By	G Hodge
Project No.	HA PIN Originator
HA540039	HHJ
Original Size	A1
Drawing number	HML-CZZMLZZZML-DR-RD-0013

Appendix 3.11 – Routes 3 and 4 Junction Drawings

Route 3 and 4 Junction Locations
Western Southern Link A2 Junction
Western Southern Link A226 Junction
Eastern Southern Link M2 Junction 1
Eastern Southern Link A226 Junction
Route 3 A13 Junction
Route 3 M25 Junction
Route 4 A13 Junction
Route 4 A127 Junction
Route 4 M25 Junction



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NOTES

1. This drawing to be viewed in colour.
2. The design shown is what was issued in the SAR. The exception to this is the bored tunnel alignment which has been changed to a three lane tunnel.

LEGEND

- Route 3 Bored tunnel
- Route 4 Bored tunnel
- Western Southern Link Bored tunnel

ILLUSTRATIVE
DESIGN

PO1	s5	03-08-16	POST CONCELATION SAR ISSUE	bdc	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Apprv'd

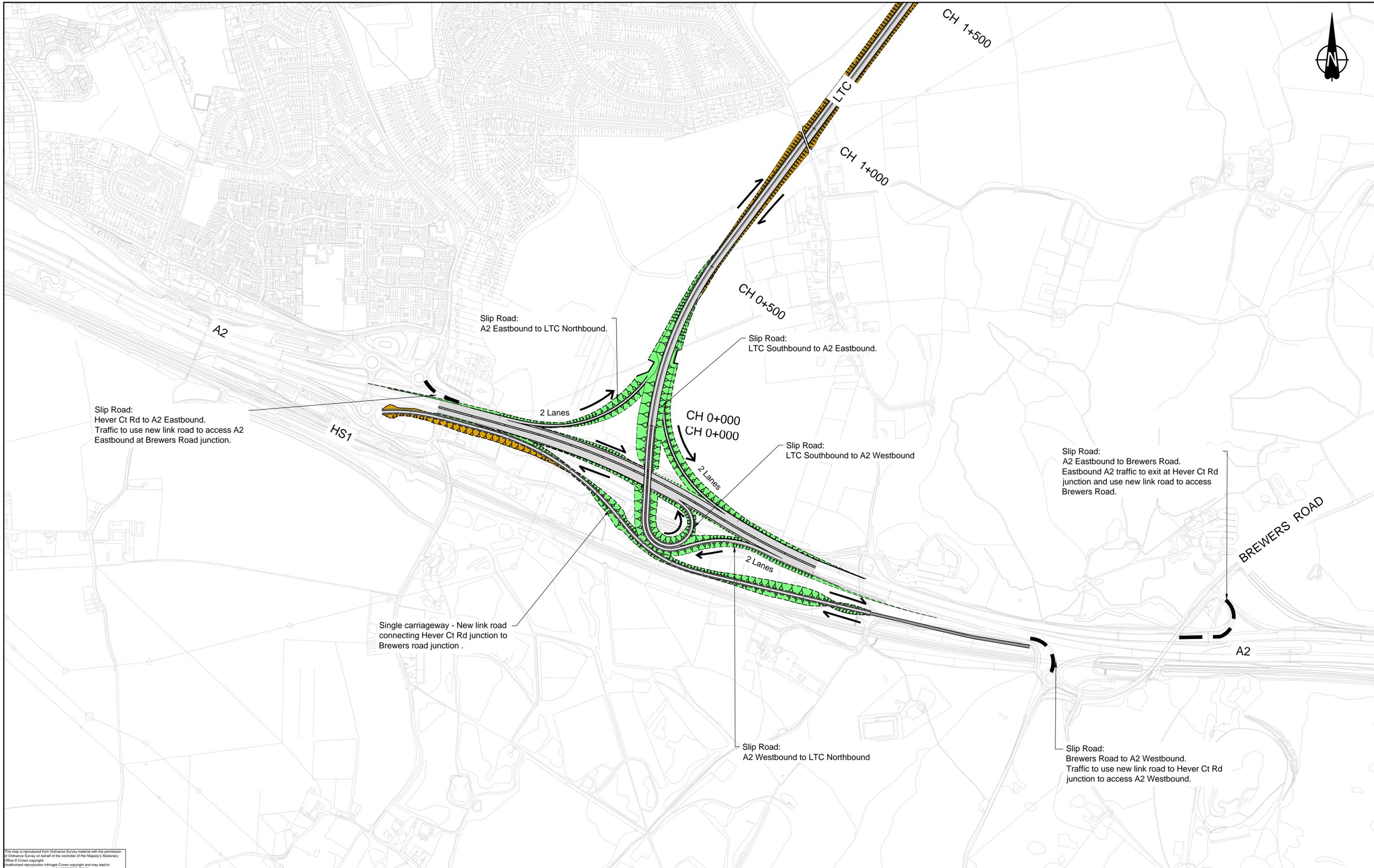
Client

Halcrow Hyder Joint Venture
 Burderop Park
 Swindon, SN4 0QD
 Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Route 3 and 4 Junction Locations**

Status	S2	Revision	P01
Scale	NTS	Date	-
Drawn By	A Garcia		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN HA540039	Originator	HHJ
Drawing number	HHJ-HML-CZZJCZZJL-DR-RD-0001		
Original Size	A1		



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Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd
P02	S5	28-06-16	Post consultation SAR changes	AG	ABE	GH
P01	S5	18-01-16	SAR Issue	ASM	MR	GH

Key:	
	Direction of traffic flow
	Structure
	Existing road stopped up
	Local road diversion

NOTES:

- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

ILLUSTRATIVE DESIGN

0 50 100 150 200 250 300 350 400 450 500
SCALE 1:5000 (A1)
SCALE 1:10000 (A3) METRES

Client

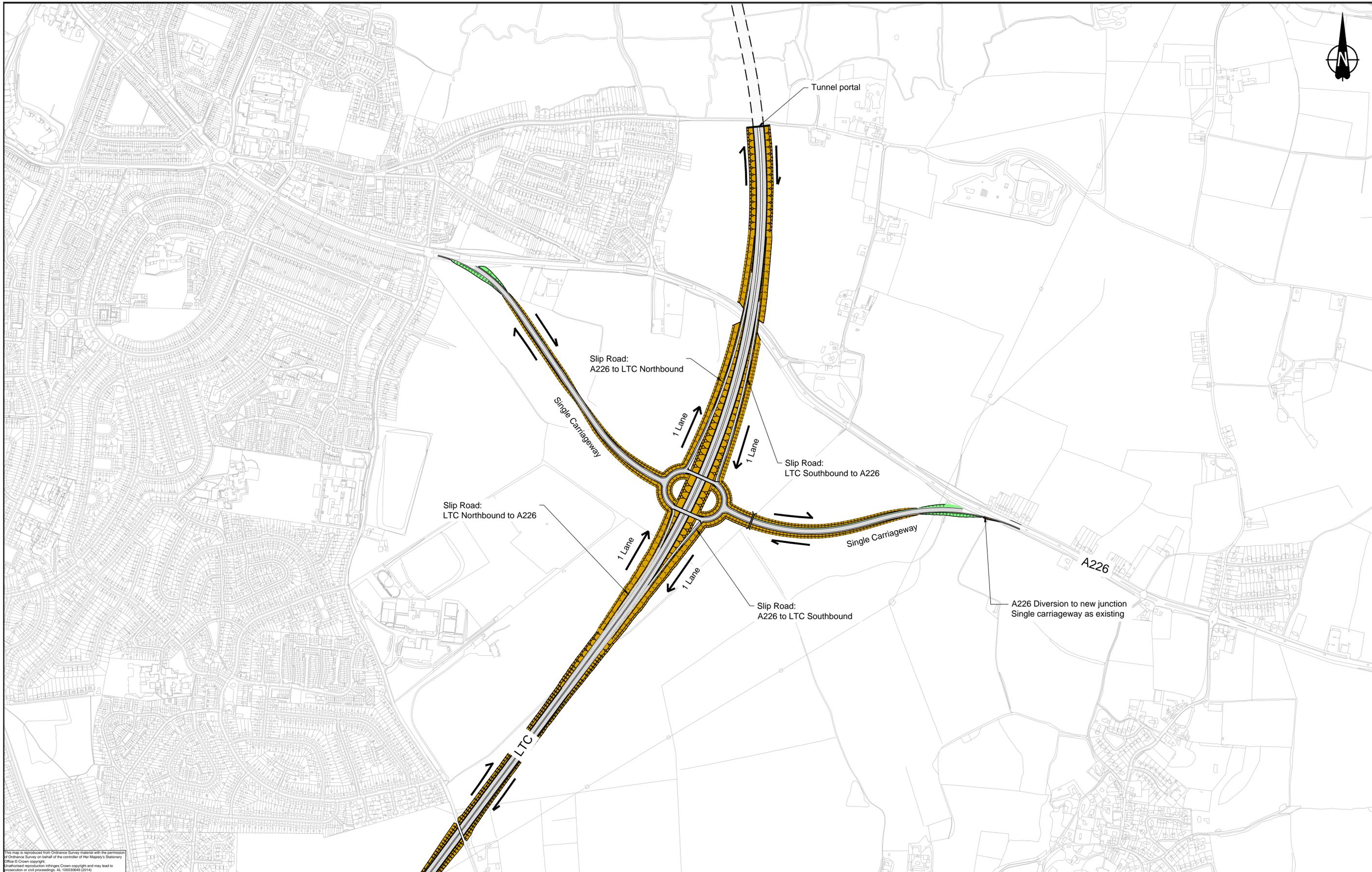
Halcrow Hyder Joint Venture

Burderop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Western Southern Link A2 Free Flow Junction**

Status	Revision
S5	P02
Scale	1:5000
Drawn By	A Sánchez Muñoz
Checked By	M Robinson
Approved By	G Hodge
Project No.	HA FIN HA540039
I Originator	HHJ
Original Size	A1
Drawing number	HML-CB1JC01AJL-DR-RD-0001



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P02	S5	12-08-16	Post Consultation SAR Issue	BDC	MR	GH
P01	S5	18-01-16	SAR Issue	ASM	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Checked	Approved

Key:	
	Direction of traffic flow
	Structure
	Existing road stopped up
	Local road diversion

NOTES:
 1. The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

ILLUSTRATIVE DESIGN

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 METRES
 SCALE 1:5000 (A1)
 SCALE 1:10000 (A3)

Client

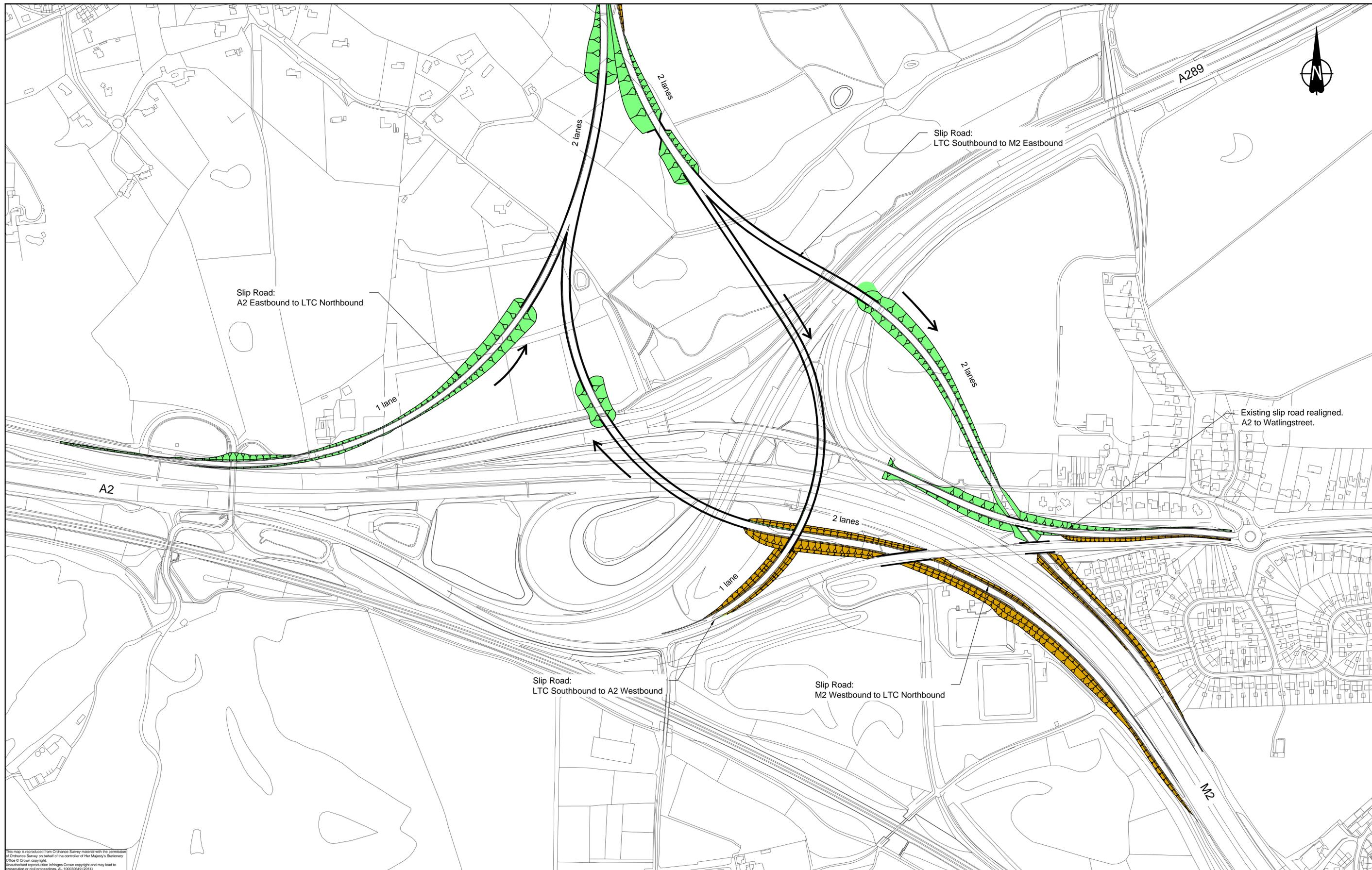
highways england

Halcrow Hyder Joint Venture
 Burderop Park
 Swindon, SN4 0QD
 Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Western Southern Link Tunnel
 A226 Grade Separated Junction**

Status	S5	Revision	P01
Scale	1:5000	Date	-
Drawn By	A Sánchez Muñoz		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA-RN-HA540039	Originator	HHJ
Original Size	A1		
Drawing number	HML-CB1JC02AJL-DR-RD-0001		



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P02	S5	12-08-16	Post Consultation SAR Issue	BDC	MR	GH
P01	S2	18-01-16	SAR Issue	AG	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Checked	Approved

Key:

	Direction of traffic flow
	Structure
	Existing road stopped up
	Local road diversion

NOTES:

- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

ILLUSTRATIVE DESIGN

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SCALE 1:2500 (A1)
SCALE 1:5000 (A3)
METRES

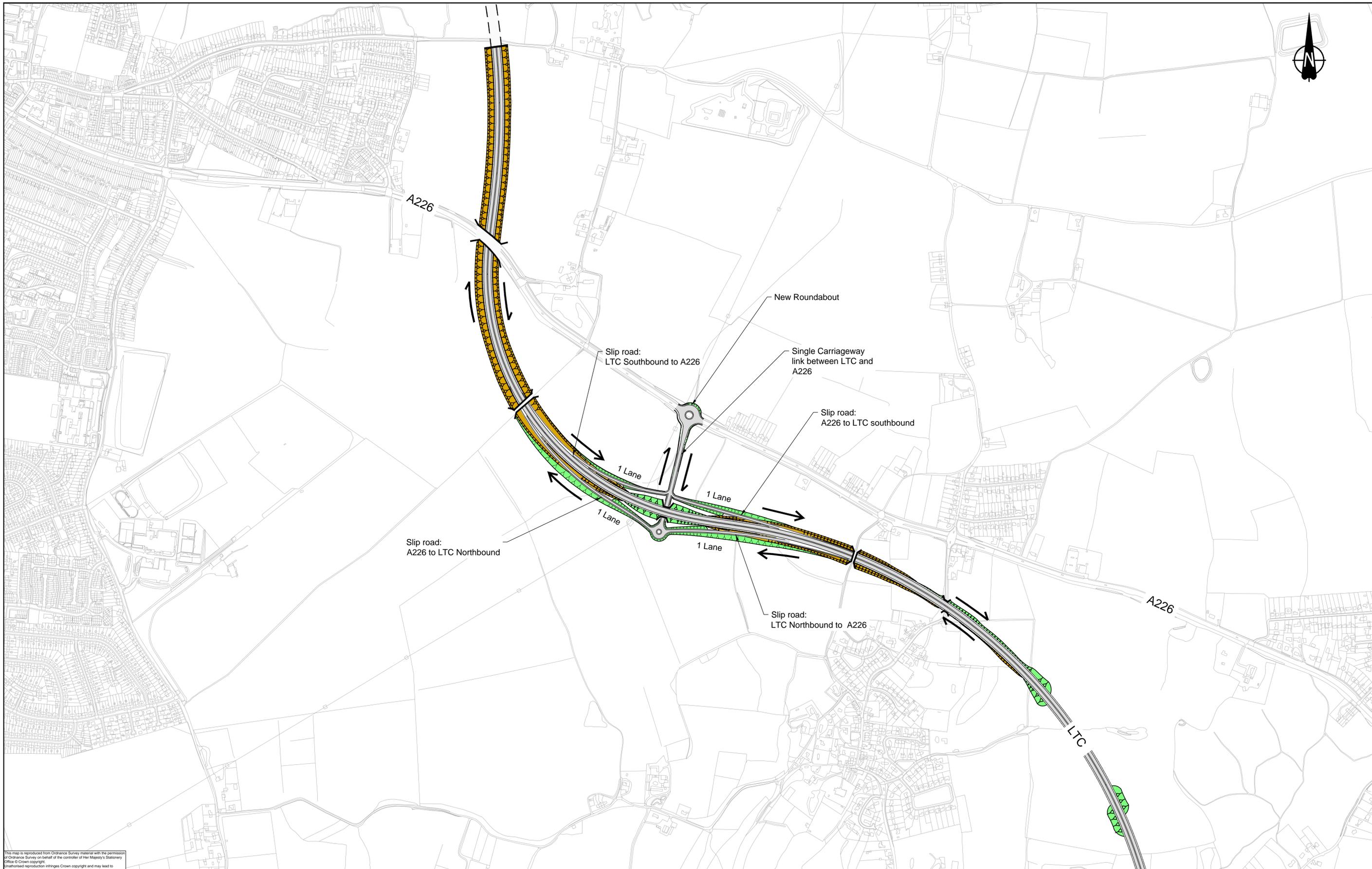
Client

Halcrow Hyder Joint Venture
Burderop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Eastern Southern Link
M2 Junction 1 Free Flow**

Status	S2	Revision	P01
Scale	1:2500	Date	-
Drawn By	A Sánchez Muñoz		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA-FIN-HA540039	Originator	HHJ
Original Size	A1		
Drawing number	HML-CD1JC01AJL-DR-RD-0001		



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Rev	Status	Rev. Date	Purpose of revision	Drawn	Checked	Approved
P02	SS	28-06-16	Post Consultation SAR Issue	BDC	MR	GH
P01	SS	18-01-16	SAR Issue	AG	MR	GH

Key:

	Direction of traffic flow
	Structure
	Existing road stopped up
	Local road diversion

NOTES:

- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

DESIGN FREEZE 1

0 50 100 150 200 250 300 350 400 450 500
DRG_SCA1 DRG_SCA2 UNITS

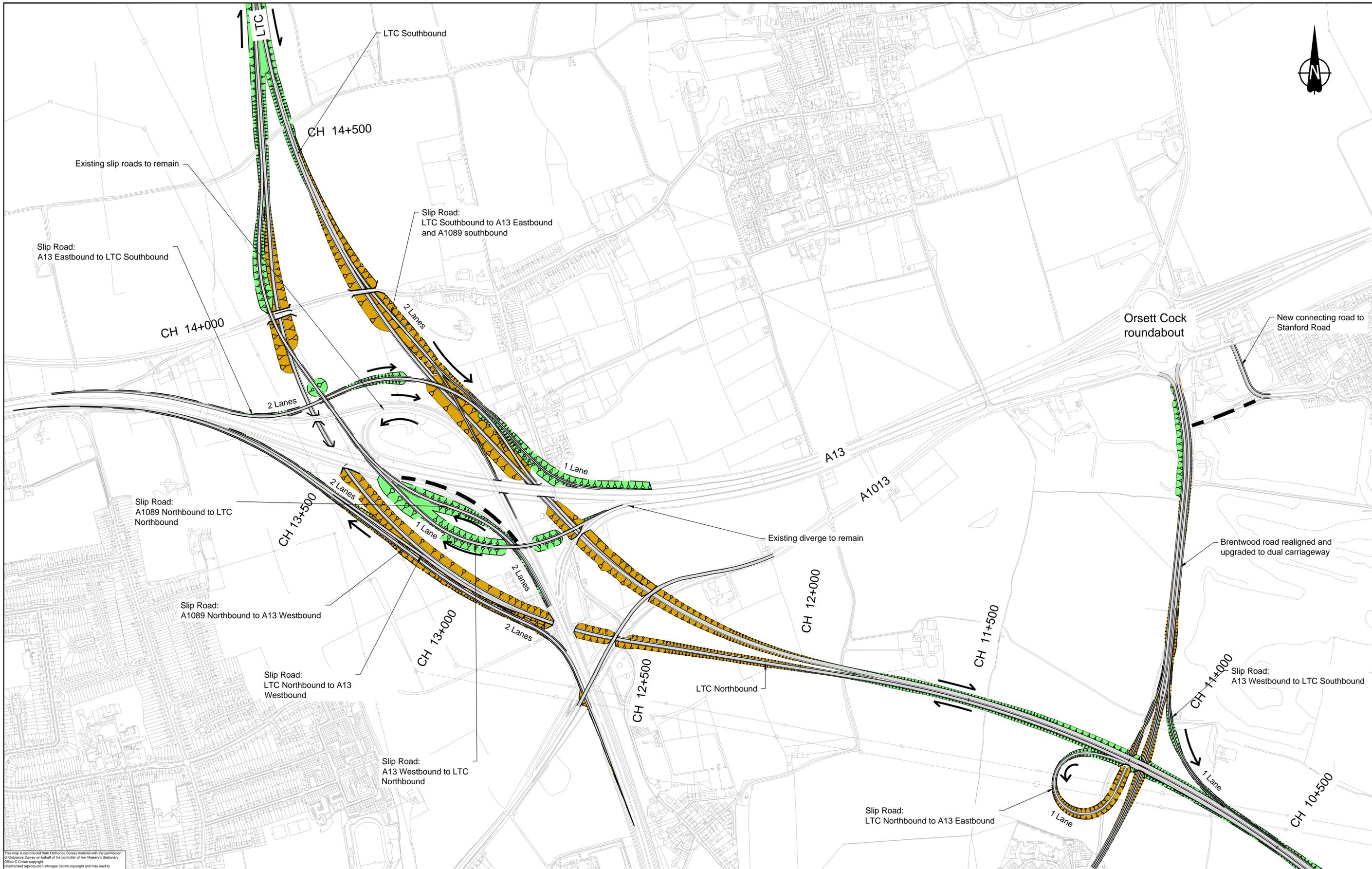
Client

Halcrow Hyder Joint Venture
 Burderop Park
 Swindon, SN4 0QD
 Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

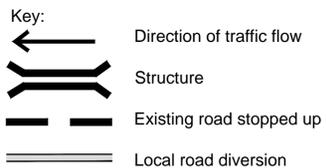
Drawing title **Eastern Southern Link Tunnel
A226 Grade Separated Junction**

Status	S5	Revision	P02
Scale	1:5000	Date	-
Drawn By	A Sánchez Muñoz		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN	I Originator	Original Size
	HA540039	HHJ	A1
Drawing number	HML-CD1JC02AJL-DR-RD-0001		



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Rev	Status	Rev. Date	Purpose of revision	Drawn	Checked	Approved
P02	SS	29-06-16	Post consultation SAR changes	AG	MR	GH
P01	SS	18-01-16	SAR Issue	ASM	MR	GH



NOTES:

- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

ILLUSTRATIVE DESIGN

SCALE 1:5000 (A1)
SCALE 1:10000 (A3)

Client

highways england

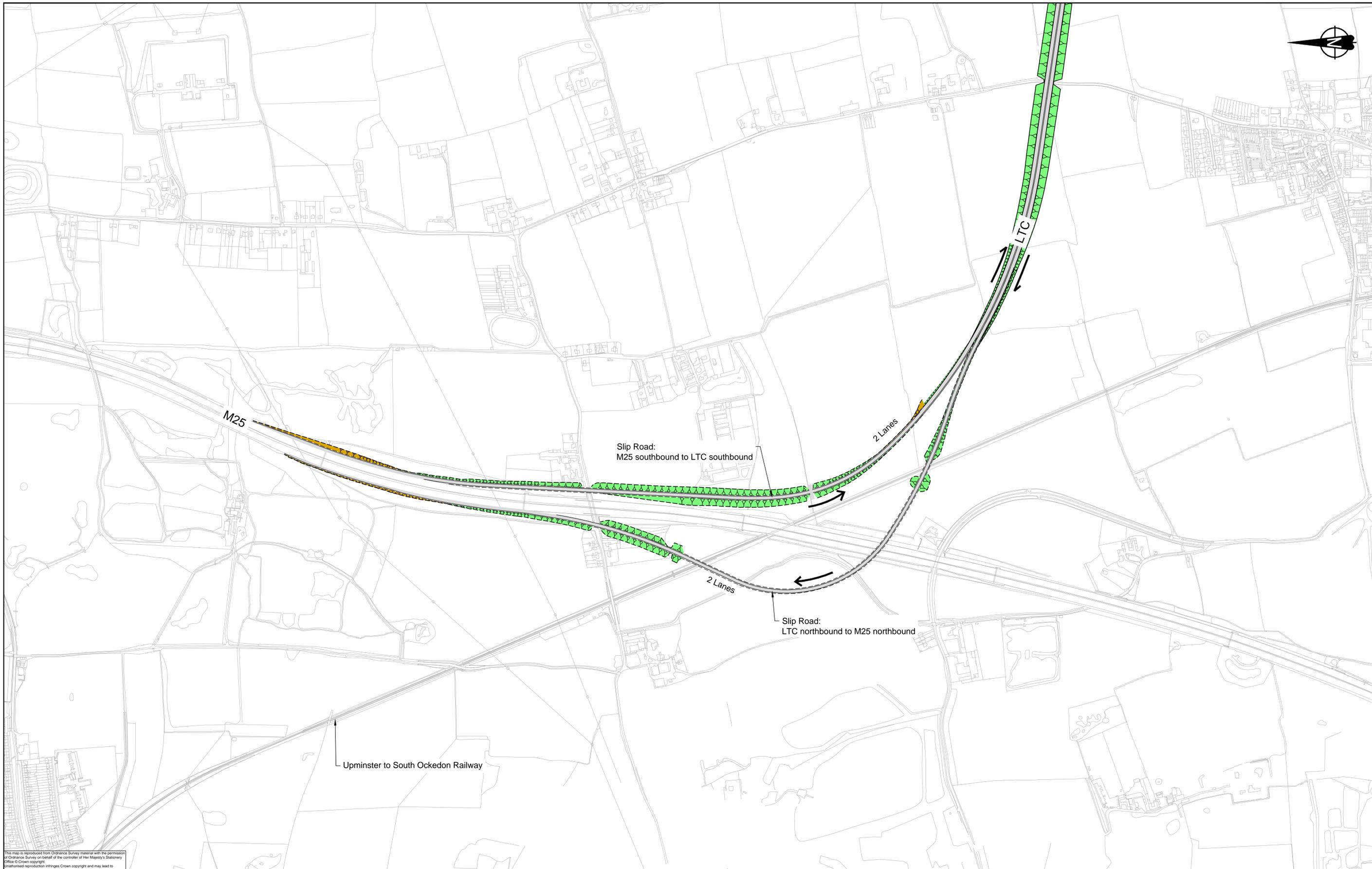
Halcrow Hyder Joint Venture
Burderop Park
Swindon, SN4 0QD
Tel: +44(0)1793 812479

Halcrow Hyder

Project LOWER THAMES CROSSING

Drawing title Route 3 A13 Freeflow Junction

Status	S5	Revision	P02
Scale	1:5000	Date -	06-11-15
Drawn By	A Sánchez Muñoz		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN	I Originator	Original Size
	HA540039	HHJ	A1
Drawing number	HML-CD3JC03AJL-DR-RD-0001		



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PO2	SS	12-08-16	Post Consultation SAR Issue	BDC	MR	GH
PO1	SS	19-01-16	SAR Issue	ASM	MR	GH
Rev	Status	Rev. Date	Purpose of revision	Drawn	Checked	Approved

Key:

	Direction of traffic flow
	Structure
	Existing road stopped up
	Local road diversion

NOTES:

- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

ILLUSTRATIVE DESIGN

0 50 100 150 200 250 300 350 400 450 500
UNITS

DRG_SCA1
DRG_SCA2

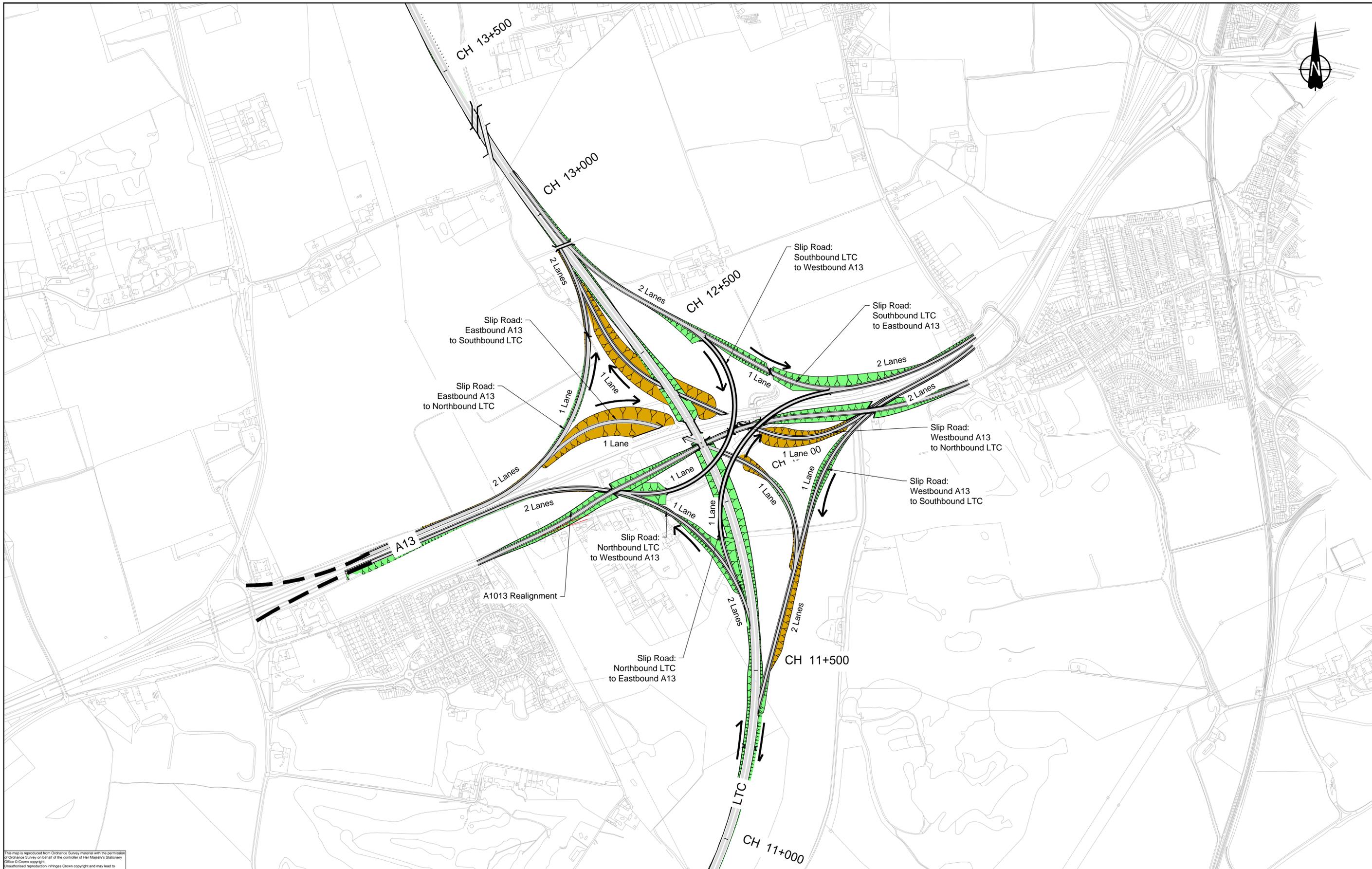
Client

Halcrow Hyder Joint Venture
Burdorpe Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

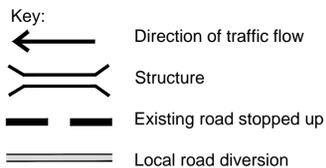
Drawing title **Routes 3 M25 Free Flow Junction**

Status	S5	Revision	P01
Scale	1:5000	Date	-
Drawn By	A Sánchez Muñoz		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN	I Originator	Original Size
	HA540039	HHJ	A1
Drawing number	HML-CDZJC05AJL-DR-RD-0001		



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Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Appr'd
P02	SS	28-06-16	Post consultation SAR Issue	ASM	MR	GH
P01	SS	18-01-16	SAR Issue	ASM	MR	GH



NOTES:

- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

ILLUSTRATIVE DESIGN

SCALE 1:5000 (A1)
SCALE 1:10000 (A3)

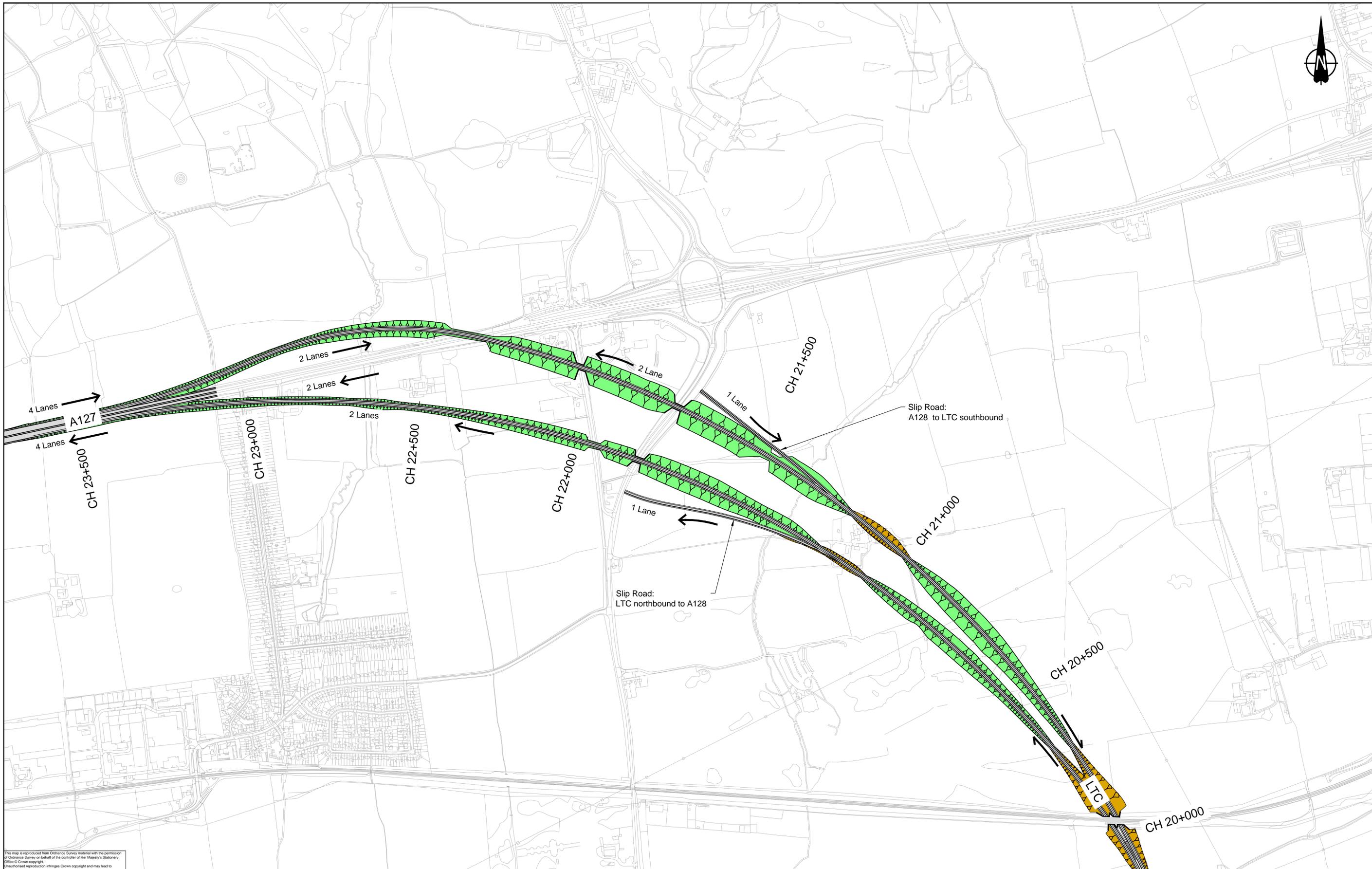
Client

Halcrow Hyder Joint Venture
Burderop Park
Swindon, SN4 0QD
Tel. +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Route 4 A13 Junction Free Flow**

Status	S5	Revision	P02
Scale	1:5000	Date	06-11-15
Drawn By	A Sánchez Muñoz		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN	I Originator	Original Size
	HA540039	HHJ	A1
Drawing number	HML-CD4JC03AJL-DR-RD-0001		



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Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Apprv'd
P02	SS	29-06-16	Post consultation SAR issue	ASM	MR	GH
P01	SS	21-04-16	SAR Issue	ASM	MR	GH

Key:

	Direction of traffic flow
	Structure
	A127 Westbound stopped up through existing junction
	Local road diversion

NOTES:

- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

ILLUSTRATIVE DESIGN

SCALE 1:5000 (A1)
SCALE 1:10000 (A3)

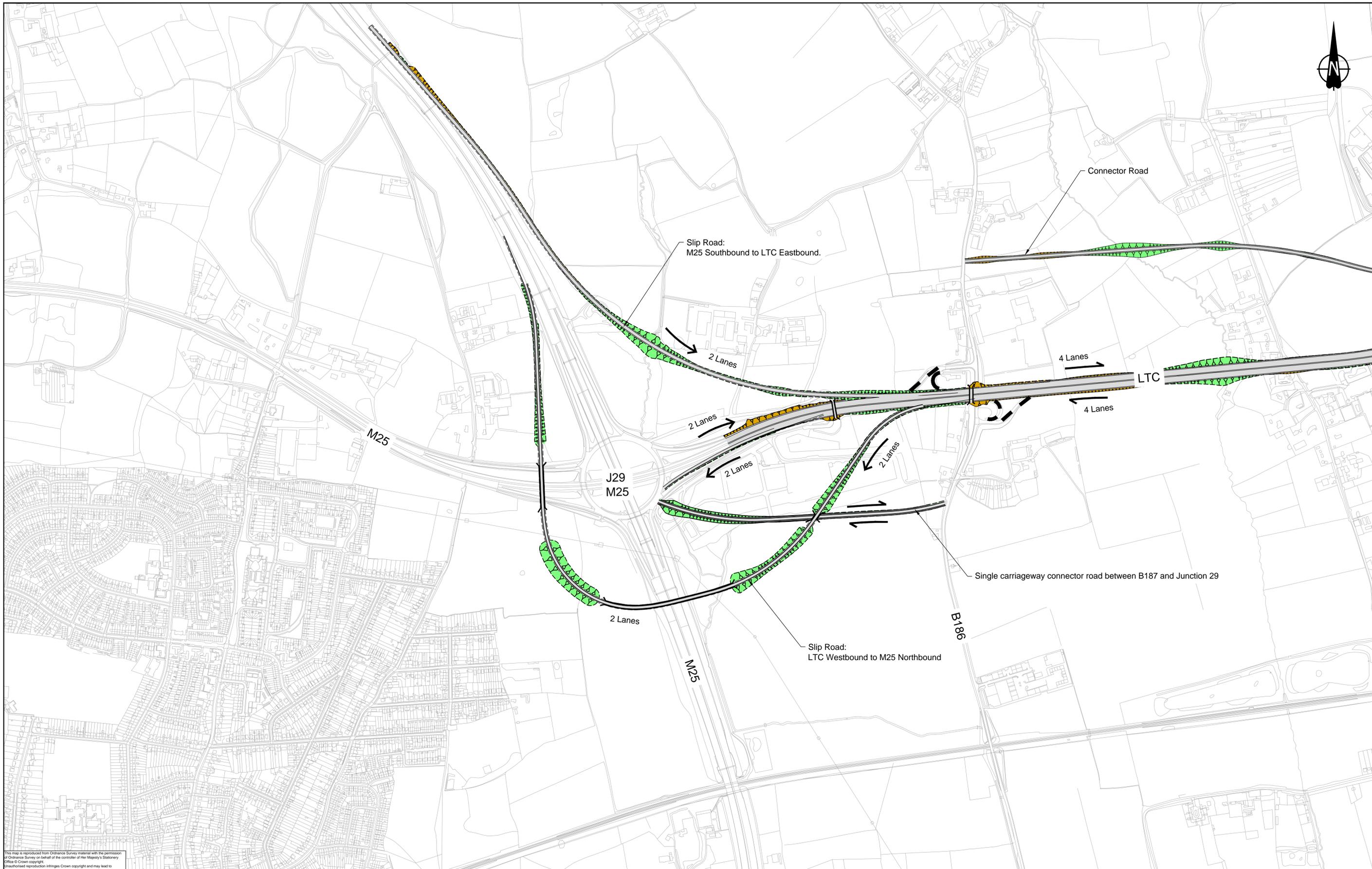
Client

Halcrow Hyder Joint Venture
Burderop Park
Swindon, SN4 0QD
Tel: +44(0)1793 812479

Project **LOWER THAMES CROSSING**

Drawing title **Route 4 A127 Junction**

Status	S5	Revision	P01
Scale	As Shown	Date -	21-04-16
Drawn By	A Sánchez Muñoz		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN	I Originator	Original Size
	HA540039	HHJ	A1
Drawing number	HML-CD4JC04AJL-DR-RD-0001		



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Rev	Status	Rev. Date	Purpose of revision	Drawn	Checked	Approved
P02	SS	29-06-16	Post consultation SAR issue	AG	MR	GH
P01	SS	18-01-16	SAR Issue	ASM	MR	GH

Key:

	Direction of traffic flow
	Structure
	Existing road stopped up
	Local road diversion

NOTES:

- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

ILLUSTRATIVE DESIGN

SCALE 1:5000 (A1)
SCALE 1:10000 (A3)

Client

Halcrow Hyder Joint Venture
Burderop Park
Swindon, SN4 0QD
Tel: +44(0)1793 812479

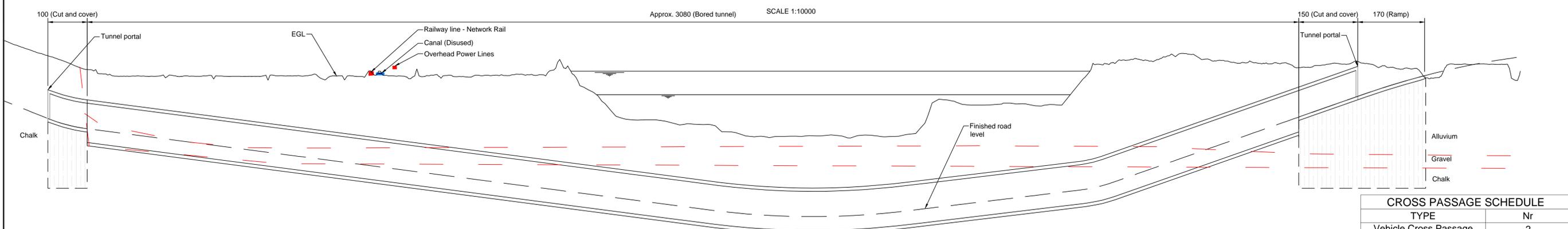
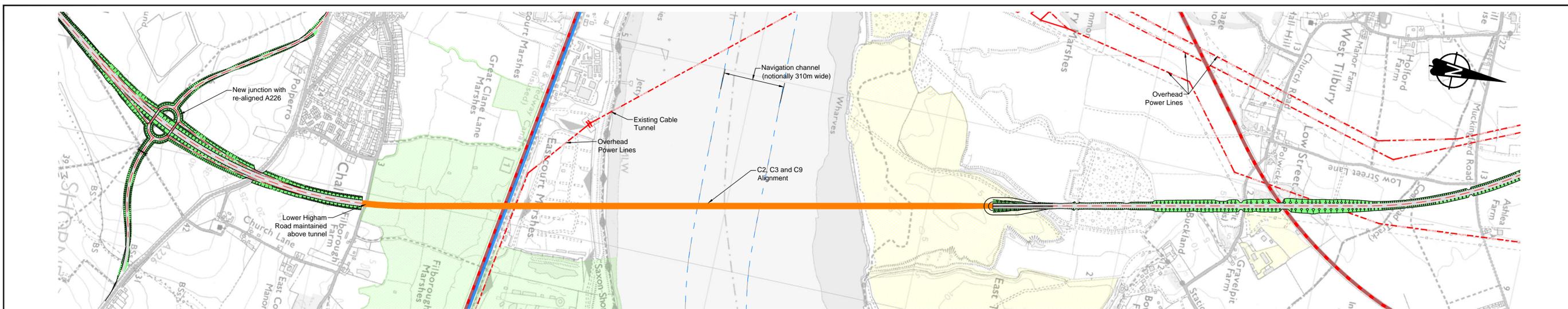
Project **LOWER THAMES CROSSING**

Drawing title **Route 4 M25 Free Flow Junction**

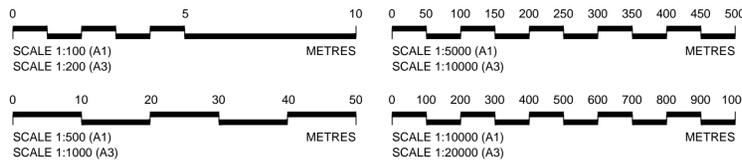
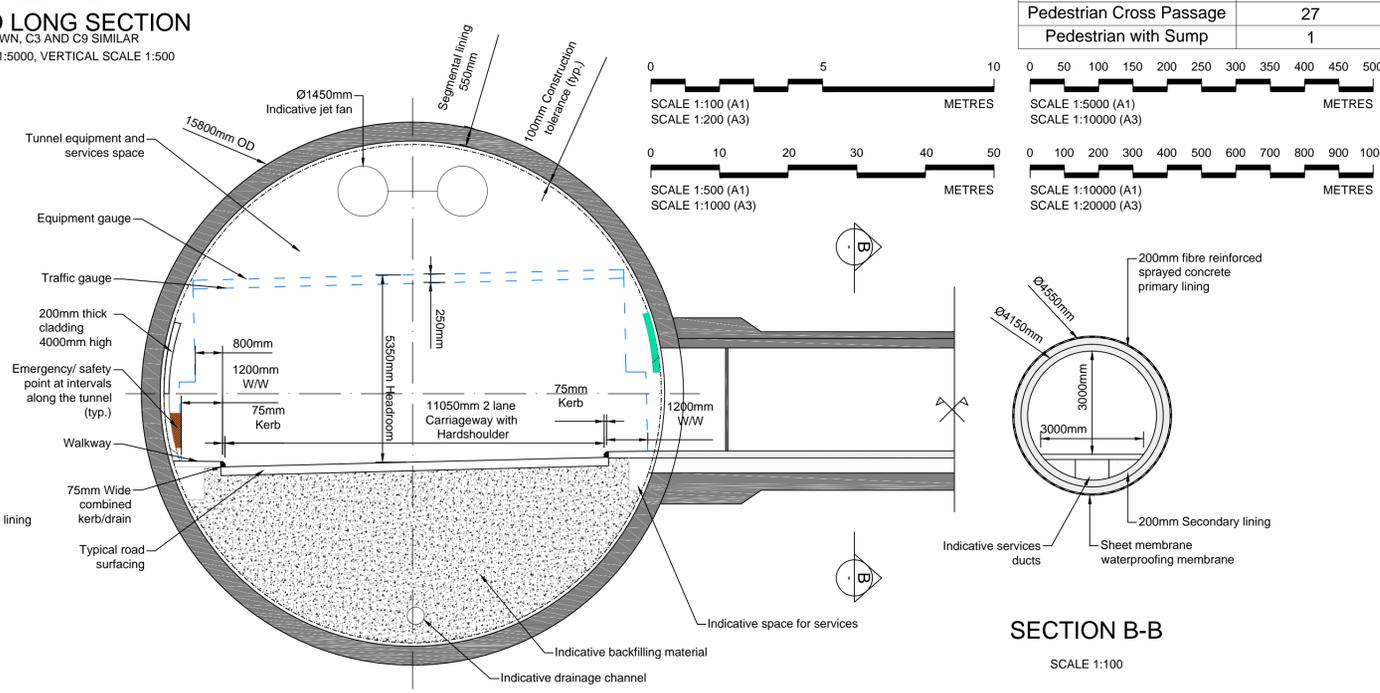
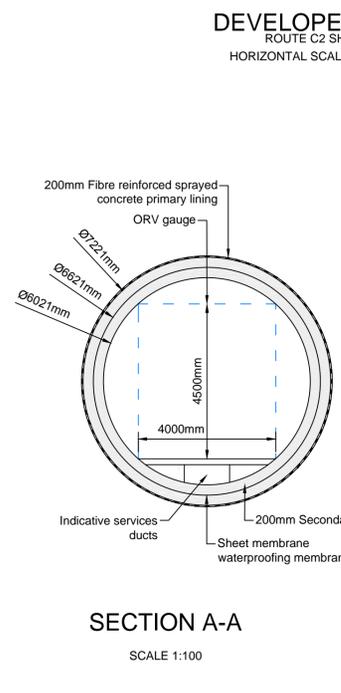
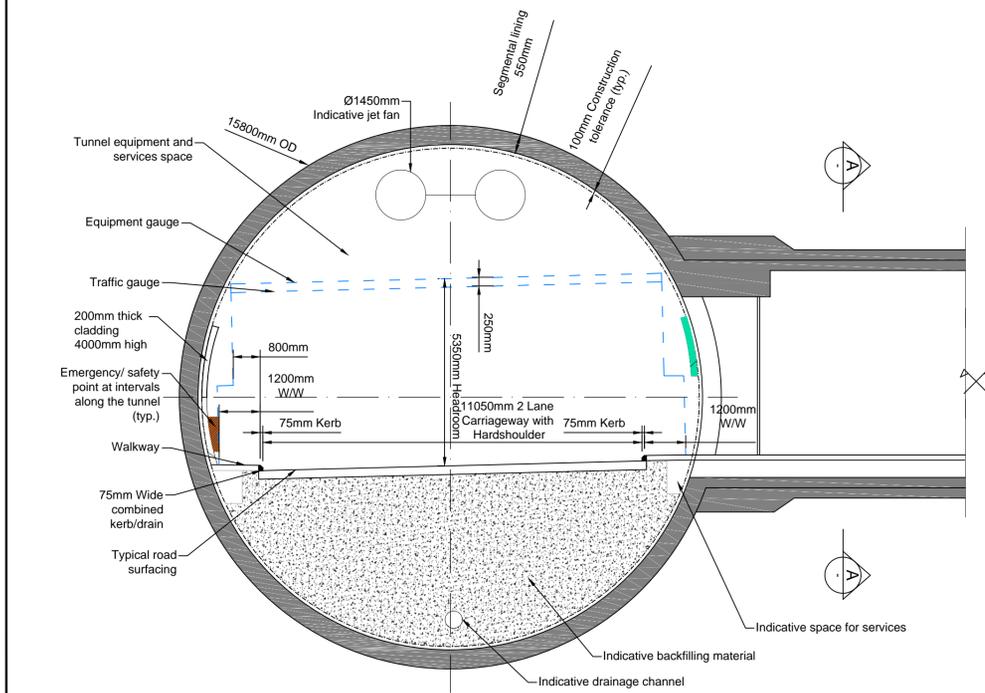
Status	S5	Revision	P01
Scale	1:5000	Date	06-11-15
Drawn By	A Sánchez Muñoz		
Checked By	M Robinson		
Approved By	G Hodge		
Project No.	HA PIN	I Originator	Original Size
	HA540039	HHJ	A1
Drawing number	HML-CD4JC06AJL-DR-RD-0002		

Appendix 3.12 – Routes 3 and 4 Bored Tunnel General Arrangement Drawings

Routes 3 and 4 Bored Tunnel Crossing General Arrangement Sheet 1 of 2
Routes 3 and 4 Bored Tunnel Crossing General Arrangement Sheet 2 of 2



CROSS PASSAGE SCHEDULE	
TYPE	Nr
Vehicle Cross Passage	2
Pedestrian Cross Passage	27
Pedestrian with Sump	1



Rev	Status	Rev. Date	Purpose of revision	Drawn	Check'd	Apprv'd
P01	S5	12-08-16	POST CONSULTATION SAR ISSUE	DM	RLD	SIW

- NOTES**
- All dimensions in metres unless shown otherwise.
 - All dimensions and structural details are indicative for purposes of option costing only.
 - All soil layer levels are indicative for option costing purposes only.
 - The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

- LEGEND**
- Proposed crossing structure
 - Overhead power lines
 - Existing cable tunnel
 - Railway line - Network Rail
 - Canal (disused)
 - Ramsar and SSSI
 - Historic landfill site

ILLUSTRATIVE DESIGN

Client: **highways england**

Halcrow Hyder Joint Venture
Burdorop Park
Swindon, SN4 0OD
Tel. +44(0)1793 812479

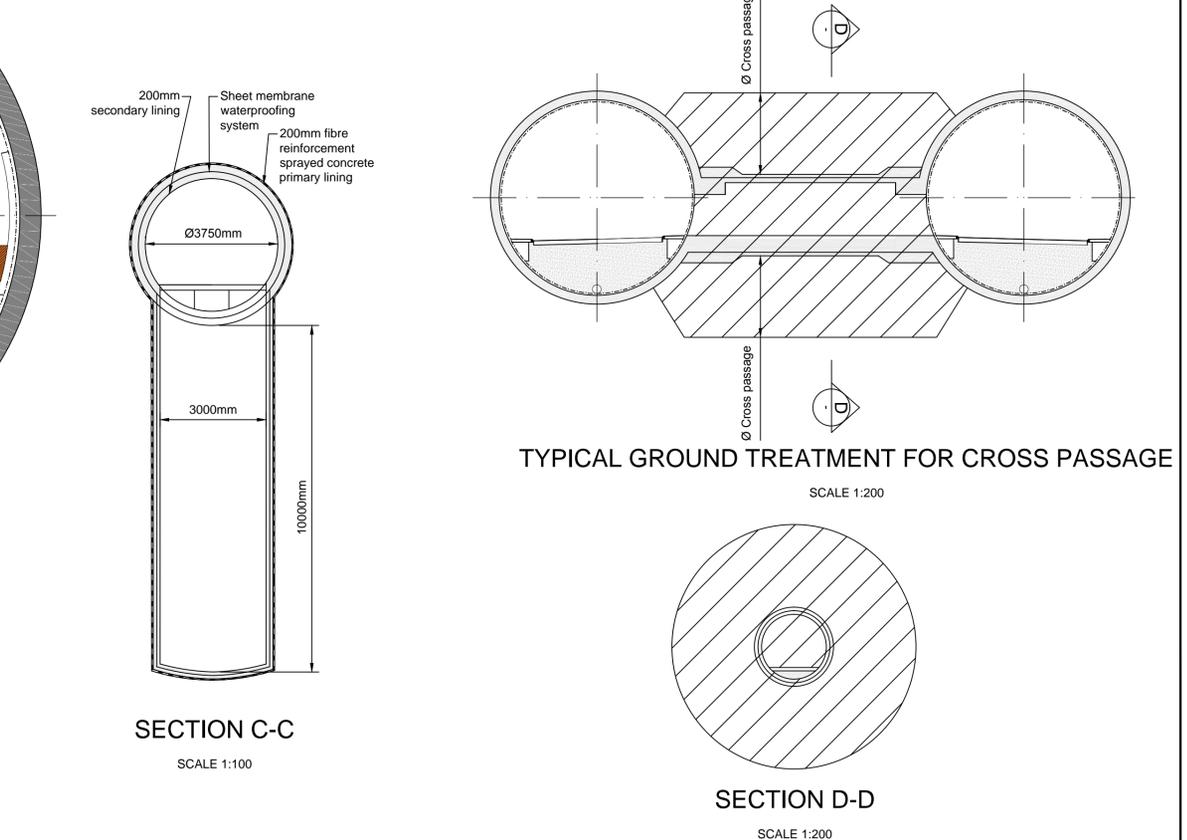
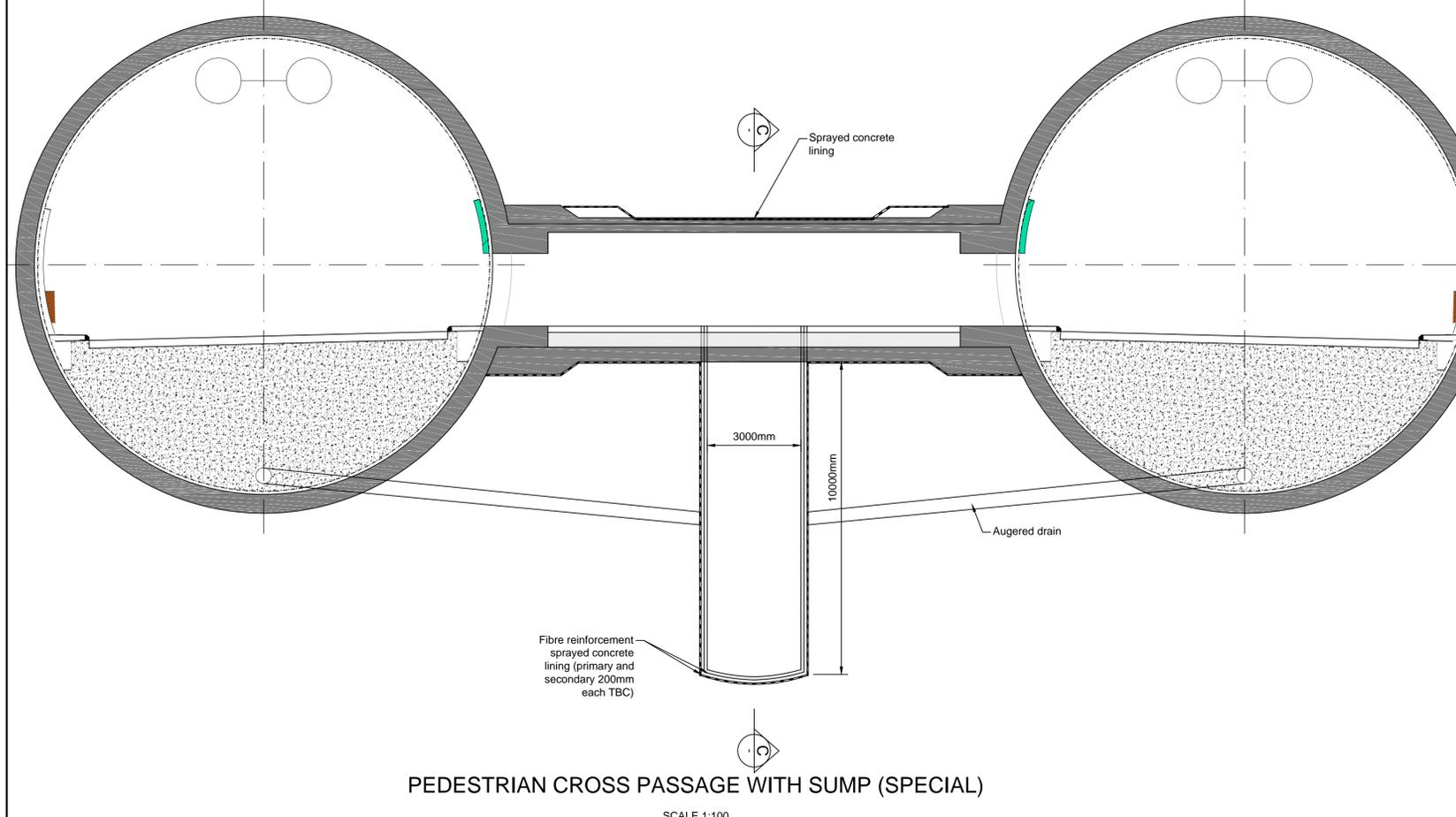
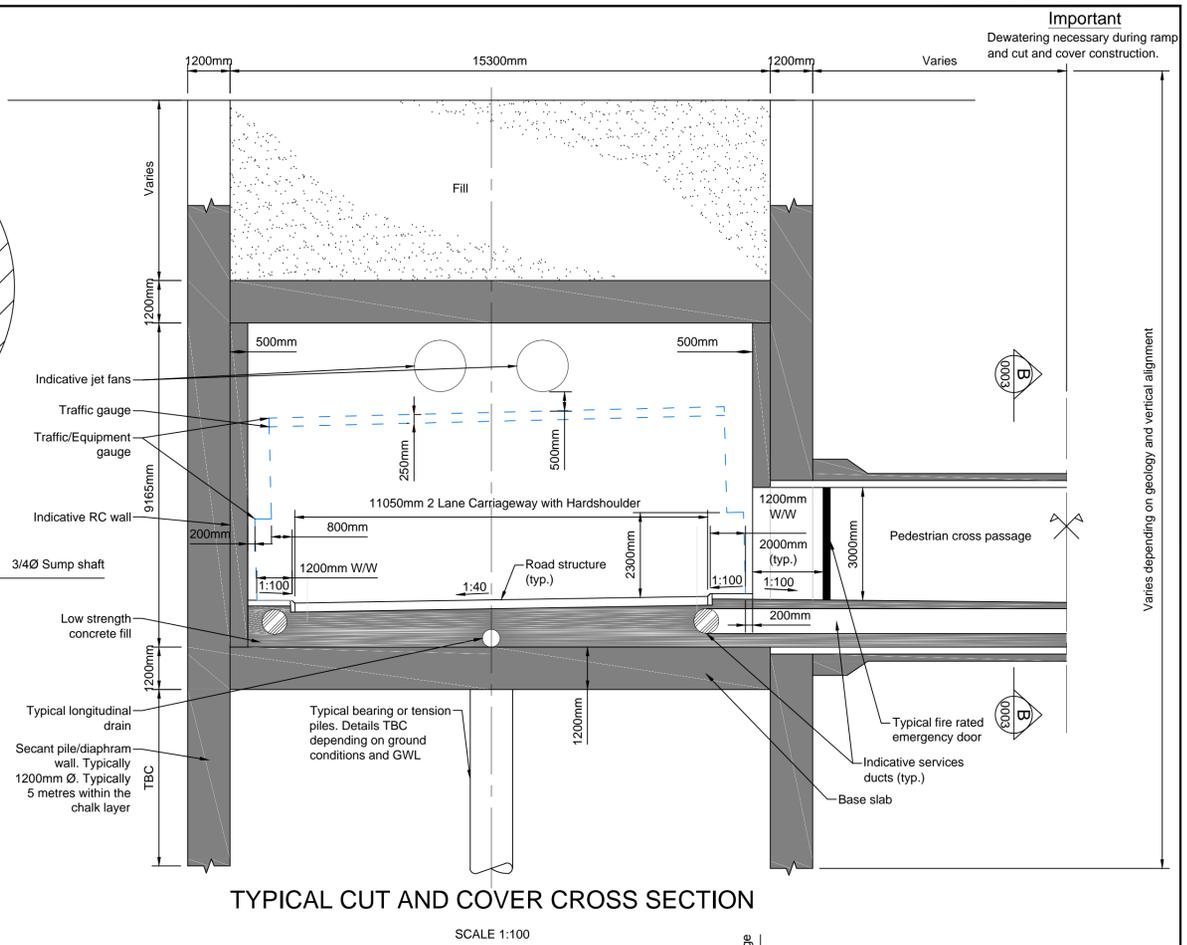
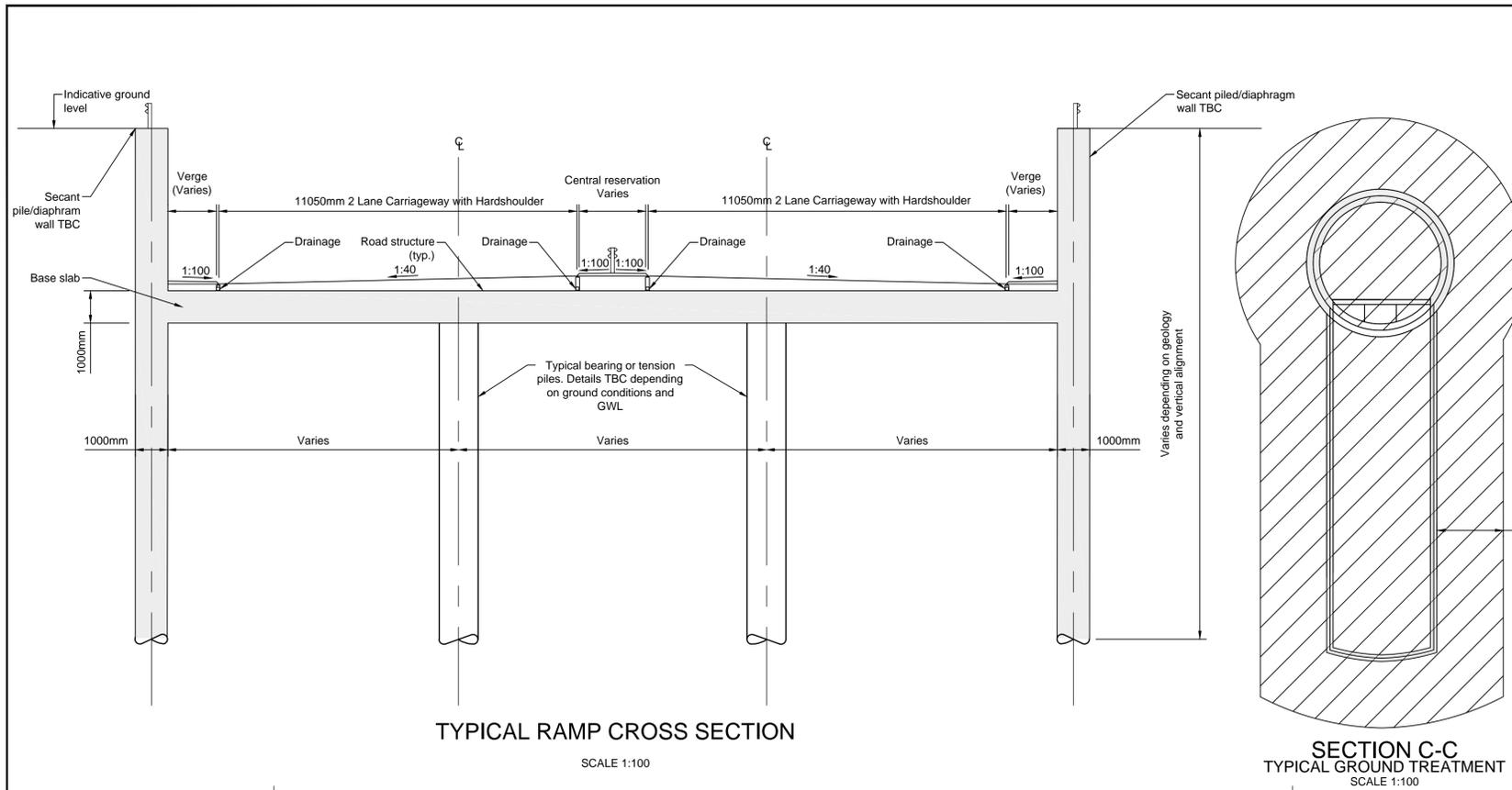
Halcrow **Hyder**

Project: **LOWER THAMES CROSSING**

Drawing title: **Location C Routes 3 and 4 Bored Tunnel Crossing**

General Arrangement Sheet 1 of 2

Status	Revision
S5	P01
AS SHOWN	Date - 18-03-16
DM	
RLD	
SIW	
HA - P01	Originator
HA540039	HHJ
Original Size	A1
Drawing number: HA540039-HHJ-STU-CZZMCZZTU-DR-TN-0016	

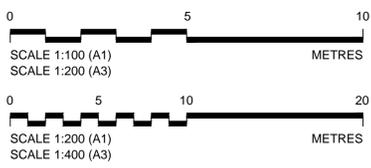


Important
Dewatering necessary during ramp and cut and cover construction.

NOTES

- All dimensions in metres unless shown otherwise.
- All dimensions and structural details are indicative for purposes of option costing only.
- The design shown on these drawings is illustrative and may be subject to change in later stages of the scheme development.

ILLUSTRATIVE DESIGN



Client Halcrow Hyder Joint Venture Burderop Park Swindon, SN4 0QD Tel. +44(0)1793 812479 	Project LOWER THAMES CROSSING	Status S5	Revision P01
	Drawing title Location C Routes 3 and 4 Bored Tunnel Crossing General Arrangement Sheet 2 of 2	Scale AS SHOWN	Date - 18-03-16
		Drawn By DM	
		Checked By RLD	
		Approved By SIW	
	Project No. HA PIN HA540039	I Originator HHJ	Original Size A1
	Drawing number HA540039-HHJ-STU-CZZMZZTU-DR-TN-0017		

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