Peer review of modelling for the Northern Freight and Logistics Strategy

Report for:
Transport for the North

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EXECUTIVE SUMMARY

This report peer reviews the modelling work that was undertaken using GBFM and associated models to support the development of the Freight and Logistics Strategy for Transport for the North. It is based on the model documentation and files that were provided to the reviewer by the model developers MDS Transmodal.

The general aim of this review is to test the overall quality of the approach taken and whether it fits with accepted best practice. It examines the validity of the overall approach to forecasting the demand for freight movements and for calculating wider economic impacts.

Overall, this GBFM-based suite of models represents the state-of-the-art for use in strategic large scale freight studies in the UK. The combination of the main model GBFM with three smaller supporting models provides a system that is well suited to the particular needs of this type of freight strategy study. GBFM does have some particular limitations in its highway modelling methodology and in the underlying network for use in estimating congestion effects but these do not impact on the appraisal method that has been adopted. Accordingly, the current representation of the HGV mode should be adequate for the needs of this type of strategic study.

The need to combine a set of distinct individual models that are loosely linked together for this study, rather than having a single automated modelling system, implies that the running of each individual scenario is more complex than is typical in simpler traditional transport models. Nevertheless the overall approach taken when running these scenario tests seems sound.

The widespread use of DfT's WebTAG based values to guide the development of the base year model and the Do Minimum scenario, is appropriate in providing a reasonable set of underlying assumptions on demographic and economic growth that is consistent across modes in its assumptions on input cost values. Overall, the design of the elements included within the various Scenarios appears sound and the measures included within the Preliminary Central Scenario are realistic and supported by a reasonable evidence base, in most but not all cases. However, some of the measures within the variant Scenario bundles are more speculative in their deliverability (e.g. the Trans-Pennine Super Canal and tunnels under the Pennines), though these were not ultimately included as part of the final Preferred Scenario.

The adoption of a WebTAG compliant approach to economic and environmental appraisal is appropriate. The adoption of the Mode Shift Revenue Support (MSRS) method is directly suited to the appraisal of environmental and social benefits for this type of study. The magnitude of the wider economic benefits component of the appraisal benefits for the North is likely to be subject to considerable uncertainty and needs to be interpreted with care.

The direction and magnitude of the model's responses to the policy scenario changes generally lie within expectations but a few oddities have been found which merit further examination. The wider economic benefit gains that accrue from 2033 to 2043 appear rather large. There is also some uncertainty regarding the exact magnitude of the user benefits due to congestion savings, as their form of measurement is relatively crude. Otherwise the benefits measured for the Preferred Scenario appear to be well founded.

1 INTRODUCTION

1.1.1 This report peer reviews the modelling work that was undertaken using GBFM and associated models to support the development of the Freight and Logistics Strategy for Transport for the North. It is based on the model documentation and files listed in the following Section that were provided to the reviewer by the model developers MDS Transmodal.

1.1.2 The general aim is to test the overall quality of the approach taken and whether it fits with accepted best practice. It examines the validity of the overall approach to forecasting demand for freight movements and for calculating wider economic impacts.

1.1.3 The main emphasis is on the use of the GBFM based modelling system in the context of this study, rather than exploring the wider capabilities of the current GBFM version. Accordingly, this peer review has focused on:

a) the reasonableness of the specification of the assumptions underlying the various scenarios, including those underpinning the reference do-minimum forecast through to 2043;
b) the acceptability of the manner of specification of the scenarios through the changes that are introduced to the input files of the model;
c) the plausibility of the model's responses to these policy scenario changes within the input files, in terms of their direction and magnitude;
d) the robustness of the empirical foundations for the interpretation of these impacts in policy terms within the Study's reports;
e) the plausibility of these reported policy implications within the wider economic and spatial context;
f) through examination of the quality assurance documentation to assess whether appropriate calculation checks have been made to provide confidence that the model is operating in practice as intended

1.2 DOCUMENTATION REVIEWED

1.2.1 The following documents have provided the foundation for this peer review.

- Mott MacDonald & MDS Transmodal (2016) Freight & Logistics Strategy: Strategy Report + Appendices. Report for Transport for the North. This main report presents the broad context for the modelling work and explains the key findings from the study. Its appendices are of particular relevance as they provide greater detail on the initial set-up and baseline assumptions of GBFM as well as on the set of scenarios that have been tested and appraised. They also provide greater detail on the numerical results from the scenario tests.

- Mott MacDonald & MDS Transmodal (2015) Freight and Logistics Strategy: Baseline Report – Report for Transport for the North. This provides information on an earlier version of the Do Minimum Scenario definition as well as background on current operations and issues within freight transport and logistics in the North.

- MDS Transmodal (2008) GBFM Version 5.0 Report; and User Guide. These provided information on the mechanisms and functionality of the central model component of this study.
- MDS Transmodal (2016) Quality Assurance Exercise, plus associated spreadsheet. This provides information on how the complete suite of models was integrated and run for this study, along with details of the QA procedures based on DfT Guidance that were implemented.
- A large set of input and of summary output model results have been provided for inspection, together with some further details on how the test runs were executed.
- Finally, there have been written responses by MDS Transmodal to various requests for extra information or for greater clarification on aspects not fully covered in the items above.

2 GENERAL ASSESSMENT OF THE MODELLING SYSTEM

2.1 CHOICE OF MODEL

2.1.1 GBFM is the main model within the modelling system used for this strategy development. It is a four stage freight transport model developed and maintained by MDS Transmodal. It forms the freight model component of the Department for Transport's (DfT's) National Transport Model. It has been the most widely used freight model in Great Britain over the last decade so that a strong skill base has been developed at MDS Transmodal through GBFM's usage within a range of different types of studies.

2.1.2 The only other comparable multi-modal freight model for Great Britain is the Base Year Freight Matrices (BYFM) model developed in 2009 for DfT by WSP (2011). BYFM could potentially provide a better representation of logistics stages and of highway assignment behaviour (see Section 2.2 below). However, BYFM does not include the inland waterway mode, only has a coarse representation of maritime transport and does not have a long track record of practical use in studies, so it may be less suited to this specific study than this suite of GBFM together with its associated model components that are discussed below.

2.1.3 More conventional single-mode models would not have been suitable for this strategy development study because it requires integration and competition across the full set of road, rail and waterborne modes.

2.1.4 The full freight forecasting system that has been used comprises four component models. Two models are run in an integrated fashion: GBFM for inland transport and European non-bulk shipping; and the Multimodal Distribution Park

Demand Model (MDPDM) for intermodal rail (See Section A4.5). In contrast the other two models are operated in a standalone fashion: the End-to-End Container Cost Model (E2ECCM) for deep sea Lift-on/Lift-off (LoLo) shipping (See Section A4.5); and the Warehouse Operating Cost Model (WOCM - see Section E.6). For reasons now explained these latter two models provide results that are used to inform the modeller's judgement when determining an appropriate set of input assumptions for individual scenarios to feed into GBFM and MDPDM respectively (see Figure A.5).

2.1.5 This modelling approach constructed around GBFM provides a comprehensive, integrated coverage of a wide range of future industry and transport responses. Some of these forecast responses are direct outputs from an endogenous model mechanism, whereas some others are based on assumptions made by the modeller in a manner that is informed by the results provided from running other individual model elements. A typical transport model application is where some new transport infrastructure is introduced or some transport cost component is changed. The model then seeks to estimate the reactions in aggregate to this changed situation by a large number of passengers and/or of shippers of individual consignments. This is in effect how GBFM and MDPDM operate in this study. However, an important part of this freight strategy development also entails forecasting the likely major individual investment decisions (e.g. multimodal distribution park locations) and operational decisions (e.g. deep sea container services) by a small group of competing and ever evolving private sector enterprises. Such responses are inherently difficult to model in an automated fashion, as they depend significantly on influences confidential to each enterprise. Accordingly, they are better represented by using models to assemble the relevant cost information that is then used to underpin informed judgement by the modeller in specifying the input assumptions for the scenario. This is how E2ECCM and the WOCM are utilised for this study.

2.1.6 In principle, this combination of model use coupled with informed judgement and assumptions should provide a more complete evidence base for use in appraisal in the context of this type of study, *provided that* the basis for the modeller's assumptions is fully transparent. The soundness of the application of this approach in practice is considered in the Case Study in Section 8 below, which examines in detail the evidence from the E2ECCM that is used to underpin the important assumptions for the Preferred Scenario regarding the growth in deep-sea LoLo services to the North. The background evidence from the WOCM has already been presented in detail in Appendix E.6.

2.1.7 Overall, this GBFM-based suite of models represents the state-of-the-art for use in strategic large scale freight studies in the UK, though it has some particular limitations in its highway modelling details that are now discussed.

2.2 HIGHWAY ASSIGNMENT AND CONGESTION ESTIMATION

2.2.1 Best practice in congestion estimation in highway assignment models is to use a deterministic or stochastic user equilibrium assignment procedure that assigns all types of vehicles to the network and iterates around the model steps of demand, assignment and speed/flow estimation until a converged equilibrium solution has been achieved from which to estimate the associated congestion delays on each link.

2.2.2 GBFM adopts a simpler all or nothing assignment approach instead, so it is not surprising that the highway traffic validation results for 2004 presented in the GBFMv5 Report (2008) are of mixed quality. There is no reason to expect this quality to have improved significantly by virtue of having updated this GBFM version 5 to its current base year of 2014, from its original 2004 year. This update did not carry out a significant recalibration of the O-D demand matrix and did not improve the endogenous procedure that converts from tonnes to the associated different sizes of HGVs.

2.2.3 Furthermore, because GBFM does not include passenger traffic assignment, it cannot implement a full equilibrium assignment procedure, so that it is inherently unable to directly forecast the congestion changes that result from HGV traffic changes. Some of these shortcomings are outlined on p. 25 of Appendix A, which correctly states that GBFM "is not well suited to representing congestion, and how it might vary with capacity enhancements." Enhancing GBFM to explicitly address such shortcomings in highway congestion modelling would have been a major model development undertaking - well beyond the resources available to this study.

2.2.4 An extra drawback from the current GBFM implementation is that the base HGV speeds used on the individual links of the network date back to around the year 2000 (source: email from MDS Transmodal), except for those speeds on new or upgraded links. This lack of current road speed data is not ideal and is likely to underestimate current congestion levels overall within the 2014 Baseline.

2.2.5 Nevertheless, despite these various caveats above regarding the highway assignment in GBFM, their importance in the context of this particular study is less than would be the case for studies just analysing specific individual local infrastructure investments in isolation. When used in a strategy study such as this, which seeks to forecast the broad changes from a large collection of schemes combined across a large study area, the local shortcomings will partly balance out so that the broad findings should still be informative. Moreover, the approach that has been adopted for congestion forecasting in this use of GBFM provides a sensible but simplified approach that makes informed use of broad brush DfT forecasts of congestion growth by road type and region.

2.2.6 In summary, the resulting estimates of road congestion change impacts are likely to be relatively crude, although on balance they would appear to be more likely to generate conservative estimates of the congestion cost savings, rather than over optimistic estimates. Moreover, the appraisal of road congestion savings that is used is based on the DfT's Mode Shift Benefits procedure (See App. A.5.1.2) which is a more aggregate approach that is not based on speeds on individual links. Accordingly, the current representation of the HGV mode should be adequate for the needs of this type of strategic study. However, GBFM would require substantial further refinement if it was to be used subsequently to drill down in greater detail to analyse either more localised highway impacts or the costs and benefits of individual highway schemes within this strategy.

3 ASSUMPTIONS UNDERLYING THE SCENARIOS

3.1 INTRODUCTION

3.1.1 The development and use of the various scenarios is explained in Appendix 4.5. As explained above, because of the need to combine a set of distinct individual models that are loosely linked together for this study, rather than having a single automated modelling system, the running of each individual scenario is more complex than is typical in simpler traditional transport models. Nevertheless the overall approach taken when running these scenario tests seems sound.

3.1.2 The assumptions underpinning the various individual scenarios have been assessed leading to the individual comments provided below.

3.2 THE DO-MINIMUM SCENARIO

3.2.1 The first modelling step for this study was to provide a suitable baseline model from which to develop the forecast scenarios into the future. The current implementation of GBFM is unchanged in structure from the version 5 that is documented in the GBFMv5 Report (2008). However, the input data has been updated from the original 2004 base year to now adopt a 2014 base year. Section A.4.3 presents details for the sources of the 2014 baseline data. The HGV O-D matrix for 2014 was not recalibrated but was scaled up to match aggregate totals from the Port Freight and the Continuing Survey of Road Goods Transport datasets from DfT. While this simple scaling is not the ideal, alternative approaches would have been resource intensive. The waterborne and rail modes in contrast should be well represented, through use of 2014 census data rather than the sampled data that underpins the HGV demand. The modal network links representing the supply of transport for all modes have also been updated from 2004, other than the HGV speeds.

3.2.2 A very wide set of assumptions were then combined in order to specify the 2033 Do-Minimum Scenario (Section A.4.4 and Chapter 5 of Baseline Report). In particular the assumed disappearance of many major coal flows between 2014 and 2033 due to structural economic reasons and its consequent impact to reduce total annual rail tonnes carried is an important part of this Scenario.

3.2.3 This large scale freight strategy study differs in nature from the majority of transport studies for which the DfT Guidance (WebTAG) has been developed. Nevertheless, the widespread use here of WebTAG based values to guide the development of the base year model and the Do Minimum scenario is appropriate in providing a reasonable set of underlying assumptions on demographic and economic growth that is consistent across modes in its assumptions on input cost values.

3.3 The Preliminary Central and variant Scenarios

3.3.1 The main focus of modelling for the Scenarios is on the year 2033. This 19 year modelling period from the Base Year of 2014 seems appropriate to allow time for the measures to be fully implemented and for their effects to filter through the system, while retaining a time horizon that may be expected to not have changed too fundamentally from the present in its general transport requirements.

3.3.2 In general the set of assumptions that is made for each of the individual traffics appear to be reasonable. There is an explicit evidence base developed to underpin the exogenous assumptions introduced regarding the improvements in deep-sea services to the Northern ports (See the Case Study in Section 8 below). The evidence behind the assumed shift in the balance of future warehousing locations from the Midlands to the North is also explained in a credible fashion for 2033 (See Appendix E.6) but the assumed rapid further warehouse growth to 2043 as discussed below in Section 4.3 does not appear to have a clear justification as yet.

3.3.3 The decision made to avoid introducing major differences in bulk traffics between the Do Minimum and the Preferred Scenario is prudent because this is a heterogeneous set of markets that is inherently difficult to model and forecast in aggregate.

3.3.4 The decision to represent the Preferred Scenario in 2023, through interpolation rather than through designing a 2023 specific Preferred Scenario, is an unusual approach. Nevertheless this novel approach does appear to have a sound logical basis in the context of this study, as explained in Appendix A.4.7. I do not see any reason why this interpolation approach should generate problems for the validity of the appraisal calculations.

3.3.5 Overall, the design of the elements included within the various Scenarios appears sound and the measures included within the Preliminary Central Scenario in general are realistic. However, some of the measures within the variant bundles are more speculative in their deliverability (e.g. the Trans-Pennine Super Canal and tunnels under the Pennines).

4 The modelling and appraisal Results

4.1 Appraisal of benefits and impacts

4.1.1 The adoption of a WebTAG compliant approach to economic and environmental appraisal as outlined in A.5.1 is appropriate. The adoption of the Mode Shift Revenue Support (MSRS) method is directly suited to the appraisal of environmental and social benefits for contexts such as this study in which mode shift and reductions in HGV kilometres play an important role.

4.2 Wider economic appraisal

4.2.1 A substantial proportion of the benefits to the Northern economy from this strategy arise from the wider economic benefits that have been calculated using Mott MacDonald's Transparent Economic Assessment Model (TEAM) process (Appendix A.5.1.3) and C.3.2.

4.2.2 These benefits are calculated based on the increase in the demand in the North for large units of warehousing and logistics floor space that is triggered by the interventions set out in the scenarios. This increased demand gives rise to:

- Direct Benefits through the associated jobs and Gross Value Added (GVA);
- Indirect Benefits through the local supply chain that is needed to support their activity;
- Induced Benefits through consumption effects of additional people employed directly and indirectly and spending their disposable incomes.

4.2.3 Although the methodology appears sound, the exact magnitude of the benefits resulting from these calculations is likely to be subject to considerable uncertainty[1], due to the difficulties in estimating appropriate local parameters, particularly the multiplier values and longer term employment density estimates, as well as due to uncertainty regarding the future outcomes from the planning system.

4.2.4 When interpreting the wider economic benefits it is important to make explicit that the total wider economic benefits presented as accruing to the North would mainly be have resulted from a gross displacement of future jobs and GVA into the North but out from elsewhere in the UK, particularly from the Midlands. Accordingly, in any net appraisal that adopts a national rather than solely a Northern perspective, these benefits need to be interpreted in this light. Specifically, the net wider economic benefits for Great Britain taken as a whole are likely to be a small fraction of these totals for the North in isolation. In contrast the user[2] and environmental benefits that are presented in the reports generally cover all of Great Britain, and so will already provide a national perspective.

4.3 Appraisal results

4.3.1 The plausibility of the model's responses to the policy scenario changes, in terms of their direction and magnitude, has been examined for the test result tables and charts presented in Appendices B and C for the Scenarios and for the Preferred Strategy, respectively. Most results appear to within expectations but a few oddities have been found which are discussed below.

4.3.2 The assigned traffic results on the networks presented in the Charts appear plausible in their patterns, both in absolute movements for the Do-Minimum

[1] This uncertainty is appropriately indicated throughout the reports through presenting these benefits as a low to high range rather than as a single number.

[2] With the exception of the abolition of road tolls in the North as part of the roads bundle.

Scenario and in the differences calculated for the Preliminary Central and other Scenarios.

4.3.3 The B8 warehousing floorspace change forecasts presented in Table C.10 show regional growth rates that appear reasonable for the Do-minimum Scenario, indicating 5% (NE), 6% (NW) and 9% (Y&H) total growth over the period 2014-3033. However, the Do-minimum Scenario growth rate then leaps to 59% in each region for the period 2033-43. It is this spurt in the Do-Minimum floorspace growth that largely determines the increase in GVA benefits from the £6 to £10 billion range estimated over the 19 year period from 2014 to 2033, to the extra £7 to £10 billion range estimated over the 10 year period from 2034 to 2043 (c.3.2.1, p.88). This Do-Minimum floorspace growth spurt merits an explanation as it generates over the period 2033-43, a major increase in the estimated wider economic benefit gains in jobs and GVA, as well as in the user cost savings for warehousing labour and land (Table C.5).

4.3.4 In fact these user cost savings for warehousing labour and land comprise around 7% of the total user cost savings for the various scenarios so that a more detailed evidence base should be provided to confirm that this unit cost differential between the North and the Midlands is well founded in the present and would continue to exist through the 29 year future.

4.3.5 The largest component by far of the non-user cost savings derives from road congestion savings. However these are calculated in a relatively crude fashion within the appraisal through use of broad-brush standard MBS values (Table B.16). As explained above in Section 2.2, road congestion estimation is perhaps the weakest element in GBFM so it is not recommended to switch to use the GBFM estimates instead. The potential for significant uncertainty over the correct level of congestion savings should be noted.

5 THE QA PROCEDURE

5.1.1 The Quality Assurance Exercise report makes explicit the manner through which the four components of the modelling system have been managed in a form that adheres to the recommendations of the DfT Guidance on the Quality Assurance of Analytical Models (April 2013, updated September 2014). All of the relevant sub-processes from this Guidance appear to have been applied in a satisfactory form.

5.1.2 A comprehensive spreadsheet has been developed covering the main modelling procedures. This documents the input data sources that they require and the manual checks that need to be carried out and signed-off prior to instigating model runs.

5.1.3 The documentation of GBFM version 5 represents a major improvement on that previously available for version 4. This improvement was made in response to one of the major recommendations from the audit of version 4. Most of the other earlier recommendations for changes to the model have also been implemented successfully within GBFMv5.

6 CONCLUSIONS

6.1.1 A wide ranging review has been carried out of the model structure and operation and no major issues have been uncovered. The modelling system appears to be well suited to this type of study and has been operated in an informed and intelligent fashion by the team.

6.1.2 The various scenarios have been designed, specified and run in an informative fashion within this modelling system. Most of the assumptions underlying the scenario development appear well founded but a few may require further examination.

6.1.3 The resulting benefits to the North that are measured for the Preferred Scenario are plausible in general but there are a few elements that are subject to uncertainty regarding their exact magnitudes.

7 REFERENCES

WSP (2011) Base Year Freight Matrices: Final Report. For Department for Transport contract PPRO 04/03/14. http://data.dft.gov.uk/byfm/byfm-report.pdf

8 CASE STUDY: ASSUMPTIONS ON DEEP-SEA LOLO SERVICES

8.1.1 It is always difficult to strike the right balance between terseness and comprehensiveness when documenting transport model development and usage within a report for general consumption, so not all of the background data and parameter values will normally be provided in such reports. This is also the case for the Strategy Report plus Appendices. Accordingly, as a test study to confirm that access to the complete set of background evidence and assumptions still supports the decisions made by the modellers, one of the important underlying assumptions, namely that specifying the future level of deep sea LoLo port activity in the North, has been examined in detail below using more detailed extra information that the reviewer requested from and then received from MDS Transmodal.

8.1.2 According to the Baseline Report

> "Ports in the South of England, principally Felixstowe and Southampton are even more dominant in the container port market, with Liverpool the only deep sea container port in the North of England and focusing at the moment on its transatlantic deep sea services, plus a range of feeder services. East coast ports are limited to handling smaller short sea and feeder container services that link the east coast to the continental mainland, Scandinavia and the Baltic." (p.41)

8.1.3 The information provided by DfT port statistics Table "Port0499"[3] confirms this and shows that over the period 2000-2014 neither Liverpool nor Teesport had attracted significant volumes of unitised deep-sea traffic from the East, though vessels from the Western hemisphere were indeed attracted to Liverpool. The vast majority of the existing container traffic for both ports is short-sea from around Europe. For example, although China nowadays is the source for around 23% of all container traffic to/from the UK, China provided at most 3.3% (in 2011) of the total containers through Teesport and at most 3.4% (in 2008) of those through Liverpool, while much lower percentages were observed generally in other years. In reality, even these are generally likely to have been misclassified containers that have arrived there indirectly via feeder services from European ports, as opposed to directly via deep-sea services originating from Asia. In summary, there is no evidence up to 2014 of significant deep sea diversions of container vessel services from the major Asian market via the Northern ports.

8.1.4 This current pattern where Asian container shipping services do not significantly use the Northern ports, makes it important to provide a clear cost based set of evidence to underpin the assumptions that are made in moving from the Do-Minimum to the Preliminary Central Scenario in which future diversions of deep sea container lines to both Liverpool and Teesport have been included.

8.1.5 In Section 3.9 of the QA Exercise Report it states that

> "One of the key limitations for the TfN Freight and Logistics Strategy was the need for the Senior Modeller and the Project Director to make a judgement about the elasticity of demand for deep sea container traffic volumes via northern ports due to a reduction in the estimated door-to-cost of transporting containers via ports in the North of England that was calculated using the E2ECCM" (p.22)

8.1.6 The Main Report Appendix explains the logic behind the 2033 Preliminary Central Scenarios, stating:

> "In the Preliminary Central scenario, we made the assumption that the port of Liverpool invests in sufficient rail facilities at the port to complement Liverpool2 and the inland networks are able to cope with the extra demand. In conjunction with the hinterland moving nearer to Liverpool, this will attract a deep sea container service with large ships (around 13,000 TEU) to Liverpool making good use of the capacity available. Using typical container port productivity assumptions per metre of deep-water quay, we concluded that Liverpool would handle 1,655,000 TEU in 2033 (up from 666,000 TEU in 2014).
>
> Note that the costs of the two shipping scenarios are an output of the model. However the response of a deep sea shipping company choosing to re-direct their large ships to Liverpool is a judgement based on the costs and other elements of the strategy i.e. it is not a modelled response." (p.23)

[3] Downloaded from https://www.gov.uk/government/statistics/port-freight-statistics-2014-final-figures

"In the Preliminary Central scenario, we have assumed that a deep sea shipping line would call at Teesport, boosting its traffic to from 304,000 to 700,000 LoLo TEU between 2014 and 2033 (4.5% per annum compound growth)."(p.24)

8.1.7 Section "6.3.2.2 Deep Sea Shipping" of the Main Report states
"In the future, deep water container terminals at Liverpool2 and potentially Teesport's Northern Gateway Terminal will have the capability needed to directly accommodate such global deep sea shipping services. However, shipping companies will only be attracted to use these ports if they can achieve an overall door-to-door cost reduction per container. For example, as Liverpool is closer to the centre of the UK than southern ports, inland costs can be reduced, providing the incentive for ships to divert from the main route along the English Channel." (p. 38)

8.1.8 For the reasons above, the assumed future cost of bunker fuel is critical to the cost competitiveness of deep-sea service diversions to the ports of Liverpool and Teesport. P. 63 of the Baseline Report outlines the future year fuel and employment cost change assumptions for the Do-Minimum Scenario but only for road and rail modes and not for maritime bunkers. Nor is the bunker cost for deep sea services presented in the Main Report. According to a clarification email from MDS Transmodal, the assumed cost for heavy fuel oil in 2033 is $651/tonne (2015 prices). This is derived indirectly from WebTAG values and the stated MDS Transmodal calculation method appears to be sound. The underlying basis is consistent with the corresponding WebTAG based assumptions on road and rail fuel costs and so this value provides an appropriate bunker cost assumption for use within the modelling.

8.1.9 Table 1 below completes the picture by tabulating for a representative sample of major destination in the Midlands and North, the resulting estimates of the comparative end to end costs per container in 2033 from Asia via each of Liverpool and Teesport, relative to the comparator port Felixstowe. The costs indicate that throughout the North the extra sea cost resulting from a deep sea service call at Liverpool, rather than at Felixstowe, are more than offset by Liverpool's inland transport cost savings to the counties of the North. Furthermore, these Liverpool based costs are also competitive with Felixstowe based costs for much of the existing logistics heartland in the Midlands. The use of an additional service call via Teesport also produces cost savings throughout the North but not in general for the Midlands. These costs provide the evidence base that underlies the assumptions in the Preliminary Scenario to introduce deep sea service calls to Liverpool and Teesport.

Table 1 Difference in inland costs per container for entry by Liverpool or Teesport relative to entry by Felixstowe in 2033 – selected counties only

	Costs relative to Felixstowe	
	Liverpool (instead of Felixstowe)	Tees (additional call)
	Shipping cost only	
Port	£21.97	£42.66
County	Inland + shipping cost	

Durham	-£80.91	-£212.19
Tyne And Wear	-£57.46	-£206.58
Humberside	-£63.20	-£68.20
South Yorkshire	-£101.24	-£63.74
West Yorkshire	-£149.92	-£112.23
Nottinghamshire	-£26.34	£9.52
Leicestershire	£0.36	£67.12
Northamptonshire	£72.29	£120.70
Warwickshire	£1.95	£77.95
Staffordshire	-£81.43	£39.02
West Midlands	-£38.39	£61.85
Greater Manchester	-£195.47	-£59.96
Merseyside	-£240.99	-£35.22

Source: MDS Transmodal - email

9 CORRECTIONS TO THE REPORT

9.1.1 A few corrections needed in the report have been identified as part of this review.

9.1.2 The outputs for the 2033 Environment scenario look to have been transposed in error in Table B.2 as they are not consistent across the tables: matching exactly to “2033 Central” values in Tables B.1 and B.3 and B.4 but to “2033 Do Minimum” in Table B.2.