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A5 WTC
Western Transport Corridor

A5 Western Transport Corridor (A5 WTC)

Appendix TNI – Theme Report: Dual Carriageway Alternatives

29 July 2016

Appendix TNI – Theme Report: Dual Carriageway Alternatives

1. The development of the dual carriageway scheme considered alternatives / options for a dual carriageway standard road early in the process. As scheme development progressed, the findings of these assessments were reported as follows:-

    - Preliminary Options Report (published September 2008) (also called the (Stage 1 Scheme Assessment Report (SAR1)): The work in considering and assessing corridor alternatives in this Phase of the commission focussed on identifying the major constraints associated with each discipline which would restrict the development of any route corridor. This data was gathered either by desk based studies or by site visits and collated in a GIS database. Combining the discipline data in digital format highlighted the major constraints within the study area through which a number of alternative route corridors could be developed. These route corridors and associated constraints were presented by the various disciplines to the project team at the Preliminary Options Workshop, as reported in Appendix C: Preliminary Options Workshop: Qualitative Matrix Assessment of Constraints against Corridors. An extract of this appendix is included in Annex 1

    - Preferred Options Report (published July 2009) (also called the Stage 2 Scheme Assessment Report (SAR2)): In this Phase of the commission, the project team carried out further detailed investigation of the constraints in the Preferred Corridor and those immediately adjacent as these may have influenced the option choice. Using these constraints, the team determined a number options which were presented to the public at Consultation Exhibitions in February 2009. The views received were then used in refining the options links for more detailed assessment. These route options were developed using horizontal and vertical design criteria for a dual carriageway standard from TD9/93 Highway Link Design (Design Manual for Roads and Bridges: Volume 6: Section 1: Part 1) and these were then presented to the project team at the Preferred Route Workshop in May 2009. Examples of the assessment findings and data presented at the workshop are contained in Preferred Route Workshop: Appendix C of Submission on Scheme Development up to Publication of Draft Orders (Ref: 718736-0000-R-021). An extract of this appendix is included in Annex 2. The outcome from this Workshop was the Emerging Preferred Route which was further refined to become the Preferred Route which was announced by the Minister in July 2009.

- Alternatives Discussion Paper (published June 2010): Following the announcement of the Preferred Route by the Minister in July 2009, public exhibitions were held to explain to the public and affected parties what the preferred route was and how it affected them. Through this consultation exercise a number of parties suggested alternatives at 31 locations along the scheme. These were assessed by the project team using the five key criteria (Safety; Economics; Environment; Integration; and Accessibility) and compared with the Preferred Route. This assessment process identified that 11 of the alternatives proposed provided a better solution and these were adopted and incorporated into the Proposed Scheme.

2. The above reports were summarised in the Submission on Scheme Development up to Publication of Draft Orders. The findings reported in this Submission are still valid in the decision making process.

3. During the public inquiries, a number of affected parties proposed alternatives, mainly in relation to the side road realignments which were on lands under their control. These were developed by the consultants, any new impacts assessed and where acceptable and with the agreement of all parties were incorporated into the Proposed Scheme. Changes in land take requirements associated with these alternatives were included in the formal process for acquisition through a Supplementary Vesting Order which was published without significant objection.

4. In addition, also at the public inquiries, TransportNI gave a number of commitments to affected parties to change local aspects of the design of the scheme and these have been, or will be incorporated into the scheme at the appropriate time that a particular Phase of the scheme is progressed to construction.

Summary

5. In summary, the complete scheme development has considered dual carriageway alternatives at each stage of the process. The assessment of these alternatives has demonstrated that whilst there are impacts associated with the Proposed Scheme, which are reported in the Environmental Statement, and when engineering and economics into account, overall these are less than for any of the alternative sections that were identified and considered

Annexes

Annex 1 – Extract from Preliminary Options Report Workshop

Annex 2 – Extract from Preferred Route Workshop

Core documents

Preliminary Options Report

Preferred Options Report

Alternatives Discussion Paper

Submission on Scheme Development up to Publication of Draft Orders (Ref: 718736-0000-R-021)

TD9/93 Highway Link Design (Design Manual for Roads and Bridges: Volume 6: Section 1: Part 1)

Section 1 - New Buildings to north of Sion Mills

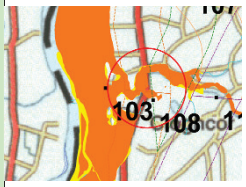
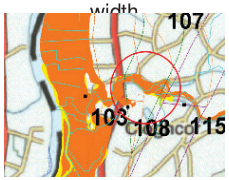
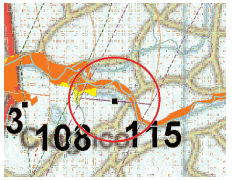
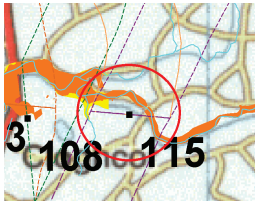
Section 1A New Buildings to Milltown Burndennet

Node-Node Link	101-102-108	101-107-108	101-107-115	114-115
Link Description	Existing A5 from New Buildings to Loughneas via Bready	East of existing A5 at New Buildings to Loughneas via Eden	Variant, East of existing A5 at New Buildings to Milltown Burndennet via Eden	East of existing A5 at New Buildings to Milltown Burndennet

Section 1A Geotechnical

	101-102-108	101-107-108	101-107-115	114-115
High ground with shallow rock & steep slopes		Gortmonly Hill		Tullyvally
Peat & soft alluvial soils	Foyle floodplain	-	-	-
constrained land take by houses or terrain	extg village development	-	-	Tullyvally
Landfill/contaminated sites	New Buildings			SE of New Buildings
Mineral & aggregate resources		Cloghcor	Milltown Burndennett	

Section 1A Drainage

	101-102-108	101-107-108	101-107-115	114-115
Flooding Issues	Comment	Comment	Comment	Comment
	Significant Constraint Burndennet (perpendicular) 100 - 350m potential floodplain width 	Significant Constraint Burndennet (perpendicular) 100 - 350m potential floodplain width 	Moderate Constraint Burndennet (perpendicular) - 100m potential floodplain width 	Moderate Constraint Burndennet (perpendicular) - 100m potential floodplain width 
Service Reservoirs	-	-	-	-
Treatment Centres	2 WwTW	-	2 WwTW	3 WwTW
Pipelines & Pumping	8 WwPS, Trunk Main on Centreline	-	1 WwPS	-

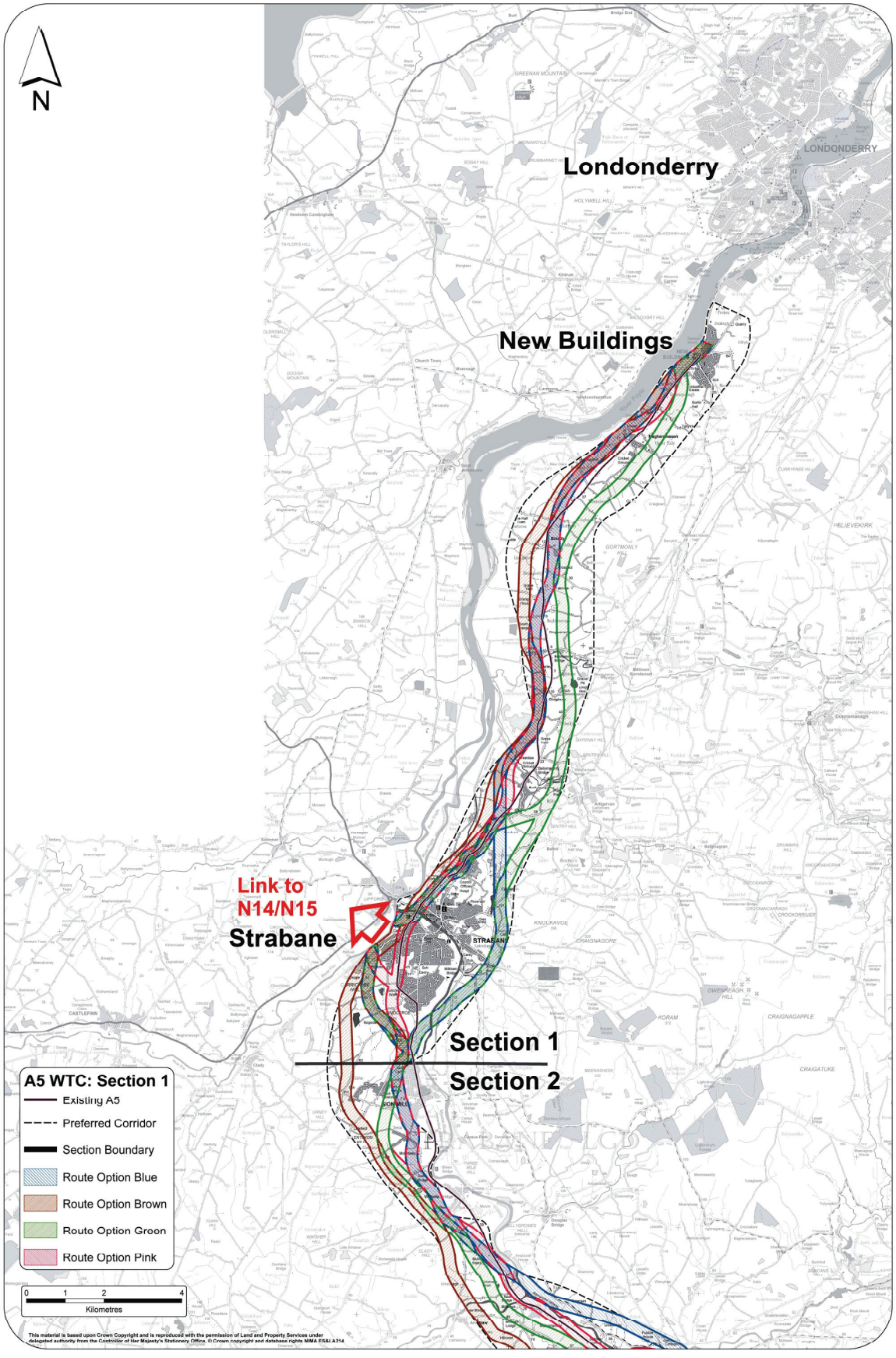
Section 1A Highway Alignment / Buildability

	101-102-108	101-107-108	107-115	114-115
Alignment etc	Roundabout / GSJ @ Newbuildings. Existing vertical profile at grade. Horizontal constraints through Magheramason - alignment off line to west of A5 around the town and into floodplain	Horizontal constraint through Magheramason to miss development. Vertical constraint west of Magheramason 11m level diff, vertical constraint west Bready 20m level difference 7.5% longfall, vertical constrain Burndennet river 11m level difference	Vertical constraint at tie in with green resulting in 40m level diff. Vertical constraint just before tie in with pink resulting in 10 level difference. Minimal properties affected.	First 5km on-line B48 - Horizontal constraint through town of new buildings which will affect 100 approx properties. Vertical constraint alignment follows Gortmonly Hill resulting in 10% vert gradient reduced vertcial curves and level difference in excess of 10m. Follows contours.
Buildability/ TM	Traffic Management issues online - connectivity of existing local network, Minor Road Crossings	Minor Road Crossings	Minor Road Crossings	Minor Road Crossings
Services	Eircom & Virgin fibre optic 3km ‖to corridor - 9km 33KV	Eircom & Virgin fibre optic 3km ‖to corridor - 3no. mobile phone masts	Eircom & Virgin fibre optic 2.3 & 2.8km ‖to corridor - 2no. mobile phone masts - 2no. 110KV over 1.8km	2no. 110KV over 6km ‖to corridor - Eircom & Virgin fibre optic 4km ‖to corridor
Earthworks	Potential flood plain - fill may be required where off-line as flood protection - drainage	Localised cut 20m deep around Bready	Localised cut 40m deep around Bready	Minor eathworks - road cuts into hill side - sub-standard profile to reduce earthworks
Structures	Minor culverts - 4no. minor bridges as roads / tracks or may divert local network - major Burndennet River Crossing >25m span	4no. minor bridges - major Burndennet River Crossing >25m span	4no. minor bridges - major Burndennet River Crossing >25m span	4no. minor bridges. Sub-standard profile to reduce earthworks - 1no structure >25m span / possible cut & cover tunnel

Section 1A Environment

Discipline	Constraint	101-102-108	101-107-108	101-107-115	114-115
Air Quality	Proximity to settlement / human receptors	Magheramason, Bready	Magheramason	Donagheady	New Buildings, Donagheady
	Proximity to Air Quality Management Areas	None	None	None	None
	Potential Nitrogen Identity Ecological Areas (200m of new and affected road network)	Foyle Flood Plain ESA, SAC, ASSI	Foyle Flood Plain ESA, SAC, ASSI	None	None
Heritage	Heritage Identity Areas	Bready Ancestry	none	none	Tullyvally ID AREA
	Scheduled Monuments / Listed Buildings	Dunnalong Fort			
Ecology	Ecologically Identity Areas / Designations	Foyle Flood Plain ESA Foyle & Estuaries SAC/ASSI	Foyle Flood Plain ESA Foyle & Estuaries SAC/ASSI LEAW close to Cloghcor	none	Tullyvally ESA
Landscape and Visual *	Landscape Identity Areas	Foyle Flood Plain	Foyle Flood Plain	none	Tullyvally
	Designations				
Land Use	Major Planning Applications / Development	3 (all within/on limits of settlements)	2 (both within/on limits of settlements)	1 (within/on limits of settlement)	2 (both within/on limits of settlement)
	ALC: Best and Most Versatile Land	Grade 3a (predominantly) & Grade 2	Grade 3a (predominantly) & Grade 2	Grade 2 (predominantly) & Grade 3a	Grade 3a (predominantly) & Grade 2
	Countryside Management Branch Env. Sensitive Areas Scheme	None	None	None	None
	Forest Service-managed and Grant-aided Private Woodland	4 small private woodland tracts	1 small private woodland tract	1 small private woodland tract	1 small private woodland tract
Noise and Vibration	Proximity to settlement / human receptors	Magheramason, Bready	Magheramason	Donagheady	New Buildings, Donagheady
Pedestrians, Cyclists, Equestrians and Community	Towns in close proximity to each other	None	None	None	None
	Cycle routes	None	None	None	93 National Cycle Route
	Footpaths	Several	Several	Three	Several
	Equestrians / Bridleways	None	None	None	None
	Recreation areas, tourist places and amenities	Foyle Flood Plain Cricket ground	Foyle Flood Plain Cricket ground	None	None
Road Drainage	Water Quality	FFD - very good; GQA chemistry - very good to fairly good; GQA biology – very good to poor.	FFD - very good; GQA chemistry - very good to fairly good; GQA biology – very good to poor.	FFD - very good; GQA chemistry - very good to fairly good; GQA biology – very good to poor.	FFD - very good; GQA chemistry - very good to fairly good; GQA biology – very good to poor.
	Watercourses and Floodplains	Burnadet floodplain – significant constraint	Burnadet floodplain – significant constraint	Burnadet floodplain – moderate constraint	Burnadet floodplain – moderate constraint
	Groundwater Vulnerability	Type B(H) and Type C	Type B(H) and Type C	Type B(H) and Type C	Type B(H) and Type C
	Superficial Aquifers	1b, 3a and 3b	1b, 3a and 3b	1b, 3a and 3b	1b, 3a and 3b
Geology and Soils	Soft Ground	River Foyle floodplain (alluvium)			
	Contaminated Land	Landfill at New Buildings	Landfill at New Buildings	Landfill at New Buildings	Landfill at New Buildings

Section 1 – New Buildings to South of Strabane



Section 1 – Development of Routes

CRITERIA	EXHIBITION ROUTE CORRIDOR			
	BROWN	**GREEN**	**PINK**	**BLUE**
Description	**Hugs western edge of preferred corridor**	**Hugs eastern edge of preferred corridor**	**Follows existing A5 corridor, west of Magheramason, east of Bready, west of Ballymagorry and through Strabane.**	**Follows existing A5 corridor, west of Magheramason, east of Bready before heading round Strabane to the east**
ENGINEERING	Less than desirable Vertical alignment as it needs to be above the flood plains of River Foyle generating significant earthworks Significant Viduct required to span floodplain	Significant earthworks local to Magheramason. Less than desirable vertical alignment around Strabane Glen and Pattens Glen generating significant earthworks.	Vertical alignment and horizontal alignments are desirable. Need to implement reduced cross section via re-use of through pass.	Both vertical and horizontal alignments are adequate. Less than deasirable vertical alignment around Strabane Glen and Pattens Glen generating significant earthworks.
ENVIRONMENT	Impact on Floodplain, SAC	Creates a new road corridor with associated landscape and visual intrusion. Runs parallel to Strabane Glen. Crosses Pattens Glen - significant landscape and ecological impacts.	Established Corridor. Severance issues through Strabane.	Runs parrallel to Strabane Glen, crosses Pattens Glen, significant landscape and ecological impacts.
TRAFFIC & ECONOMICS	Adequate transfer of traffic from existing A5 at Newbuilings. Adequate transfer of traffic from exisitng A5 north of Strabane. Good connectivity to ROI via the N14	Adequate transfer of traffic from existing A5 at Newbuildings. Access to Strabane and RoI not significantly adversely affected by length of link	Adequate transfer of traffic from existing A5 at Newbuildings Good connectivity/access to Strabane and ROI	Adequate transfer of traffic from existing A5 at Newbuildings. Access to Strabane and RoI not significantly adversely affected by length of link
PUBLIC PREFERENCE	**North - 34%** **South - 34%**	**North - 29%** **South - 25%**	**North - 22%** **South - 24%**	**North - 15%** **South - 17%**
STATUS	**Eliminated south of Glenmornan River (ref Pink Loop) - retained north of Glenmornan as Purple Route**	**Retained - to be progressed to Preffered Route Workshop**	**Retained - to be progressed to Preffered Route Workshop**	**Superceded - south of Glenmornan River now combined with Brown Route north of Glenmornan River to form a new Purple Route.**

Section 1 North - Engineering Matrix

DISCIPLINE	Option			Assumptions / Comments / Mitigation Suggestions
	PURPLE (west to east) Sublink Pu1, Pu2,	**PINK (central / on line) Pk1, Pk2, Pk3**	**GREEN (east) Gr1, Gr2**	
Alignment	**Scheme Length:** 12,060 m **Relaxations:** 0 **Departures:** 0 **Local Access Roads/ Diversions Required:** None **New Buildings:** Single carriageway bypass	**Scheme Length:** 10,500 m **Relaxations:** 0 **Departures:** 0 **Local Access Roads/ Diversions Required:** None **New Buildings:** Terminates to the south. Existing asset utilised thereafter.	**Scheme Length:** 12,100 m **Relaxations:** 2 **Departures:** 0 **Local Access Roads/ Diversions Required:** None **New Buildings:** Single carriageway bypass.	
Junctions	**No. of Junctions (Mainline & Ex A5): 2** **New Link Roads Required:** None	**No. of Junctions (Mainline & Ex A5): 1** **New Link Roads Required:** Tie-in arrangement south of New Buildings	**No. of Junctions (Mainline & Ex A5): 1** **New Link Roads Required:** None	
Structures	**No. of long span/ complex structures:** 2 **No. of retaining walls:** TBC	**No. of long span/ complex structures:** 2 **No. of retaining walls:** TBC	**No. of long span/ complex structures:** 2 **No. of retaining walls:** TBC	
Geotechnical	**Approx cut:** 0.04M m^3 **Approx fill:** 3.94M m^3 Significant earthworks due to side road strategy	**Approx cut:** 1.45M m^3 **Approx fill:** 3.04M m^3 Significant earthworks due to side road strategy	**Approx cut:** 3.23M m^3 **Approx fill:** 2.45M m^3 Significant earthworks due to topography	
Drainage	Minor drainage constraints associated with this route. High potential for balancing pond Attenuation 2 areas with limited potential to attenuate flows	Significant constraints associated with route. High potential for balancing pond Attenuation 2 areas with limited potential to attenuate flows	Minimal constraints associated with route. High potential for balancing pond Attenuation All proposed outfalls close to watercourses, reduced quantity of pipework	
Flooding	**Approx 4940m of floodplain affected Very Significant Impacts**	**Approx 2460m of floodplain affected Significant Impacts**	**Approx 470m of floodplain affected Minimal Impacts**	
Other Engineering Issues	**Buildability & Maintenance Issues** No Significant Issues	**Buildability & Maintenance Issues** Route crosses existing A5 twice	**Buildability & Maintenance Issues:** Working Quarry on route. High ground.	
Value Engineering Potential	**Greatest Opportunity**	**Least Opportunity**	**Medium Opportunity**	
POLICY				
UTILITIES	**Low Impact**	**Low Impact**	**Low Impact**	

Section 1 North – Environmental Table

DISCIPLINE	Option			SUMMARY
	PURPLE (west to east) Sublink Pu1, Pu2,	PINK (central / on line) Pk1, Pk2, Pk3	GREEN (east) Gr1, Gr2	
AIR QUALITY	No exceedence of PM10 or NO2 Air Quality Standards at any receptor location.			Little difference between route options for AQ
CULTURAL HERITAGE	Potential for unknown archaeology. Generally thought to be limited to potential for spot finds relating to the historic use of (but not settlement in) the floodplain.	The option broadly follows the existing transport corridor and therefore is likely to have the least risk for unknown archaeology.	Potential for historic settlement (given that the landscape/form comprises a number of sheltered areas and several small river tributaries (potentially used historically)) therefore high risk for unknown discoveries.	All options have significant potential for buried archaeology. The pink option is preferable in terms of archaeology.
LANDSCAPE	The proposed alignment would result in the modification to the south of the character zone, however existing hedgerows would afford some screening. Development of a new alignment in parallel to the existing A5 corridor would result in changes to the perception of the river bank.	The use of the existing transport corridor would help to retain the existing landscape character of the area. The alignment reflects the local break in the slope and would run broadly parallel with the existing A5 to form a broader transport corridor within the zone.	Local disruption to the existing landscape. The southern exposed ridgeline of the hill would require a deep cutting that would result in a notch to the skyline when viewed from the south.	The pink and purple options result in less significant landscape effects than the green option north of Strabane. They broadly follow the existing transport corridor and impacts can be mitigated for with screening etc.
NATURE CONSERVATION	Foyle Floodplain SAC McKean's Moss SAC Foyle Swamp SAC Grange Foyle - Birds	Foyle Floodplain SAC McKean's Moss SAC	Foyle Floodplain SAC Foyle Swamp SAC	The green option avoids the SACs between New Buildings and Strabane but it likely to have more protected species constraints. The pink and purple options are broadly similar.
NOISE	Little difference between route options.			
COMMUNITY AND PRIVATE ASSETS (INC. LAND USE)	No. of buildings within alignment footprint: No. of buildings adjacent to alignment:	No. of buildings within alignment footprint: No. of buildings adjacent to alignment:	This alignment crosses through the car park of the new cricket ground at Magheramason No. of buildings within alignment footprint: No. of buildings adjacent to alignment:	There is no significant difference between the route options north of Strabane.
ROAD DRAINAGE AND THE WATER ENVIRONMENT	This option transects fewer watercourses than the green route. McKean's Moss SAC Foyle Floodplain SAC	This option transects fewer watercourses than the green route. McKean's Moss SAC Foyle Floodplain SAC	This option crosses the most watercourses (also severs more tributaries of Burn Dennet) resulting in higher potential of cumulative effects for road drainage. However this option avoids the floodplain.	Overall the pink and purple options are slightly more favourable than the green option, predominantly due to the potential for cumulative effects related to the number of water crossings.
PUBLIC CONSULTATION	Preferred Route Option from Public Consultation Questionnaire feedback.	no comment	Cricket club Petition Article in Strabane Chronicle 5/3/09 Magheramason Residents - Quoted in Londonderry Sentinel 250209.	The purple option is preferred by the public.

Section 1 South – Engineering Matrix

DISCIPLINE	Option			
	PURPLE (west to east) Pu3, Pu4, Pu5	**PINK (central / on line) Pk4, Pk5, Pk8, Pk9**	**PINK LOOP Pk4, Pk6, Pk7, Pk9**	**GREEN (east) Gr3, Gr4, Gr5**
Alignment	**Scheme Length:** 10,250 m **N14 Link:** 2,890 m **Relaxations:** 2 **Departures:** 2 **Local Access Roads/ Diversions Required:** None **N14 Link:** From junction southwest of Strabane	**Scheme Length:** 9,950 m **N14 Link:** 2,890 m **Relaxations:** 1 **Departures:** 0 **Local Access Roads/ Diversions Required:** Urney Road tie-in to Bradley Way **N14 Link:** From junction southwest of Strabane	**Scheme Length:** 10,450 m **N14 Link:** 100 m **Relaxations:** 0 **Departures:** 0 **Local Access Roads/ Diversions Required:** None **N14 Link:** From junction adjacent to Border	**Scheme Length:** 9,682 m **N14 Link:** 3,067 m **Relaxations:** 3 **Departures:** 0 **Local Access Roads/ Diversions Required:** None **N14 Link:** From junction south of Strabane
Junctions	**No. of Junctions (Mainline & Ex A5): 3** **New Link Roads Required:** None	**No. of Junctions (Mainline & Ex A5): 3** **New Link Roads Required:** None	**No. of Junctions (Mainline & Ex A5): 3** **New Link Roads Required:** None	**No. of Junctions (Mainline & Ex A5): 2** **New Link Roads Required:** None
Structures	**No. of long span/ complex structures:** 5 **No. of retaining walls:** TBC	**No. of long span/ complex structures:** 3 **No. of retaining walls:** TBC	**No. of long span/ complex structures:** 2 + viaduct **No. of retaining walls:** TBC	**No. of long span/ complex structures:** 5 **No. of retaining walls:** TBC
Geotechnical	**Approx cut:** 2.54M m^3 **Approx fill:** 3.68M m^3 Significant earthworks due to floodplain	**Approx cut:** 0.81M m^3 **Approx fill:** 2.69M m^3 Significant earthworks due to floodplain	**Discrete Length of Pink Loop** **Approx cut:** 0.32M m^3 **Approx fill:** 0.57M m^3 Assumes Viaduct **South of Glenmornan (Pink Route + Pink Loop inserted)** **Approx cut:** 0.73M m^3 **Approx fill:** 2.02M m^3	**Approx cut:** 4.05M m^3 **Approx fill:** 3.15M m^3 Earthworks dictated by topography
Drainage	**Minor drainage constraints associated with this route.** **High potential for balancing pond attenuation** **2 areas with limited potential to attenuate flows**	**Very significant drainage constraints associated with this route.** **Limited potential for balancing pond attenuation** **5 areas with limited potential to attenuate flows**	**Very significant drainage constraints associated with this route.** **Limited potential for balancing pond attenuation** **7 areas with limited potential to attenuate flows**	**Moderate drainage constraints associated with this route, greater impacts on N14 link.** **High potential for balancing pond attenuation** **1 area with limited potential to attenuate flows**
Flooding	**Approx 2040m of floodplain affected** **Significant Impacts**	**Approx 4864m of floodplain affected** **Very Significant Impacts**	**Approx 2140m of floodplain affected** **Very Significant Impacts**	**Approx 1010m of floodplain affected** **Significant Impacts**
Other Engineering Issues	**Buildability & Maintenance Issues** Proximity to Strabane Glen, high ground	**Buildability & Maintenance Issues** Online construction, no alternative route through Strabane	**Buildability & Maintenance Issues** Settlement issues on Floodplain	**Buildability & Maintenance Issues** All offline in 'hilly' terrain, high ground
Value Engineering Potential	**Medium Opportunity**	**Lowest Opportunity**	**Greatest Opportunity**	**Medium Opportunity**
POLICY				
UTILITIES	**Medium Impact**	**Low Impact**	**Low Impact**	**High Impact**

Section 1 South – Environmental Matrix

DISCIPLINE	Option			
	PURPLE (west to east) Pu3, Pu4, Pu5	PINK (central / on line) Pk4, Pk5, Pk8, Pk9	PINK LOOP Pk4, Pk6, Pk7, Pk9	GREEN (east) Gr3, Gr4, Gr5
AIR QUALITY	No exceedence of PM10 or NO2 Air Quality Standards at any receptor location.			
CULTURAL HERITAGE	This option is offline around Strabane. Therefore there are higher risks on unknown / buried archaeology. This option runs parallel to Strabane Glen which is a remnant historic woodland.	Preferred route through Strabane and within this section given the presumption of previous disturbance. Potential for few point artefacts, spot finds and risk of encountering unknown artefacts. No effects on listed buildings	Listed Building (Castletown House Grade B1) within proximity of the route.	This option is offline around Strabane. Therefore there are higher risks on unknown / buried archaeology. Reduced impacts on the setting of Strabane Glen.
LANDSCAPE	The proposed alignment ascends the hill slopes to the east of Strabane resulting in the requirement to heavily modify the existing landform in the form of deep cuttings and new structures.	The alignment utilises the existing A5 corridor and therefore changes within are not anticipated to result in significant impacts on the wider context of the character area and the town of Strabane.	Effects on features of the Finn Valley Complex and introduction of new road in largely unspoilt valley. Visible from both Lifford and Strabane.	The proposed alignment ascends the hill slopes to the east of Strabane resulting in the requirement to heavily modify the existing landform in the form of deep cuttings and new structures.
NATURE CONSERVATION	This option passes very close to Strabane Glen ASSI and will result in impacts on Cavanalee Ancient Woodland (habitat and species issues).	This option crosses the Foyle / Finn SAC, the crossings will need to be sensitively designed to control/reduce potential impacts on the SAC. Appropriate Assessment is likely to be required here.		This option passes close to Strabane Glen ASSI (the southern tip) and will result in impacts on Cavanalee Ancient Woodland (habitat and species issues).
NOISE	Little difference between route options.			
COMMUNITY AND PRIVATE ASSETS (INC. LAND USE)	No. of buildings within alignment footprint: No. of buildings adjacent to alignment:	Severance in relation to Strabane and Lifford. No. of buildings within alignment footprint: No. of buildings adjacent to alignment:	Severance in relation to Strabane and Lifford. No. of buildings within alignment footprint: No. of buildings adjacent to alignment:	No. of buildings within alignment footprint: No. of buildings adjacent to alignment:
ROAD DRAINAGE AND THE WATER ENVIRONMENT	Routing to the east of Strabane avoids impacts on the Flood Plain. Potential impacts on Strabane Glen.	Long Section running through flood plain and removing flooding footprint (increasing flood risk upstream). Potential to restrict flows in the Foyle. Also risk of inundation of runoff in to SAC.	Longer Section running through flood plain and removing flooding footprint (increasing flood risk upstream). Potential to restrict flows in the Foyle. Also risk of inundation of runoff in to SAC.	Routing to the east of Strabane avoids impacts on the Flood Plain. Potential impacts on Strabane Glen.
PUBLIC CONSULTATION	Least Preferred Route Option from Public Consultation Questionnaire feedback	no comment	no comment	no comment

Section 1 – Cost

DISCIPLINE	OPTION			
	PURPLE (west)	PINK (central / on line) Pk1, Pk2, Pk3, Pk4, Pk5, Pk8, Pk9	PINK LOOP Pk1, Pk2, Pk3, Pk4, Pk6, Pk7, Pk9	GREEN (east)
Earthworks	Purple earthwork balance is 5,348,050m^3. Purple total cut volume is 2,580,046m^3 Purple total fill volume is 7,622,897m^3 Pink total reusable is 2,274,847m^3 Purple total generates 203,357m^3 of Rock Total Cost £53,341,450	Pink earthwork balance is 4,235,559m^3 Pink total cut volume is 2,260,728 m^3 Pink total fill volume is 5,725,889 m^3 Pink total reusable is 1,490,330m^3 Pink total rock volume is 146,556 m^3 Total Cost £42,783,941	Pink Loop earthwork balance is 2,771,740m^3 Pink Loop total cut volume is 2,186,333 m^3 Pink Loop total fill volume is 4,334,244 m^3 Pink total reusable is 1,562,504 m^3 Pink Loop rock volume is 154,063m^3 Total Cost £32,101,715 Saving is minimal when viaduct cost is included in structures cost.	Green earthwork balance is +635,127 m^3 Green total cut volume is 7,284,924 m^3 Green total fill volume is 5,602,200m^3 Green total reusable is 6,237,327 m^3 Green 4 generates 3,170,007 of m^3 rock Total Cost £65,278,680
Pavements	Mainline is 475,788 m^2 - 25.58 km Side roads is 78,293 m^2 Total cost £27,097,458 All capping is imported material	Mainline is 437,770 m^2 - 23.54 km Side roads is 70,057 m^2 Total cost £31,486,117 All capping is imported material	Mainline is 417,310 m^2 - 22.44 km Side roads is 38,102 m^2 Total cost £25,011,236 All capping is imported material	Mainline is 446,437 m^2 - 24.00 km Side roads is 108,490 m^2 Total cost £30,193,806 All capping is imported material
Structures	River crossings 3 Nr Under bridges 22 Nr Over bridges 12 Nr Retaining walls tbc Culverts 1,503 m Accommodation Structures 4 Nr Total Cost £75,606,200	River crossings 4 Nr Under bridges 12 Nr Over bridges 9 Nr Retaining walls tbc Culverts 1,623 m Accommodation Structures 4 Nr Total Cost £50,916,913	River crossings 4 Nr Under bridges 10 Nr Over bridges 9 Nr Retaining walls tbc Culverts 828 m Accommodation Structures 4 Nr Total Cost £156,384,913	River crossings 4 Nr Under bridges 19 Nr Over bridges 15 Nr Retaining walls tbc Culverts 2,040 m Accommodation Structures 5 Nr Total Cost £80,423.575
Other Construction Costs		2km of additional traffic management allowance included.	Viaduct 1900 * 30m wide. Cost included in Structures Viaduct total cost £105,450,000	
Land	Agricultural 2,019,608 m^2 £8,987,253 Industrial 53,148 m^2 - £6,643,446 Residential 53,148 m^2 - £9,832,300 Compensation £6,707,750	Agricultural 1,419,162 m^2 £6,315,271 Industrial 37,346 m^2 - £4,668,296 Residential 37,346 m^2 £6,909,078 Compensation £8,417,375	Agricultural 1,349,249 m^2 – £6,004,160 Industrial 35,507 m^2 - £4,438,320 Residential 35,507 m^2 - £6,568,714 Compensation £8,417,375	Agricultural 1,977,153 m^2 £8,798,330 Industrial 52,030 m^2 - £6,503,792 Residential 52,030 m^2 - £9,625,612 Compensation £7,447,000
Risk, OB, P&S etc	Optimism Bias at 15.8% Risk function of length x £76,000,000 / 85	Optimism Bias at 15.8% Risk function of length x £76,000,000 / 85	Optimism Bias at 15.8% Risk function of length x £76,000,000/85	Optimism Bias at 15.8% Risk function of length x £76,000,000 / 85
Total Estimated Costs	Construction £243,645,258 Total £ 395,107,778 Ranking 2 of 4	Construction £ 205,451,718 Total £ 335,527,184 Ranking 1 of 4	Construction £ 290,780,173 Total £ 445,513,706 Ranking 4 of 4	Construction £ 264,238,754 Total £ 419,950,144 Ranking 3 of 4

Section 1 – Traffic

OPTION				Assumptions / Comments / Mitigation Suggestions
PURPLE (west)	**Brown**	**PINK (central / on line)**	**GREEN (east)**	
Provides the 2nd lowest PVB of all schemes. Lower benefits north of Strabane compared to Pink Route over the same length.	Sight better relief at New Buildings bypass. Best relief in Strabane. Higher PVB comparing to Purple/Pink. Relief offered by Brown Route in part attributable to Pink Loop	Provides no alternative to divert the through traffic away from the urban area of Strabane. Assuming 50 Mph through Strabane, the lowest PVB of all schemes. Greater benefits north of Strabane compared to Pink Route over the same length.	Highest PVB off all schemes Removes long distance through traffic from the Strabane urban section. While still maintaining the linkage to the N15	

Mini Test 1	Mini Test 2	Mini Test 3	Mini Test 4	Assumptions / Comments / Mitigation Suggestions
This mini assessment was to assess the change in economic performance of reducing the standard of road from a Dual 70mph to a Dual 50 through Strabane. The results of this tests show: PVB for Pink (70Mph) - 845 PVB for Pink (50Mph) - 826 A reduction in the PVB of 13 million	This mini assessment was to assess the change in economic performance of changing the pink alignment thorough Strabane to the Pink Loop Option. The results of this tests show: PVB for Pink (50Mph) - 826 PVB for Pink Loop - 845 A increase of 13 million to the PVB	This mini assessment was to assess the impact of removing the New Buildings Bypass. The results of this tests show that PVB for Green (inc Bypass) - 865 PVB for Green (Ex Bypass) - 826 A reduction in the PVB of 39 million	This mini assessment was to assess the economic performance of the new Building bypass if the A5/A6 link was to be constructed. The results of this tests show that PVB for A5WTC + NB Bypass + A5/A6 Link - 872 PVB for A5WTC +A5/A6 Link - 851 A reduction in the PVB of 21 million. This test was to quantify the reduction in the PVB for the NB Bypass	

TUBA results

Color coding			Scheme Cost	PVB v6.4	Rank by PVB	PVC	Accidents	WEB	Total Benefit	BCR	Rank by BCR	
Pink	Yellow	Green	1007	847	8	735	144	106	1097	1.49	1	Pink 70mph Through Strabane
Purple	Yellow	Green	1036	857	5	756	110	107	1074	1.42	2	
Pink	Black	Pink	1060	845	9	774	134	106	1085	1.40	3	Pink 70mph Through Strabane
Pink	Yellow	Purple	1060	849	7	774	127	106	1082	1.40	4	Pink 70mph Through Strabane
Green	Yellow	Green	1092	860	3	797	129	107	1096	1.38	5	
Purple	Yellow	Purple	1089	858	4	795	125	107	1089	1.37	6	
Purple	Black	Pink	1089	851	6	795	131	106	1088	1.37	7	
Pink	Purple	Pink	1050	800	15	766	132	100	1032	1.35	8	Pink 70mph Through Strabane
Green	Black	Pink	1145	865	2	836	145	108	1118	1.34	9	
Purple	Purple	Pink	1078	826	11	787	120	103	1049	1.33	10	
Green	Yellow	Purple	1145	866	1	836	131	108	1105	1.32	11	
Pink	Black	Red	1078	806	14	787	129	101	1036	1.32	12	Pink 70mph Through Strabane
Green	Purple	Pink	1134	834	10	828	142	104	1079	1.30	13	
Purple	Black	Red	1106	817	13	808	122	102	1041	1.29	14	
Green	Black	Red	1162	820	12	848	146	102	1067	1.26	15	
Green	Black	Red	1150	822	4	839	122	103	1047	1.25	(16)	Test for section 3: Tullyvar Red
Green	Black	Pink	1131	878	1	826	110	110	1098	1.33	(10)	Test for section 3: Tullyvar Pink, no update on the local link road
Pink	Black	Pink	1060	832	3	774	144	104	1080	1.40	(3)	Test for section 1: Pink 50mph + Urban Dual Carriageway
Pink	Black	Pink	1170	845	2	854	144	106	1095	1.28	(14/15)	Test for section 1: Pink Loop

A5WTC - EPR WORKSHOP : WHOLE SCHEME OPTION TESTING

TUBA results

Color coding			PVB v6.4	Rank by section
Brown	Black	Pink	860.9	2
Pink	Black	Pink	845.4	4
Blue	Black	Pink	851.0	3
Green	Black	Pink	865.3	1
Green	Purple	Pink	833.7	3
Green	Yellow	Pink	853.4	2
Green	Red	Pink	830.9	4
Green	Black	Pink	865.3	1
Green	Black	Red	819.5	4
Green	Black	Pink	865.3	3
Green	Black	Purple	883.3	2
Green	Black	Green	886.7	1
Brown	Black	Pink	860.9	2

Green	Black	Brown	856.4	
Green	Brown	Pink	775.1	

Purple	Black	Pink	837.4	
Pink	Black	Pink	840.8	
Green	Black	Pink	865.2	

Green	Black	Red	822.3	
Green	Black	Pink	878.3	
Green	Yellow	Green	862.1	

A5WTC - EPR WORKSHOP : OPTION TESTING

Mini Test

Color coding	Scheme Cost	PVB v6.4	Rank by PVB	PVC	Accidents	WEB	Total Benefit	BCR	Rank by BCR
Blue / Yellow / Black / Pink	1088.6	847.5	11	795	80	100	1028	1.29	10
Blue / Black / Pink / Green	1044.1	876.5	2	762	80	100	1057	1.39	3
Pink / Yellow / Green / Pink	1072.1	821.4	19	783	80	100	1001	1.28	12
Green / Black / Brown	805.0	856.4	9	588	80	100	1036	1.76	1
Green / Brown / Pink	759.8	775.1	20	555	80	100	955	1.72	2
Blue / Yellow / Green / Pink	1100.6	831.0	16	803	80	100	1011	1.26	14
Blue / Yellow / Black / Pink / Green	1042.9	864.5	5	761	80	100	1045	1.37	4
Purple / Black / Pink	1120.0	837.4	14	818	80	100	1017	1.24	17
Pink / Black / Pink	1060.4	840.8	13	774	80	100	1021	1.32	6
Green / Black / Pink	1144.8	865.2	4	836	80	100	1045	1.25	16
Green / Black / Red	1149.6	822.3	18	839	80	100	1002	1.19	20
Green / Black / Pink	1130.9	878.3	1	826	80	100	1058	1.28	11
Green / Yellow / Green	1091.5	862.1	7	797	80	100	1042	1.31	8
Pink / Black / Pink	1060.4	832	15	774	80	100	1012	1.31	9
Pink / Brown / Black / Pink	1170.4	845.3	12	854	80	100	1025	1.20	19
Green / Black / Pink	1123.0	826.5	17	820	80	100	1007	1.23	18
Purple / Black / Pink / Green	1075.2	859.4	8	785	80	100	1039	1.32	5
A5A6 / Green / Black / Pink	1144.8	872.5	3	836	80	100	1053	1.26	13
A5A6 / Green / Black / Pink	1123.0	851.5	10	820	80	100	1032	1.26	15
Green / Yellow / Green	1091.5	862.4	6	797	80	100	1042	1.31	7

Color coding	Discriptions
Blue / Yellow / Black / Pink	Test for section 2: Yellow linked to Black at south of Omagh *** Test for section 3: East of eye
Blue / Black / Pink / Green	Test for section 3: Pink linked to Green at A4A5 junction
Pink / Yellow / Green / Pink	Test for section 3: Green linked to Pink at A4A5 junction
Green / Black / Brown	Test for seciton 3: Brown option
Green / Brown / Pink	Test for seciton 2: Brown option
Blue / Yellow / Green / Pink	Test for section 3: West of eye
Blue / Yellow / Black / Pink / Green	Test for section 3: East of eye
Purple / Black / Pink	Test for section 1: Brown+Blue
Pink / Black / Pink	Test for section 1: revised Pink
Green / Black / Pink	Test for section 1: revised Green
Green / Black / Red	Test for section 3: Tullyvar Red
Green / Black / Pink	Test for section 3: Tullyvar Pink, no update on the local link road
Green / Yellow / Green	Test for section 3: Augh connection, no update on the local link road
Pink / Black / Pink	Test for section 1: Pink 50mph + Urban Dual Carriageway
Pink / Brown / Black / Pink	Test for section 1: Pink Loop
Green / Black / Pink	Test for section 1: remove Newbuildings bypass
Purple / Black / Pink / Green	Test for section 1: Purple's effect
A5A6 / Green / Black / Pink	Test for section 1: revised Green + A5A6 link
A5A6 / Green / Black / Pink	Test for section 1: revised Green + remove Newbuilding bypass + A5A6 link
Green / Yellow / Green	Test for section 3: close to Aughnacloy

A5WTC - EPR WORKSHOP : SCENARIO TESTING