

ArupTransport

Tyne and Wear Passenger Transport Authority

New Tyne Crossing

Summary of Proof of Evidence on Environmental Matters

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1. STRUCTURE OF EVIDENCE

- 1.1 This summary proof of evidence on environmental matters covers both generic and specific issues relevant to the environmental assessment of the proposed New Tyne Crossing.
- 1.2 My evidence first deals with the general processes followed by the project team in undertaking the Environmental Impact Assessment and preparing the Environmental Statement with its supporting technical documentation and Non-Technical Summary. This includes the preliminary scoping and consultation processes.
- 1.3 Specific environmental issues then dealt with in greater detail are :
- i) River Tyne – water quality;
 - ii) River Tyne – marine ecology;
 - iii) River Tyne – fisheries;
 - iv) Terrestrial ecology;
 - v) Hydrology and Hydrogeology; and
 - vi) Code of Construction Practice.

2. ENVIRONMENTAL IMPACT ASSESSMENT

- 2.1 The requirement for Order applications to be accompanied by an Environmental Statement (ES) is set out in the Transport and Works (Applications and Objections Procedure)(England and Wales) Rules 2000 (the “Applications Rules”). The Statement is produced as the culmination of the process of Environmental Impact Assessment (EIA).
- 2.2 An outline reference design formed the basis for the EIA. The Concessionaire, when appointed, would progress the reference design to the detailed design stage and would then construct the New Tyne Crossing subject to the provisions of the Order and the appropriate legislative and contractual constraints.
- 2.3 Prior consultation on the proposed scope and methodology for the EIA was undertaken with a variety of statutory consultees and public and voluntary sector bodies with a responsibility for, or interest in, the environmental issues arising from the proposals.
- 2.4 The Environmental Impact Assessment (EIA) was undertaken by an experienced multi-disciplinary team of specialists.
- 2.5 The assessment of the impact of the scheme on each aspect of the environment followed the procedure below:
- Baseline environmental conditions in the area were assessed and described.
 - Significance criteria, against which any impacts are assessed, were identified.
 - An assessment of the impacts of the proposals during both construction and operation was undertaken.
 - Mitigation measures to reduce the impacts were proposed.
 - Following the incorporation of agreed mitigation, the residual impacts of the project proposals were assessed and described.
- 2.6 Although not a formal requirement of the EIA process, public consultations were used to identify concerns of both statutory and non-statutory consultees. The consultees included individuals such as affected occupiers and landowners, residents groups, local interest groups, and local schools. Statutory consultees included the Highways Agency, the Environment Agency, One North East and DEFRA. The relevant statutory undertakers were also consulted. Their individual and collective responses helped to develop the approach to the proposal, methods of working and possible mitigation measures.

3. RIVER TYNE - WATER QUALITY ISSUES

- 3.1 The issues considered for water quality were subject to consultation and agreement with the Environment Agency, DEFRA and representatives of riparian interest groups.
- 3.2 The principal water quality parameters investigated were Suspended solids such as silts and clays, Oxygen demand, Chemical contaminants (such as heavy metals and specifically the contaminant tributyl tin), Sediment toxicity and Endocrine disrupters (i.e. contaminants capable of causing hormonal changes in organisms).
- 3.3 Data, surveys, modelling studies and advice were commissioned and undertaken. They were used to inform the EIA process and the findings were reported in the ES.
- 3.4 According to the Environment Agency (1997), the River Tyne's tidal water quality has been steadily improved over the past 20 years with new sewage collection and treatment schemes, controls over sewage and industrial discharges, and a general decline in industrial activity. The improvement in water quality has been accompanied by increasing numbers of migratory salmon and trout.

Findings

- 3.5 The EIA identified that construction works in the river could potentially effect water quality in a number of ways. The significance of these effects is given below.
- 3.6 **Sediment suspension during dredging.** Overall, the effects of sediment suspension were judged to be of minor adverse significance. However, sediment suspension could, depending on a combination of factors including natural conditions, cause short-term increases of suspended solids in concentrations that exceed the significance criteria, which could cause a moderate adverse impact on water quality although it would be very localised and short-lived.
- 3.7 **Oxygen demand during dredging and construction works.** It is predicted that a dredging induced oxygen deficit of 1% on baseline concentrations could occur but that this indicates that dissolved oxygen concentrations would not be reduced below either of the significance criteria set by the Environment Agency. This is assessed as a minor adverse impact on water quality.
- 3.8 The oxygen demand due to sediment dispersion and deposition was also assessed. The mean sediment deposition depth is predicted to be very small - about 0.7mm. The conclusion was that this would have only a minor adverse effect on water quality.
- 3.9 **Chemical contaminant mobilisation** (from sediments into the water column) during dredging and construction works was assessed and it was concluded that there was only limited potential for the works to mobilise contaminants in significant concentrations. Taking into account background levels, it was predicted that dredging and construction works would have a minor to moderate impact on water quality. Also, the dilution effect of the volume of water in the River Tyne would have the effect of substantially reducing the concentrations of any mobilised contaminants.
- 3.10 **Toxic Sediment mobilisation and dispersion** was also assessed. The analyses undertaken indicated that the River Tyne sediments were not significantly toxic. At worst, the effects were considered to be a minor adverse impact on the receiving sediment within 800m of the works and not significant, further upstream and downstream. The effects associated with **potential mobilisation and dispersion of endocrine disrupting substances** in the Tyne sediments were also assessed to be not significant.

Mitigation

- 3.11 During the EIA, mitigation measures were identified to minimise impacts on water quality arising from the construction works in the river. The principal mitigation measures were divided into the categories of dredging method, control structures and environmental

windows. The recommended environmental window for the New Tyne Crossing will restrict dredging to the period between 1 November to 31 March, thus avoiding an indirect water quality impact on fish migration over the summer months.

- 3.12 The River Tyne management plan will cover measures such as the dredging and backfilling methods, the use of control structures, environmental windows, and the quality of the fill material.
- 3.13 It is proposed to monitor continuously the existing water quality in the river local to the New Tyne Crossing site for a period of 2 - 3 years prior to the dredging works commencing.
- 3.14 Following consultation with the Environment Agency it is proposed that the in-river works monitoring would include for DO, turbidity, salinity, temperature and current speed. If the monitor alarms are triggered, construction works would cease and only restart when the relevant parameters were within the criteria set.

Residual Impacts / Conclusions

- 3.15 All residual effects on water quality are associated with construction works rather than operation of the New Tyne Crossing. The majority of residual effects would be of minor adverse significance or less.

4. RIVER TYNE - MARINE ECOLOGY

4.1 In the EIA, the potential effects on marine ecology were investigated through the following processes:

- Consultation with English Nature and the Environment Agency;
- Collection of existing data;
- Undertaking a marine biological survey;
- Assessment of impacts; and
- Identification of possible mitigation measures.

4.2 The EIA found that the proposed new crossing could potentially have the following impacts:

Alteration of riverbed habitat type

4.3 This impact was assessed as being of both minor adverse and minor beneficial significance, because the naturalness of the seabed will be reduced, but the introduction of rock will increase the diversity of habitats present on the river.

Loss of species in area of dredging

4.4 The construction of the new crossing will require dredging of approximately 3.42ha of river bed. The type of marine species present within the dredge area was investigated during the marine biological survey. The majority of species affected are common and widespread in occurrence. Overall, the significance of this impact was assessed as being minor adverse.

Increase in suspended sediment

4.5 This is predicted to have no effect on the ecology of the River Tyne and therefore this impact was assessed as being not significant.

Increase in sedimentation

4.6 As with all dredging works there is a risk that an indirect impact on marine ecology could occur through an increase in the rate of sedimentation on the riverbed. The levels of suspended sediment are predicted to have no impact on the marine ecology of the Tyne.

Reduction in dissolved oxygen

4.7 The potential impact of the dredging works on levels of dissolved oxygen has been assessed by numerical modelling by the University of Newcastle. The study found that the dredging would have minimal impact on dissolved oxygen levels in the Tyne and therefore it is predicted that there will be no impact through this route on the marine ecology of the River Tyne.

Remobilisation of contaminants

4.8 A potential impact of the dredging works could be an adverse impact on SSSIs and SPA at the mouth of the River Tyne through deposition of contaminated sediments. Investigations in the EIA found that the sediments to be dredged are considered to be not significantly toxic. Due to the lack of toxicity and the minimal levels of sediment that will be deposited in the area no impact on marine ecology is predicted to occur.

Construction of training walls

4.9 This impact would be restricted to a very small area because although the walls are quite long, they would be very thin due to the sheet pile construction. This impact was therefore assessed as being of minor adverse significance.

Change in hydrodynamics

- 4.10 The training walls could have an indirect impact on the marine ecology of the Tyne through temporarily altering the hydrodynamics of the river. The modelling study determined that the temporary structures would have a limited impact on the tidal flow and sediment transport regime, therefore it was assessed that there would be no significant impact on the marine ecology of the river.

Disturbance to birds

- 4.11 The river is already subject to shipping and movements of vessels. It is therefore likely that waterfowl on the river are already accustomed to disturbance from vessels on the river. The presence of an extra vessel dredging is therefore unlikely to significantly increase the existing levels of disturbance to birds and hence birds are unlikely to be affected.

Temporary loss of subtidal habitat within Howdon Dock

- 4.12 The proposed alterations to Howdon Dock involve reclaiming an area of seabed then demolishing part of the existing quay. Overall a minimal amount of seabed would be lost because the area of seabed to be reclaimed would roughly equal that which would be created. The temporary loss of a very small area of seabed is judged as being of minor adverse significance.

Loss of vertical Intertidal Habitat

- 4.13 A very small amount of intertidal habitat could be lost as a result of the works in order to join the immersed tube tunnel in the river to the tunnel on the landward side. The works will result in loss of a very small area of intertidal quay wall habitat. This impact is judged as being of minor adverse significance because this habitat is very common on the Tyne.

Mitigation

- 4.14 For most of impacts described above, no mitigation is required. For the remainder, which relate to potential changes in sedimentation or dissolved oxygen or contaminant mobility, it is recommended that the mitigation measures proposed earlier to control dredging methods should be utilised.

Residual Effects / Conclusion

- 4.15 All residual effects on marine ecology are associated with the construction rather than operation of the New Tyne Crossing. With the exception of some minor beneficial effects on biodiversity on the riverbed habitat, all effects are assessed to be not significant or of minor adverse significance.

5. RIVER TYNE – FISH AND FISHERIES

Existing Conditions

- 5.1 Although much of the River Tyne's catchment lies in unspoilt countryside, its fish populations have been affected by Kielder Reservoir in its upper reaches and the Tyneside conurbation in its lower reaches. However, great environmental improvements have been attained in recent years. These have been reflected in significant increases in rod catches of both salmon and sea trout. As a result, the River Tyne is now one of the most important game fisheries in England and Wales.
- 5.2 Potential effects on fish, and indirectly on fisheries, arise exclusively from the construction works with no effects foreseen from the subsequent operational phase. Broad classes of potential impacts include those on suspended solids, dissolved oxygen, chemical contaminants, sediment toxicity, endocrine disruptors, construction noise and construction lighting. Such effects can potentially be manifested at lethal, sub-lethal and behavioural levels. The overall findings were, however, that for each potential impact, with mitigation in place during dredging, construction, enabling and completion works, there would be an insignificant impact on fish and fisheries. The exception was for construction noise where there was a small possibility of a moderate adverse impact, although this would be reappraised when more detail became available of construction methodology.

Mitigation

- 5.3 The effects on the fish populations of the River Tyne is largely determined by the impacts on water quality, which has already been covered in detail earlier.
- 5.4 The major mitigation method which would be adopted is the seasonal constraint of dredging activities to within the period from 1 November to 31 March, on the basis of prevailing environmental conditions and the principal migration periods of salmon, sea trout, eel and lampreys.
- 5.5 Although dredging is not predicted to cause significant increases in suspended solids, its effects on this aspect of the environment would be mitigated by the use of a sealed grab, the preparation and implementation of management plans for dredging and backfilling, and the enclosure of cofferdam open ends and training wall structures. Construction noise, including pile driving, and construction lighting would be mitigated by restricting relevant activities to daylight hours when fish migration is likely to be at its daily minimum.
- 5.6 In addition to the above direct mitigation, a substantial programme of precautionary mitigation would also be undertaken to improve the resilience of the fish populations to any future adverse impact.
- 5.7 The monitoring of fish populations in a large river such as the River Tyne is an extremely difficult task. Consequently, an extensive monitoring programme, which would span over 7 years and include a substantial pre-construction component, has been developed in close association with and received the approval of the Environment Agency at both local and national levels.

Residual Effects and Conclusions

- 5.8 The predicted residual effects on fish and fisheries of the Tyne are all associated with construction works rather than the operational phase. All are considered to be not significant. The proposed monitoring and precautionary mitigation measures would constitute a beneficial impact because of their value to the management of fish populations in the future.

6. TERRESTRIAL ECOLOGY

- 6.1 On the north side of the river there are three non-statutory Sites of Nature Conservation Importance (SNCI). There are a further two non-statutory sites on the south side of the river in close proximity of the tunnel approach roads. In addition, South Tyneside Borough Council has identified two other sites during a survey of potential SNCIs. These sites are located at Straker Street and Cemetery Road, and have been treated as if fully designated SNCIs.
- 6.2 The River Tyne itself is noted as a Strategic Wildlife Corridor and the River Don is considered a corridor for the movement of wildlife through the wider countryside.
- 6.3 The lower stretches of the River Don and the River Tyne contain locally rare and potentially fragile habitats. These areas are consequently of high local and regional nature conservation interest. Three faunal species of high importance were observed within the survey site. These are: the Water Vole, the Skylark and the Song Thrush.
- 6.4 The River Tyne Entrance SNCI and Willington Gut SNCI are sufficiently far from the site that they would not be affected directly or indirectly by the proposals. Similarly, Jarrow Slake SNCI and the River Don Saltmarsh SNCI would not be directly affected. The potential SNCIs at Straker Street and Cemetery Road would also not be affected by the approach roads to the Tunnel.
- 6.5 Although no work is planned within the River Don wildlife corridor, works are proposed adjacent to it which may cause some temporary disturbance to the passage of wildlife. Similarly, there may be some temporary disturbance to the passage of wildlife along the River Tyne corridor. Overall, the impact on these river corridors is considered to be minor adverse.
- 6.6 The two ponds at Church Street and Straker Street would not be directly affected by the proposals. However, there is a slight potential for surface runoff and accidental spillages to pollute Straker Street Pond if they are not correctly controlled.
- 6.7 The removal of landscape areas identified in the habitat survey would have an impact on the ecological value of the study area. Matured planted areas may serve as nesting sites or foraging areas for the Song Thrush. Without appropriate mitigation this impact is considered to be minor adverse.
- 6.8 Other species noted of significance in the habitat surveys would not be directly affected by the proposals. The scheme would not extend into areas used by the water vole or remove habitat important to the Skylark.
- 6.9 The effects of construction noise are expected to be temporary and of short duration. Any disturbance to wildlife is considered to be a minor adverse impact.
- 6.10 Provided appropriate measures to prevent pollution are incorporated within the completed scheme, the impact of the tunnel on ecological resources would be not significant.

Mitigation measures

- 6.11 It is recommended that Church Street and Straker Street Ponds are fenced to prevent accidental disturbance by construction workers and vehicles. There should also be appropriate protection measures provided to prevent pollution occurring from runoff and accidental spillages in Straker Street Pond and the River Don.
- 6.12 New landscape measures would be implemented using ecological design guidance to fully mitigate any losses and create new areas of value to nature conservation where this is practicable. This would reduce the minor adverse impact from planted landscape removal to a not significant or possibly beneficial impact.
- 6.13 There would be appropriate measures put in place at Straker Street SNCI and Cemetery Road SNCI to prevent pollution from runoff and spillages affecting water voles. Where works are

proposed in close proximity to these sites, the sites would be temporarily fenced to ensure encroachment does not take place.

- 6.14 English Nature has been consulted during the EIA and will also be consulted on the final mitigation measures. These will generally be designed as part of the ecologically beneficial landscape proposals.

Residual Effects and Conclusions

- 6.15 Following implementation of the proposed mitigation measures, there will be, at worst, minor adverse effects on terrestrial ecological resources of the River Tyne and River Don corridors. These minor effects will reduce still further with the passage of time following the completion of construction works.

7. HYDROGEOLOGY

- 7.1 Dewatering of the cut and cover phases of tunnel construction would lower groundwater levels around the site in an area extending to about 100- 200 metres away from the excavation. Any risk of settlement can however be mitigated by the design and operation of the dewatering system in conjunction with appropriate cut-off walls. Monitoring of ground levels and critical structures would be required to assess whether settlement was occurring.

Mitigation

- 7.2 The risk of contamination of groundwater resources during excavation work can be mitigated by adoption of good working practices and effective site management through the Code of Construction Practice.

Residual Effects

- 7.3 Implementation of appropriate mitigation measures would result in minor adverse or non significant residual impacts of construction or operation of the project on ground water resources

8. SURFACE WATER HYDROLOGY

- 8.1 This section deals with the surface water hydrological features in the project area. The assessment presented in the ES was undertaken qualitatively as a desk study but with consultation with the Environment Agency and Northumbrian Water.
- 8.2 The main conflict with surface water hydrology is the effect of construction on the network of drainage pipes and water mains which pass through the area. As the waste water system and existing water mains in Howden and Jarrow serve a significant area, there is the potential for a moderate adverse impact. Close working with water supply and sewerage undertakers will be necessary to prevent disruption.
- 8.3 A potential for a small increase in surface runoff to occur also exists. In themselves the quantities are not great but they may have a moderate adverse effect because of the effect on existing piped drainage systems which become periodically tide locked – increasing the risk of local flooding. The design of traditional or sustainable urban drainage systems should adequately mitigate this issue.

Mitigation and Residual Effects

- 8.4 Implementation of appropriate mitigation measures, including the adoption of the Code of Construction Practice, should ensure that conflicts with existing drainage systems, and water mains, increases in surface runoff, the effects on receiving watercourses and works around the existing local watercourses should be non significant or at worst have a minor adverse residual effect.

9. CODE OF CONSTRUCTION PRACTICE

- 9.1 The construction of the new Tyne Crossing will involve significant engineering works within relatively small urban areas of South and North Tyneside. Whilst a range of environmental legislation exists to protect the public and the environment, a draft Code of Construction Practice has been prepared to provide a framework for sound environmental management which the Concessionaire and any appointed contractors will be obliged to adopt and implement.
- 9.2 The Code sets out a series of general environmental standards, objectives and measures which are to be applied to the construction works throughout the construction period. Its purpose is to maintain satisfactory levels of environmental protection and minimise disturbance and inconvenience to local residents, businesses and the general public from the construction activities.
- 9.3 Key provisions of the Code are the requirement for prior agreement on:
- An Environmental Management System;
 - Liaison arrangements with local authorities, statutory agencies and the public;
 - General site operations and management;
 - Working hours;
 - Construction site boundaries , layout and appearance;
 - Lighting; and
 - Safety and security measures.
- 9.4 A series of specific management plans will be required from the contractor to ensure effective delivery of environmental control. These are :
- General Environmental Management Plan;
 - Public Access and Traffic Management Plan;
 - Noise and Vibration Management Plan (including noise insulation criteria);
 - Dust and Air Pollution Management Plan;
 - Contaminated Land Management Plan;
 - Surface and Groundwater Management Plan;
 - River Tyne Management Plan;
 - Spoil and Waste Management Plan; and
 - Landscape and Ecology Management Plan.
- 9.5 The Management Plans will develop the general principles described in the Code into more specific control measures which can be applied at the local level. The Plans, which will be formulated by the appointed contractor, will be discussed with the local authorities and relevant statutory bodies such as the Environment Agency. They will be updated at appropriate intervals as the construction work and mitigation activity proceeds.
- 9.6 The Code also provides for mechanisms to ensure that relevant occupiers of premises are given advance notification of the commencement of works in their vicinity. Contact names of community relations representatives and a telephone help line will be provided. A project

web site with educational resources will be established. The Environmental Management System will provide a mechanism for the timely processing of enquiries and complaints to a satisfactory conclusion.

10. CONCLUSION

- 10.1 With respect to the matters considered in my proof of evidence, it is my conclusion that the effects of the proposed works on water quality and the marine environment, on the ecology and fisheries of the River Tyne and on the conservation status and integrity of protected sites of conservation interest have been adequately assessed, proposals for comprehensive mitigation and monitoring have been made and only limited residual effects of minor significance would remain. I further conclude that the Environmental Statement submitted with the application for the order, adhered to statutory procedural requirements and is adequate for use in the decision making process.