

Appendix B – WebTAG Appraisal Summary Tables

Appraisal Summary Table		Date produced:	15/08/2019		Contact:			
Name of scheme:		Armagh East Link - 2007 Option			Name	Colin Ball		
Description of scheme:		The proposed Armagh East Link is intended to run from the A28 Markethill Road in the south to the A3 Portadown Road in the north, incorporating a proposed junction with the A51 Hamiltonsbawn Road.			Organisation	Mouchel		
					Role	Project Manager		
Impacts		Summary of key impacts		Assessment				
				Quantitative	Qualitative	Monetary £(NPV)		
				Distributional 7-pt scale/ vulnerable grp				
Economy	Business users & transport providers	Over the 60 year appraisal period, travel time benefits are accrued for business users, with savings in vehicle operating costs and accident benefits. Overall, benefit to cost ratio (BCR) is 1.255 (low growth), indicating good value for money. A reduction in journey times of approximately 4 minutes in both the opening year and design year through the city centre may be achieved.	Value of journey time changes (£) 6.8m		-	-	£8.0m	
			Net journey time changes (£)					
			0 to 2min	2 to 5min	> 5min			
			£5.5m	£1.3m	£0.0m			
	Reliability impact on Business users	The scheme would ease congestion, improving reliability of journeys			Moderate Beneficial	-		
	Regeneration	While Armagh is not specifically targeted as a Regeneration Area, improvements to the road network (including the trunk road network) to provide congestion relief in the city centre along with reduced journey times and increased journey time reliability for all road users will provide an opportunity to promote regional economic growth. Encouraging people and business into the city centre and the east of the city will become easier with the reduction in traffic, and the overall improved road network and accessibility to this, has a positive impact on both those seeking employment and those wishing to employ.			Moderate Beneficial	-		
	Wider Impacts	Improvements to the network will increase the accessibility of the area to firms and workers, potentially increasing the level of agglomeration activity. This can lead to higher productivity through greater business interaction, better labour market interaction, and/or increased input and output markets due to reduced freight costs, with an overall increase in UK GDP, resulting in a positive impact on "welfare". A reduction in transport costs allows an increase in production or output of goods or service markets using the transport. A transport intervention which leads to an expansion of output will deliver a welfare gain not appraised within other user benefits. Greater access to the overall transport network will incentivise individuals to work and positively impact on the UK GDP through labour supply and movement between or to employment.			Slight Beneficial	-		
Environmental	Noise	Short-term Major increases are concentrated in three locations, Linsey's Heights, Banvale Villas and Ardmore. Short-term Moderate and Minor increases are principally located in the same areas but are found further away from the scheme alignment. Long-term increases are located in the same locations as for Short-term, but at a smaller number of receptors; a function of the change in banding between Short and Long-term. Short-term Major, Moderate and Minor decreases are found along Drumadd Terrace, Orangefield Drive and in Ardmore. Long-term Moderate and Minor decreases are mostly found in the east of Ardmore.	Short-term perceptible (>=1dB) increases Dwellings: 62 Major; 36 Moderate; 124 Minor OSR: 0 Major; 0 Moderate; 1 Minor Short-term perceptible (>=1dB) decreases Dwellings: 11 Major; 37 Moderate; 145 Minor OSR: 0 Major; 1 Moderate; 2 Minor Long-term perceptible (>=3dB) increases Dwellings: 33 Major; 34 Moderate; 58 Minor OSR: 0 Major; 0 Moderate; 1 Minor Long-term perceptible (>=3dB) decreases Dwellings: 0 Major; 9 Moderate; 30 Minor OSR: 0 Major; 0 Moderate; 1 Minor		Major Adverse	-£218,977.00		
	Air Quality	Overall improvement in local air quality (NO2 and PM10 exposure) predicted across the study area. The majority of properties affected see an improvement in air quality over the 60 year appraisal period. There are 28 affected properties situated within Armagh AQMA, there is a small improvement in NO2 exposure at these properties in the opening and design year.	Local Air Quality: Opening Year Concentrations NO2 Overall Assessment Score = -432.7. Properties within 200m of modelled road links with Improvement: 1257; deterioration: 573; no change: 540 PM10 Overall Assessment Score = -62.8. Properties within 200m of modelled road links with Improvement: 652; deterioration: 352; no change: 1366 Local Air Quality: Design Year Concentrations NO2 Overall Assessment Score = -264.8. Properties within 200m of modelled road links with Improvement: 1026; deterioration: 680; no change: 664 PM10 Overall Assessment Score = -57.4. Properties within 200m of modelled road links with Improvement: 685; deterioration: 387; no change: 1298 Regional Air Quality: The 'net total route assessment' in the opening year for PM10 is 63 µg/m3. The emissions of NOx decrease as a result of the scheme by 2 tonnes for a projection of 60 years.		Opening Year NO2 The proposed scheme is anticipated to lead to an improvement in air quality (NO2 exposure) in the Opening Year. It is anticipated to improve NO2 concentrations at 28 receptors within Armagh AQMA declared for NO2 only. Opening Year PM10 The proposed scheme is anticipated to lead to an improvement in air quality (PM10 exposure). Design Year NO2 The proposed scheme is anticipated to lead to an improvement in air quality (NO2 exposure) in the Design Year. It is anticipated to improve NO2 concentrations at 28 receptors within Armagh AQMA declared for NO2 only. Design Year PM10 The proposed scheme is anticipated to lead to an improvement in air quality (PM10 exposure). Not expected to have an exceedance from PCM links in the opening or design year. Maximum roadside NO2 concentration for PCM links in opening year (2020) is predicted to be 20.8 µg/m3	Monetary value of change in NOx = £1,948 Monetary value of change in PM10 = £181,461 Overall Benefit = £183,409		
	Greenhouse gases	There is an overall decrease in emissions of CO2(eq) as a result of the scheme over the 60 year appraisal period.	Change in non-traded carbon over 60y (tCO2e) -9,183 Change in traded carbon over 60y (tCO2e) N/A				£424,280	
	Landscape	There are no national landscape designations. The landscape around the developed Armagh City is characterised by a small scale pattern of irregular shaped fields and mixed urban development over a rolling drumlin landscape. The urban fringe is fragmented by a variety of land uses and there is a marked change between the open farmland to the east and the urban edge of Armagh. The corridor of the 2007 Option passes through areas of residential housing estates to the north and south, commercial premises and industry in between as well as occasional small pastoral fields bordered by overgrown mature hedgerows. Vegetation is typically associated with properties and field boundaries and while this would be disrupted at a local level the pattern or landcover is not distinctive or important at a wider scale. The effects on the landscape character would be limited to the introduction of another man made element to the edge of an urban fringe landscape. The proposed option would effectively fit into the existing pattern of the urban fringe with limited effects on tranquility, cultural associations or landcover.	N/A		Neutral	N/A		
	Townscape	There are no designations that relate to townscape. The townscape within the northern and southern extents of the study area are characterised by dense residential areas with Armagh to the west and rolling farmland to the east. Through the middle of the study area residential estates are interspersed by a mix of buildings including larger warehouses. The effects on the townscape would be limited to the introduction of another man made element within residential areas. However the proposed option would effectively fit into the existing layout and appearance of the townscape with minimal effects on density, human interaction or scale. The proposed improvements will therefore likely have no significant effect on the surrounding built environment.	N/A		Neutral	N/A		
	Historic Environment	There are four listed buildings and two registered parks, gardens or demesnes within the study area. Industrial heritage assets comprise two ox-bow road bridges and the sites of four demolished mills. Known archaeological assets are restricted to the area of Linsey's Heights and comprise a possible ecclesiastical site reputed to have been re-used in the 1840s for famine burials, elements of a potential prehistoric ritual landscape, settlement activity of Neolithic date, and settlement activity of early medieval date including a possible rath and ecclesiastical enclosure. The setting of the option comprises parts of the eastern urban fringe of Armagh and areas of small regular fields enclosed by hedgerows, which were rationalised during the latter part of the 20th century. The construction and operation of the 2007 Option would result in a neutral impact on known designated and undesignated heritage assets and a minor adverse impact on the character of the historic landscape. The construction phase could have a major adverse impact on potential unknown sub-surface archaeological assets.	N/A		Slight Adverse	N/A		
	Biodiversity	There are no statutory or non-statutory nature conservation designations within the study area. The construction and operation of the 2007 Option will result in the loss and fragmentation of habitats, including hedgerows and mature trees, resulting in a Slight Adverse impact on these habitats. Following the implementation of mitigation and compensation measures, impacts on semi-improved grassland and watercourses are likely to be Neutral. The construction and operation of the 2007 Option will also result in the loss of habitats suitable for nesting birds. The impact of this may be compensated for, however the loss of established habitat is likely to result in a Slight Adverse impact on breeding birds. Further survey work is required to determine the impact of the 2007 Option on bats and badgers. At this stage, the impact on these species is Unknown.	N/A		Slight Adverse (impact on bats and badgers unknown at this stage. Further survey work required before impacts can be determined)	N/A		
	Water Environment	Surface water features in the area comprise an unnamed tributary of Callan River (Derryscollop), the Kileen Water plus other unnamed tributaries and field drains. One groundwater body is assessed, the Keady Groundwater body. There is one standing water body within 1km of the scheme. The presence of public water supplies in the area has not been confirmed. The construction and operation of the scheme could have a slight adverse impact on these features. Impacts include increased flood risk along surface watercourses as a result of an increase in runoff. Pollution from construction activities, accidental spillage and routine runoff may impact surface watercourses. Potential changes to groundwater flow may occur as a result of cuttings, and potential contamination of groundwater as a result of accidental spillage and routine runoff. Other impacts include direct or indirect loss of potential GWDEs as a result of groundwater changes.	N/A		Slight Adverse	N/A		
Social	Commuting and Other users	Over the 60 year appraisal period, travel time benefits are accrued for business users, with savings in vehicle operating costs and accident benefits. Overall, benefit to cost ratio (BCR) is 1.255 (low growth), indicating good value for money. A reduction in journey times of approximately 4 minutes in both the opening year and design year through the city centre may be achieved.	Value of journey time changes (£) £4.9m		-	-	£5.4m	
			Net journey time changes (£)					
			0 to 2min	2 to 5min	> 5min			
			£3.8m	£1.1m	£0.0m			
		Reliability impact on Commuting and Other users	The scheme would ease congestion, improving reliability of journeys			Large Beneficial	-	
		Physical activity	Pedestrian and cycling provision is being provided as part of the link scheme. It is hoped that by maintaining, upgrading where appropriate or necessary, and integrating the existing NMU provision with the introduction of new facilities, physical activity will increase.			Moderate Beneficial	-	
		Journey quality	Driver stress levels would reduce through the town with reduced traffic volumes. Driver stress levels along the scheme would be reduced as a result of an increase in speed and less frustrating driving conditions.	Reduction of 8.5% in AADT 2-way flows through the city (along The Mall) from 7,700 to 7,100 in the Opening Year and 10.6% from 9,400 to 8,500 in the Design Year.		Moderate Beneficial	-	
		Accidents	The scheme will lead to reduction in accidents in the area. Over the 60 year appraisal period, a modelled reduction of 79 accidents and 105 casualties is anticipated.	Accidents saved = 79 (1 No. Fatal, 6 No. Serious and 69 No. Slight) Fatal casualties saved = 1 Serious casualties saved = 12 Slight casualties saved = 92			£4,580,000	
		Security	New link road will increase road speeds for road users on the link road as well as on existing roads in the city centre, improving road user security as a result. Street lighting will be provided along the length of the scheme.			Slight Beneficial	-	
		Access to services	Improves access to the private car network			Moderate Beneficial	-	
	Affordability	Funding of the scheme will be by public sector			N/A	-		
	Severance	Removal of traffic from the city centre will decrease severance for residents and users within the city centre. Provision has been made for continued access to the city centre using a number of priority junctions and at grade junctions.			Moderate Beneficial	-		
	Option and non-use values	Not applicable to this type of scheme	N/A		N/A	-		
Public Account	Cost to Broad Transport Budget	Total Construction and Land Cost.				£18.51m		
	Indirect Tax Revenues	Forecast results indicative that drivers will consume less fuel and thus pay less fuel tax to the government.				£0.5m		

Appraisal Summary Table		Date produced:	15/08/2019	Contact:					
Name of scheme:		Armagh East Link - Option 16		Name	Colin Bell				
Description of scheme:		The proposed Armagh East Link is intended to run from the A28 Markethill Road in the south to the A3 Portadown Road in the north, incorporating a proposed junction with the A51 Hamiltonsbawn Road.		Organisation	Mouchel				
				Role	Project Manager				
Impacts	Summary of key impacts	Quantitative			Assessment				
		Value of journey time changes (£)			Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp		
Economy	Business users & transport providers	Over the 60 year appraisal period, travel time benefits are accrued for business users, with savings in vehicle operating costs and accident benefits. Overall benefit to cost ratio (BCR) is 0.339 (low growth), indicating poor value for money. A reduction in journey times of approximately 4minutes in both the opening year and design year through the city centre may be achieved.		£11.4m					
		Net journey time changes (£)							
		0 to 2min	2 to 5min	> 5min					
		£8.6m	£2.8m	£0.0m		£12.4m			
	Reliability impact on Business users	The scheme would ease congestion, improving reliability of journeys			Moderate Beneficial				
	Regeneration	While Armagh is not specifically targeted as a Regeneration Area, improvements to the road network (including the trunk road network) to provide congestion relief in the city centre along with reduced journey times and increased journey time reliability for all road users will provide an opportunity to promote regional economic growth. Encouraging people and business into the city centre and the east of the city will become easier with the reduction in traffic, and the overall improved road network and accessibility to this, has a positive impact on both those seeking employment and those wishing to employ.			Moderate Beneficial				
	Wider Impacts	Improvements to the network will increase the accessibility of the area to firms and workers, potentially increasing the level of agglomeration activity. This can lead to higher productivity through greater business interaction, better labour market interaction, and/or increased input and output markets due to reduced freight costs, with an overall increase in UK GDP, resulting in a positive impact on "welfare". A reduction in transport costs allows an increase in production or output of goods or service markets using the transport. A transport intervention which leads to an expansion of output will deliver a welfare gain not appraised within other user benefits. Greater access to the overall transport network will incentivise individuals to work and positively impact on the UK GDP through labour supply and movement between or to employment.			Slight Beneficial				
Environmental	Noise	Short-term Major increases are concentrated in three locations, Linsey's Heights, Lowrys Avenue and Bannvale Villas. Short-term Moderate and Minor increases are principally located in the same areas, but are further away from the scheme alignment. Long-term increases are located in the same locations as for Short-term but at a smaller number of receptors, a function of the change in banding between Short and Long-term. Short-term Minor decreases are found along Drumadd Terrace, Orangefield Drive and in Ardmore. No Long-term perceptible decreases are predicted for Option 16.		Short-term perceptible (>=1dB) increases Dwellings: 41 Major; 31 Moderate; 64 Minor OSR: 1 Major; 3 Moderate; 1 Minor Short-term perceptible (>=1dB) decreases Dwellings: 0 Major; 0 Moderate; 140 Minor OSR: 0 Major; 0 Moderate; 0 Minor Long-term perceptible (>=3dB) increases Dwellings: 16 Major; 33 Moderate; 46 Minor OSR: 0 Major; 1 Moderate; 5 Minor Long-term perceptible (>=3dB) decreases Dwellings: 0 Major; 0 Moderate; 0 Minor OSR: 0 Major; 0 Moderate; 0 Minor			Moderate Adverse	£104,391.00	
	Air Quality	Overall improvement in local air quality (NO2 and PM10 exposure) predicted across the study area. The majority of properties affected see an improvement in air quality over the 60 year appraisal period. There are 28 affected properties situated within Armagh AQMA, there is a small improvement in NO2 exposure at these properties in the opening and design year.		Local Air Quality: Opening Year Concentrations NO2 Overall Assessment Score = -599.3 Properties within 200m of modelled links with Improvement: 1611; deterioration: 337; no change: 451 PM10 Overall Assessment Score = -89.2 Properties within 200m of modelled links with Improvement: 709; deterioration: 175; no change: 1515 Local Air Quality: Design Year Concentrations NO2 Overall Assessment Score = -424.4 Properties within 200m of modelled links with Improvement: 1362; deterioration: 326; no change: 711 PM10 Overall Assessment Score = -87.0 Properties within 200m of modelled links with Improvement: 756; deterioration: 208; no change: 1435 Regional Air Quality: The 'net total route assessment' in the opening year for PM10 is -89 µg/m3. The emissions of NOx increase as a result of the scheme by 3 tonnes for a projection of 60 years.		Opening Year NO2 The proposed scheme is anticipated to lead to an improvement in air quality (NO2 exposure) in the Opening Year. It is anticipated to improve NO2 concentrations at 28 receptors within Armagh AQMA declared for NO2 only. Opening Year PM10 The proposed scheme is anticipated to lead to an improvement in air quality (PM10 exposure) in the Opening Year. It is anticipated to improve NO2 concentrations at 28 receptors within Armagh AQMA declared for NO2 only. Design Year NO2 The proposed scheme is anticipated to lead to an improvement in air quality (NO2 exposure) in the Design Year. It is anticipated to improve NO2 concentrations at 28 receptors within Armagh AQMA declared for NO2 only. Design Year PM10 The proposed scheme is anticipated to lead to an improvement in air quality (PM10 exposure) in the Design Year. It is anticipated to improve NO2 concentrations at 28 receptors within Armagh AQMA declared for NO2 only. Not expected to have an exceedance from PCM links in the opening or design year. Maximum roadside NO2 concentration for PCM links in opening year (2020) is predicted to be 20.8 µg/m3			Monetary value of change in NOx = -£2,001 Monetary value of change in PM10 = £271,697 Overall Benefit = £269,696
	Greenhouse gases	There is an overall decrease in emissions of CO2(eq) as a result of the scheme over the 60 year appraisal period.		Change in non-traded carbon over 60y (tCO2e)	-25,054	There is an overall decrease in emissions of CO2(eq) as a result of the scheme. The change in opening year (2020) carbon dioxide emissions in tonnes (tCO2e) between the with scheme and without scheme scenario is -389 in the opening year 2020. Over the 60 year appraisal period a decrease is predicted of 25,054 tCO2e.		£1,157,857	
				Change in traded carbon over 60y (tCO2e)	N/A				
	Landscape	There are no national landscape designations. The landscape around the developed Armagh City is characterised by a small scale pattern of irregular shaped fields over a rolling drumlin landscape. The urban fringe is fragmented by a variety of land uses and there is a marked change between the open farmland to the east and the urban edge of Armagh. The effects on the landscape character would be limited to the introduction of another man made element to the edge of an urban fringe landscape. The proposed option would effectively fit into the existing pattern of the urban fringe with limited effects on tranquility, cultural associations or landcover in the northern half of the option while to the south, where the route sits eastwards and extends into the rural farmland away from the urban edge, there would be a minor effect on the drumlin landform as the route cuts through the rolling farmland over a short distance before connecting with the A28. It would also be visually exposed locally through a short section of low lying landscape immediately north of the A28.		N/A		Slight Adverse	N/A		
	Townscape	N/A		N/A		N/A	N/A		
	Historic Environment	There are three listed buildings and one registered parks, gardens or demesnes within the study area. Industrial heritage assets comprise two extant road bridges and the sites of three demolished mills. Known archaeological assets are restricted to the area of Linsey's Heights and comprise a possible ecclesiastical site reputed to have been re-used in the 1940s for famine burials, elements of a potential prehistoric ritual landscape, settlement activity of Neolithic date, and settlement activity of early medieval date including a possible rath and ecclesiastical enclosure. The setting of the option comprises parts of the eastern urban fringe of Armagh and small regular agricultural fields enclosed by hedgerows, which were rationalised during the latter part of the 20th century. The construction and operation of Option 16 would have a neutral impact on known designated and undesignated heritage assets and a moderate adverse impact on the character of the historic landscape. The construction phase could have a major adverse impact on potential unknown sub-surface archaeological assets.		N/A		Slight Adverse	N/A		
	Biodiversity	There are no statutory or non-statutory nature conservation designations within the study area. The construction and operation of Option 16 will result in the loss and fragmentation of habitats, including hedgerows and mature trees, resulting in a Slight Adverse impact on these habitats. Following the implementation of mitigation and compensation measures, impacts on semi-improved grassland and watercourses are likely to be Neutral. The construction and operation of Option 16 will also result in the loss of habitats suitable for nesting birds. The impact of this may be compensated for, however the loss of established habitat is likely to result in a Slight Adverse impact on breeding birds. Further survey work is required to determine the impact of Option 16 on bats and badgers. At this stage, the impact on these species is Unknown.		N/A		Slight Adverse (Impact on bats and badgers unknown at this stage. Further survey work required before impacts can be determined)	N/A		
	Water Environment	Surface water features in the area comprise an unnamed tributary of Calkin River (Derryscollop), the Killeen Water plus other unnamed tributaries and field drains. One groundwater body is assessed, the Keady Groundwater body. There is one standing water body within 1km of the scheme. The presence of public water supplies in the area has not been confirmed. The construction and operation of the scheme could have a Slight Adverse impact on these features. Impacts include increased flood risk along surface watercourses as a result of an increase in runoff. Pollution from construction activities, accidental spillage and routine runoff may impact surface watercourses. Potential changes to groundwater flow may occur as a result of cuttings, and potential contamination of groundwater as a result of accidental spillage and routine runoff. Other impacts include direct or indirect loss of potential GWDTEs as a result of groundwater changes.		N/A		Slight Adverse	N/A		
Social	Commuting and Other users	Over the 60 year appraisal period, travel time benefits are accrued for business users, with savings in vehicle operating costs and accident benefits. Overall, benefit to cost ratio (BCR) is 0.339 (low growth), indicating poor value for money. A reduction in journey times of approximately 4minutes in both the opening year and design year through the city centre may be achieved.		£9.4m					
		Net journey time changes (£)							
		0 to 2min	2 to 5min	> 5min					
		£7.0m	£2.4m	£0.0m		£9.7m			
		Reliability impact on Commuting and Other users	The scheme would ease congestion, improving reliability of journeys			Large Beneficial			
		Physical activity	Pedestrian and cycling provision is being provided as part of the link scheme. It is hoped that by maintaining, upgrading where appropriate or necessary, and integrating the existing NMU provision with the introduction of new facilities, physical activity will increase.			Moderate Beneficial			
		Journey quality	Driver stress levels would reduce through the town with reduced traffic volumes. Driver stress levels along the scheme would be reduced as a result of an increase in speed and less frustrating driving conditions.			Moderate Beneficial			
		Accidents	The scheme will lead to reduction in accidents in the area. Over the 60 year appraisal period, a modelled reduction of 37 accidents and 43 casualties is anticipated.		Accidents saved = 37 (0 No. Fatal, 2 No. Serious and 34 No. Slight) Fatal casualties saved = 0 Serious casualties saved = 5 Slight casualties saved = 37		£1,910,000		
		Security	New link road will increase road speeds for road users on the link road as well as on existing roads in the city centre, improving road user security as a result. Street lighting will be provided at all junctions and along the urban length of the scheme.			Slight Beneficial			
		Access to services	Improves access to the private car network.			Moderate Beneficial			
	Affordability	Funding of the scheme will be by public sector			N/A				
	Severance	Removal of traffic from the city centre will decrease severance for residents and users within the city centre. Provision has been made for continued access to the city centre using a number of priority junctions and at grade junctions.			Moderate Beneficial				
	Option and non-use values	Not applicable to this type of scheme		N/A		N/A			
Public Account	Cost to Broad Transport Budget	Total Construction and Land Cost.				£28.30m			
	Indirect Tax Revenues	Forecast results indicative that drivers will consume less fuel and thus pay less fuel tax to the government.				£0.5m			

Appraisal Summary Table		Date produced:	15/08/2019	Contact:			
Name of scheme:		Armagh East Link - Option 12		Name	Colin Bell		
Description of scheme:		The proposed Armagh East Link is intended to run from the A28 Markethill Road in the south to the A3 Portadown Road in the north, incorporating a proposed junction with the A51 Hamiltonsbawn Road.		Organisation	Mouchel		
				Role	Project Manager		
Impacts	Summary of key impacts	Quantitative		Assessment Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp	
Economy	Business users & transport providers	Over the 60 year appraisal period, travel time benefits are accrued for business users, with savings in vehicle operating costs and accident benefits. Overall benefit to cost ratio (BCR) is 0.968 (low growth), indicating value for money. A reduction in journey times of approximately 5.5minutes in both the opening year and design year through the city centre may be achieved.	Value of journey time changes(£)	£3.2m			
			Net journey time changes (£)				
			0 to 2min	2 to 5min	> 5min		
			£2.4m	£0.8m	£0.0m	£3.4m	
	Reliability impact on Business users	The scheme would ease congestion, improving reliability of journeys			Moderate Beneficial		
	Regeneration	While Armagh is not specifically targeted as a Regeneration Area, improvements to the road network (including the trunk road network) to provide congestion relief in the city centre along with reduced journey times and increased journey time reliability for all road users will provide an opportunity to promote regional economic growth. Encouraging people and business into the city centre and the east of the city will become easier with the reduction in traffic, and the overall improved road network and accessibility to this, has a positive impact on both those seeking employment and those wishing to employ.			Moderate Beneficial		
	Wider Impacts	Improvements to the network will increase the accessibility of the area to firms and workers, potentially increasing the level of agglomeration activity. This can lead to higher productivity through greater business interaction, better labour market interaction, and/or increased input and output markets due to reduced freight costs, with an overall increase in UK GDP, resulting in a positive impact on "welfare". A reduction in transport costs allows an increase in production or output of goods or service markets using the transport. A transport intervention which leads to an expansion of output will deliver a welfare gain not appraised within other user benefits. Greater access to the overall transport network will incentivise individuals to work and positively impact on the UK GDP through labour supply and movement between or to employment.			Slight Beneficial		
Environmental	Noise	Short-term Major increases are mostly found on and around Killuney Park Road and in the vicinity of the northern end of the scheme. Short-term Moderate and Minor increases are located in the same area as the Major impacts detailed above. Long-term increases are located in the same location as for Short-term, but at a smaller number of receptors; a function of the change in banding between Short and Long-term. Short-term Minor decreases are found along Drumadd Terrace, Orangefield Drive and in Ardmore. No Long-term perceptible decreases are predicted for Option 12.	Short-term perceptible (>=1dB) increases Dwellings: 34 Major; 28 Moderate; 104 Minor OSR: 2 Major; 1 Moderate; 1 Minor Short-term perceptible (>=1dB) decreases Dwellings: 0 Major; 0 Moderate; 179 Minor OSR: 0 Major; 0 Moderate; 0 Minor Long-term perceptible (>=3dB) increases Dwellings: 17 Major; 23 Moderate; 49 Minor OSR: 1 Major; 1 Moderate; 3 Minor Long-term perceptible (>=3dB) decreases Dwellings: 0 Major; 0 Moderate; 0 Minor OSR: 0 Major; 0 Moderate; 0 Minor		Moderate Adverse	£170,262.00	
	Air Quality	Overall improvement in air quality (NO2 and PM10 exposure) predicted across the study area. The majority of properties affected see an improvement in air quality over the 60 year appraisal period. There are 28 affected properties situated within Armagh AQMA, there is a small improvement in NO2 exposure at these properties in the opening and design year.	Local Air Quality: Opening Year Concentrations NO2 Overall Assessment Score = 822.2. Properties within 200m of modelled road links with Improvement: 1968; deterioration: 137; no change: 336 PM10 Overall Assessment Score = 128.2. Properties within 200m of modelled road links with Improvement: 911; deterioration: 21; no change: 1509 Local Air Quality: Design Year Concentrations NO2 Overall Assessment Score = 579.9. Properties within 200m of modelled road links with Improvement: 1689; deterioration: 616; no change: 136 PM10 Overall Assessment Score = 121.6. Properties within 200m of modelled road links Improvement: 886; deterioration: 112; no change: 1443 Regional Air Quality: The 'net total route assessment' in the opening year for PM10 is -128 µg/m3. The emissions of NOx decrease as a result of the scheme by 5 tonnes for a projection of 60 years.	Opening Year NO2 The proposed scheme is anticipated to lead to an improvement in air quality (NO2 exposure) in the Opening Year. It is anticipated to improve NO2 concentrations at 28 receptors within Armagh AQMA declared for NO2 only. Opening Year PM10 The proposed scheme is anticipated to lead to an improvement in air quality (PM10 exposure). Design Year NO2 The proposed scheme is anticipated to lead to an improvement in air quality (NO2 exposure) in the Design Year. It is anticipated to improve NO2 concentrations at 28 receptors within Armagh AQMA declared for NO2 only. Design Year PM10 The proposed scheme is anticipated to lead to an improvement in air quality (PM10 exposure). Not expected to have an exceedance from PCM links in the opening or design year. Maximum roadside NO2 concentration for PCM links in opening year (2020) is predicted to be 20.8 µg/m3		Monetary value of change in NOx = £4,669 Monetary value of change in PM10 = £381,718 Overall Benefit = £386,387	
	Greenhouse gases	There is an overall decrease in emissions of CO2(eq) as a result of the scheme over the 60 year appraisal period.	Change in non-traded carbon over 60y (tCO2e)	-22,044	There is an overall decrease in emissions of CO2(eq) as a result of the scheme. The change in opening year (2020) carbon dioxide emissions in tonnes (tCO2e) between the with scheme and without scheme scenario is -329 in the opening year 2020. Over the 60 year appraisal period a decrease is predicted of 22,044 tCO2e.		£1,019,465
		Change in traded carbon over 60y (tCO2e)	N/A				
	Landscape	There are no national landscape designations. The corridor of the Option 12 initially passes through an area of residential housing at the northern end before passing through rural drumlin farmland to the east of Armagh and approaching the A28 to the south. The landscape to the east of the developed Armagh City is characterised by a small scale pattern of irregular shaped fields over a rolling drumlin landscape. The effects on the landscape character would be limited to the introduction of another man made element to the edge of an urban fringe landscape, disruption to the local pattern of fields and vegetation cover and the affect on drumlin landforms. The proposed option would also extend the extents from which tranquility can be afforded although with mitigation the effects on pattern and landform would not be significant. There would be no effects on cultural association.	N/A		Slight Adverse	N/A	
	Townscape	N/A	N/A		N/A	N/A	
	Historic Environment	There is one listed building within the study area. Industrial heritage assets comprise three rail bridges and one road bridge of 19th century date. Known archaeological assets include a focus of activity at Linseys Heights which comprises a potential ecclesiastical site reputed to have been re-used in the 1840s for famine burials, elements of a potential prehistoric ritual landscape, settlement activity of Neolithic date and settlement activity of early medieval date, including a possible rath and ecclesiastical enclosure. An extant early medieval rath and a tree ring (a possible reused rath) are also recorded c.150m to the east of the option. The option passes through a predominantly agricultural landscape of small regular fields enclosed by hedgerows. The construction and operation of Option 12 would have a slight adverse impact on the listed building, a neutral impact on known undesignated heritage assets and a moderate adverse impact on the character of the historic landscape. The construction phase could have a major adverse impact on potential unknown sub-surface archaeological assets.	N/A		Moderate Adverse	N/A	
	Biodiversity	There are no statutory or non-statutory nature conservation designations within the study area. The construction and operation of Option 12 will result in the loss and fragmentation of habitats, including hedgerows and mature trees, resulting in a Slight Adverse impact on these habitats. Following the implementation of mitigation and compensation measures, impacts on semi-improved grassland and watercourses are likely to be Neutral. The construction and operation of Option 12 will also result in the loss of habitats suitable for nesting birds. The impact of this may be compensated for, however the loss of established habitat is likely to result in a Slight Adverse impact on breeding birds. Further survey work is required to determine the impact of Option 12 on bats and badgers. At this stage, the impact on these species is Unknown.	N/A		Slight Adverse (Impact on bats and badgers unknown at this stage. Further survey work required before impacts can be determined)	N/A	
	Water Environment	Surface water features in the area comprise an unnamed tributary of Callan River (Derryscollop), the Killeen Water plus other unnamed tributaries and field drains. One groundwater body is assessed, the Keady Groundwater body. There is one standing water body within 1km of the scheme. The presence of public water supplies in the area has not been confirmed. The construction and operation of the scheme could have a Slight Adverse impact on these features. Impacts include increased flood risk along surface watercourses as a result of an increase in run-off. Pollution from construction activities, accidental spillage and routine run-off may impact surface watercourses. Potential changes to groundwater flow may occur as a result of cuttings, and potential contamination of groundwater as a result of accidental spillage and routine runoff. Other impacts include direct or indirect loss of potential GWDTEs as a result of groundwater changes.	N/A		Slight Adverse	N/A	
Social	Commuting and Other users	Over the 60 year appraisal period, travel time benefits are accrued for business users, with savings in vehicle operating costs and accident benefits. Overall benefit to cost ratio (BCR) is 0.968 (low growth), indicating value for money. A reduction in journey times of approximately 5.5minutes in both the opening year and design year through the city centre may be achieved.	Value of journey time changes(£)	£2.2m			
			Net journey time changes (£)				
			0 to 2min	2 to 5min	> 5min		
			£1.3m	£0.9m	£0.0m	£1.9m	
		Reliability impact on Commuting and Other users	The scheme would ease congestion, improving reliability of journeys			Large Beneficial	
		Physical activity	Pedestrian and cycling provision is being provided as part of the link scheme. It is hoped that by maintaining, upgrading where appropriate or necessary, and integrating the existing NMU provision with the introduction of new facilities, physical activity will increase.			Moderate Beneficial	
		Journey quality	Driver stress levels would reduce through the town with reduced traffic volumes. Driver stress levels along the scheme would be reduced as a result of an increase in speed and less frustrating driving conditions.			Moderate Beneficial	
		Accidents	The scheme will lead to reduction in accidents in the area. Over the 60 year appraisal period, a modelled reduction of 15 accidents and 16 casualties is anticipated.				£716,000
		Security	New link road will increase road speeds for road users on the link road as well as on existing roads in the city centre, improving road user security as a result. Street lighting will only be provided at junctions.			Slight Beneficial	
		Access to services	Improves access to the private car network.			Moderate Beneficial	
	Affordability	Funding of the scheme will be by public sector			N/A		
	Severance	Removal of traffic from the city centre will decrease severance for residents and users within the city centre. Provision has been made for continued access to the city centre using a number of priority junctions and at grade junctions.			Moderate Beneficial		
	Option and non-use values	Not applicable to this type of scheme	N/A		N/A		
Public Account	Cost to Broad Transport Budget	Total Construction and Land Cost.				£31.08m	
	Indirect Tax Revenues	Forecast results indicative that drivers will consume less fuel and thus pay less fuel tax to the government.				£0.0m	