

Appraisal Summary Table

Date produced: 27 11 2020

Contact:

<p>Name of scheme: M6 SMART MOTORWAY PROGRAMME - JUNCTIONS 21a to 26</p> <p>Description of scheme: The Proposed Scheme is 16.4km long and extends from the Croft Interchange at J21A (Chainage 39600), where it meets the M62, to the Orrell Interchange at J26 (Chainage 56000), at the eastern terminus of the M58. The southern end of the Proposed Scheme, at J21A, is located approximately 5km north east of Warrington town centre (Ordnance Survey (OS) grid reference of SJ631922). The northern end of the Proposed Scheme, at J26, is located approximately 4.5km west of Wigan Town Centre (OS grid reference of SD 538044). Three residential properties at Martinscroft are being purchased by agreement as essential air quality mitigation. These properties and associated area footprint are considered as part of the Proposed Scheme. The existing three-lane carriageway with hard shoulder (DM3) is to be upgraded to four-lane ALR (D4ALR), which will be accommodated within the existing paved area (current carriageway and hard shoulder). Variable Mandatory Speed Limits (VMSL) will be enabled using a combination of verge and portal and cantilever gantry mounted variable message signs and lane specific signalling, with variable speed limits displayed on advanced motorway indicators mounted above each lane on portal gantries. A number of emergency areas will also be provided.</p> <p>The assured traffic data available for the North West SMP Schemes is for an opening year of 2020, which aligns with the year used in the traffic and economics assessments, and thus this assessment is based on an opening year of 2020. In practice as delivery programmes have developed this is a conservative year of assessment and the M6 J21a-26 is expected to have at the earliest a full year of operation in 2023. There is expected to be a negligible change in traffic flow between the approximate differences in opening years between the component schemes. A sensitivity test assessment showed that the expected impact of traffic flow changes between 2020 and 2022 along the scheme section is in line with the background growth in traffic. The increase in traffic along the scheme section is in the range of 1 to 2%. Assessment of traffic flow changes in the wider area suggests that the additional traffic is not causing any major re-routing issues except for the periphery of the study area where there are marginal changes due to sensitivity of the model and this is not deemed to be significant. From this assessment, it is considered that the impacts predicted from 2020 model are robust enough representation of the network conditions in 2022. Further sensitivity test was not deemed to be required following the revised forecast opening year of 2023 i.e. sensitivity tests have not been completed for 2023 opening year and 2038 design year, but it is anticipated that these are in line with traffic growth demand. Furthermore, Defra background air quality concentrations and vehicle emission factors both allow for improvements in future years, therefore the modelled opening year of 2020 represents a conservative air quality assessment for the Scheme. Likewise, for the noise assessment the consequences of this slightly later opening year (and associated future assessment year) will not be a material change as the small increases in traffic flow (for both opening year and future assessment year) over that 3 year period will not result in a different outcome for the noise appraisal reported here.</p>		<p>Name</p> <p>Organisation</p> <p>Role Promoter/Official</p>										
<p>Impacts</p>		<p>Summary of key impacts</p>		<p>Assessment</p>								
				<p>Quantitative</p>		<p>Qualitative</p>	<p>Monetary £(NPV)</p>	<p>Distributional 7-pt scale/ vulnerable gro</p>				
<p>Economy</p>	<p>Business users & transport providers</p>	<p>Majority of the benefits due to the scheme are derived from travel time savings, with additional VOC fuel and non-fuel benefits driven by the savings for HGVs with more efficient speeds being facilitated. Does not include user impacts during construction. Monetary benefits include indirect tax benefits of £12.6m.</p>	<p>Value of journey time changes(£) £405m</p> <p>Net journey time changes (£)</p> <table border="1"> <tr> <td>0 to 2min</td> <td>2 to 5min</td> <td>> 5min</td> </tr> <tr> <td>£104.1m</td> <td>£288.7m</td> <td>£18.9m</td> </tr> </table>	0 to 2min	2 to 5min	> 5min	£104.1m	£288.7m	£18.9m	<p>N/A</p>	<p>£459m</p>	<p>N/A</p>
	0 to 2min	2 to 5min	> 5min									
	£104.1m	£288.7m	£18.9m									
	<p>Reliability impact on Business users</p>	<p>The scheme would produce an overall benefit. Daily travel time variability (TTV) will be negatively impacted overall due to the loss of the hard shoulder with the scheme in place; there is an increase in disbenefits resulting from non-HGV breakdowns and HGV fire incidents. Delays (due to non-HGV and HGV breakdowns) would have a benefits overall on the scheme links, and a disbenefit overall in the diversion area. Estimated using MyRIAD.</p>	<p>N/A</p>	<p>N/A</p>	<p>£3.3m</p>	<p>N/A</p>						
<p>Regeneration</p>	<p>Appraisal of impact on Regeneration Areas not necessary as scheme is unlikely to impact accessibility to any significant degree.</p>	<p>N/A</p>	<p>None</p>	<p>N/A</p>	<p>N/A</p>							
<p>Wider Impacts</p>	<p>Not assessed.</p>	<p>N/A</p>	<p>None</p>	<p>N/A</p>	<p>N/A</p>							
<p>Environmental</p>	<p>Noise</p> <p>Overall net disbenefit noise impact as a result of the Proposed Scheme. However, both with-scheme and without-scheme noise levels to residential properties in the forecast year (2035) are an improvement on those without the scheme in the opening year.</p> <p>On scheme opening there is a combination of negligible noise increases and negligible noise decreases within the major part of the study area. These result from the interaction of changes in traffic flows, changes in road alignment and changes in road surface noise correction values (Lane 1 and Lane 4 resurfaced with low noise surfacing for opening year). There are minor noise decreases to a number of properties in Ashton-in-Makerfield due to the proposed noise barrier to the south bound carriageway.</p> <p>In the long term there are negligible noise decreases within the major part of the study area when compared to the without-scheme situation in the opening year. Whilst traffic flows are expected to increase as a result of the Proposed Scheme and due to natural growth over time between 2020 and 2035, resulting in corresponding increases in noise levels, these noise increases are offset by the effects of the assumed low noise surface across all lanes of both carriageways in 2035. There are negligible noise decreases to a number of properties in Ashton-in-Makerfield due to the proposed noise barrier to the south bound carriageway.</p> <p>In the short term there are generally negligible noise changes in the NIAs along the Proposed Scheme, apart from a number of properties in NIA 8191, which experience minor noise decreases as a result of the proposed noise barrier. In the long term there are negligible noise decreases in the NIAs along the Proposed Scheme.</p> <p>The opening year for the Proposed Scheme is now likely to be 2023 rather than 2020. The consequences of this slightly later opening year (and associated future assessment year) will not be a material change as the small increases in traffic flow (for both opening year and future assessment year) over that 3 year period will not result in a different outcome for the noise and vibration assessment reported here.</p> <p>The night time traffic noise levels are obtained by factoring a constrained model (based on 18 hour AAWT flows) for an unconstrained situation. Consequently, the night time noise levels increases may have been overpredicted. As such, a worst case has been presented in the EAR, which has been shown not to result in any significant adverse changes in night-time noise levels.</p> <p>The scheme results in benefits for each income quintile. Quintiles 1 and 5 benefit the most whilst Quintiles 4 and 5 receive a proportion if benefits smaller than their population proportion.</p> <p>The few non-residential noise receptors identified within the impact area are not thought to impact children or older people. The overall impact on vulnerable groups has been classed a neutral for both children and older people.</p>	<p>Households experiencing increased daytime noise in forecast year:1306 Households experiencing reduced daytime noise in forecast year: 222 Households experiencing increased night-time noise in forecast year: 1480 Households experiencing reduced night-time noise in forecast year: 166</p> <p>There are no households which experience $L_{Aeq,10h}$ noise levels above 80 dB in the short term or in the long term (this applies for both "No Scheme" and "With Scheme").</p>	<p>N/A</p>	<p>£5,602,818</p>	<p>Q1: Moderate Beneficial Q2: Moderate Beneficial Q3: Moderate Beneficial Q4: Moderate Beneficial Q5: Moderate Beneficial</p> <p>Non-residential: Neutral</p>							

Air Quality	<p>There are 7 Air Quality Management Areas (AQMA) within the study area. As a result of the proposed scheme some receptors within the AQMAs are predicted to experience an increase of more than 0.4 µg/m³ in NO₂ with concentrations of NO₂ above the objective value of 40 µg/m³. In total 33 receptors, located both within and outside AQMAs, are predicted to experience an increase of more than 0.4 µg/m³ in NO₂ with concentrations of NO₂ above the objective value of 40 µg/m³. With the implementation of Scheme mitigation no significant air quality effects are predicted. Scheme mitigation will require the demolition of three residential properties.</p> <p>Air quality benefits are not spread evenly across income groups. The most deprived generally appear to experience dis-benefits in air quality whilst those better off experience a large proportion of benefits relative to the proportion of their population.</p> <p>Although there are schools/nurseries, hospitals and community locations in the impact area set to receive increased levels of NO₂, this is imperceptible and therefore concluded that the scheme will not be of detrimental effect to vulnerable groups.</p>	<p>Opening Year: A total of 21,215 properties are located within 200m of the road network. For PM_{2.5} 9,085 would experience an improvement, 5,142 would experience no change, and 6,985 would experience a worsening in pollutant concentrations. For NO₂, 12,038 would experience an improvement, 69 would experience no change, and 9,105 would experience a worsening in pollutant concentrations. Net Total Assessment score for PM_{2.5} in the Opening Year: -74.22 Net Total Assessment score for NO₂ in the Opening Year: -498.79</p> <p>Design Year: A total of 21,215 properties are located within 200m of the road network. For PM_{2.5} 10,365 would experience an improvement, 2,849 would experience no change, and 7,998 would experience a worsening in pollutant concentrations. For NO₂, 10,663 would experience an improvement, 112 would experience no change, and 10,437 would experience a worsening in pollutant concentrations. Net Total Assessment score for PM_{2.5} in the Opening Year: -60.39 Net Total Assessment score for NO₂ in the Opening Year: 40.84.</p> <p>Regional emissions of PM_{2.5} are predicted to increase by 3.2 tonnes/year in the proposed scheme opening year. Regional emissions of NO_x are predicted to increase by 104.4 tonnes in the opening year.</p>	N/A	<p>Total Value of change in Air Quality: -£5,030,603 (TAG Data Book v1.13.1) or -£4,345,956 (TAG Work Book v1.14.1 - sensitivity test data book)</p> <p>Present value of change in NO₂ concentrations: -£5,118,442 (TAG Data Book v1.13.1) or -£4,423,628 (TAG Work Book v1.14.1 - sensitivity test data book)</p> <p>Present value of change in PM_{2.5} concentrations: £87,839 (TAG Data Book v1.13.1) or £77,673 (TAG Work Book v1.14.1 - sensitivity test data book)</p>	<p>NO₂ Q1: Large Adverse Q2: Moderate Beneficial Q3: Large Beneficial Q4: Large Beneficial Q5: Large Beneficial</p> <p>PM₁₀ Q1: Slight Beneficial Q2: Slight Beneficial Q3: Slight Beneficial Q4: Large Beneficial Q5: Large Beneficial</p> <p>Non-residential: Neutral</p>				
Greenhouse gases	<p>Predictions carried out using Emissions Factor Toolkit (EFT) calculations indicate that there would be an increase of 4,104,829 tonnes of carbon over 60 years with the scheme in place, based on the GDP deflator values in TAG Data Book v1.13.1. Using TAG Work Book v1.14.1 - sensitivity test data book, the same increase of 4,104,829 tonnes of carbon over 60 years with the scheme in place is predicted. In each case, with the Proposed Scheme there is a predicted opening year increase of 46,217 tonnes. There are no traded carbon emissions. The overall increase in emissions is due to an increase in vehicle kilometers travelled with the scheme over the appraisal period compared to without the scheme.</p> <p>Change in carbon dioxide equivalent emissions by carbon budget period: Carbon Budget 1: 0; Carbon Budget 2: 0; Carbon Budget 3: 143,774; Carbon Budget 4: 273,772.</p>	<table border="1"> <tr> <td data-bbox="1073 521 1356 561">Change in non-traded carbon over 60y (CO2e)</td> <td data-bbox="1356 521 1478 561">4,104,829</td> </tr> <tr> <td data-bbox="1073 561 1356 683">Change in traded carbon over 60y (CO2e)</td> <td data-bbox="1356 561 1478 683">0</td> </tr> </table>	Change in non-traded carbon over 60y (CO2e)	4,104,829	Change in traded carbon over 60y (CO2e)	0	N/A	-£183,793,610	
Change in non-traded carbon over 60y (CO2e)	4,104,829								
Change in traded carbon over 60y (CO2e)	0								
Landscape	<p>There are no national landscape designations.</p> <p>The corridor of the M6 between Junctions 21a and 26 passes through a predominantly rural landscape consisting of medium to large scale regular and irregular shaped arable fields broken by intermittent towns and intersecting roads between Warrington to the south and Wigan to the north. The landscape is characterised by the interaction between agricultural and urban fringe landscape with a variety of land uses over a gently rolling topography. The proposed scheme passes alongside areas of dense residential development and the additional infrastructure such as gantries and Emergency Areas (EA) as well as traffic moving closer to the highway boundary would marginally increase the awareness of the motorway through the landscape at a local level. At a broader level the scale of the changes as a result of the proposed scheme would be imperceptible, particularly once mitigation planting has matured, and would not affect the pattern of the landscape, cultural association, overall tranquility or landcover and pattern. There would therefore be a Neutral effect on landscape character.</p> <p>The proposed scheme is within the limits of an existing motorway corridor and will result in very localised areas of vegetation clearance. Given an existing awareness of the motorways presence with existing gantries and infrastructure, the landscape has a low susceptibility to the type and scale of change that will result from the scheme proposals.</p> <p>There are four Landscape Character Areas through the M6 corridor potentially susceptible to change between J21a to 26 (LCA 1C: Winwick, Culcheth, Glazebrook, and Rixton Undulating Enclosed Farmland, LCA WFE2: Haydock Park (St Helens MBC), LCA WFE1: Garswood Park (St Helens MBC) and LCA 2A: Billinge & Orrell Ridge (Wigan MBC)), the effect on these LCAs is neutral.</p>	N/A	Neutral	N/A					
Townscape	<p>This topic is not applicable to the Proposed Scheme location, which predominantly passes and would only be perceived through open countryside. While the M6 passes the western edge of Ashton-in-Makerfield and Bryn, due to highway vegetation and landform it mostly goes unnoticed and does not directly relate to the adjacent townscape. The proposed scheme is set within the limits of an existing motorway corridor and would have no impact on the urban form of the towns of Ashton-in-Makerfield or Bryn. Townscape effects were not scoped into the assessment in the M6 Junction 21a to 26 Environmental Scoping Report, July 2017 (Document: MPD164).</p>	N/A	N/A	N/A					

	Historic Environment	<p>Moss Brow which is located within the air quality mitigation area at Martinscroft will be demolished. Moss Brow is of no more than local importance and the effect is not considered to be more than slight adverse.</p> <p>The setting of the scheduled monument of Castle Hill and the Willow Park Conservation Area will be changed by the Proposed Scheme due to the construction of a gantry in proximity to the assets. This results in an overall assessment score of slight adverse. Works are within the existing highway boundary, which has previously been disturbed, and therefore the scheme is unlikely to impact any buried archaeology. Appropriate mitigation measures will be included within a Construction Environmental Management Plan (CEMP) in the unlikely event of discovery of unknown archaeological remains during the construction phase.</p>	N/A	Slight adverse	N/A													
	Biodiversity	<p>The overall assessment score for biodiversity is neutral. A slight adverse effect has been identified in relation to great crested newts. All other effects have been assessed as neutral.</p> <p>The Proposed Scheme will have an overall neutral effect on all European and national sites designated for nature conservation. There are eight non-statutory designated sites (Houghton Green Pool Local Wildlife Site (LWS), Winstanley Hall Woods Site of Biological Interest (SBI), Glead Wood & Tan Pit Slip SBI, Castle Hill LWS, Plantation Copse and Ponds LWS, Newton Lake and Southern Woodland LWS, Ellams Brook LWS and Orrell Brickworks SBI) located within 50m of Proposed Scheme. The Proposed Scheme is expected to have a slight adverse effect from noise associated with construction activities and a neutral effect during operation on these sites. Habitats within the scheme boundary are of low (local) (tall ruderal, grassland, scrub), or medium (watercourses, woodland, hedgerows) importance, no significant impacts are anticipated during construction or operation on habitats. The Proposed Scheme is likely to have a slight adverse effect during construction from the minor loss of woodland from the implementation of new infrastructure; however, this habitat will be replaced elsewhere within the Proposed Scheme boundary. Legally protected species recorded or habitats are present which may support roosting bats, great crested newts, reptiles, badger and breeding birds. These require avoidance, mitigation, compensation and/or enhancement measures incorporated into the Proposed Scheme. Examples of measures included in the scheme are the enhancement of retained habitats to accommodate protected species displaced by construction; ensuring that construction takes place under European Protected Species Mitigation Licences where necessary; and including standard measures detailed in CEMP to prevent damage and disturbance of nesting birds. Surveys for bats (trees only) and badger have been undertaken and pre-construction checks will be undertaken in advance of construction; trees with features suitable for roosting bats will be retained where possible. With appropriate mitigation in place the Proposed Scheme is predicted to have a slight adverse effect on great crested newts during construction and operation due to the temporary and permanent (small scale) loss of terrestrial habitat from the footprint of new infrastructure, (gantries and Emergency Areas). The Proposed Scheme is predicted to have a neutral effect on all other species during construction and operation.</p>	N/A	Neutral	N/A													
	Water Environment	<p>The overall impact on the water environment from the Scheme has been assessed as neutral. The outfalls 4.0, 4.1 and 8.0 all pass the risk characterisation ratio M-BAT assessment for copper and zinc. The Proposed Scheme will increase impermeable areas within paved central reserves and Emergency Areas. The drainage strategy allows for provision of drainage features including flow attenuation to ensure no increase in flow from existing outfalls. All design and construction to follow advice and requirements of IAN 161/15. There is a predicted increase in traffic in terms of AADT. This has triggered the need for more detailed water quality assessment in some locations. HAWRAT assessments have been carried out for outfalls within areas predicted to receive a the greater than 20% increase in traffic flow as a result of the scheme. Following the advice within the Smart Motorways Treatment of Priority Outfalls (HE, 2019), Hydrodynamic Vortex Separators will be installed on six drainage to mitigate six Priority Outfalls.</p> <p>The construction of gantry bases will accompany the removal of some gantries bases within fluvial flood zone of J21a, and are considered to be insignificant. There are no discharges to ground, and no permanent loss of floodplain storage.</p>	N/A	Neutral	N/A													
Social	Commuting and Other users	<p>Majority of the benefits due to the scheme are derived from travel time savings, with a small additional VOC fuel benefit for commuting trips. Disbenefits for VOC Non-Fuel and VOC Fuel for other trips, due to longer but faster routes being used as a result of the scheme providing additional capacity. Does not include user impacts during construction. Monetary benefits include indirect tax benefits of £21.7m.</p>	<table border="1"> <tr> <td colspan="2">Value of journey time changes (£)</td> <td>£179m</td> </tr> <tr> <td colspan="3">Net journey time changes (£)</td> </tr> <tr> <td>0 to 2min</td> <td>2 to 5min</td> <td>> 5min</td> </tr> <tr> <td>£78.3m</td> <td>£98.9m</td> <td>£2.5m</td> </tr> </table>	Value of journey time changes (£)		£179m	Net journey time changes (£)			0 to 2min	2 to 5min	> 5min	£78.3m	£98.9m	£2.5m	N/A	£156m	<p>Q1: Moderate Beneficial Q2: Moderate Beneficial Q3: Moderate Beneficial Q4: Moderate Beneficial Q5: Moderate Beneficial</p>
	Value of journey time changes (£)		£179m															
Net journey time changes (£)																		
0 to 2min	2 to 5min	> 5min																
£78.3m	£98.9m	£2.5m																
Reliability impact on Commuting and Other users	<p>The scheme would produce an overall benefit. Daily travel time variability (TTV) will be negatively impacted overall due to the loss of the hard shoulder with the scheme in place; there is an increase in disbenefits resulting from non-HGV breakdowns and HGV fire incidents. Delays (due to non-HGV and HGV breakdowns) would have a benefits overall on the scheme links, and a disbenefit overall in the diversion area. Estimated using MyRIAD.</p>	N/A	N/A	£3.2m														

	Physical activity	All existing facilities (such as foot bridges) will be retained. The scheme will not directly affect any pedestrian or cyclist facilities. It will not result in any changes in the journey length or time for pedestrians or cyclists.	0	Neutral	N/A	
	Journey quality	Smart motorways are a technology driven approach to make better use of our motorways, aid the management of congestion and improve the reliability of journey times. Using a range of new technology speed limits can be varied in response to driving conditions and the hard shoulder can be made available to traffic, permanently or at particularly busy times of the day. Traveller Views: Some changes to the perceptions of the motorway due to the frequency of additional infrastructure, however a neutral impact within the context of the motorway. Frustration: Variable message signs will be erected as part of the Proposed Scheme which will serve to provide clear and unambiguous information to drivers regarding road conditions, journey time certainty and reliability and can convey relevant operational information. All of which should contribute beneficially to the journey ambience.	N/A	Slight Beneficial	N/A	
	Accidents	The Scheme would result in an overall increase in accidents and casualties in all severity categories, as the scheme will attract more traffic onto the motorway network due to the decongestion of the network.	Total Accidents saved by scheme: -101	N/A	£-6.5m	Not Assessed
	Security	The scheme is understood to have no impact on security.	N/A	Neutral	N/A	N/A
	Access to services	The proposed scheme does not affect the provision or location of transport facilities and hence access to transport is unaffected.	N/A	Neutral	N/A	N/A
	Affordability	The proposed scheme results in an increase of Vehicle Operating Costs. This is as result of traffic reassigning onto the strategic road network to use longer but faster routes as a result of the scheme providing additional capacity.	N/A	Slight Adverse	N/A	Q1: Slight Adverse Q2: Moderate Adverse Q3: Moderate Adverse Q4: Large Adverse Q5: Moderate Adverse
	Severance	No severance effects are expected following implementation of the proposed motorway scheme. All existing facilities (such as foot bridges) will be retained.	N/A	Neutral	N/A	N/A
	Option and non-use values	The scheme does not involve the loss or introduction of a new mode of transport, as such, option values are unaffected.	N/A	Neutral	N/A	
Public Accounts	Cost to Broad Transport Budget	Represents July 2020 HECS D estimate plus operating and maintenance costs estimated in 2017.	N/A	N/A	£227.5m	
	Indirect Tax Revenues	Data extracted from TUBA. Operation-related ITR excluding Construction-related ITR.	N/A	N/A	£33.6m	