METROTIDAL A13/A1089/A2 TILBURY TUNNEL (MTT) JANUARY 2019

To be read with the Metrotidal Tilbury Tunnel and Metrotidal Lower Thames Orbital presentations on the webpage www.metrotidal.com

1. EXECUTIVE SUMMARY

The Metrotidal A13/A1089/A2 Tilbury Tunnel (MTT) is an efficient alternative to the DfT/Highways England/Lower Thames Crossing (HELTC) that makes use of the existing A1089 and junctions on the A13 and A2 to relieve congestion on the Dartford Crossing while providing new capacity for growth across the Lower Thames Estuary region. The period over which congestion is relieved enables the Belvedere Crossing (BC) and other metropolitan crossings further upstream to be implemented along with the Metrotidal Lower Thames Orbital (MLTO) downstream, which together provide greater multimodal capacity, connectivity and resilience than the HELTC, for less cost and environmental impact. The period of relieved congestion also enables UK/European freight demand to be developed and redistributed on routes north of the Thames through HS1, the Port of Tilbury, London Gateway and Felixstowe as an alternative to the concentration of demand on the Dover/Midlands road freight route over the Dartford Crossing. The twin-track MLTO complements the combination of new road crossings upstream and downstream of the Dartford Crossing but is not a requirement for the relief of the Dartford Crossing.

The existing, well-engineered, underused A1089 already covers half the 8.6km route between the A13/A1089 junction by Orsett Heath and the A2260/A2 junction by Ebbsfleet. The remaining 4.3km of the route runs beneath the Port of Tilbury, the Thames and the Tarmac Northfleet Works, sites where the materials and facilities already exist to reduce the cost and impacts of constructing a tunnel. With a north portal beside the main gates to the Port of Tilbury and a south portal some 300m from the Ebbsfleet A2260/A2 junction almost the whole of the new route is completed by a 3.7km twin-bored tunnel that runs beneath dock and wharf areas where the proposed uses can be developed above the route in due course. The existing site facilities reduce the impacts during construction and after completion of the works the

environmental impacts are contained and controlled by the tunnel. The A1089/A126 Asda Roundabout is programmed for improvements by Highways England as part of the Tilbury 2 proposals, which will have direct access to the MTT along the existing A1089. The A2260/A2 junction is programmed for major improvements by Highways England as part of the Ebbsfleet Garden City Vision. A London Resort underground road alignment from the junction for use by Fast Track is currently proposed by the Ebbsfleet masterplan pending further investigations. As the junction is already subject to these changes these proposals can be recast to receive the A1089 tunnel connection from the north bank without imposing significant impacts on the Ebbsfleet Garden City Vision. The extension of Crossrail to Ebbsfleet provides a substitute for the London Resort road Fast Track route.

The Metrotidal Tilbury Tunnel downstream with the Belvedere Crossing upstream cost one third of the budget for the DfT/Highways England Lower Thames Crossing. Together they provide a system that decants local and regional demand from the Dartford Crossing enabling the existing capacity to serve the national demand while a strategy is put in place to manage the long term demands of the Dover/Midlands route.

2. THE CHALLENGE

Congestion at the Dartford Crossing is created by the confluence of local, regional and national demand. The concentration of these demands on a single node of the network requires high capacity and lacks resilience. The congestion is most efficiently relieved, and the resilience improved by considering each of these demands in turn to identify the priorities and co-ordinate the solutions in a phased programme of works that results in the lowest overall cost. The impact and cost of each phase of works is then more manageable, with the programme spreading the overall cost.

The DfT/Highways England/Lower Thames Crossing (HELTC) has chosen demand on the road haulage Dover/Midlands route, a component of national demand, as the priority, identified a high-capacity direct hypotenuse between the M2 and M25 as a solution and then

bespoked a large phase of works to provide the required Lower Thames Crossing capacity for the chosen demand including the projected secondary local and regional demands on this route. To realise the full capacity of the hypotenuse the HELTC ought to be accompanied by free-flow upgrades of the M2/A229/M2 link and the M25/M11 junction. Together these components lift the cost of the full hypotenuse from the M20 to the M11 to some £9bn. In the meantime, for the HELTC alone, the 25.5km direct hypotenuse between the M2 Medway Bridge and the M25/A127 gyratory, conceived to relieve congestion and save 10.2km from the existing 35.7km route over the Dartford Crossing, has become through attrition the sinuous 31.1km HELTC saving just 4.6km from the Dover/Midlands route. The sinuous hypotenuse from the southeast is not efficient at serving the local, regional or remaining national cross-river demands including those from the Port of Tilbury and London Gateway Port.

Consideration of the local, regional and national demands places emphasis on the roles of A2 and A13 and the connections between them. These two major radial arteries have already been upgraded to gather local and regional demand south and north of the estuary respectively with the effect that they efficiently channel these demands on to the Dartford Crossing. All that is now needed to decant local and regional demand from the Dartford Crossing are new connections upstream and downstream between the A2 and A13. Once local and regional demand has been decanted from the Dartford Crossing the existing capacity can serve the national demand, allowing time to reduce demand on the Dover/Midlands road haulage route by encouraging greater use of HS1 and the ports of Tilbury, London Gateway and Felixstowe.

3. CAPACITY

The HELTC provides six new lanes of river crossing. The Metrotidal Tilbury Tunnel and the Belvedere Crossing together provide eight new lanes of river crossings, so that even without the twin-track rail contribution of the Metrotidal Lower Thames Orbital they contribute more local and regional capacity than the HELTC.

4. CONSTRUCTION

The MTT with two lanes each way can make use of the existing A1089, including the A13 junction, thereby substantially reducing the extent and cost of the new crossing. Instead of the 23km of new motorway across the green belt required for the HELTC only 4.3km of new route is required to complete the MTT between the A1089 and the A2260/A2 junction of which 3.7km is within a twin-bored tunnel. For a minimum-cost scheme a second roundabout is provided on the A126 Marshfoot Road to the east of the A1089 Dock Approach Road to provide local access to the tunnel. The A1089 then descends in a cutting within Dock Approach Road to pass under the A126 Dock Road gyratory and enter a north portal before passing under the LTS railway tracks. A scheme that provides better local access and access for the Port of Tilbury extends the cutting for the A1089 a short distance further south under the LTS railway tracks and St. Andrew's Road to a north portal close to the main gates of the Port of Tilbury. Here a new gyratory, working in tandem with the existing A126 Dock Road gyratory provides access to the tunnel, which descends to pass under the Port of Tilbury, the Thames and the Tarmac site at Northfleet.

Reduction of the twin-bored tunnel from the 16m diameter proposed for the 3-lane HELTC to 11m diameter required for the MTT more than halves the volume of excavations and requires only 69% of the tunnel lining materials thereby substantially reducing the cost and programme for the tunnel construction while also enabling the route to avoid obstructions. TBMs can be assembled and launched within the working environments of the Port of Tilbury and the Tarmac Northfleet sites, where there are facilities for loading tunnel excavations directly on to Thames barges and unloading materials from Thames barges for manufacturing the tunnel sections on site. The TBM's for boring the tunnels can start from two sites to reduce the period of construction. The excavation spoil is removed and materials supplied by Thames barges to minimise impacts on the surrounding neighbourhoods. Deep piling of the Tilbury dock wharves and on the south bank at Northfleet is lifted and replaced to allow the TBM's to pass. The

tunnel portals are equidistant from the deep channel of the Thames tideway towards the Northfleet shore, allowing easy and uniform gradients within the tunnel.

The route from the Northfleet embankment to the A2260/A2 junction runs under areas that have yet to be developed. The proposed employment, school and open space uses can be implemented above the tunnel in due course. Sheet steel and foundation piling, currently underway to bridge the Ebbsfleet from Springhead, leaves enough space beside the A2260 for the new twin-bored tunnel to pass under HS1 and emerge from a south portal 300m from the A2260/A2 gyratory system. Here an existing dual carriageway underpass of the A2 can be adapted to receive the dual carriageway of the A1089 along with a new gyratory for local access, leaving the existing Ebbsfleet landscaping largely intact. Alternatively, subject to archaeological investigations before any disturbance to the site of Vagniacae in the field immediately south of the A2, the existing underpass together with a new underpass of the A2 and a new gyratory for local connections can complete a D3 capacity junction to serve the MTT and the future demands of Ebbsfleet Garden City as and when required. The reduced extent and scale of construction along with the reduced impacts enables the Metrotidal Tilbury Tunnel to be implemented ahead of the programme for the HELTC even after allowing for the later project instigation.

5. CONNECTIVITY

With the Belvedere Crossing upstream and the Metrotidal Tilbury Tunnel downstream the existing and proposed demand between the A13 and A2 including the cross-river contributions from the Port of Tilbury and London Gateway Port can be decanted from the Dartford Crossing helping the existing capacity to serve the remaining national network demand. The two new crossings at similar distances upstream and downstream from Dartford provide better connectivity for local and regional demand thereby releasing more existing capacity at Dartford to serve national demand. The separation of the new connections opens a wide range of local and regional routes that are more direct than the Dartford Crossing

enabling more demand to be decanted from the Dartford Crossing. In contrast while the HELTC hypotenuse between the A2 and M25 marginally shortens the national Dover/Midland southeast cross-river route it provides much longer southwest cross-river routes from London Gateway and the Port of Tilbury than the Dartford Crossing. For cross-river demand from the London Gateway Port and the Port of Tilbury, the HELTC forms a southwest route that is 10.4km longer than the existing Dartford Crossing, while the MTT forms a southwest route that is the same distance for the London Gateway Port and 8.6km shorter for the Port of Tilbury. There is no demand to increase road haulage capacity southeast from the London Gateway as Kent is already well served by the Port of Dover. Accordingly, the MTT will carry a higher proportion of demand from London Gateway, the Port of Tilbury and the proposed Tilbury 2 than the HELTC and therefore provide greater relief from these demands on the Dartford Crossing.

With the Metrotidal Tilbury Tunnel and Belvedere Crossing serving the existing and proposed metropolitan and regional demands between the A13 and A2 including the cross-river contributions from the Port of Tilbury, Tilbury 2 and London Gateway Port the proposed HELTC extension north from the A13 to the M25 can be omitted.

6. RESILIENCE

The Dartford Crossing relieved by the MTT upstream and BC downstream provides greater resilience than the DfT/Highways England LTC proposal with only one new crossing.

7. IMPACTS AND REMEDIATION

The proposed HELTC has a very high impact on Thurrock and Gravesham while avoiding any impact on Ebbsfleet Garden City. The MTT has a low impact on Thurrock and Gravesham and manageable impacts on the Port of Tilbury, Ebbsfleet Garden City and Dartford Borough Council where the losses are largely offset by gains.

The MTT will increase use of the existing A1089 but as the costs and impacts in Thurrock are very much lower than those of the HELTC full remediation can be provided including noise and air-quality mitigation along the route.

The minimum cost scheme with a second roundabout on the A126 Marshfoot Road to the east of the A1089 Dock Approach Road has a tunnel passing under the Port of Tilbury to minimise disturbance. The scheme with the new gyratory and tunnel access beside the main gates to the Port of Tilbury has greater impacts but these are on a working environment that can manage them and generate some revenue, including the delivery and setting up of a TBM, removal of tunnel excavations and supply of tunnel materials. Compensation is due for the impacts and modest land take of the new gyratory beside the main gates this to take account of the very significantly improved access to the Port of Tilbury and Tilbury 2 provided by the MTT.

The route passes under the Tarmac Northfleet embankment site where good use can be made of the bulk aggregate wharves and cement import terminal to reduce the construction costs and environmental impacts. Again, the wharves can be used for delivery and setting up of a TBM, removal of tunnel excavations and supply of tunnel materials to generate some revenue. The proposed uses and safeguarding of the sites in Gravesham remain unchanged.

A small area of the route through the Ebbsfleet DC area east of the A2260 is within Dartford Borough Council. Compensation for use of the existing infrastructure and for lost development opportunity here would be due to Ebbsfleet DC. However, these losses are largely offset by the improved access to Ebbsfleet provided by the direct MTT connections.

8. COST AND PROGRAMME

The D3 capacity HELTC with three major new junctions and 23km of motorway across the Green Belt including 3.9km of twin-bored 16m diameter tunnels ought to be accompanied by free-flow upgrades to the A229/M20/M2 link and the M25/M11 junction for the full capacity to be realised. As a result, the current Lower Thames Crossing budget of £6bn rises to an overall cost of £9bn. In comparison the D2 MTT with two modest junctions and 4.3km of motorway including 3.7m of 11m twin-bored tunnels along with the D2 Belvedere Crossing in due course have a combined cost of £2-3bn. Accordingly, the phased provision of the MTT followed by the Belvedere Crossing provides eight lanes of river crossing for a third of the cost of the HELTC and on a shorter programme to completion. The period of relief for the Dartford Crossing allows alternatives to the Dover/Midlands route to be investigated and developed.

With the Government reviewing current and proposed PFI contracts there is an opportunity to reconsider the business case for the hypotenuse HELTC Lower Thames Crossing. The relief of the Dartford Crossing by the MTT provides enough time for the Belvedere Crossing and Metrotidal Lower Thames Orbital to follow in due course. The overall public sector funding for the alternative MTT + BC + MLTO system will be much lower than that required for the HELTC and provides much greater outputs including the next generation of sea flood defences for London and the entire Thames Estuary basin.

9. ACTIVE DEMAND MANAGEMENT

The significantly reduced cost of the MTT, without the extension north from the A13 to the M25, compared to the HELTC allows a viable local discount scheme to be set up on the new crossings to encourage local and regional demand away from the Dartford Crossing. An active management system using Sat Nav and mobile apps directs local and regional demand away from the Dartford Crossing as and when the existing capacity is required for peak national demand.

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