Department for Transport

Review of Revenue Support Freight Grant Schemes

Summary Report

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Executive Summary

The Department for Transport (DfT) has commissioned Arup to undertake a research study into the operation of the Mode Shift Revenue Support (MSRS) and the Waterborne Freight Grant scheme (WFG), and the models used to calculate grant rates. As part of this study Arup has reviewed the operation of the models to ensure that they operate in a consistent and auditable manner, and to provide evidence and recommendations for changes to the models used to calculate grant rates.

As part of the study 19 interviews were undertaken with grantees and industry bodies to understand how the current schemes were perceived by the rail and water industries. Respondents made generally positive comments. They endorsed the timing of the research study as the long term future of the grants is dependent on renewing the state aid clearance in 2015.

The industry believes the grants send an important signal of government encouragement of modal shift to rail and water rather than road for bulk and intermodal transport by compensating for the cost differences where there is demonstrable environmental benefit. Generally the current grant arrangements were felt to work well.

Water industry interviewees felt that the intermodal grant favours shifts to rail freight rather than water freight (which treats this as a bulk grant) and expressed a wish for the rail grant intermodal revenue support to be made available for waterborne movements on an equal basis, even though the cost calculations are solely for the rail mode. They believe that this would provide a level playing field between rail and water.

Arup supports this, and has also recommended that the extension of intermodal grant to Channel Tunnel traffic, and better awareness of the scheme's coverage of empty container movements, should be considered. Other proposals made by grantees, including providing additional start up support for new flows, and differentiating grant support rates for 20' and 40' containers are however not supported.

The current models which calculate grant support levels for intermodal traffic have been reviewed and substantially revised. The models calculate road and rail operating costs, and identify where rail costs are higher and therefore require grant support to divert traffic to rail. Since the model was last updated in 2009 costs have changed, while significant investment (such as gauge clearance) has benefited the rail freight industry.

The zonal basis of the model has been retained, but the centroid locations to and from which distances are calculated have been revised to make them more central to each zone.

Rail and road costs have been revised using responses from interviewees and industry data, and distances between zones recalculated. Other detailed procedural changes have been made to the model, and the calculation methodology and origin of the cost inputs have been made explicit. These changes have led to a recalculation of the Financial Need calculations (the difference between moving containers by road and rail between each zone pair).

In total there has been a slight increase in the number of zone pairs where the models identify a Financial Need, though the levels of grant support are in some cases lower than before. This is because road journey times have been reduced to reflect LGV maximum speed limits and the need for statutory driving breaks. Two additional model options (coverage of intermodal traffic running through the Channel Tunnel and traffic conveyed long distance on high productivity freight trains and then transferred to lower productivity rural freight services) were also developed and tested.

To test the impact of the changes a number of sensitivity tests were undertaken. These sequentially added the main changes between the current and proposed models, to demonstrate where the changes occur and the impacts on Financial Need.

The most significant changes contained in the proposed model relate to the centroid changes. In addition it is apparent that the proposed model calculates rail journeys more accurately than the current model, and in total lengthens the rail journeys between zone pairs. This has had the most significant impact on the model results, and accounts for most of the changes in grant eligibility.

Presenting the results in a scatter diagram format has helped to demonstrate the impact of these changes, and also to demonstrate the overall trend, which remains driven primarily by inflation.

The models have been audited by an independent team, and their recommendations have been incorporated into the final version passed over to DfT. The changes consist of simplifying cell calculation formulae and correcting some minor computational errors.

An assessment has been made of the impacts if revenue grants were either withdrawn totally, or tapered to reduce grant award levels to zero after 3 further years of operation. The assessment covers bulk (rail and water) and intermodal (rail) grants.

Intermodal grant produces significant societal benefits, we estimate at a ratio of 4.27:1 for every £1 of grant expenditure (based on the total environmental and congestion cost impacts shown in Table 15).

Impacts are significant. A marginal cut in support quickly makes rail flows uncompetitive, and leads to transfer to road. Road mileage increases by 73 million miles in the case of tapered grant, and 112 million in the case of total withdrawal.

The net impact of tapering the grant is to worsen the national position by £22.5m per annum, and total withdrawal creates a national disbenefit of £30.0m per annum, even allowing for the savings in grant expenditure. The impacts are largely due to increased congestion and carbon emissions. However overall employment increases, largely due to road transport’s poorer labour productivity levels.

There are also wider impacts on the rail industry, and in particular domestic rail terminals, which can be expected to be rationalised, with many closing altogether. Reducing the grant would also send a message to the industry, which is likely to have an impact on business decisions taken by stakeholders and key customers.

1 Introduction

1.1 Background

The Department for Transport (DfT) has commissioned Arup to undertake a research study that will contribute to the review of its two revenue support freight grant schemes: Mode Shift Revenue Support (MSRS) and the Waterborne Freight Grant scheme (WFG). The results will also be of interest to the Scottish and Welsh Governments.

DfT commissioned this report to undertake a thorough analysis of the change in cost factors for road and rail transport of containers since the last iteration of the MSRS models, to review the operation of the models to ensure that they operate in a consistent and auditable manner, and to provide evidence and recommendations for changes to the models used to calculate grant rates

1.2 Aims and Objectives of the Study

According to the Specification: “The aims of this research are to provide updated evidence of the “Financial Need” for modal shift revenue support freight grants beyond March 2015, when the EC State-aid approvals for the current schemes end and to estimate the potential impact on rail and water freight should grants be discontinued from March 2015 or tapered to end in March 2018.”

The results will help to inform decisions about the future of revenue support freight grants beyond March 2015.

This report sets out the methodology used for calculating the updated draft Maximum Grant Rates (in 2013 prices), outlines a suggested way forward with regard to bulk rail, inland waterway and coastal/short sea shipping grants, and presents an assessment of the impact of removing or tapering grants across all four sectors.

1.3 Context

The Department for Transport provides freight revenue grants to industry to encourage modal shift from road to rail or water, where the transport cost is higher by the alternative mode than by road, and where this cost differential is outweighed by net environmental benefits. Competitive bid rounds are held three times a year with applications prioritised for funding on the basis of value for money.

Mode Shift Revenue Support Grant (MSRS) is paid for rail and inland waterways borne flows, while Waterborne Freight Grant (WFG) is paid for costal and short sea shipping flows

The Mode Shift Revenue Support (MSRS) grant estimation procedure differs for bulk and intermodal traffic. MSRS for rail bulk traffic flows, and WFG for all flows, is calculated on a case by case basis by reference to the specific road and rail transport costs and environmental benefits for each particular flow.

The Mode Shift Revenue Support scheme – Intermodal (MSRS I) applies to rail traffic and is calculated on a predetermined zonal basis with the Maximum Grant Rates payable presented in a matrix. It was introduced on 1 April 2010 and replaced the previous Rail Environmental benefit Procurement Scheme (REPS) which operated since 1 April 2007.

The basic method used to calculate REPS was carried forward to MSRS (I) with the values and some assumptions reviewed and updated. For MSRS (I) both the Environmental Benefits and Financial Need were recalculated using updated rail and road cost values developed through discussions with the rail and road freight industry. All costs used for the calculation of Financial Need were in 2008/09 prices.

State Aid clearance for MSRS (I) ends on 31 March 2015. The road and rail costs which form the inputs to the Financial Need calculations are therefore being updated to current (2013) prices.

Evidence has been collected on the costs of moving intermodal freight by road and by rail in order to estimate the current Financial Need for rail intermodal grants. This has been done by collecting, from operators, unit cost information relating to each element of road or rail movement.

To collect this evidence, interviews were carried out with the rail and road freight industry, including detailed meetings with MSRS grantees, the principal rail Freight Operating Companies (FOCs) and transport industry bodies. Rail handling costs and local distribution costs were discussed with FOCs. On the road cost side, information has been sourced from the Freight Transport Association (FTA) together with the FOCs that have experience of road haulage operations.

This study is a piece of analytical research. The work suggests changes and model modifications that may be introduced, and makes specific recommendations for changes that can be considered in the future. In parallel with this work, DfT is also reviewing the environmental benefit rates for road journeys, and the combination of these two pieces of work provides the full picture of future grant eligibility.

It will be for DfT to decide how any changes should be implemented and to reissue the grant tables.

1.4 Process and Reports

This Summary Report describes this research process and is written for DfT's stakeholders.

1.5 Terminology

The following terms are used in this report:

- Mode Shift Revenue Support grant for intermodal traffic is termed MSRS (I)
- Mode Shift Revenue Support grant for bulk traffic is termed MSRS (B)
- Waterborne Freight Grant is termed WFG
- Financial Need is the cost differential between road and rail transport for a given movement

- Environmental Benefit is the costed value of the environmental impacts of a given road movement
- Maximum Grant Rate is the highest grant payable per container for a given movement, where Financial Need is capped by the value of the Environmental Benefit
- Current model describes the DfT model which is in use at the moment and which was constructed in 2010.
- Proposed model describes a model that we have produced and which is put forward to DfT for consideration.

2 Methodology

2.1 Introduction

MSRS (I) currently uses two inter-modal cost models which operate in a similar way, but use different source data and have slightly different calculation methodologies. Both models compare the costs of movements by rail with the costs of a comparable movement by road. The difference between the two models relates to the origin and destination of each movement:

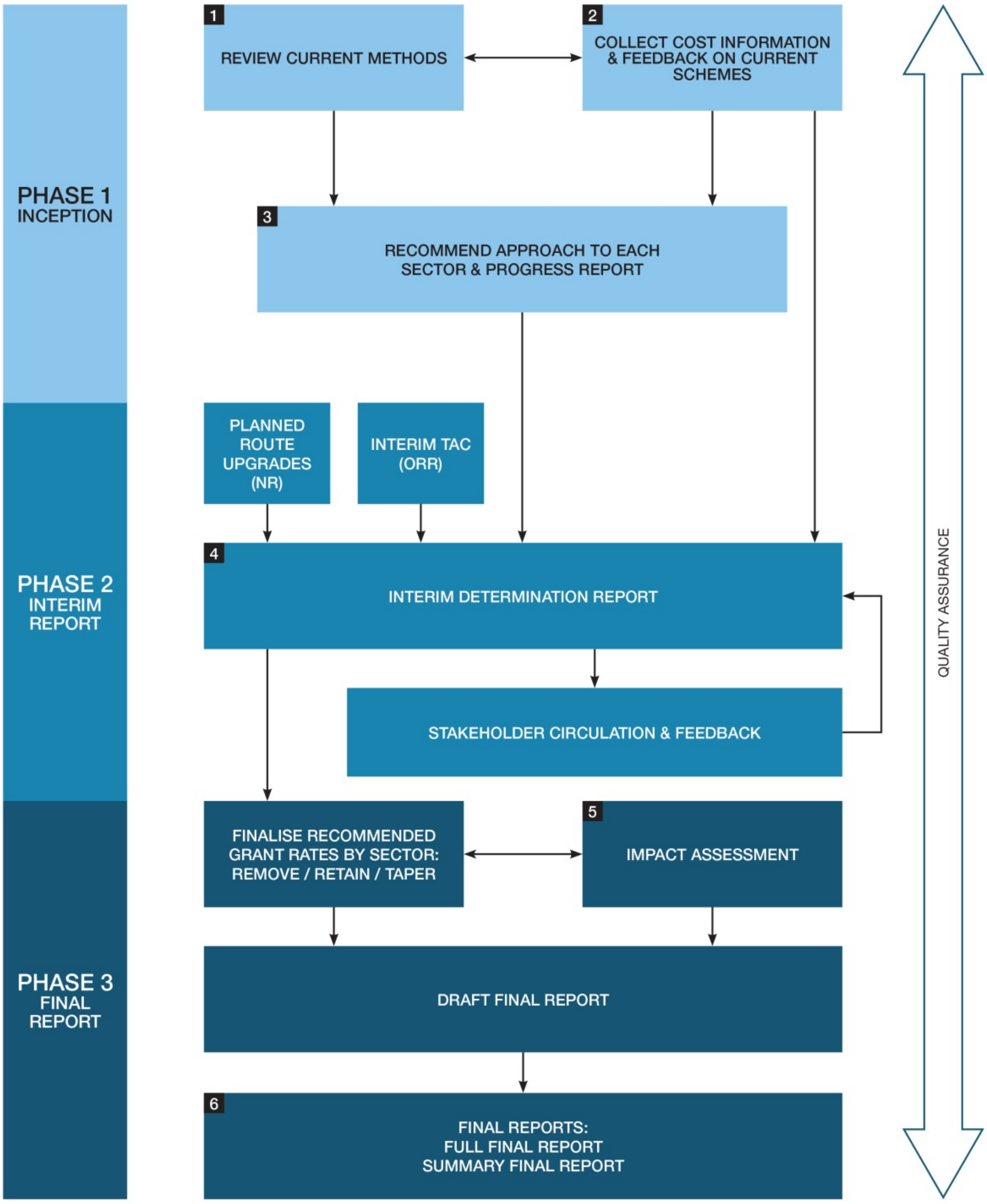
- The port model considers deep sea containers arriving at UK ports and then being forwarded by rail to distribution terminals across the country. The competitive road movement is for the haulage of a container from the port direct to the customer's premises.
- The domestic model relates to the movement of domestic intermodal swap bodies between two points within the UK via two local rail terminals, one at the despatch point and one near the receiver. In this case the competitive road movement is for a standard semi-trailer (for example a tautliner) direct from the forwarding location to the receiving customer.

The study reviewed both these models, and makes proposals for the update and revision of each. Though there is an element of commonality, the two models were reviewed independently. Specific proposals for alterations to the methodology were made for each.

2.2 Main Elements of the Approach

The main elements of the approach are set out in Figure 1 and described in the sections below.

Figure 1: Overall Methodology



2.2.1 Stakeholder Consultation: Phase 1

Stakeholder consultation took place during two distinct phases: an initial first phase of data collection and interviews and a second phase, at a Workshop in November 2013 and a period after this when stakeholders provided comments on the initial estimates of Financial Need and Maximum Grant Rates.

The Phase 1 exercise had two main objectives: collection of feedback on the current MSRS inter-modal model and the grant making process followed for the bulk rail, inland waterway and coastal/short sea shipping sub-sectors and collection of data to update the inter-modal port and domestic cost models.

An extensive series of interviews was conducted to gain industry data from all interested bodies. All current grantees were contacted with a request for an interview.

The majority of interviews were carried out by telephone, though where requested by interviewees face to face meetings were arranged; primarily this involved meetings with the Freight Operating Companies (FOCs) who contributed the majority of the factually based rail data. Industry bodies (including Railfreight Group, Freight Transport Association and British Ports Association) were also consulted.

In total (including the Waterborne Grant interviews) 19 interviews were carried out.

In line with the previous REPS work, extensive use was made of the Freight Transport Association's cost tables, which provide a comprehensive (though possibly cautious) view of industry costs, but which can also be taken to represent cost changes which have occurred since the current models were constructed.

It was agreed with each interviewee that any commercially confidential information supplied to Arup would not be divulged in an attributable form to DfT, and this undertaking was maintained at all times.

2.2.2 Model Review and Development

Following completion of the data gathering phase of the study, the results were analysed and upgrades to the models proposed. At the same time the model methodologies were critically reviewed and where revisions were considered necessary (for example to establish clear traceability for variables or to clarify the origin of the data inputs) these were incorporated into a developing model. At all times these revisions were discussed with DfT as they arose.

These reviews were informed by the data collected through interviews and data requests.

The current domestic and port intermodal models used to assess Financial Need and Maximum Grant Rates paid to support intermodal traffic movements are described in section 4.2. Bulk rail, coastal/short sea shipping and inland waterway movements are assessed on a case by case basis.

The original models have been upgraded, incorporating new cost information and other changes as described in Chapter 4.

2.2.3 Stakeholder Consultation: Phase 2

A review of our process and the resultant draft Maximum Grant Rates was presented to stakeholders in a Workshop held in Arup offices on 13th November 2013. The workshop was attended by 12 of the respondents, and all other respondents were copied into the minutes and the presentation made. Comments on the presentation were invited, and detailed responses were received.

2.2.4 Development of final proposed model and draft Maximum Grant Rates

Comments airing from the Stakeholder Workshop and additional cost information supplied by FOCs were incorporated in to the proposed models in December 2013.

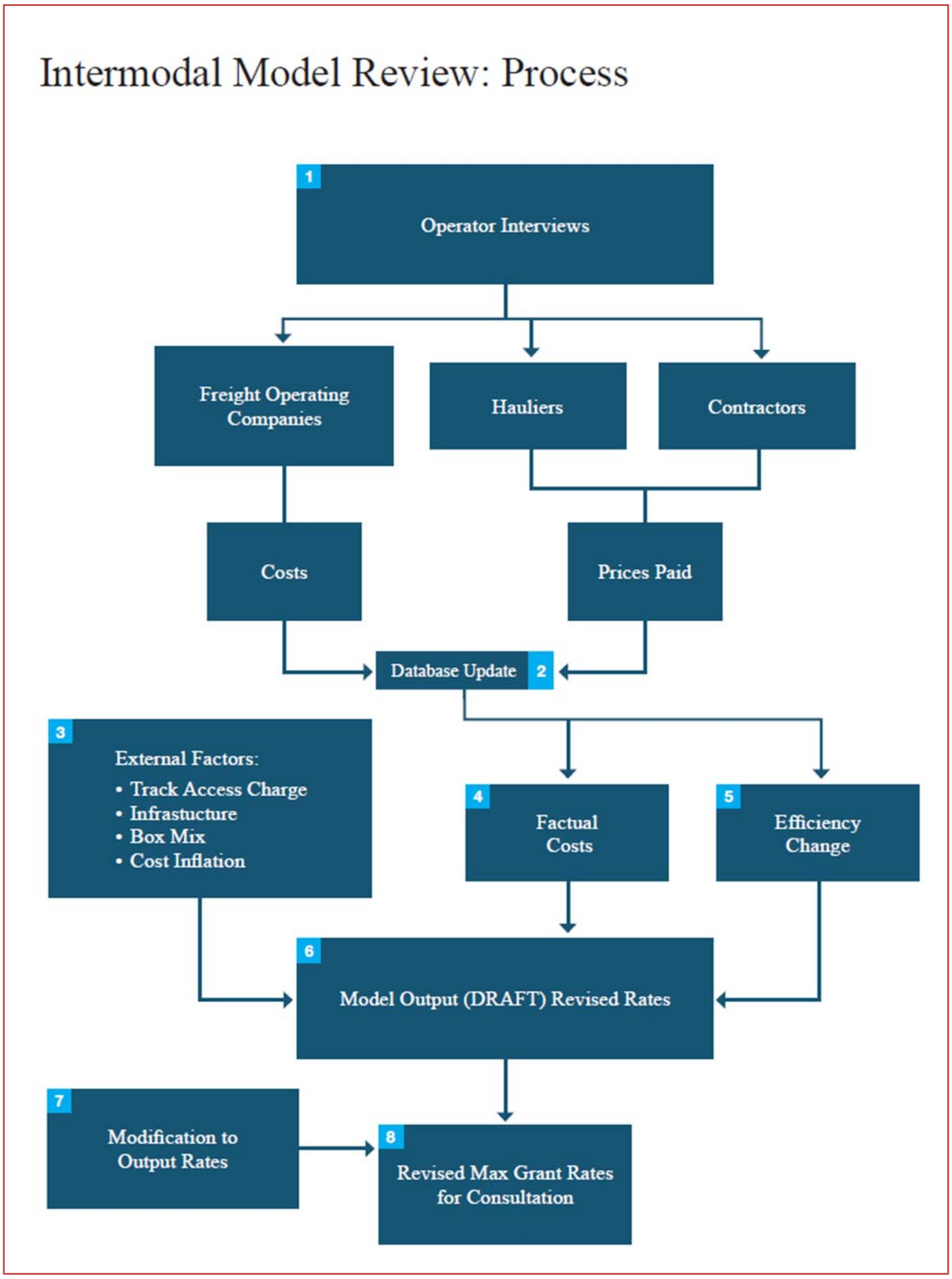
Figure 2 shows the process of deriving revised Maximum Grant Rates in more detail. An important part of the data revision process was to collect updated costs which were divided into two categories: factual information on fuel prices, driver salaries etc., and costs reflecting operator efficiency, such as locomotive trips/ day and numbers of containers per wagon. The revised Maximum Grant Rates are intended to be company neutral whilst reflecting the costs of an efficient operator. To ensure neutrality, individual cost information has not been passed on to the DfT. Efficiency is dealt with in the revised models through key choice variables; recommended values for these variables are provided in input fields.

The proposed models and output estimates of Financial Need and Maximum Grant Rates are described in chapters 4and 5 of this report.

The proposed models have undergone a full Quality Assurance Review. Details of this QA methodology are:

- Model mapping to confirm the flow of data in the model and to check that the model works as intended. This has been undertaken with reference to the scope and specification of the model;
- Detailed computational checks;
- Input checks and output checks; and
- Review meeting with modelling team to clarify any questions on data flow and model functionality.

Figure 2: Revised draft Maximum Grant Rates: process methodology



2.2.5 Impact Assessment

The Terms of Reference also call for an assessment of the impacts if MSRS grant (across all freight sub-sectors) were to be removed or reduced after March 2015. A key aspect of our approach to this item was to undertake an analysis fully consistent with the cost information collected for the other aspects of the study. The results of the impact assessment are presented in chapter 6.

3 Stakeholder Consultation

3.1 Stakeholder Interview Programme:

The stakeholders with interest in the study fall into four broad groups:

3.1.1 Rail Bulk and Intermodal

- Rail freight operating companies (FOCs)
- Road hauliers buying FOC services
- Customers buying services from hauliers or directly from FOCs
- Trade organisations

3.1.2 Waterways and Waterborne

Stakeholders within the waterborne sector are in the following groups:

- Inland waterway and waterborne freight grant recipients
- Ports – London Gateway has just commenced operations and was therefore included although it is not yet the origin of any applicant's flows
- Trade organisations

3.2 Objectives of the Stakeholder Interviews

The objectives of the interviews were to obtain updated transport cost information and to elicit views on the effectiveness of the current scheme and the impact if grants were removed or tapered after March 2015.

As background to the interviews a general introduction statement was provided. This was supplemented by a detailed rail costs questionnaire based on the existing format of the intermodal models; matrices showing the existing assumptions on the "allocation" of freight train configurations to zone-to zone movements (one for port based and one for domestic flows) and a road cost questionnaire.

3.3 Views from Interviews: Intermodal Traffic

Comments received are set out below. Stakeholders made a number of positive comments, endorsing the study but not requiring specific action from the team. These comments can be summarised as:

- The interviewees reported that the timing of this research study is appropriate. State Aid clearances for the current MSRS Scheme expire on 31 March 2015. This date is within current contract timescales and standard company planning horizons and therefore resolution of the direction of the future grant regime is welcome.
- The industry view the grant as sending an important signal of government endorsement of the use of rail, and it is important that this is maintained to preserve distribution industry confidence.
- Generally the current grant arrangements work well, though some aspects could be improved, particularly in terms of processing of information.

3.4 Views from Interviews: Inland Waterways and Waterborne freight

The interviews with the inland waterways and waterborne freight and bulk rail grantees indicated that, although the number of successful grant applications for water based freight transport is low, there are some excellent case studies that illustrate the benefits, both to the start-up venture and to the wider environment.

Comments received are set out below and can be summarised as:

- There is a strong perception amongst all interviewees that MSRS (I) overwhelmingly favours shifts to rail freight compared to shifts to water freight (as this is treated as a bulk scheme)
- As the break even costs of moving freight by water are generally higher than movement by rail, there is an in built disincentive for waterborne transport until a critical mass of volume is reached. This makes applying for WFG more difficult than for MSRS (I) rail applicants
- Several interviewees strongly believed that the existing MSRS (I) grant scheme should be extended to coastal/short sea shipping by making the MSRS (I) grant rates available to them on a per box basis. This they considered would enable treatment on a like-for-like basis with rail freight. They accepted that this would however not have involved calculation of waterborne costs.

3.5 Recommendations for items to be included in future model revisions

Arising from our discussions with grantees, issues have been highlighted as being worthy of consideration for future model revisions. Where appropriate we have taken these comments forward into our construction of the revised models, or considered them in the impact testing.

We have listed these items which fall outside this approach below. In each case we have added our conclusions based on our consideration of the points raised:

- *Extension of MSRS (I) to cover Channel Tunnel traffic.* MSRS (B) awards have been made for specific CT flows, but they are not eligible for MSRS (I). While it is true that it is very unlikely that traffic would be transferred to road once it reaches Dollands Moor, this ignores the fact that for the UK leg the issues of Financial Need and Environmental Benefit are the same as for deep sea traffic, and the application of MSRS (I) could have an impact on stimulating the transfer of more traffic from end to end road journey. For this reason we support the extension of MSRS (I) to cover Channel Tunnel traffic from a new Zone 19, with the condition that it should not apply to traffic already passing by rail.
- *Intra zonal moves.* In some cases *intra*-zonal moves can travel further distances than *inter*-zonal moves yet not qualify for grant. There may be some limited cases where MSRS (I) may be appropriate, but in general given the short distances this is unlikely. We understand that the option is made available for a specific intermodal flow to be considered under the MSRS (B) scheme where the applicant believes a strong case can be made for support based on specific circumstances and see no reason to vary this.
- *Paying higher grant rates for initial years to recognise start up factors.* In practical terms it is often hard to distinguish genuinely new intermodal flows from those that transfer existing traffic between terminals and operators. We do not recommend that this option is pursued, and the current Maximum Grant Rate system should continue to apply in all cases.
- *Separate treatment of 20’ and 40’ boxes.* Given that for road movements the cost per box is identical regardless of length, the current model methodology that determines the loadability of trains depending on a mix of containers appears to us to be the most pragmatic way of determining Financial Need. We recommend that the current methodology of paying MSRS (I) irrespective of box length should be maintained.
- *Establishment of a simpler methodology for grantees to report actual flows.* The reporting of data is a complex process for grantees and establishment by DfT of an electronic portal for submission of the data (preferably using a standard electronic proforma, security locked to restrict access) would improve matters considerably, as well as potentially simplifying DfT internal procedures. We recommend this is proceeded with as soon as possible, and can if required advise further on how best this can be achieved.
- *Division of Zone 1 (London).* This item does not apply to traffic from Zone 1 ports, for which a specific centroid (which is based on the new London Gateway) has been created. Analysis shows that there are no port based flows *to* Zone 1, and only limited domestic flows from it. While it is possible to split the zone it is hard to see where would be an appropriate boundary, and there appears to be little need to do so. Given the parallel wish by grantees to retain the Zone structure in more or less its current form we do not recommend any change is made to the current definition of Zone 1.
- *Extension of MSRS (I) to coastal/short sea shipping.* Coastal/short sea shipping grantees and industry bodies made a very strong case for extension of the intermodal rail scheme to water, citing the fact that the Environmental Benefits are the same, but grant treatment is radically different. We

recommend that for parallel flows between ports and costal zones it would be appropriate to make MSRS (I) available to waterborne operators to generate a level playing field between the modes. However we recognise that there are practical difficulties with this, both in ensuring that waterborne operators are not overcompensated for some flows, and that some of the traffic might actually be abstracted from rail rather than road.

- *Consideration of lower levels of cost/benefit for WFG grants.* The point has been made that shipping has higher break even volumes than rail (both for bulk and intermodal) and that sometimes it is hard to reach the required cost benefit levels in the first year of WFG, if the application is not backed up by firmly committed total volumes. DfT treats an application for WFG as a block item covering all 3 years, which already goes some way to addressing this. However we agree with the point made, and would recommend that consideration be given that the threshold level of cost/benefit is lowered to compensate for lower volumes in years 1 and possibly 2 of a WFG grant award to recognise this.
- *Extension of MSRS (I) to cover empty container movements.* Interviewees expressed a desire to see empty container movements made eligible for MSRS (I) support. In actual fact this is already the case, and it appears that this may not be universally understood within the industry. We recommend that more awareness is generated of this facility, as the costs of moving containers by road, rail and water are practically the same whether they are loaded or empty, and the environmental benefits generated by saving of road mileage are the same.

4 Cost Model: Review and Development

4.1 Introduction

4.1.1 Overview

This chapter focusses on the review of MSRS (I) port and domestic models which are used by DfT for estimating the Maximum Grant Rates which can be paid to support rail movements of container traffic. The layout of this chapter is as follows:

- Section 4.1: sets out the introduction, objectives and background. Changes in infrastructure on the Strategic Freight Network are also reported in this section.
- Section 4.2: describes the core of the analysis of the model structure, reviewing all the features of the current port and domestic models and setting out the proposed actions (revision details or “no change”) with justifications.
- Section 4.3: describes the updating of rail input cost data. This divides into two broad categories: “point-of fact” costs, such as fuel or driver salaries and productivity related costs, such as train length.
- Section 4.4: presents the changes to road haulage costs.
- Section 4.5: summarises the key changes to the intermodal models. The resultant estimates of Financial Need and Maximum Grant Rate are presented in Chapter 5.

The MSRS (I) port and domestic models are referred to as the current models and the updated models are referred to as the proposed models.

At present Maximum Grant Rates paid to intermodal traffic are estimated using the current models, the results of which (reference: DfT: Guide to mode shift revenue support (MSRS) Scheme, September 2009, Annex B) allow potential grantees to see, ex ante, the maximum amount per container that they could receive. Supplementary Guidance notes have updated rates from Southampton to reflect the impact of gauge enhancement works implemented since 2009. The grantees can bid for grants / container movement up to these Maximum Grant Rate levels. The Maximum Grant Rates are publicised on the DfT website.

This chapter presents the review and updating of the inter-modal cost models (port and domestic) used to estimate the Financial Need and Maximum Grant Rate payable per container for each zone-to zone rail movement. When the generic term ‘model’ is used, this applies to both the port and domestic models.

Potential grants to bulk rail, inland waterway and coastal/short sea shipping traffic are calculated on a case by case basis and not discussed in this chapter.

4.1.2 Network Infrastructure Changes

Since the current model was developed in 2009 there have been a number of rail network infrastructure changes. In addition, further infrastructure will be added during the timeframe of the proposed models. These updates allow for longer trains and / or greater gauge clearance on a number of routes on the Strategic Freight Network, which has been nominated by DfT as comprising the core freight routes covering England, Scotland and Wales.

The following rail infrastructure changes are reflected in the proposed models:

- W10 gauge from Southampton to West Coast Mainline (WCML) via Oxford and London – Completed since 2009;
- W10 gauge on the WCML from London to Manchester, Liverpool and Glasgow – Completed prior to 2009;
- W10 gauge from Felixstowe, Tilbury and London Gateway to WCML via London – Completed prior to 2009;
- W10 gauge from Birmingham to Doncaster and Hull – Under construction;
- W10 gauge Doncaster – Carstairs – To be completed during CP5
- W10 gauge from London to Peterborough – Under construction
- W10 gauge from Peterborough to Doncaster, Leeds and the North East – To be completed by 2015;
- A new route for trains from Felixstowe to the WCML via Peterborough, Leicester; and the new flyover at Nuneaton (This was completed in 2012. However use of this routing was challenged by FOCs through the Stakeholder Workshop as there is only restricted capacity available between Peterborough and Leicester. This will remain until the completion of planned resignalling in CP5 and realisation of the HLOS required CP5 Leicester remodelling. For this reason the route used in the models from Zone 2 to the West Midlands, North West and Scotland remains via London).

Further changes envisaged in CP5 2014 -2019 (notably the Electric Spine, and electrification of the Midland Main Line, which would deliver a significant change in traction policy) have not been incorporated. It was suggested (and strongly agreed by FOCs) that the implementation of this change would be too late to have a significant impact within the lifespan of the proposed model. If conversion of freight haulage to electric traction were to be considered, a change to locomotive costs and haulage characteristics would be required. (In general terms, an electric freight locomotive can haul heavier trains within the same timing loads, and therefore it is likely that the train length would be increased beyond the new maximum of 26 wagons). For these reasons it appears to us that the model's use of the generic class 66 diesel used by most operators is appropriate for the time being.

4.2 Review and Update of Model Structure

4.2.1 Introduction: description of current models

The DfT provided the current models used for the calculation of the Maximum Grant Rates together with documentation on how the models are structured and used.

This provided the basis for the review and update. For referencing purposes, the models are referred to as the current model for the models provided by the DfT and the proposed model for the models updated by Arup.

Within the main models there are two sub-models, one ("the port sub model") representing movements to and from ports and the other ("the domestic sub model") representing movements between inland terminals. In simple terms, the models use cost data and distances to calculate estimates of Financial Need from the perspective of a potential rail freight customer or operator. Financial Need is defined as the difference between rail costs and road costs. Rail costs include a final road delivery leg in the port model and road collection and delivery legs in the domestic sub model.

There are limited cases where in the domestic model one end of the journey is to a rail connected warehouse eliminating the road leg. However these are still extremely limited and were not considered sufficiently likely to require a sub division of the model. If this were to become more frequent the model could be easily revised.

The models estimate the Financial Need defined as the difference between the cost of moving a container by rail and the cost of the same movement by road. England, Scotland and Wales are divided into18 county based zones (shown in Figure 3) with a centroid in each zone which represents the point to and from which transport costs are calculated. This is undertaken to provide a neutral point in each zone to eliminate any bias towards one operator.

The Maximum Grant Rate payable for each zone-to-zone movement is the lower of the Financial Need and the Environmental Benefit (defined as the environmental impacts of an equivalent costed road journey).

4.2.2 Review of the Current Model Structure

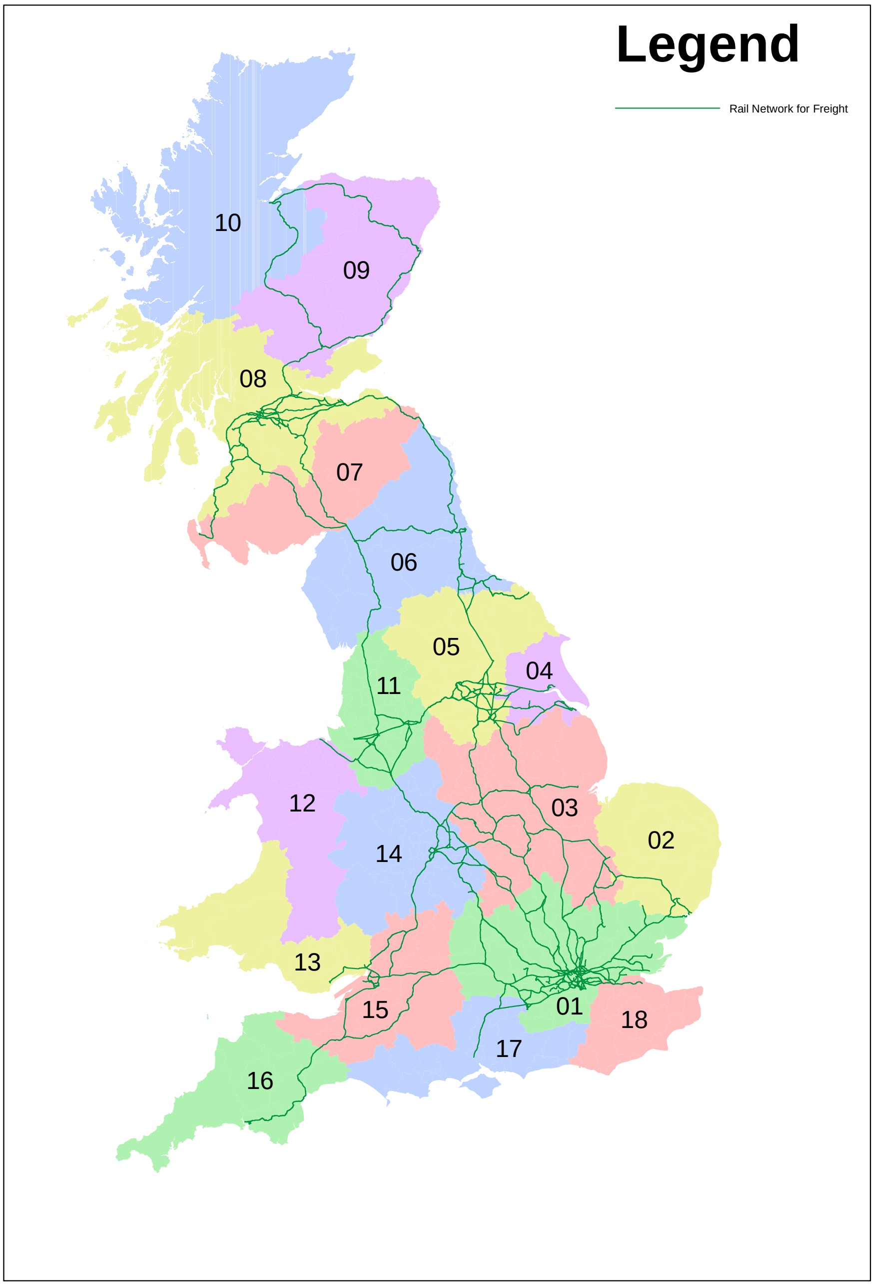
4.2.2.1 Introduction

Whilst categorisation is somewhat arbitrary, it is felt useful to distinguish fundamental or structural features of the model from changes in key inputs. This sub section describes the review of the current model structure and following from this the structural changes proposed. The main structural features of the model are considered to relate to zone boundaries and centroids, train configurations and productivity, train distance bands and the estimation of road and rail distances. These are discussed and the proposed actions set out and justified in the sections below. More specific non–structural aspects of the cost update are described in section 4.2.3.

4.2.2.2 Zone boundaries

The port and domestic models are both based on 18 zones defined by local authority boundaries as shown in Figure 3. Whilst more zones would increase accuracy, a large increase in the number of zones would make the model unwieldy. It was commented by stakeholders that they are familiar with current zone boundaries and it would be better to keep to these for practical reasons. It was therefore decided not to change the number of zones in the model. It would however be of assistance to the stakeholders if a table showing which county falls into which zone was provided.

Figure 3: Freight Rail Network and zone boundaries for the proposed models



4.2.2.3 Zone Centroids

There is no explanation in the current model notes as to how the centroids were originally calculated or the reason for the location. In the current model there are only 4 port locations included in the port model and both models contain the same inland locations. The review established that these centroids are often not centrally located within a zone.

As a result the zone centroids have been changed in both of the proposed models to better reflect an actual freight terminal in each zone using a more central location. These were chosen with the aid of the DfT interactive multi modal map at http://www.multimodalmap.org.uk/. The MSRS (I) models must be company neutral, and centroid selection has therefore been an unbiased choice without consideration of the usage of centroid terminals by specific FOCs. All of the terminals are available for use by any FOC, and the centroid Maximum Grant Rates will of course apply to any other terminal within the same zone.

The centroids are now identified by a postcode for clarity and to simplify identification of the equivalent road journey.

Road distances have been recalculated using the Transport Direct journey planner (which produces a standard route, not specifically the shortest or quickest). We have recalculated the rail distances using GIS mapping of the Strategic Freight Network to ensure correct routing. The impact of these changes is discussed in Section 5.3.3 below.

In total these amendments have had the effect of increasing rail journeys relative to road. Analysis shows that for 130 zone pairs (42%) in the proposed model the rail distance relative to road is shortened, while for 176 pairs (58%) the relative distance increases. In total the recalculation has had the effect of increasing the difference between rail and road distances by 2,298 km, or an average of 8km per zone pair. In a few cases the rail distance has crossed one of the threshold boundaries which impact on the calculation of rail costs, but this is not a significant driver of the changes.

In addition, for the proposed port model, two zone centroid locations in each zone have been identified, an intermodal rail terminal inland and a port, with the costs shown in the matrix reflecting a journey between a port in one zone and an intermodal rail terminal in another. There are therefore now two matrices for ports, one with the port location as the origin, and one with the port location as the destination (to/from an intermodal rail terminal). Zones 5 and 14 do not have a suitable port location within them so have no port origin movements in the port models.

4.2.2.4 Rail Distances

The description of the current models contained insufficient evidence regarding the calculation of rail distances or the points from and to they were measured. Due to the changes made to the zone centroid locations, all rail distances between the 18 zone pairs have been recalculated (in some cases the selected route is not the most direct due to network capacity, route characteristics and capability constraints). The rail distances were calculated using the Network Analysis tool within the ARCGIS[1] software. This used the Strategic Rail Freight Network (shown in Figure 3) along with zone centroid postcodes.

4.2.2.5 Road Distances and Times

The proposed methodology of road distance measurement is the same as in the current model. The proposed model road distances and road times are calculated between the new zone centroids for each of the inter-zonal movements using the Transport Direct Freight Grants – Environmental Benefits Calculator[2]. It has however been noted that the road times generated by the calculator are an underestimate as they do not take into account congestion at certain times of day, maximum LGV speed limits or requirements for statutory driver breaks. .

To counter this discrepancy an overlay of the Transport Direct calculator has been included, by increasing the journey times by 20% to recognise the longer journey time for lorries, and driver rest legislation. Congestion is clearly a more subjective calculation as it depends on the time of day of the journey through key route sections, but our speed reduction recognises some element of this as well.

4.2.2.6 Train Configurations

The models estimate rail operating costs based on typical train configurations. These configurations were reviewed and adjusted based on the responses from the FOCs and Arup expert opinion to be typical of the rail freight services operated in terms of the locomotive type and wagons used.

The port model uses four train configurations which are governed by the zones they are moving between and the gauge clearance along the routes. The four train configurations have been updated in the proposed model to reflect revised wagon mix and route gauge clearance with a number of zone pairs becoming eligible for longer trains and greater standard wagons.

The domestic model uses two train types with a longer train for gauge cleared movements and a shorter train for non-gauge cleared routes. These have remained the same as in the current model.

The train configuration descriptions are shown in Table 1 below.

[1] ARCGIS is a Geographical Information System which allows measurement of data.
[2] http://www.transportdirect.info/Web2/JourneyPlanning/FindEBCInput.aspx

Table 1: Train Configuration Descriptions

Train Configuration	Model	Description
1	Port	Deep sea port traffic, non-gauge cleared flows on high productivity routes
2 (deep sea)	Port	Deep sea port traffic on lower productivity routes
2	Port	Other ports on lower productivity routes
3	Port	Gauge cleared routes
4	Domestic	Domestic flows on low productivity routes
5	Domestic	Domestic flows on high productivity routes

The configurations in the current and proposed models are shown in

Table 2 and Table 3 respectively.

Table 2: Current Train Configuration

Train Configuration	Port or Domestic	Locomotive	Wagons
1	Port	Class 66	24
2 (deep sea)	Port	Class 66	18
2	Port	Class 66	18
3	Port	Class 66	21
4	Domestic	Class 66	20
5	Domestic	Class 66	26

Table 3: Proposed Train Configuration

Train Configuration	Port or Domestic	Locomotive	Wagons
1	Port	Class 66	26
2 (deep sea)	Port	Class 66	18
2	Port	Class 66	18
3	Port	Class 66	26
4	Domestic	Class 66	20
5	Domestic	Class 66	26

A key feature of the original model was that it did not recognise the introduction (see section 4.1.2 above) of W10 gauge clearance of key routes. This led to the use of train formations which included lowliner wagons which allow the carriage of 9’6” containers on W8 routes. However more recently DfT has adjusted the Maximum Grant Rates for Southampton to the West Midlands (zone 17-14) and Southampton to the North West (zone 17-11). These are covered in supplementary guidance notes issued by DfT.

The proposed model recognises that routes from Felixstowe, the Thames ports and Southampton to the West Midlands, North West and Scotland are cleared to W10, and 9’6” containers can now been carried on standard wagons. However the mix of 40’ containers relative to 20’ containers is increasing, with the result that FOCs are finding it more difficult to fully load 60’ standard wagons. To recognise this, a number of wagons with 40’ beds have been incorporated to improve load factors. One operator has ordered a batch of VTG Ecofret wagons and others operate AAE Megafret wagons which provide this capability, but conversion of the fleet is a slow process, and for the time being 60’ wagon beds predominate in operator fleets.

A second feature of the current model is that for the core routes represented by train configurations 1 and 3 (which form part of the Strategic Freight Network) the maximum average train length is set at 21 or 24 wagons. Since many of the core routes are now cleared for up to 750m trains[3], this assumption appeared to be unrepresentative of current operating capabilities. This issue has been raised with FOCs, who have countered with comments that the trailing length limits cannot be fully exploited, partly because of terminal length constraints, but also because timing loads[4] on key passenger routes do not allow the operation of full length trains. In consultation with FOCs the maximum length of a ‘high productivity’ train on train configurations 1 and 3 has therefore been increased by 8% from 24 to 26 wagons.

These revised network capabilities are reflected in the train configurations generated (which lengthen trains to 26 wagons on the gauge cleared routes) and rail distances (which are calculated using the Strategic Freight Network element of the GIS plotting).

4.2.2.7 Train Distance Bands

It is recognised that rail costs vary with distance, and in particular that locomotive, wagon and driver utilisation rates improve as distances increase. Therefore the models use the following 3 distance bands for each train configuration:

1. Short distance – less than 300km;
2. Medium distance – between 300km and 600km; and
3. Long distance – greater than 600km.

Higher utilisation levels are assumed to apply to the longer distance bands than the shorter distance one.

The distance bands (which drive locomotive, wagon and driver utilisation) have been retained, using the same definitions as in the current models. These bands create a stepped function of cost against distance, with steps at 300 and 600 km. A continuous relationship was too complex to model, and these bands still give a good representation of actual journey efficiencies. The banding principles are understood by grantees.

[3] Trailing lengths do not include the locomotive(s)
[4] Timing loads are specific train weight and locomotive combinations used by Network Rail to generate train journey times

This gives 12 fixed and variable rail costs in the port model and 6 in the domestic model which are applied depending on the distance travelled by the train between the zones.

4.2.2.8 Other Structural Inputs

In addition to the overall costs and distances, the current model includes a local distribution road leg adjustment to represent delivery to the customer and a repositioning factor to take into account road vehicle repositioning for a return haul.

The current model contains a local distribution adjustment which takes account of the proportion of road journeys where there is a 'doubling back' in distance. This was included following research which indicated that a weighting of 80/20 should be applied to the road journey with 80% relating to road legs which increase the overall journey distance and 20% which reduce the overall journey distance. There was no further evidence to change this factor in the proposed model and the factors have been retained.

The vehicle repositioning fixed cost calculation was also kept in the proposed model as this was considered to be reasonable approach and there was no further evidence to support a change in this.

The current model also assumes that one container is equivalent to one lorry journey. This was considered as a reasonable assumption, as there are very few cases where two twenty foot loaded containers can be carried on one road vehicle. This assumption has been retained in the proposed model.

Both the current and proposed models make assumptions about the loadability of rail wagons, in that wagons can either carry 2 or 3 TEU at maximum, while the size of containers moved varies between 20' and 40' containers. It should be noted that, in the interests of comparability of rail and road, the models make no differentiation between 20' and 40' containers. This has no impact on utilisation rates of road movements (where, normally, one container is moved per lorry), whereas for rail, this entails making assumptions about average wagon utilisation.

4.3 Rail Cost Update

This section describes the review and update of the rail costs input to the proposed model. These cost changes are divided into two categories: Externally-given costs (such as fuel and driver salaries) and productivity related costs such as train length.

4.3.1 Externally-Provided Costs

4.3.1.1 Overview

This section describes the procedure for the review and update of specific rail and road cost inputs.

Rail cost data is used to calculate rail fixed costs and variable costs. These are made up of the following:

Fixed Costs

- Locomotive provision (annual leasing and maintenance, employment and other costs);
- Wagon provision (leasing and maintenance costs);
- Terminal handling (assessed as a standard per container handling charge);
- Port shunt or swap body cost (port and domestic model respectively); and
- Local distribution (assessed as a fixed delivery charge based on an average delivery distance).

Variable Costs

- Traincrew costs
- Traction (fuel); and
- Track Access Charge.

Wagon costs are assembled from a range of train configurations based on the rail network characteristics, which determines wagon types used, number of wagons hauled per train, and costs for leasing, maintenance and the track access charge.

These costs are then applied to the journeys between zone pairs (a total of the distance between the zone centroids plus the road distribution legs) to produce a final cost based on the train type and the actual rail distance travelled through the network.

Although the updated MSRS (I) would run from April 2015, current rail and road costs for Q2 2013 have been used rather than forecasts of costs at a future date. This is consistent with the approach for the current MSRS (I) which uses 2008/09 costs.

Where information on individual cost increases was not available, an inflation factor of 1.14, based on the change in the Retail Prices Index between 2008 and 2012/13[5] has been used.

There are variations in the rail costs reported by the different industry participants. However the costs used have been determined from an assessment of the responses to provide estimates representing an efficient operator.

In response to a questionnaire, FOCs responded with updated cost data. The companies have different cost structures, in particular reflecting the assets they own and those that they lease.

4.3.1.2 Track Access Charges

In the case of track access charges, the work has spanned the publication of the ORR's final determination of Network Rail financing for Control Period 5. This in turn drives the track access charge rates Network Rail will apply to FOCs.

[5] 2008 average RPI: 214.8; 2012/13 annual average April_March: 244.7. ratio 1.14. Source: ONS, publication MM23 Consumer Price Indices. Values: All items retail price index (CHAW).

Network Rail published its final price list detailing how these charges will be applied to different locomotive and wagon types on 20th December 2013, and these have been incorporated into a revision of the models released to DfT in January 2014.

4.3.1.3 Rail Costs: Proposed Values

Current and proposed values of key rail costs are shown in Table 4. Column 4 shows the current values adjusted to 2013 prices. Column 5 shows the proposed new values also at 2013 prices. Columns 6 and 7 show the build-up of the overall change proposed; column 6 shows the overall change and column 7 the change in real terms after adjusting the price base.

The bottom line of the table shows the average rail cost increasing by a factor of 1.12, slightly less than the price base adjustment, implying a cost reduction, in real terms by a factor of 0.98.

Table 4: Rail Cost Information

item	units	Current value	Current value plus RPI (ratio 1.14)	Proposed value	Ratio (Proposed value)/(Current value)	Ratio (Proposed value)/(Current value plus RPI)
Locomotive costs:						
Annual lease	£'000	157	179	161	1.03	0.90
Annual maintenance	£'000	61	69	66	1.08	0.95
Driver salaries	£'000	40	46	45	1.14	1.00
Depot costs	£'000	65	75	62	0.94	0.83
Access to third party terminals	£/train	144	164	164	1.14	1.00
Fuel	£/litre	0.44	0.50	0.67	1.52	1.33
Track Access Charge	£/kgtm	2.266	2.57	2.57	1.14	1.00
Capacity charge	£/train m	0.16	0.18	0.17	1.10	0.97
Terminal (2 lifts)	£	51	58	50	0.98	0.86
Local distribution	£/trip	150	171	167	1.11	0.98
Port shunt	£/trip	17	19	18.50	1.09	0.96
Average change in cost					1.12	0.98

[6] CP4 Track Access Charge

4.3.2 Changes in rail costs: train productivity

Train productivity is reflected in the model through two components: train length (measured by wagons per train) and wagon utilisation (measured by containers per wagon). FOCs were asked to provide information on productivity, which is a key input to the models. Based on the limited information provided, it was assumed that driver and locomotive productivity[7] (on short and medium distance trips) was unchanged since 2009, whilst there has been a decrease in locomotive activity on long distance trips.

Wagon activity (trips/day) has decreased on short trips but increased on long trips.

Following a stakeholder workshop, revised assumptions on train productivity were agreed with the FOCs, based on assumptions suggested by Arup. These assumed that the train length and utilisation would change from those shown in Table 5 to those in Table 6.

Table 5: Train Configuration and Utilisation Current Models

Train Configuration	Port or Domestic	Wagons	Maximum Containers	Utilisation : containers per wagon	Actual Containers
1	Port	24	42	1.38	33
2 (deep sea)	Port	18	30	1.28	23
2	Port	18	30	1.28	23
3	Port	21	42	1.57	33
4	Domestic	20	20	0.90	18
5	Domestic	26	26	0.88	23

Table 6: Train Configuration and Utilisation Proposed Models

Train Configuration	Port or Domestic	Wagons	Maximum Containers	Utilisation : containers per wagon	Actual Containers
1	Port	26	44	1.25	32.5
2 (deep sea)	Port	18	30	1.25	22.5
2	Port	18	30	1.25	22.5
3	Port	26	52	1.25	32.5
4	Domestic	20	20	0.90	18
5	Domestic	26	26	0.88	22.9

The main change is to the number of actual containers per wagon which has reduced compared to the previous models. This is due to the way in which the utilisation has been recalculated in the model based on information from the FOCs, which suggested that a utilisation of 1.25 containers per wagon was

[7] Measured by trips per day. Locomotive productivity was measured in this way to fit with the input needed for the Model. A measure of miles/day might give a different answer but this information was not readily available.

appropriate (due to the 20'/40' mix on 60' wagons). This is a lower utilisation than in the current model. The number of wagons per train has increased for train configurations 1 and 3. These changes are shown in Table 7. This has led to the overall changes in the number of containers per train ranging between 0.98 and 1.00 (i.e. almost no change at all).

Train productivity is a key input to the model. The proposed model has been set up in a user-friendly way to make it easy to change this assumption.

Table 7: Change in productivity due to train length and utilisation

Train Configuration	Port or Domestic	Change in wagon productivity (wagons/train)	Change in utilisation per wagon	Overall change: wagons/train
1	Port	1.083	0.906	0.981
2 (deep sea)	Port	1.000	0.977	0.977
2	Port	1.000	0.977	0.977
3	Port	1.238	0.796	0.986
4	Domestic	1.000	1.000	1.000
5	Domestic	1.000	1.000	1.000

4.4 Road Costs

Road costs in the model represent the costs of the road haul equivalent of a port or domestic movement by rail. These road costs are calculated on a standing cost (pence per minute) and running cost (pence per kilometre) basis for the road equivalent port or domestic movement, and are based on an assumption of one container per road vehicle. These standing and running costs are then applied to the distance and time calculations provided by the Transport Direct calculator (plus an adjustment factor of 20% as described in Section 4.2.2 above) to produce an estimate of total road haulage costs.

This section outlines the method used for calculating road haulage costs for the movement of containers and domestic trailers.

There was a limited response to the road cost questionnaire. The FTA Road Manager's Guide Operating cost tables provide a useful guide, especially for updating the previous MSRS values which were also compiled from transport cost tables.

For the port sub-model, 44 tonne 3+3 axle vehicles were assumed with intermodal trailers. For the domestic model, one third of the vehicles were assumed to be 44 tonne 3 axle tractors with 3 axle curtain sided semi-trailers and the remaining two thirds to be 38 tonne 3 axle tractors with 2 axle curtain sided semi-trailers.

Road costs are divided into costs per kilometre (running costs) and costs per minute (fixed costs). The cost per km calculation depends on fuel, tyres, and tractor and trailer repairs and maintenance. Fuel is the dominant item within this cost category, which is a cost that does not vary between operators.

Due to the limited operator information available, the FTA Guide data was used as the main source with an adjustment for the intermodal trailer in the port model and the split between the two vehicle types in the domestic model.

Table 8 below shows the breakdown of the distance based pence per kilometre (ppkm) cost information.

Table 8: Road Operating Costs (pence per km)

Item	Current value	Current value plus RPI	Proposed value	Ratio Proposed value/ Current value	Ratio Proposed value/ Current value plus RPI)
Tractor					
Fuel	31.4	35.8	38.3	1.22	1.07
Tyres	1.13	1.29	1.09	0.96	0.84
Repairs & Maintenance	5.23	5.95	5.37	1.03	0.90
Trailer					
Tyres	1.21	1.38	1.11	0.92	0.81
Repairs & Maintenance	2.70	3.08	3.01	1.11	0.98
Combined unit					
Total mileage costs	41.66	47.45	48.92	1.17	1.03

The time related fixed costs (pence per minute - ppm) include the remaining elements of standing cost – driver wages, tractor and trailer provision and road tax. The summary data on these costs are:

- previous (2007/8 values and prices): 35.1 pence per minute
- Updated using RPI (1.14): 39.7 ppm
- Value used (FTA and data received): 40.6 ppm port model (40.7 ppm domestic model), giving an overall rate of increase 40.6/35.1 = 1.15

The FTA cost tables are considered to give maximum values of realised road costs. Discounts are offered to attract traffic and some parts of the market are highly competitive. It is difficult to gauge the extent to which these "book" values may be over estimates of actual prices.

Between 2008 and 2013, the road distance based (ppkm) costs have increased by 17% and the road time based (ppm) costs have increased by 15%. Overall, this represents an average increase in costs of 16%. As RPI inflation over the same period has been 14%, there has been an increase in road costs in real terms.

4.5 Proposed Model Changes: Summary

A review of the current models was undertaken to understand where changes are justified and where it would be better to retain the current methodology.

Within the main model there are two sub-models, one (“the port sub model”) representing movements to and from ports and the other (“the domestic sub model”) representing movements between inland terminals. In simple terms, the model uses cost data and distances to calculate estimates of Financial Need from the perspective of a potential rail freight customer or operator. These costs are estimated between specific points which represent either the ports which are the origins or destinations of freight traffic or inland terminals which are represented by zone centroids.

Financial Need is defined as the difference between rail costs and road costs between ports and inland terminals (in the port sub-model) or pairs of inland terminals (in the domestic sub model).

The proposed model incorporates the changes to the input values as described in section 4.3 and 4.4. In addition, it breaks the component parts of the model calculations down into individual costs and distances to provide transparency on the build-up of the costs. (This was felt necessary due to the current models containing a number of long calculations with hard wired values, which made it complicated to understand the full process). This allows the proposed models to be updated in any specific areas as infrastructure is updated and train configurations change.

The key drivers in the models and a list of changes made in the proposed models compared to the current models, reflecting the review and the information received from the stakeholders, are set out in Table 9:

Table 9: Proposed changes to the current models

Key Feature of models	Action	Comment
Zone Boundaries	No Change	The current zoning system has been retained.
Zone Centroids	Update of the zone centroid locations.	Changed to better reflect an actual freight terminal in each zone and to give a more central location. Centroids now recorded with a postcode for clarity.
Rail Distance	Re-measured based on new zone centroid locations. Undertaken using GIS software to produce unbiased but accurate distances which could be recorded.	The current models lack evidence on how these were calculated.
Final Road Leg Distance on rail trips	Revised in the proposed model to reflect new zone centroid locations and capped at 50km to reflect the final delivery leg	These varied in the current model according to zone size.
Road Distance Measurement	Revised in the proposed model to reflect new zone centroids using the Transport Direct website.	Current road distances were subjected to spot. As with rail distances, the calculations contained in the current models lack evidence.
Road Time	Revised to reflect new zone centroids using the Transport Direct website.	Again, no evidence is contained in current models for times.
Local Distribution Adjustment	No change	This adjustment is to take account of the proportion of road journeys where there is a ‘doubling back’ in distance. There was no evidence to change this factor.
Vehicle Reposition cost	No change	Kept the same but based on new road costs.
Train configurations	In the proposed mode the locomotive and wagon types remain the same although the mix of wagon types used changes.	This reflects the information received from the FOCs on the locomotive and wagons they use. In particular no move towards electric traction has been made, and the Class 66 locomotive remains standard, to reflect anticipated practice during the study period.
Train Distance Bands	No change	These bands create a stepped function of cost against distance, with steps at 300 and 600 km. A continuous relationship was too complex to model, and these bands still give a good representation of actual journey lengths. The banding principles are understood by grantees.

Train Productivity – Train Length	Changed to reflect network updates (see specific explanations at Section 4.1.2 (infrastructure) and Section 4.3.2 (train productivity).	This reflects the information received from the FOCs and the work undertaken by Network Rail to upgrade routes. The maximum train length for core freight routes increases from 24 to 26 wagons.
Wagon Utilisation	Updated based on information received from FOCs.	The proposed values better reflect the wagon utilisation based on the mix of 40'/20'containers
Rail Costs from FOCs	Updated (see Table 4 in this chapter).	The costs were updated based on: • an average if all costs were similar or there was considered to be no potential for efficiency gain; • the 20th percentile where costs varied (to reflect an efficient operator); or • inflation where no updated cost information was provided.
Road Costs from FTA	Updated (see Table 8 in this chapter)	Costs updated based on FTA values as little cost data received from operators.

5 Financial Need and Maximum Grant Rate Results

5.1 Introduction

The proposed model has been substantially updated and revised in line with the comments contained in Section 4 above. Some of the revisions are essentially minor corrections or updating of existing parameters. Others, and in particular the revision of the centroids for each zone, have had a significant impact on the model outputs.

This section explains the effect of these changes, and discusses the impact this would have on the resulting levels of assistance payable to grantees.

The outputs of the proposed model are calculations, for each zone-to-zone pair, of the Financial Need of carrying a container by rail rather than by road and resulting from this the Maximum Grant Rate payable. These rates are defined as follows:

5.1.1 Financial Need

Financial Need is defined as occurring when cost factors indicate that rational freight customers will move containers by road rather than rail because the road transport cost is less than the rail transport cost.

The Financial Need is calculated by comparing the road and rail costs for an equivalent movement between zone pairs. Where this identifies that the road cost is lower than rail cost an assumption is made that FOCs would not bid to carry containers between these zone pairs without financial support. It should be noted that the model compares costs without the addition of any profit elements, and does not consider wider commercial implications of container movements.

In cases where the model identifies there is a Financial Need the implication therefore is that movement by rail will only occur if external financial support is made available.

5.1.2 Maximum Grant Rate

The Financial Need shows the support levels needed to match rail costs with those that would be incurred if the movement were undertaken by road. It does not however calculate the value in environmental or other societal benefits of moving containers by road rather than rail. This Environmental Benefit is calculated by a DfT methodology separate from the terms of reference of this study, by using the Transport Direct website to calculate an equivalent road journey and assigning environmental costs to it based on the categories of road travelled over. This effectively caps the support rates payable to the maximum environmental benefit, and therefore rules out support for flows where there is insufficient societal benefit derived from rail movement.

This capped rate is termed the Maximum Grant Rate and is the lower of the Financial Need value and the Environmental Benefit value. The Environmental benefit rates are being recalculated by DfT, but as they clearly impact on the model outputs for the purposes of comparison it has been assumed that the rates applicable in the current model have been increased by the standard inflation rate

(14%). No other changes have been incorporated, and it should therefore be noted that if the Environmental Benefit rates are altered beyond an inflationary increase the Maximum Grant Rates will also change. As a further comment, the existing Environmental Benefits have not been calculated for the new zone centroid pairs as the Transport Direct model values are currently being updated. Therefore the Maximum Grant Rates are likely to move further and more in line with the changes in Financial Need reported below.

5.2 Model Outputs

The outputs from the models consist of tables of Financial Need and Maximum Grant Rates. Since the Maximum Grant Rate is the lower of Financial Need and Environmental Benefit, if there is no positive Financial Need or no Environmental Benefit, there is no basis for grant and the Maximum Grant Rate is shown as zero. To make clear the relative gap between road and rail costs, where rail costs are lower the Financial Need is quoted as a negative figure.

For the purpose of determining the draft Maximum Grant Rates shown in this Report, the Environmental Benefits have been updated to current prices using the RPI factor of 1.14. The Maximum Grant Rates for some zone pairs may change once the new Environmental Benefits are available.

At current prices, compared with 2009 values in the current models, rail costs have increased by approximately 12% (this is an arithmetic average value, reference Table 4) whereas road costs have increased by an average of 16% (

Table 8).

Rail productivity has reduced marginally due to the declining number of 20' containers available for movement. This largely negates the impact of the road cost increases.

5.3 Financial Need: Results

5.3.1 Introduction

The Financial Need is a key stepping stone in the analysis and consequently the proposed model outputs of it are shown in the tables below. The Financial Need for each zone to zone movement is shown in Table 10, Table 11 and Table 12 for the port as origin, port as destination and domestic models respectively. In each case the figure quoted for each zone pair is the difference in cost of moving one container by road and rail, with instances where road is more expensive being shown as a positive figure and where rail is cheaper a negative figure.

Though complex these tables are an essential step to understanding where the model indicates that rail is uneconomic. As is to be expected longer distance movements have lower or no Financial Need, though the effect of movements via higher productivity port services rather than lower productivity train services to more remote zones has a noticeable effect.

Figure 4 shows the model zones with the Strategic Freight Network shown in green. There are other core rail routes used by freight trains and represented in the model but these are not shown here.

Figure 4: Model Zones

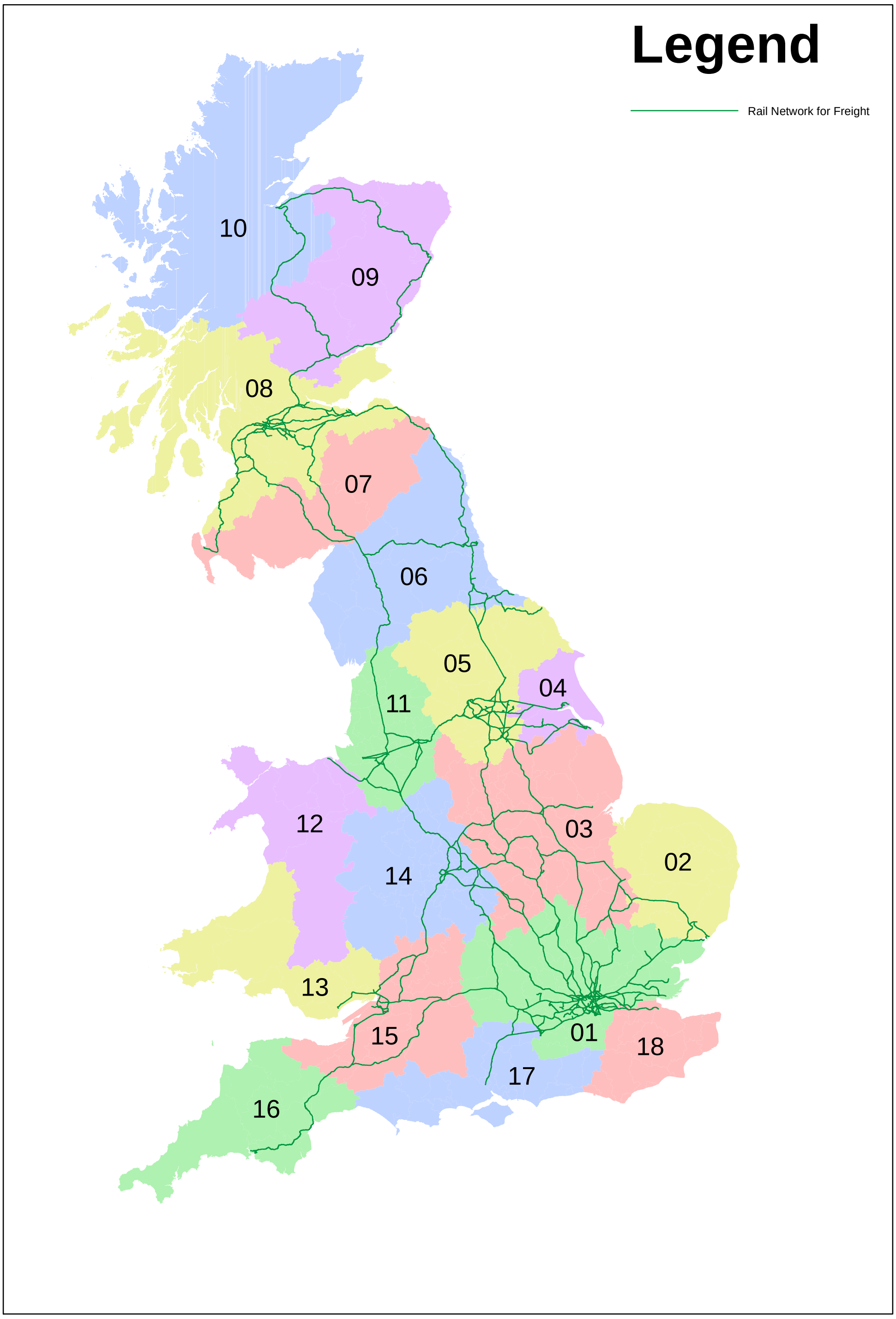


Table 10: Port as Origin Financial Need

		Destination Zone (inland terminal)																	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Origin Zone (port)	**1**	0	128	71	37	33	-48	-94	-142	-215	-248	24	48	64	63	34	13	98	160
	2	122	0	69	29	34	-56	-92	-137	-214	-243	-2	30	53	30	28	-34	26	85
	3	100	73	0	178	157	99	91	10	-98	-130	103	64	79	119	107	-8	61	19
	4	49	13	114	0	195	102	124	43	-53	-91	142	90	64	81	92	-23	-4	-7
	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	6	-1	-63	69	134	195	0	152	96	11	-33	137	119	19	66	47	-14	-51	-82
	7	-126	-194	-38	33	87	110	0	161	63	28	95	50	-31	-22	-1	-120	-160	-223
	8	-126	-196	-92	17	73	107	156	0	130	83	86	41	-33	-77	-6	-120	-158	-220
	9	-167	-234	-161	-52	-6	52	75	98	0	132	-41	-30	-159	-147	-130	-243	-196	-259
	10	-209	-275	-203	-92	-34	9	42	62	130	0	-30	-68	-200	-188	-172	-284	-237	-300
	11	24	-40	58	127	193	85	124	94	-13	-43	0	227	111	76	85	24	15	-46
	12	83	-0	37	94	159	109	94	66	-31	-70	217	0	92	55	121	6	54	-9
	13	109	18	44	57	86	-5	14	-17	-180	-215	124	92	0	61	237	109	125	29
	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	15	103	-7	75	85	114	23	42	8	-149	-183	98	119	235	91	0	152	119	-1
	16	76	-67	14	-28	2	-183	-15	-96	-259	-293	39	7	109	27	153	0	148	-21
	17	153	-6	34	-10	22	-77	-91	-137	-208	-243	28	52	125	48	120	147	0	59
	18	150	90	49	17	13	-69	-115	-166	-235	-268	4	29	100	41	34	14	93	0

This outlines the Financial Need in £ per container (not capped by Environmental Benefit) for each Zone Pair.

Positive values are in black showing those pairs which qualify for support, negative (not qualifying for Maximum Grant Rate) are in red.

Table 11: Port as Destination Financial Need

		Destination Zone (port)																	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Origin Zone (inland terminal)	**1**	0	122	100	49	N/A	-1	-126	-126	-167	-209	24	83	109	N/A	103	76	153	150
	2	128	0	73	13	N/A	-63	-194	-196	-234	-275	-40	-0	18	N/A	-7	-67	-6	90
	3	71	69	0	114	N/A	69	-38	-92	-161	-203	58	37	44	N/A	75	14	34	49
	4	37	29	178	0	N/A	134	33	17	-52	-92	127	94	57	N/A	85	-28	-10	17
	5	33	34	157	195	N/A	195	87	73	-6	-34	193	159	86	N/A	114	2	22	13
	6	-48	-56	99	102	N/A	0	110	107	52	9	85	109	-5	N/A	23	-183	-77	-69
	7	-94	-92	91	124	N/A	152	0	156	75	42	124	94	14	N/A	42	-15	-91	-115
	8	-142	-137	10	43	N/A	96	161	0	98	62	94	66	-17	N/A	8	-96	-137	-166
	9	-215	-214	-98	-53	N/A	11	63	130	0	130	-13	-31	-180	N/A	-149	-259	-208	-235
	10	-248	-243	-130	-91	N/A	-33	28	83	132	0	-43	-70	-215	N/A	-183	-293	-243	-268
	11	24	-2	103	142	N/A	137	95	86	-41	-30	0	217	124	N/A	98	39	28	4
	12	48	30	64	90	N/A	119	50	41	-30	-68	227	0	92	N/A	119	7	52	29
	13	64	53	79	64	N/A	19	-31	-33	-159	-200	111	92	0	N/A	235	109	125	100
	14	63	30	119	81	N/A	66	-22	-77	-147	-188	76	55	61	N/A	91	27	48	41
	15	34	28	107	92	N/A	47	-1	-6	-130	-172	85	121	237	N/A	0	153	120	34
	16	13	-34	-8	-23	N/A	-14	-120	-120	-243	-284	24	6	109	N/A	152	0	147	14
	17	98	26	61	-4	N/A	-51	-160	-158	-196	-237	15	54	125	N/A	119	148	0	93
	18	160	85	19	-7	N/A	-82	-223	-220	-259	-300	-46	-9	29	N/A	-1	-21	59	0

This outlines the Financial Need in £ per container (not capped by Environmental Benefit) for each Zone Pair.

Positive values are in black showing those pairs which qualify for support, negative (not qualifying for Maximum Grant Rate) are in red.

Table 12: Domestic Financial Need

		Destination Zone																	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Origin Zone	**1**	0	157	164	186	164	68	33	18	-40	-84	122	172	172	175	208	168	223	189
	2	157	0	109	144	93	6	-26	-45	-111	-149	63	90	108	63	137	25	54	124
	3	164	109	0	167	129	104	47	-39	-41	-80	101	97	106	191	140	107	38	79
	4	186	144	167	0	275	171	180	141	65	28	220	155	148	141	176	66	142	125
	5	164	93	129	275	0	202	159	139	103	86	259	227	178	137	206	96	115	67
	6	68	6	104	171	202	0	221	115	145	105	135	201	88	100	116	85	18	-12
	7	33	-26	47	180	159	221	0	216	167	136	171	156	107	63	135	103	3	-58
	8	18	-45	-39	141	139	115	216	0	160	124	148	158	100	-22	116	27	-17	-82
	9	-40	-111	-41	65	103	145	167	160	0	197	52	85	-57	-35	-26	-131	-84	-150
	10	-84	-149	-80	28	86	105	136	124	197	0	75	48	-91	-69	-60	-164	-118	-183
	11	122	63	101	220	259	135	171	148	52	75	0	290	216	118	162	134	120	59
	12	172	90	97	155	227	201	156	158	85	48	290	0	182	117	209	100	143	80
	13	172	108	106	148	178	88	107	100	-57	-91	216	182	0	123	309	173	191	107
	14	175	63	191	141	137	100	63	-22	-35	-69	118	117	123	0	158	120	115	71
	15	208	137	140	176	206	116	135	116	-26	-60	162	209	309	158	0	221	228	100
	16	168	25	107	66	96	85	103	27	-131	-164	134	100	173	120	221	0	223	67
	17	223	54	38	142	115	18	3	-17	-84	-118	120	143	191	115	228	223	0	122
	18	189	124	79	125	67	-12	-58	-82	-150	-183	59	80	107	71	100	67	122	0

This outlines the Financial Need in £ per container (not capped by Environmental Benefit) for each Zone Pair.

Positive values are in black showing those pairs which qualify for support, negative (not qualifying for Maximum Grant Rate) are in red.

5.3.2 Impact of Model Changes

To assist in the understanding of the impact of the changes between the current and the proposed model the following 6 figures provide a graphical comparison of the change in the Financial Need and the Maximum Grant Rate for each zone to zone movement produced by the proposed models against the current models .

The models generate a large amount of information with 272 different zone-to zone movements in the port model and 306 movements in the domestic model. Whilst changes to the estimated Financial Need and Maximum Grant Rate on specific movements will be of interest to individual grantees, it was felt that it would be useful to give an overall picture of the changes in the outputs. To do this, the results are presented as scatter diagrams.

Each chart plots the change for each zone pair between the current and proposed models. A plot point is established for each zone pair, falling into one of 4 quadrants. A solid blue 45 degree line provides a benchmark for assessing the ratio of the calculated proposed: current outputs. This line represents no change between the outputs. As the outputs arte not adjusted for inflation it can be expected that plot points will fall to the left of the line.

A move to the left of or above the line represents a zone pair for which the Financial Need or Maximum Grant Rate is increased. To the right or below the line indicates a zone pair which has reduced Financial Need or Maximum Grant Rate.

The overall scatter is divided into 4 quadrants moving in a clockwise rotation from the first quadrant, defined as follows:

Quadrant 1: movements with positive Financial Need in the current model and still a positive Financial Need in the proposed model;

Quadrant 2: movements with positive Financial Need in the current model changing to a negative Financial Need in the proposed model;

Quadrant 3: movements with negative Financial Need in the current model staying negative in the proposed model;

Quadrant 4: movements with negative Financial Need in the current model changing to a positive Financial Need in the proposed model.

As the Maximum Grant Rates between zones are calculated by taking the lesser of the Financial Need or the Environmental Benefit, and the Environmental Benefits are still in the process of being updated by DfT, these Maximum Grant Rates presented below are based on a simple inflation calculation of the Environmental Benefits, and are subject to change.

5.3.3 Change in Financial Need

Figure 5, Figure 6 and Figure 7 show a scatter plot of the estimated Financial Need by movement for the port as origin, port as destination and domestic models respectively. It will be observed that there are clear clusters of zone pairs roughly along the line representing an inflation based increase, as would be expected. There are however a number of significant outliers. These are caused largely by the impact of the change in zone centroids, where in the proposed model the centroids have been moved to a more representative location within the zone. This has had the effect of altering both the rail and road journey distances, and thus has had a significant impact on the cost differentials.

Figure 5: Change in Financial Need – Port as Origin

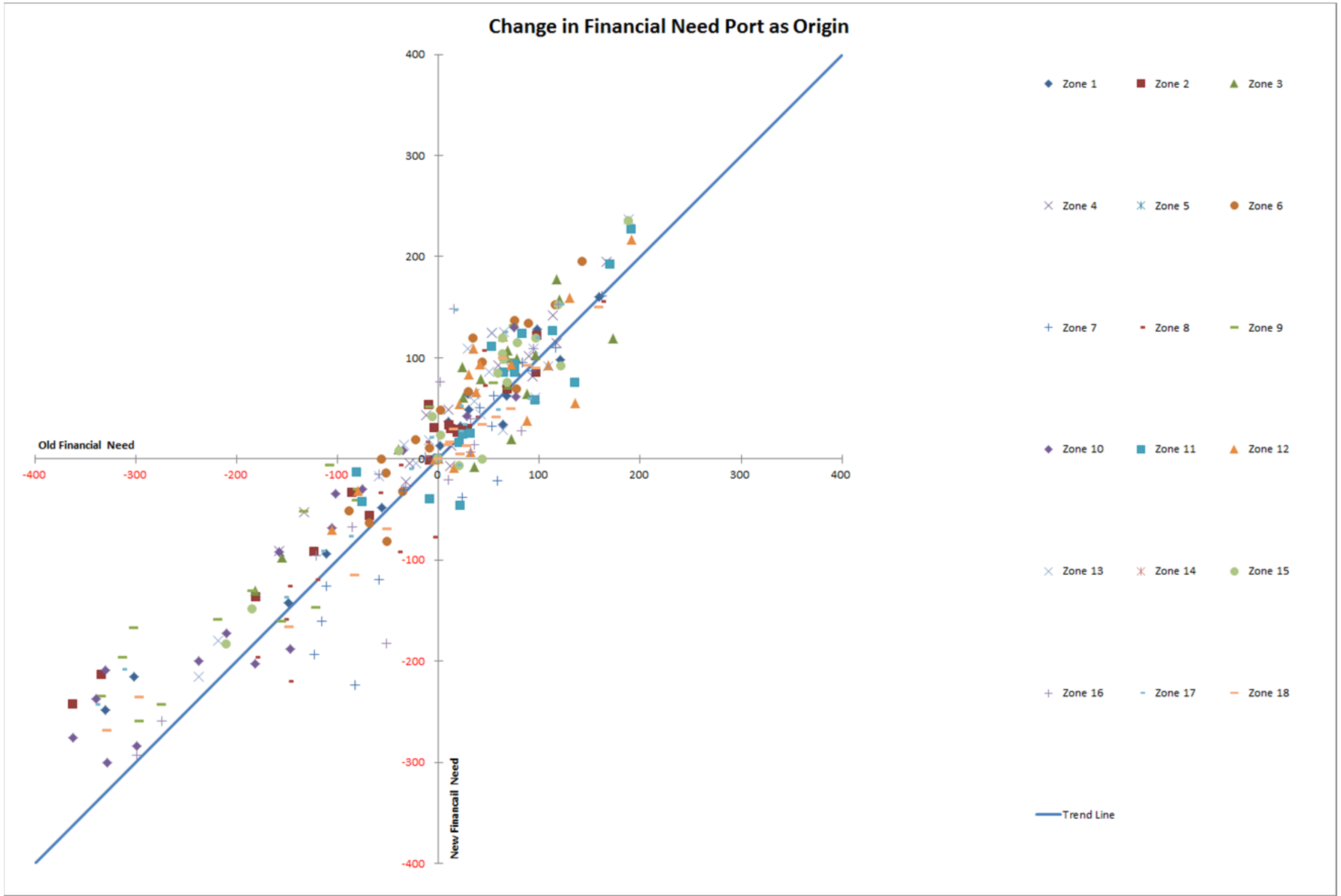


Figure 6: Change in Financial Need – Port as Destination

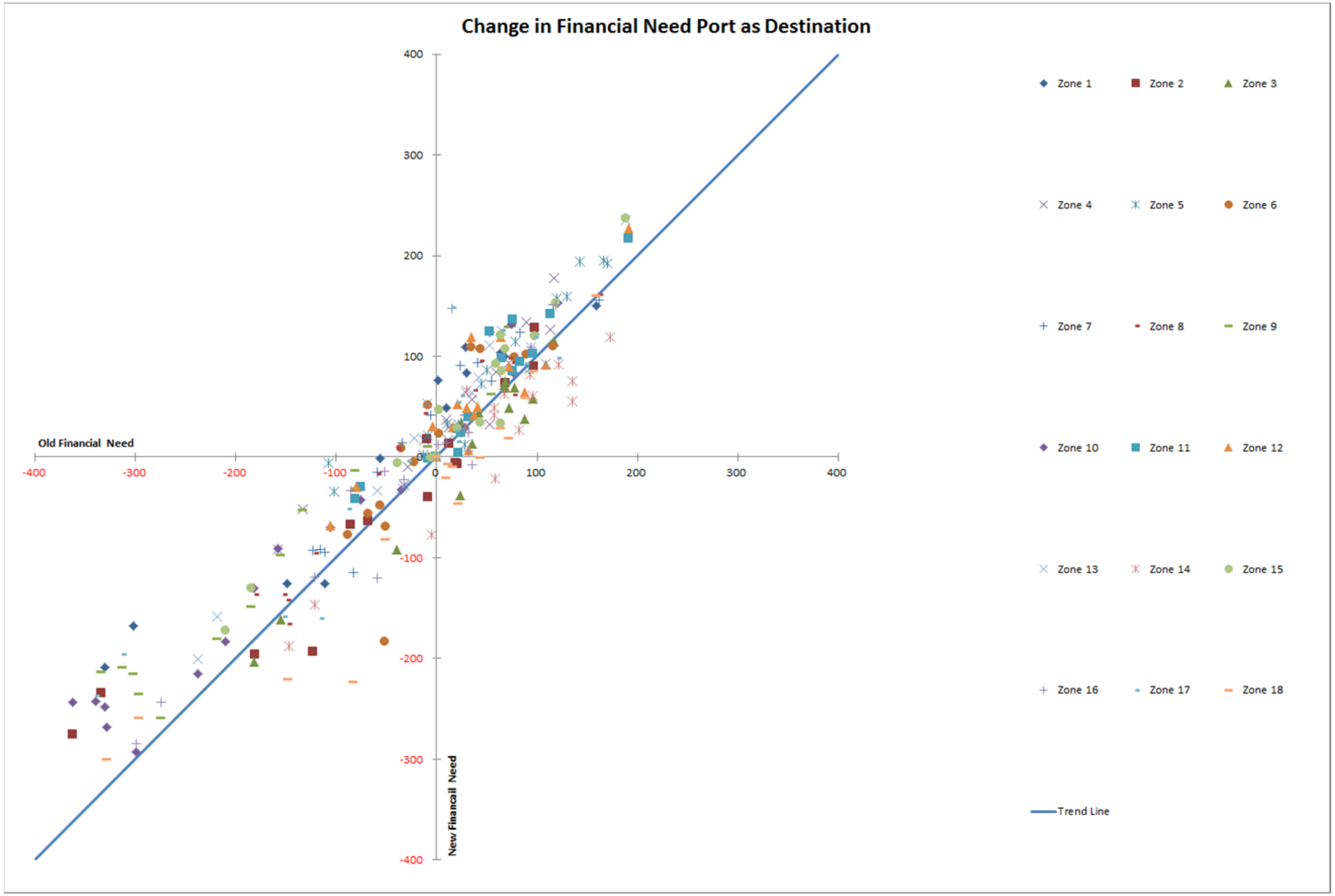
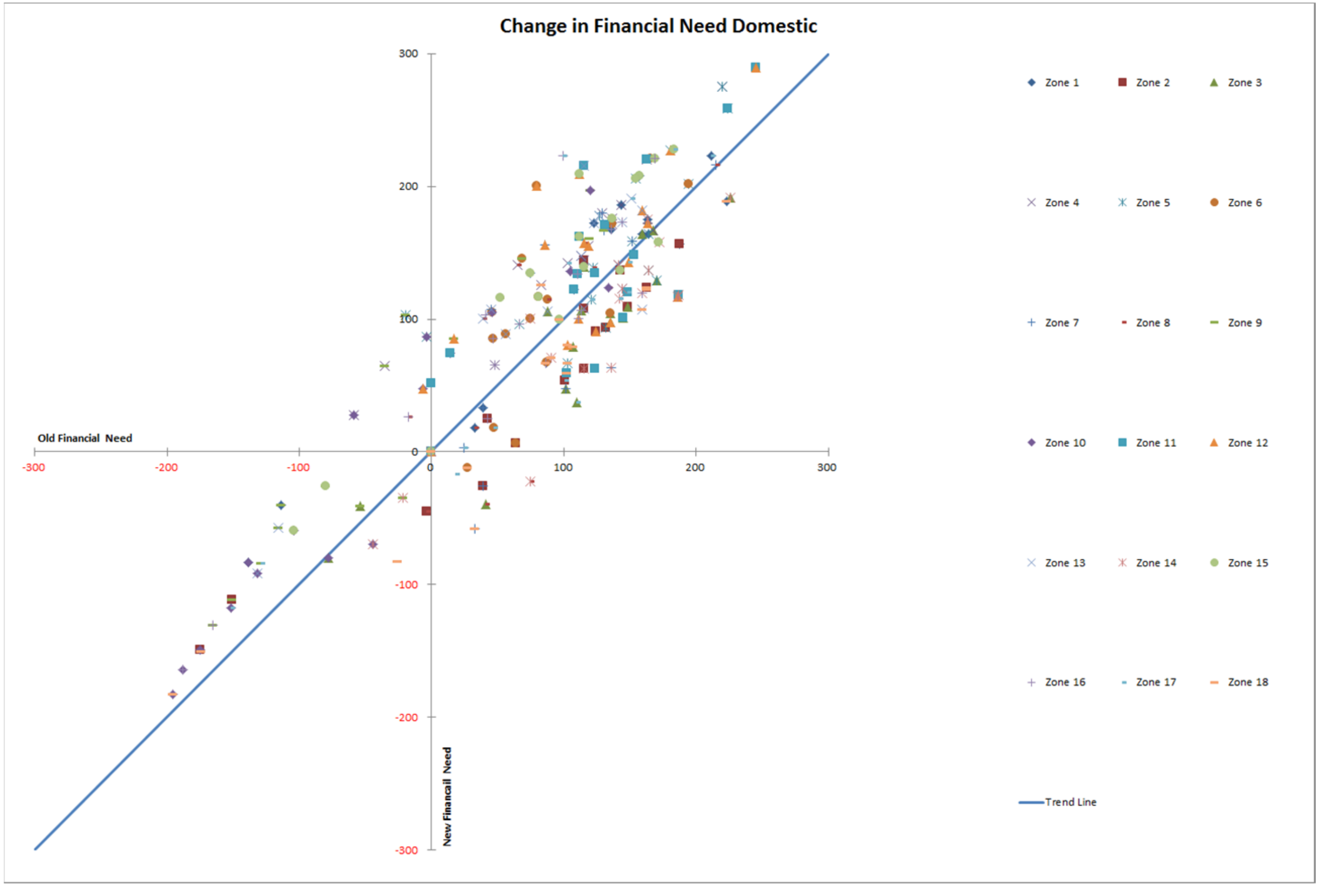


Figure 7: Change in Financial Need – Domestic



The results derived from the scatter diagrams are summarised in Table 13:

Table 13: Port Model Results

	FN current negative	FN current positive
FN proposed positive	Quadrant 4: There is now a Financial Need to support these zone pairs; 15 new zone pairs have become eligible for grant.	Quadrant 1: There was a Financial Need previously and this is still the case: 151 zone pairs remain eligible, but there has been an increase in the Financial Need as there are more points above the 45 degree line than below
FN proposed negative	Quadrant 3: There was not a Financial Need previously and there still is no Financial Need. 96 zone pairs remain ineligible for grant.	Quadrant 2: These zone pairs have become financially self-sufficient. 10 of these zone pairs become ineligible for support.

Overall, this comparison of the current and proposed port models shows there are now 166 zone pairs with Financial Need (made up of 151 in quadrant 1 and 15 in quadrant 4) compared to 161 with Financial Need in the current model (made up of 160 in quadrant 1 and 1 in quadrant 2). The change of 5 is made up of 15 new zone pairs (quadrant 4) becoming eligible and 10 (quadrant 2) which have graduated to ineligibility.

The main reason for this change derives from the reassignment of centroid locations. The new centroids are closer to the centre of the zone in many cases, and this has had an impact on journey distances discussed in this section below.

Since the costs between two points are the same, irrespective of the direction of travel, the above results are the same for the port as destination model (Figure 6).

For the domestic model (Figure 7) the results are tabulated in Table 14

Table 14: Domestic Model results

	FN current negative	FN current positive
FN proposed positive	Quadrant 4: There is now a Financial Need to support these zone pairs; 14 new zone pairs have become eligible for grant.	Quadrant 1: There was a Financial Need previously and this is still the case: 240 zone pairs remain eligible but there has been an increase in Financial Need as there are more points above the 45 degree line than below
FN proposed negative	Quadrant 3: There was not a Financial Need previously and there still is no Financial Need. 40 zone pairs remain ineligible, however the rail cost advantage has reduced in many cases s	Quadrant 2: These zone pairs have become financially self-sufficient. There are 12 of these zone pairs which become ineligible for support in the proposed model.

Overall, with the proposed domestic model there are 254 zone pairs with Financial Need (made up of 240 in quadrant 1 and 14 in quadrant 4) compared to 252 with Financial Need previously (made up of 248 in quadrant 1 and 4 in quadrant 2). The change of 2 is made up of 14 new zone pairs (quadrant 4) becoming eligible and 12 (quadrant 2) which have moved to ineligibility.

Again, the reasons for this are the change in centroid locations, and the recalibration of comparative road and rail distances.

Table 15 summarises the overall impact of the proposed model on each zone pair's eligibility for support. Zone pairs have been broken down into four categories:

- No Financial Need in current model or in proposed model – zone pair remains ineligible for grants;
- No Financial Need in current model but has Financial Need in proposed model – zone pair becomes eligible for grants when is currently ineligible;
- Financial Need in current model but has no Financial Need in proposed model – zone pair becomes ineligible for grants when it is currently eligible; and
- Financial Need in both current and proposed models– zone pair remains eligible for grants but the proposed Maximum Grant Rate may be higher or lower than currently apply.

Table 15: Change to Financial Need (number of zone pairs in each model)

Quadrant	Current model	Proposed model	Port as Origin or Destination	Domestic
1	FN	FN	151	240
2	FN	No FN	10	12
3	No FN	No FN	96	40
4	No FN	FN	15	14
Total			272	306

Container movement costs by rail have risen compared to road since the current models were produced, due to changes in the relative mode efficiencies, centroid locations, and corrections to the calculation methodology, where discrepancies have been detected in the current model and rectified in the proposed model. .

Where the centroid locations have moved road distances have been recalculated using the Transport Direct journey planner (which produces a standard route, not specifically the shortest or quickest). This has corrected some issues in the current model

In parallel we have recalculated the rail distances using GIS mapping of the Strategic Freight Network to ensure correct routing.

In total these amendments have had the effect of increasing rail journeys relative to road. Analysis shows that for 130 zone pairs (42%) in the proposed model the rail distance relative to road is shortened, while for 176 pairs (58%) the relative distance increases. In total the recalculation has had the effect of increasing the difference between rail and road distances by 2,298 km, or an average of 8km per zone pair. In a few cases the rail distance has crossed one of the threshold boundaries, but this is not a significant driver of the changes.

This explains both why the variation in Financial Needs differs between zone pairs, and why overall there is an increase in relative rail cost.

As a result there are 10 zone pairs in the port model and 12 pairs in the domestic model which lose their eligibility for grants but a greater number of zones (15 in the port model, 14 in the domestic model) become eligible based on the new Financial Need figures. These changes are driven partially by changes in centroid location, and partially by the journey distances involved being very close to the margin between loss and surplus.

The zone pairs which would become eligible for grants based on the new rates are shown in Table 16 and Table 17 below. In the Domestic model, all zone pairs gaining eligibility have an origin or destination in Scotland. This is caused again by centroid rebasing, and also due to changes in train productivity.

Table 16: Port Model Eligibility

From	**To**	**Zone Pairs Gaining Eligibility**	
2	12	East Anglia	North Wales
2	13	East Anglia	South Wales
3	8	East Midlands	Central Scotland
4	8	Hull	Central Scotland
6	9	North England	NE Scotland
6	13	North England	South Wales
8	4	Central Scotland	Hull
9	6	NE Scotland	North England
10	6	NW Scotland	North England
13	2	South Wales	East Anglia
13	7	South Wales	South Scotland
15	7	South West	South Scotland
15	8	South West	Central Scotland
16	5	Cornwall and Devon	Yorkshire
17	5	South England	Yorkshire

Table 17: Domestic Model Eligibility

From	To	Zone Pairs Gaining Eligibility	
4	9	Hull	NE Scotland
4	10	Hull	NW Scotland
5	9	Yorkshire	NE Scotland
5	10	Yorkshire	NW Scotland
8	16	Central Scotland	Cornwall and Devon
9	4	NE Scotland	Hull
9	5	NE Scotland	Yorkshire
9	11	NE Scotland	North West England
10	4	NW Scotland	Hull
10	5	NW Scotland	Yorkshire
10	12	NW Scotland	North Wales
11	9	North West England	NE Scotland
12	10	North Wales	NW Scotland
16	8	Cornwall and Devon	Central Scotland

5.3.4 Change in Maximum Grant Rate

These results are shown in Figure 8, Figure 9 and Figure 10; they introduce the capping of Financial Need by the Environmental Benefit and are subject to updating with the new Environmental Benefit values when available. At this point the full impact of the new centroid locations can also be calculated, which may generate further movements of the Maximum Grant Rate.

The points shown in these Figures are related only to zone pairs either with a positive Financial Need in the proposed model or in the current model. Zone pairs represented by points lying on the y axis in the Maximum Grant Rate figures were not eligible for grant previously but now qualify for support. Zone pairs represented by points on the x axis in the Maximum Grant Rate figures were eligible for grant previously but now fail to qualify for support. . Points above the 45 degree line show where the Maximum Grant Rate has increased; points below the 45 degree line show where the Maximum Grant Rate has decreased. The trend line from the origin at an angle slightly greater than 45 degrees represents zone pairs where the grant is capped by Environmental Benefit which has for the time being increased purely as a result of an inflation rate driven change in the price base (RPI= 1.14).

Figure 8: Change in Maximum Grant Rate – Port as Origin

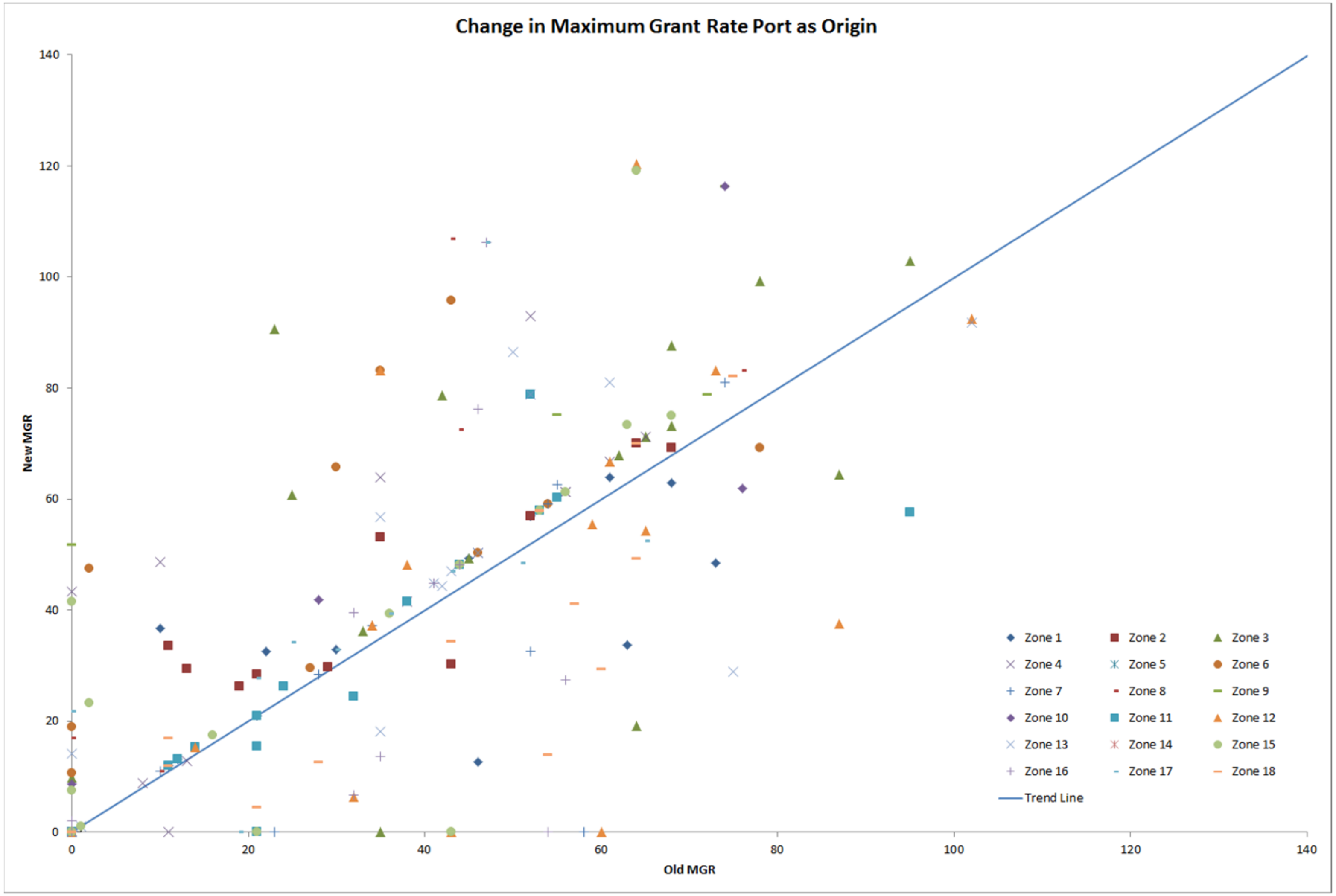


Figure 9: Change in Maximum Grant Rate – Port as Destination

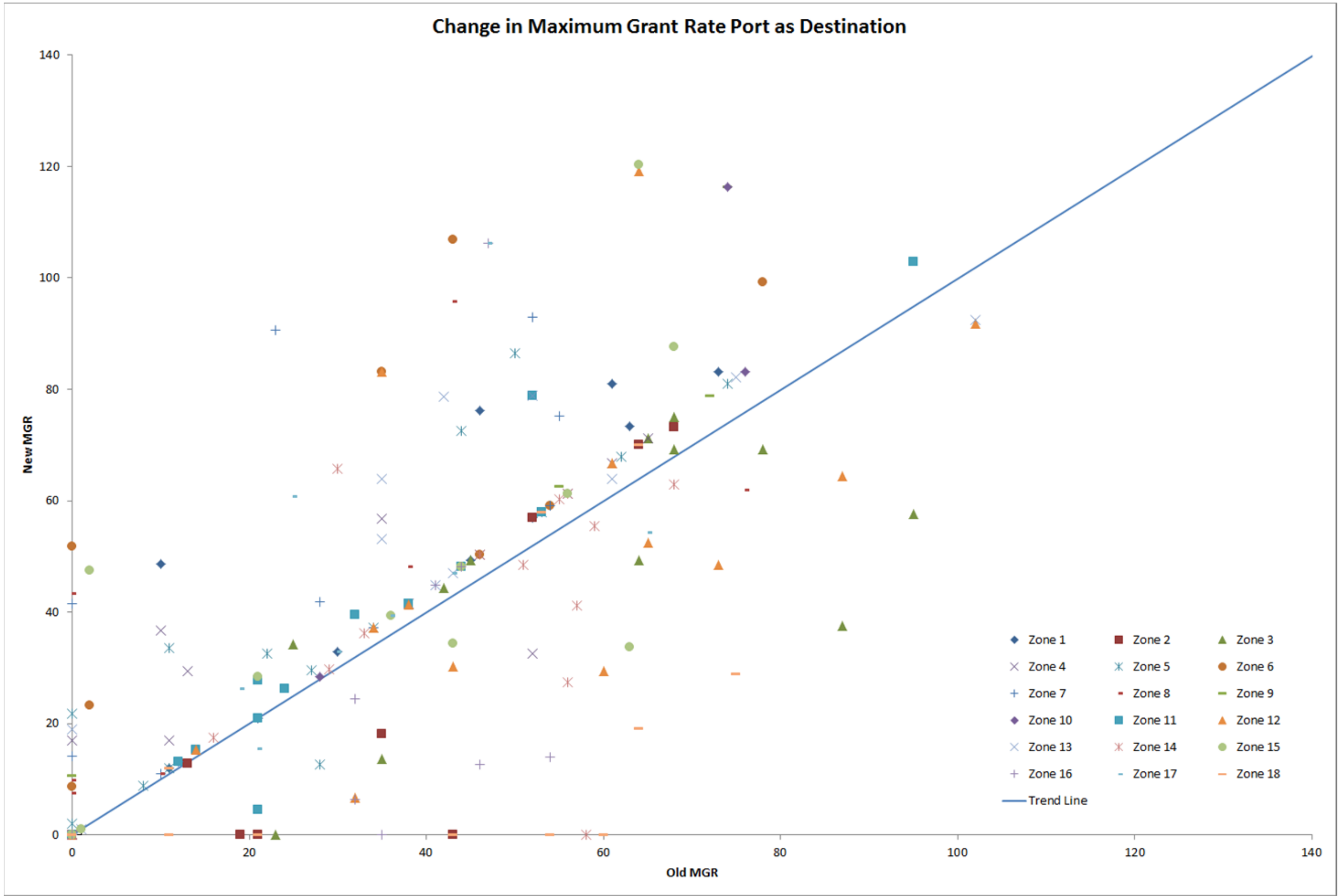
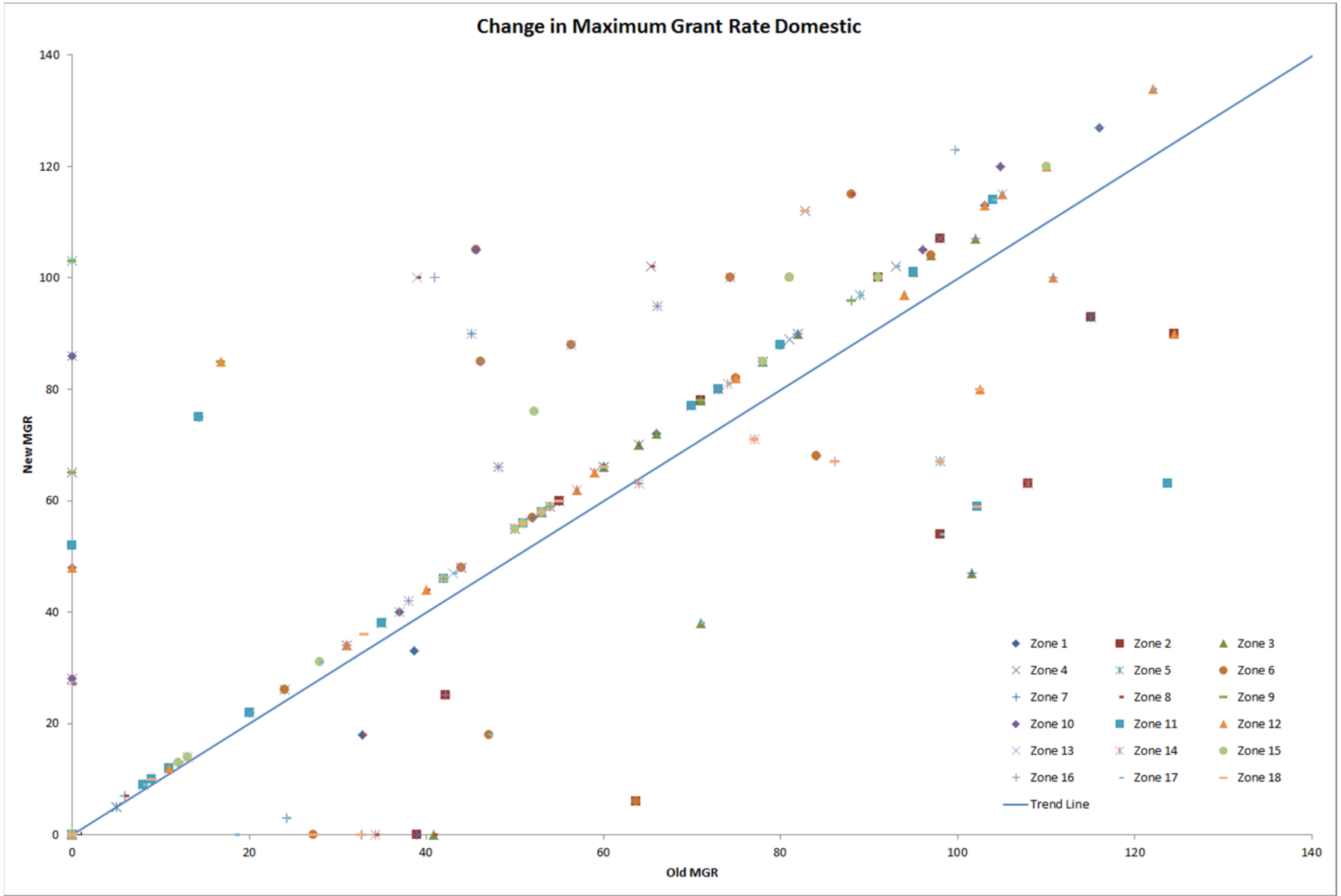


Figure 10: Change in Maximum Grant Rate – Domestic



5.4 Impact on Grant Eligibility

A further analysis has been carried out on the impact that the changes to the models on the zone pairs which have on the current list of grant supported movements. This has been based on the list of grants awarded for specific zone pairs during the period 2010-2015.

The changes to the Maximum Grant Rates for the Port and Domestic zone pairs receiving grants are shown in Figure 11 and Figure 12. The zone pairs are shown in Table 18 and Table 19.

Figure 11: Change in Maximum Grant Rates – Port – Movements Receiving Grants 2010-2015

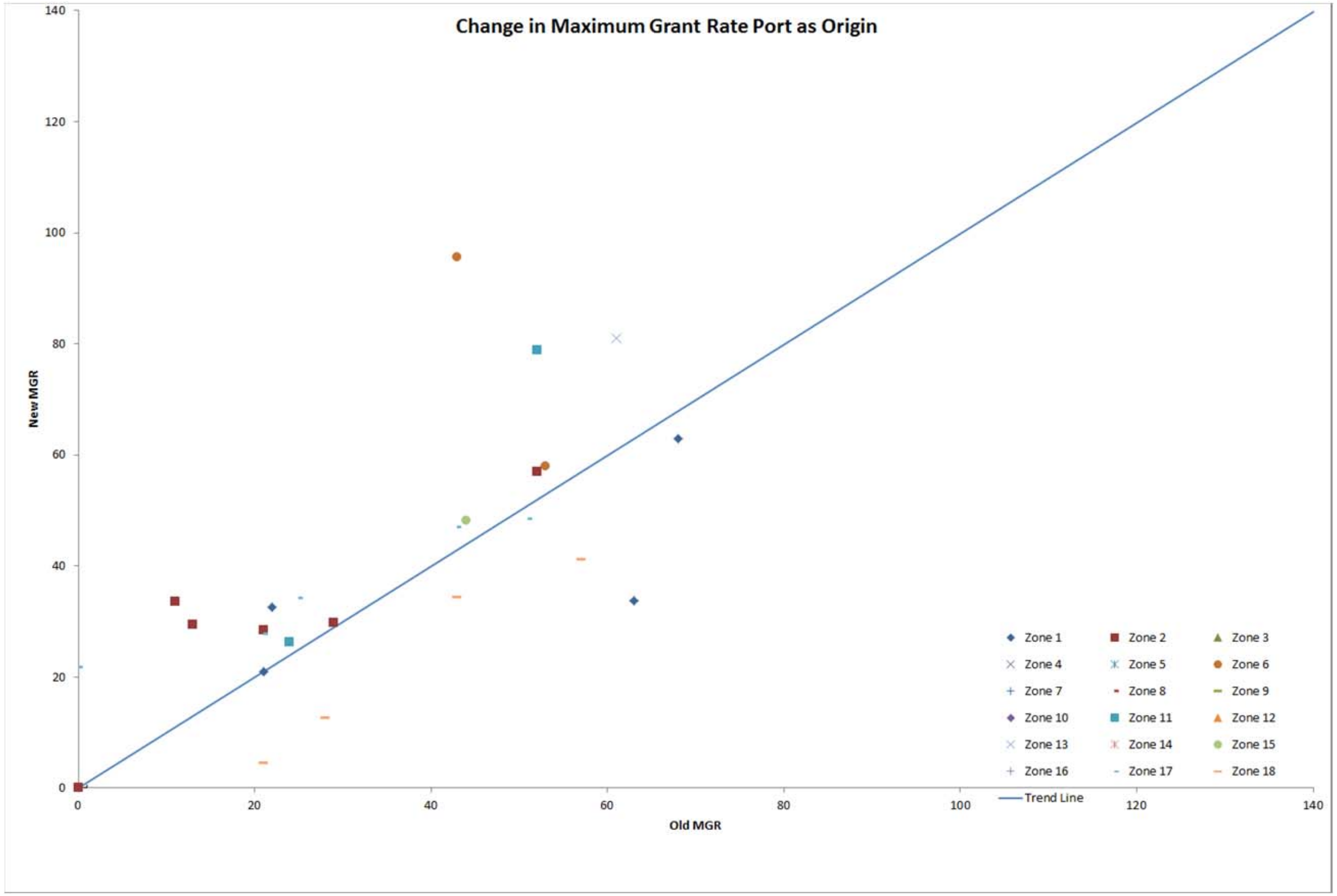


Figure 12: Change in Maximum Grant Rates – Domestic – Movements Receiving Grants 2010-2015

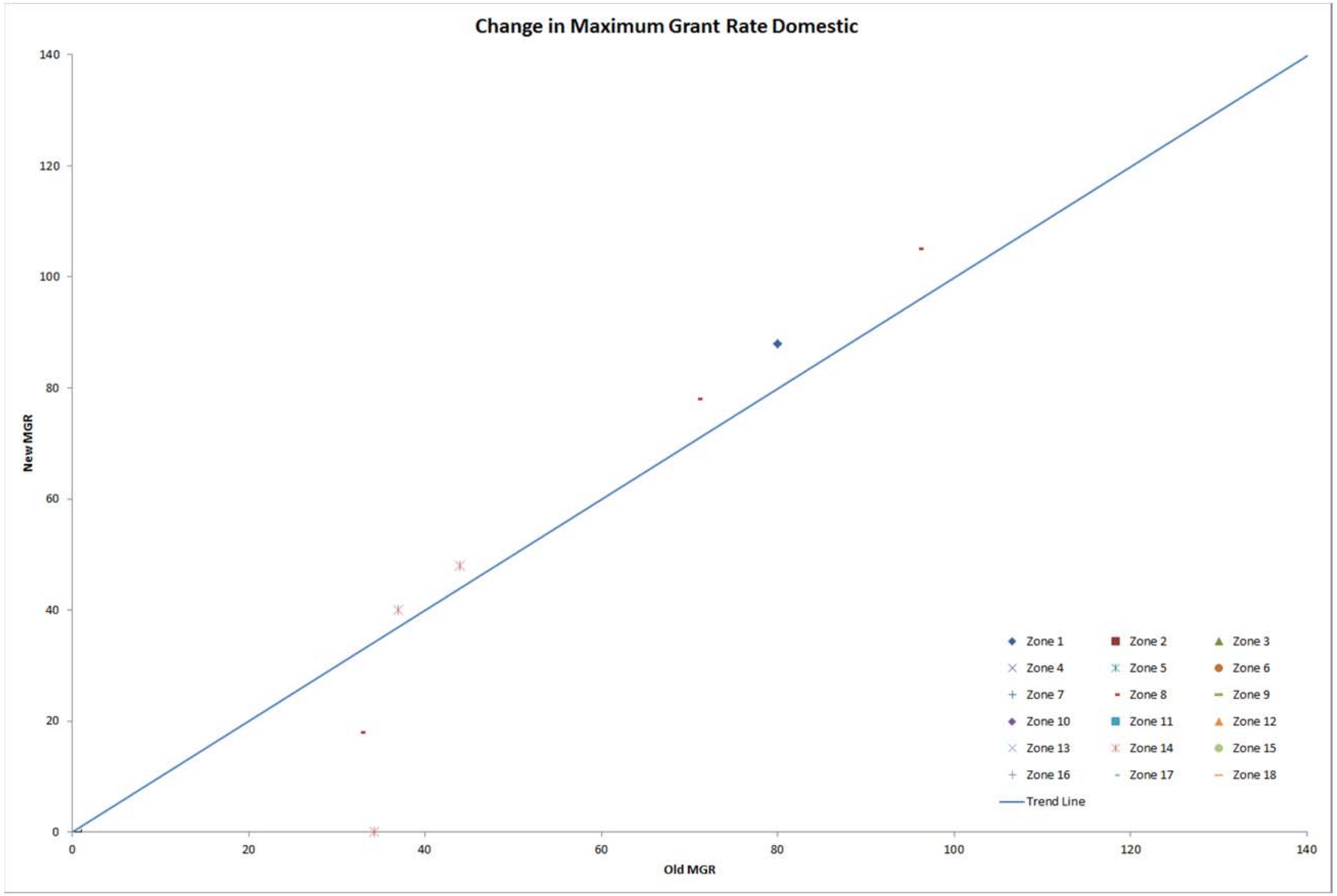


Table 18: Port Model Movements Receiving Grants: Change to Maximum Grant Rate

From	To	Current Maximum Grant Rate	Proposed Maximum Grant Rate	Change
1	5	22.0	32.6	10.6
1	11	21.0	21.0	0.0
1	14	68.0	62.8	-5.2
1	15	63.0	33.7	-29.3
2	1	52.0	56.9	4.9
2	4	13.0	29.4	16.4
2	5	11.0	33.5	22.5
2	11	0.0	0.0	0.0
2	14	29.0	29.7	0.7
2	15	21.0	28.4	7.4
6	8	43.0	95.7	52.7
6	11	53.0	58.0	5.0
11	8	24.0	26.3	2.3
11	13	52.0	78.8	26.8
13	1	61.0	81.0	20.0
15	16	44.0	48.2	4.2
17	3	25.0	34.3	9.3
17	5	0.0	21.7	21.7
17	11	21.0	27.8	6.8
17	13	43.0	47.1	4.1
17	14	51.0	48.4	-2.6
18	5	28.0	12.7	-15.3
18	11	21.0	4.5	-16.5
18	14	57.0	41.2	-15.8
18	15	43.0	34.3	-8.7

Table 19: Domestic Model Movements Receiving Grants: Change to Maximum Grant Rate

From	To	Current Maximum Grant Rate	Proposed Maximum Grant Rate	Change
1	11	80.0	88.0	8.0
8	1	32.8	18.0	-14.8
8	9	71.0	78.0	7.0
8	10	96.0	105.0	9.0
14	1	37.0	40.0	3.0
14	8	34.3	0.0	-34.3
14	13	44.0	48.0	4.0

This shows that for most of the freight zone pairs currently receiving grants, the Maximum Grant Rate has increased. This is understandable, given that the most eligible flows have been selected for grant aid to date, and the Financial Need has, as explained above, generally increased.

In the port model grant awarded would be unchanged for flows from zone 1 (London) and Zone 2 (East Anglia) to zone 11 (North West) and reduced for zone 1 (London) to zone 14 (West Midlands) and zone 15 (Bristol Channel), Zone 17 (Southern England) to Zone 14 (West Midlands) and Zone 18 (South East England) to Zone 5 (Yorkshire), Zone 11 (North West), Zone 14 (West Midlands) and Zone 15 (Bristol Channel).

In the Domestic model Zone 8 (Central Scotland) to Zone 1 (London) has reduced eligibility and Zone 14 (West Midlands) to Zone 8 (Central Scotland) would lose eligibility for grant.

In summary this demonstrates that for flows which already have a grant award, the impact of operation of the proposed model would be to increase the rate of allowed support, in some cases beyond the rate of inflation, though this is subject to change once the revised Environmental Benefits are calculated. However it should be noted that the Department operates a prioritisation process to fund those flows with the best Benefit-Cost ratios so an increase in calculated Maximum Grant Rate does not necessarily mean that rate would be awarded.

5.5 Model Development Tests

5.5.1.1 Introduction

In addition to the overall rebasing, optional variations to the model have been developed to reflect two specific issues which have been raised during the study:

1. Zone pairs to Scotland involving inter-rail transfers (the “split train” test); and
2. Services to/from the Channel Tunnel (Dollands Moor).

Split train test

The specification requires a consideration of routes where an intermediate stage to a journey would be required. This issue applies to container moves from England to the north of Scotland, which involve transhipment en route to lower gauge profile wagons operating on routes with a more significant length limitation. The same consideration could also apply to the more remote areas of England and Wales, where route constraints on rural lines would increase operating costs for the final leg of the journey.

In all cases the impact will largely be felt only on long distance flows, where the impact of the efficiency of the trunk flow can be maximised.

A split train test has been conducted to provide a more accurate estimate of the rail costs of zone pairs where loads are transhipped between trains of different configurations en route. To demonstrate the impact this test has been applied to two Scottish zones in the domestic model to help to identify if the domestic model could better represent those journeys. Zones 9 and 10 (North and West Scotland) were chosen as they create longest UK journey distance from South Coast ports. In the test a high productivity train runs to a central Scottish transhipment point where the containers are transferred to a lower productivity train to a final destination in an onward Scottish zone. The onward routes are not cleared to W10 gauge, requiring the use of low profile wagons, and given the preponderance of single line routes the length of the trains has been constrained, which significantly impacts on productivity.

Dollands Moor Test

Channel Tunnel traffic qualifies currently for MSRS (Bulk) but not for MSRS (I). A new zone (zone 19) with a centroid at Dollands Moor (the UK Channel Tunnel portal and rail entry yard) for traffic using the Channel Tunnel (port model only) has been created to identify the potential extension of MSRS eligibility to Channel Tunnel traffic. This responds to comments and representations made by most of the FOCs, who believe that the absence of support for this type of traffic as opposed to seaborne containers discriminates against through rail journeys, and is restricting the market potential. DfT assumes (correctly in our view) that if traffic is railborne through the tunnel it will continue by rail to its destination terminal.

However the FOCs’ argument is that if the UK domestic Financial Need is not recognised the overall movement is more likely to be by road than rail. This assumes that the overall rail cost advantage is at best marginal. We have no definite data on this, but the relatively small number of Channel Tunnel rail freight traffic tends to confirm this.

For this reason we have created a test to assess the impact of making the UK leg eligible for MSRS (I).

The costs for the new zone reflect the fact there is no port shunt, only 1 terminal handling charge (lift) at the destination terminal, and domestic train configurations are used rather than the port train configurations as these better reflect the characteristics of European swapbodies.

5.5.2 Split Train Test

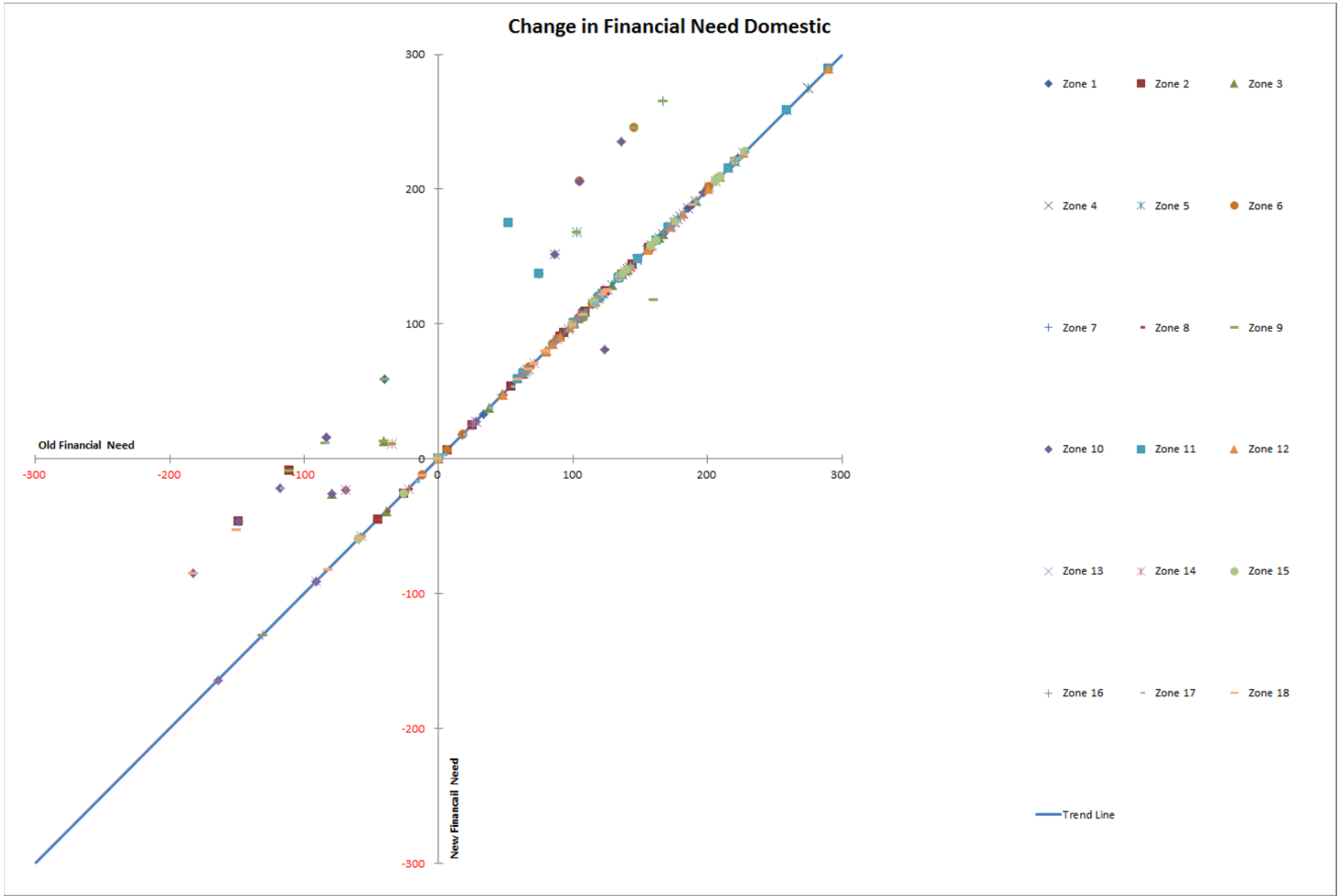
Figure 13 shows the effect of running a split train on flows to zones 9 and 10 (North East and North West Scotland) in the domestic model. This scenario indicates that 16 new zone pairs would require a Financial Need (no zone pairs lose Financial Need).

The conclusion from this test is that the inclusion of the additional costs associated with using 2 trains makes zone pairs to zones 9 and 10 more costly compared to running as 1 train, and therefore increases the Financial Need to support these services by rail. This is reflected in the results.

In essence if this modification was made to the domestic model all English zones would become eligible for support for movements to Zones 9 and 10, and the rates of support would increase for those which would already eligible, subject to the Environmental Benefits cap. However the impact is only really relevant to zones which are on the high productivity freight network, and where a long distance high productivity trunk move generates operating cost savings which counter the cost of transhipment onto a local lower productivity train leg.

The test has not covered moves to some of the more remote England and Wales zones, but in principle the more remote zones 12 and 13 (North and South Wales) and 16 (Devon and Cornwall) would also benefit, though in this case the impact would be restricted on flows from the main traffic generators such as the deep sea ports, as the trunk distances are much shorter.

Figure 13: Change in Financial Need – Split train in the domestic model



5.5.3 Dollands Moor Test

The results from including Dollands Moor cannot be compared against the current model, as this zone does not currently exist. However, Table 20 shows the Financial Need of Dollands Moor when using the appropriate cost and distance updates applied to zone 18.

The results indicate that there is a Financial Need for traffic to zones 1 – 5 and 12 – 18, which mirrors the need for zone 18 in the current model. This is an indication of the estimated Financial Need; support for these zone pairs may have beneficial effects in terms of encouraging more traffic. These results are based on an adjustment to the comparative costs by road and rail to and from zone 18. More specific costing of operations at Dollands Moor may produce a more realistic cost level.

However the results suggest that support might be provided for movements to central and northern England, which might in turn provide some encouragement to FOCs to develop European rail movements. Given the range of possible origin points in mainland Europe we have not extended this assessment to consideration of the overall viability of the end to end rail journey.

Table 20: Financial Need of Dollands Moor (new Zone 19 as Origin)

		Destination Zone (inland terminal)																		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**
Origin Zone (port)	**1**	0	128	71	37	33	-48	-94	-142	-215	-248	24	48	64	63	34	13	98	160	N/A
	2	122	0	69	29	34	-56	-92	-137	-214	-243	-2	30	53	30	28	-34	26	85	N/A
	3	100	73	0	178	157	99	91	10	-98	-130	103	64	79	119	107	-8	61	19	N/A
	4	49	13	114	0	195	102	124	43	-53	-91	142	90	64	81	92	-23	-4	-7	N/A
	5	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	6	-1	-63	69	134	195	0	152	96	11	-33	137	119	19	66	47	-14	-51	-82	N/A
	7	-126	-194	-38	33	87	110	0	161	63	28	95	50	-31	-22	-1	-120	-160	-223	N/A
	8	-126	-196	-92	17	73	107	156	0	130	83	86	41	-33	-77	-6	-120	-158	-220	N/A
	9	-167	-234	-161	-52	-6	52	75	98	0	132	-41	-30	-159	-147	-130	-243	-196	-259	N/A
	10	-209	-275	-203	-92	-34	9	42	62	130	0	-30	-68	-200	-188	-172	-284	-237	-300	N/A
	11	24	-40	58	127	193	85	124	94	-13	-43	0	227	111	76	85	24	15	-46	N/A
	12	83	-0	37	94	159	109	94	66	-31	-70	217	0	92	55	121	6	54	-9	N/A
	13	109	18	44	57	86	-5	14	-17	-180	-215	124	92	0	61	237	109	125	29	N/A
	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A
	15	103	-7	75	85	114	23	42	8	-149	-183	98	119	235	91	0	152	119	-1	N/A
	16	76	-67	14	-28	2	-183	-15	-96	-259	-293	39	7	109	27	153	0	148	-21	N/A
	17	153	-6	34	-10	22	-77	-91	-137	-208	-243	28	52	125	48	120	147	0	59	N/A
	18	150	90	49	17	13	-69	-115	-166	-235	-268	4	29	100	41	34	14	93	0	N/A
	19	112	101	63	58	1	-73	-106	-138	-193	-229	-2	19	107	65	135	29	85	175	0

This outlines the Financial Need in £ per container (not capped by Environmental Benefit) for each Zone Pair.

Positive values are in black showing those pairs which qualify for support, negative (not qualifying for Maximum Grant Rate) are in red.

5.6 Sensitivity Tests

5.6.1 Introduction

Sensitivity tests have been carried out to understand the effects of individual changes on the change in overall results. By isolating certain inputs we can understand their relative importance. This also provides an indication of whether options to retain some parts of the current model methodology might provide options for phased introduction of the proposed model.

The tests, which incorporated incremental changes to the current model, were defined as follows:

- Sensitivity Test 1: Running the current models with the cost information generated for the proposed models, to isolate the cost driven changes from those resulting from a change in the model process functionality such as rebasing of centroids; and
- Sensitivity Test 2: Running the port and domestic models with the proposed cost information, updated train configurations and gauge clearance to isolate the impact of changing these drivers in the current models. This test identifies the contribution of changes in distance to the overall change in Financial Need.

5.7 Sensitivity Test 1

5.7.1 Current models with proposed cost updates alone

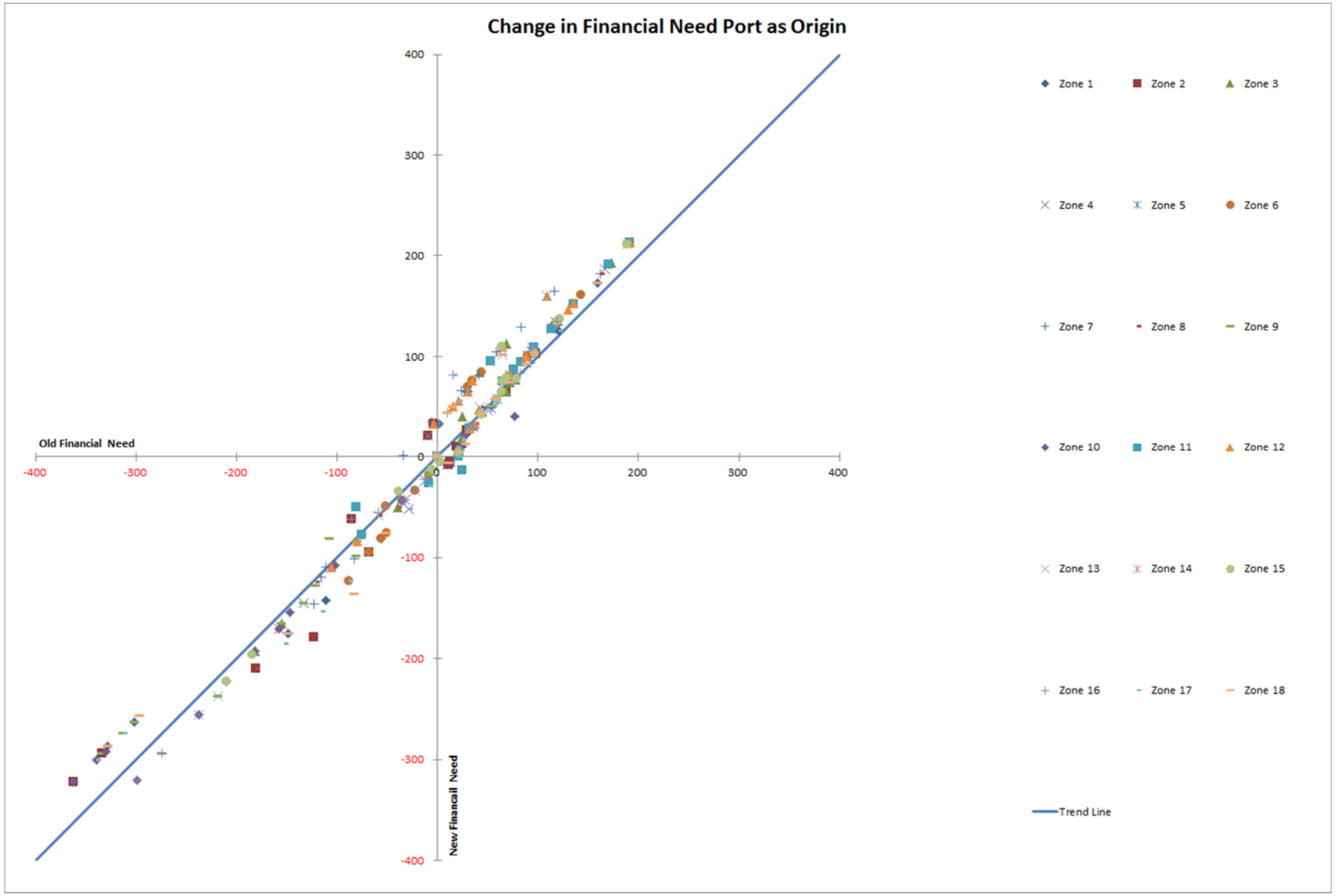
Using the methodology outlined above the following conclusions can be drawn.

Figure 14 shows the effect of the proposed costs when applied to the current port model. The results indicate that updating the costs creates 5 new zone pairs which require a Financial Need and 10 zone pairs which no longer require Financial Need. Table 21 highlights the results shown in Figure 14.

Table 21: Results of proposed port costs in current port model

	Financial Need current negative	**Financial Need current positive**
FN proposed positive	Quadrant 4: There is now a Financial Need to support these zone pairs; 6 zone pairs have become eligible for grant.	Quadrant 1: There was a Financial Need previously and this is still the case: 151 zone pairs but there has been an increase as there are more points above the 45 degree line than below
FN proposed negative	Quadrant 3: There was not a Financial Need previously and there still is no Financial Need but the size of the surplus has reduced as there are more points above than below the 45 degree line. However these zone pairs are not eligible for grant. There are 105 such zone pairs	Quadrant 2: These zone pairs have become financially self-sufficient. There are 10 of these zone pairs no longer eligible for grant.

Figure 14: Change in Financial Need – current port model with the proposed port costs



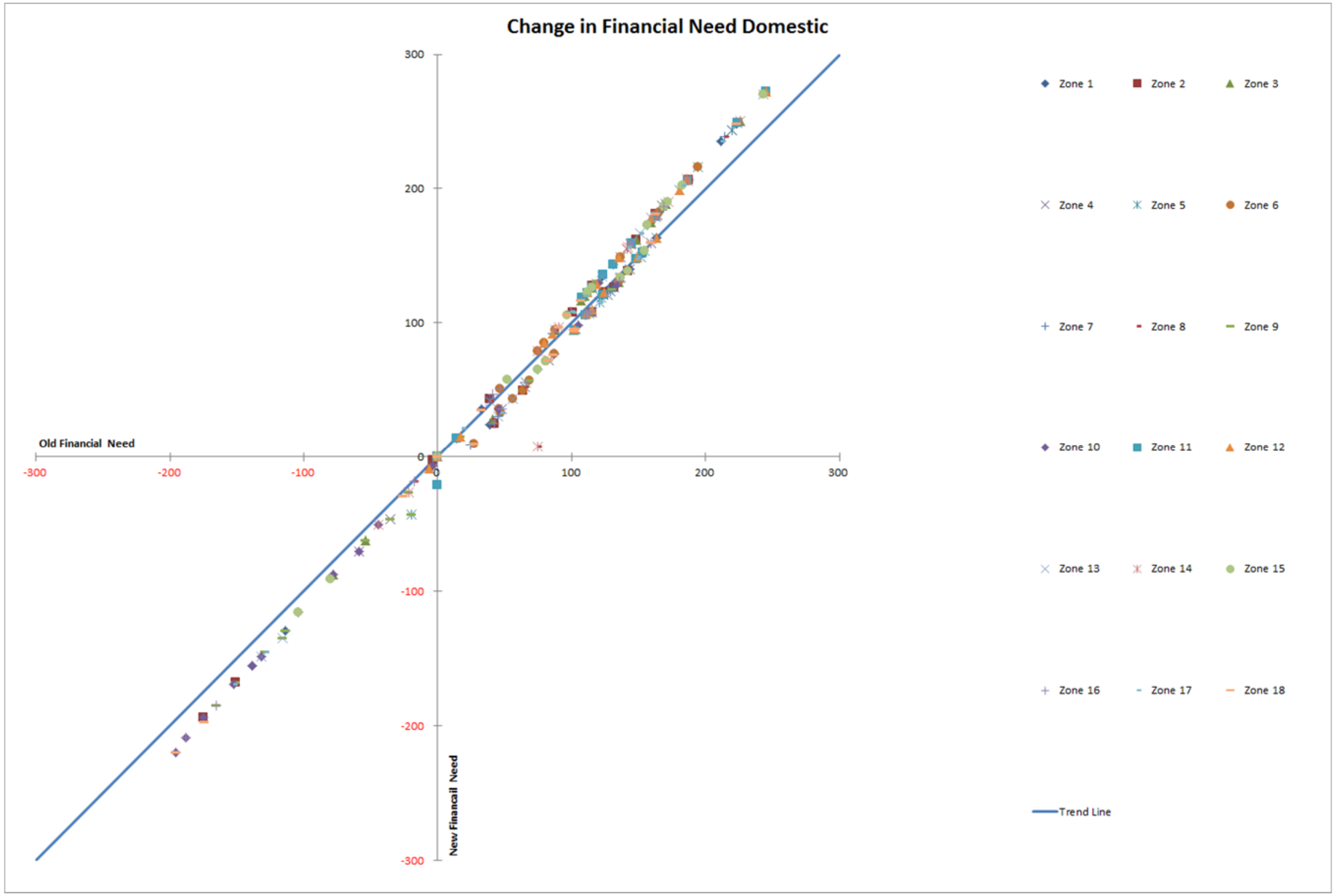
5.7.2 Current domestic model with proposed cost updates

Figure 15 shows the effect of the proposed costs when applied to the current domestic model. The results indicate that updating the costs creates no new zone pairs which require a Financial Need and no zone pairs which no longer require Financial Need. Table 22 highlights the results shown in Figure 15.

Table 22: Results of proposed domestic costs in current domestic model

	FN current negative	**FN current positive**
FN proposed positive	Quadrant 4: There is now a Financial Need to support these zone pairs; 0 zone pairs have become eligible for grant.	Quadrant 1: There was a Financial Need previously and this is still the case: 252 zone pairs but there has been an increase as there are more points above the 45 degree line than below
FN proposed negative	Quadrant 3: There was not a Financial Need previously and there still is no Financial Need but the size of the surplus has reduced as there are more points above than below the 45 degree line. However these zone pairs are not eligible for grant. There are 54 such zone pairs	Quadrant 2: These zone pairs have become financially self-sufficient. There are 0 of these zone pairs no longer eligible for grant.

Figure 15: Change in Financial Need – current domestic model with the proposed domestic costs



The conclusion to be drawn from Sensitivity Test 1 for all of the models is that the update to the costs reflects the rise in inflation plus adjustment to train productivity, with little movement of the points away from the 45 degree line. This suggests that the costs alone are not a major driver of change in the current model. This is not unexpected as change in Financial Need reflects the relative change in rail and road costs, and the differential change between the modes has been small.

5.8 Sensitivity Test 2A: Current port model with proposed model costs, updated train configurations and gauge clearance

Figure 16 shows the effect of running the current port model with the inclusion of the proposed model costs, updated train configurations and gauge cleared routes. These changes indicate that 4 new zone pairs will require a Financial Need and 9 zone pairs will no longer require a Financial Need.

Table 23 highlights the results shown in Figure 16.

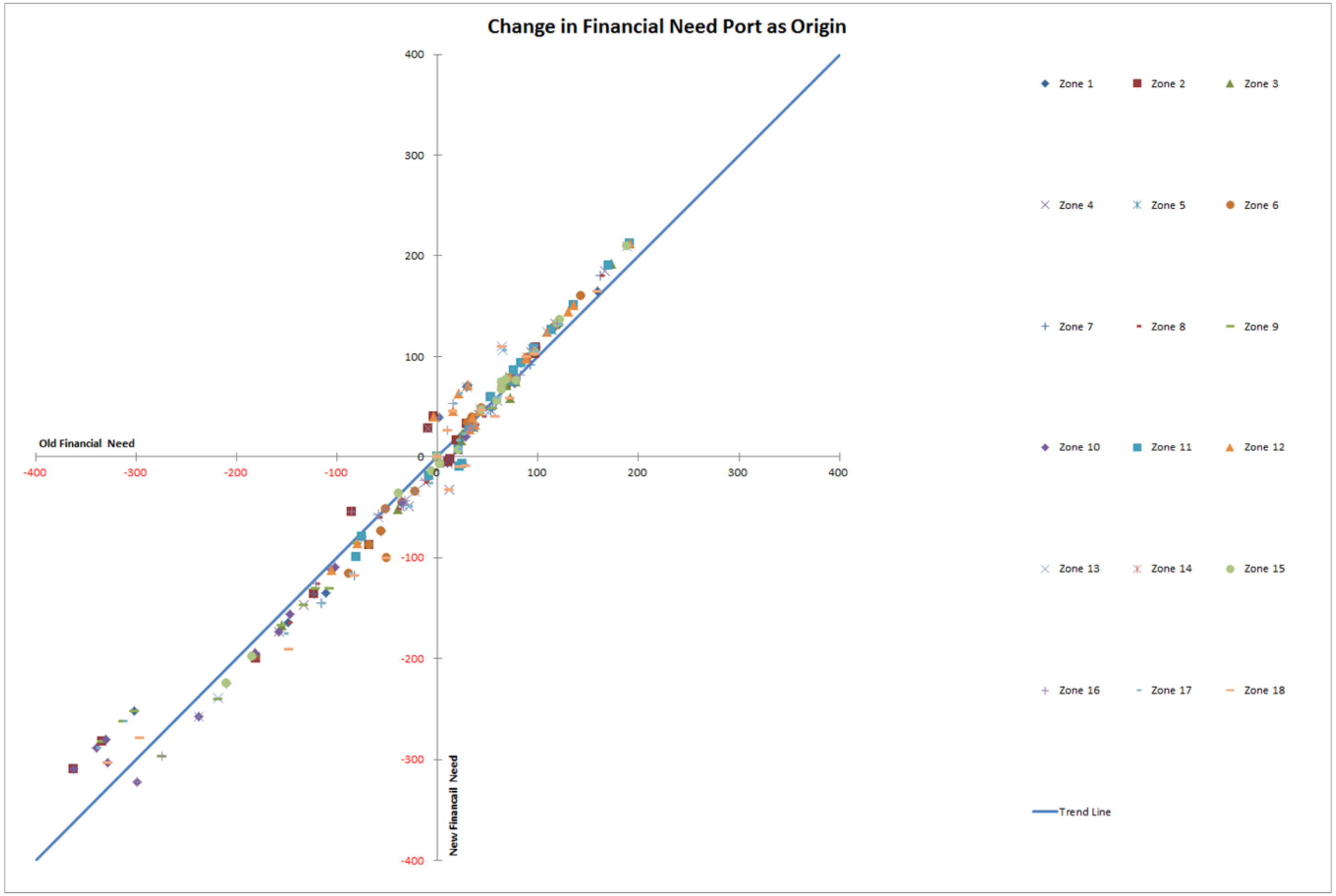
Table 23: Results of current port model with proposed model costs, updated train configurations and gauge clearance

	FN current negative	FN current positive
FN proposed positive	Quadrant 4: There is now a Financial Need to support these zone pairs; 4 zone pairs have become eligible for grant.	Quadrant 1: There was a Financial Need previously and this is still the case: 147 zone pairs remain eligible but there has been an increase as there are more points above the 45 degree line than below
FN proposed negative	Quadrant 3: There was not a Financial Need previously and there still is no Financial Need but the size of the surplus has reduced as there are more points above than below the 45 degree line. However these zone pairs are not eligible for grant. There are 107 such zone pairs	Quadrant 2: These zone pairs have become financially self-sufficient. There are 14 of these zone pairs no longer eligible for grant.

The conclusion to be drawn from this sensitivity test is that the updates to the costs and train configurations (including gauge clearance effects) have little impact on the model when using the current distances, with most points sitting on the 45 degree line.

This would suggest that as expected the rebased zone centroids in the proposed model are the major drivers in changing the outcome of the Financial Needs.

Figure 16: Change in Financial Need – Current port model with proposed model costs, updated train configurations and gauge clearance



5.9 Sensitivity Test 2B: Current domestic model with proposed model costs and gauge clearance

Table 24 highlights the effect of the current model with the inclusion of the proposed model costs and updated gauge cleared routes. These changes indicate that no new zone pairs will require a Financial Need and 20 zone pairs will no longer require a Financial Need.

Table 24: Current domestic model with proposed model costs and updated gauge clearance

	FN current negative	FN current positive
FN proposed positive	Quadrant 4: There is now a Financial Need to support these zone pairs; 0 zone pairs have become eligible for grant.	Quadrant 1: There was a Financial Need previously and this is still the case: 232 zone pairs remain eligible but there has been an increase as there are more points above the 45 degree line than below
FN proposed negative	Quadrant 3: There was not a Financial Need previously and there still is no Financial Need; these zone pairs are not eligible for grant. There are 54 such pairs	Quadrant 2: These zone pairs have become financially self-sufficient. There are 20 of these zone pairs no longer eligible for grant.

The conclusion to be drawn from this is that the updates to the costs and gauge cleared routes have a modest impact on the current domestic model through improved rail efficiencies, with a number of points now sitting below the trend line. This would suggest that gauge clearance is reducing the costs as longer and more productive trains can be run on the routes.

However comparison between the results of this sensitivity test and the full proposed model results confirms that the biggest driver of change in the proposed models is the change to the centroid distances.

5.10 Analysis of the Change in Distances and Time

As noted above, the main change to the models has been to update the rail and road distances through rebasing of the zone centroids, and more accurately calculating rail distances using GIS representations of the Strategic Freight Network. These changes have resulted in the distances changing for a number of the zone pairs. Given that the sensitivity test indicates that this change has generated the greatest changes between the current and proposed models, further analysis of this impact has been carried out.

These changes are presented in

Table 25 which covers both the Port and Domestic models.

The table shows that the majority of rail and road distances have increased, through adoption of the proposed centroid locations and the rebasing of rail and road distances described in Section 5.3.3, compared to the current models. Rail distances have increased in more cases than road distances have increased (mainly due to the recalculation using GIS software, which more accurately represents some of the longer routes used by the rail network compared to the trunk road network). Comparison of the results for the Base Test and Sensitivity Tests 1 and 2 shows that this is the main factor contributing to the increase in grant-eligible zone pairs. As explained above the rebasing has to an extent altered the balance of road and rail distances that were contained in the previous model, and there is an overall increase in the relative difference between road and rail journey distances.

Table 25: Analysis of the Change in Distance: number of zone pairs

	Port model	**Port model**	**Domestic model**	**Domestic model**
	Rail distance	Road distance	Rail distance	Road distance
Number of zone pairs showing increase in distance compared to current model	197	176	198	156
Number of zone pairs showing decrease in distance compared to current model	75	96	108	150
Total number of zone to zone pairs	272	272	306	306

5.11 Quality Assurance

An independent check for computational accuracy and spreadsheet best practice has been performed on all three of the proposed freight grant models by Arup staff not directly involved with the project.

The review was carried out in two stages. The first stage tested the models using the Excel Analysis ToolPak. Excel Analysis ToolPak is a review tool that checks spreadsheets for well known, frequently used structures which have been proven to lead to errors.

The results of the Excel Analyst review concluded that “Nested If Statements” were being used in the models. This suggested that complex logical modelling had been used and was therefore highlighted as an area that should receive closer attention during the detailed cell by cell check. Links to external workbooks were also identified during the review and were dealt with accordingly.

These recommendations were fed back into the development of the model and the links and nesting were rationalised in line with the review comments.

Following the application of the Excel Analysis ToolPak software a detailed computational and “best practice” review of the proposed models was performed. This checked each model worksheet and examined all calculations, focussing on the higher risk areas identified by the report. The review found only minor computational errors, however some deviations from spreadsheet best practice were identified in all three proposed freight grant models.

Based on the findings of this review, a number of recommendations were proposed. These aimed to address the problems surrounding the models audit trail and transparency as well as a number of minor computational errors. These have been incorporated into an updated version of the proposed freight grant models. The updates ensure that the proposed models are computationally sound and conform to a level of best practice that is appropriate for models of this description.

5.12 Summary

The work carried out with the proposed model has demonstrated that the impact of the cost and efficiency changes has been to increase both the Financial Need and the Maximum Grant Rate attributable to zone pairs. While rail costs have increased at a lower rate than road costs, road productivity has increased at a greater rate than rail (particularly in the domestic market through the use of high cube semi-trailers).

This has led to an increase in model rates, but the sensitivity tests have demonstrated that these factors generate changes to the Financial Need and Maximum Grant Rate broadly in line with inflation trends over the last 5 years.

The most significant changes contained in the proposed model relate to centroid changes. Centroids have been recalculated using more central locations, and together with a tighter explicit methodology for calculating road and rail journey distances has had an impact in changing the zone pair journey distances (which in turn work through the model in terms of both direct mileage related costs and time based costs). In addition the proposed model revises rail journey distances in the current model. Rail journeys are often longer than equivalent road ones because of geography and route restrictions, and the use of GIS has produced increased journey distances in many instances.

As the most notable example, trains from Felixstowe to the West Midlands travel via London rather than the more direct gauge cleared route via Oakham. FOCs strongly objected to such a routing proposal because until resignalling and remodelling of the Leicester track layout (specified in the CP5 HLOS) this route offers extremely limited capacity for intermodal trains, even though grade separated access onto the West Coast main line was commissioned in 2013..

This provides an illustration of why developments in the network will require adjustment of the model at appropriate times to ensure that it represents the benefits of DfT investment in the rail network.

This has had the most significant impact on the model results, and accounts for most of the increase in grant eligibility. An analysis of the actual grants awarded suggests that almost all of them will result in higher awards if the proposed model is used.

The two model enhancements suggested by stakeholders (the Scottish transhipment to low productivity routes and the establishment of a Channel Tunnel import zone) both demonstrated that enhancing the model to incorporate them would increase eligibility. In the case of the Scottish flows all domestic journeys to the north of Scotland become eligible for support, while the Channel Tunnel zone would provide support for flows to the Midlands and north of England, though understandably traffic to Scotland remains cheaper by rail than road.

Presenting the zone pair change results in a scatter diagram format has helped to demonstrate the impact of these flows, and also to demonstrate the overall trend, which remains driven primarily by inflation. The Maximum Grant Rates are calculated using existing Environmental Benefits, and it must be borne in mind that these may change on recalculation by DfT, which in turn would impact on Maximum Grant Rates.

6 Impact of Grant Tapering or Withdrawal

6.1 Introduction

This chapter sets out our assessment of the impacts if MSRS and WFG grants are discontinued at the end of March 2015 or tapered after March 2015 over the period to March 2018 at which point they would be discontinued.

The areas which are considered to be impacted by a change in grant award are as follows:

- Employment (direct, indirect and induced jobs),
- Gross Value Added (GVA)
- Environmental impact as measured by Mode Shift Benefit Values (MSBV).

Highway traffic congestion is the largest element of MSBV and this is given special attention.

The wider overall impacts on the UK rail freight industry, including supply chain implications, are also considered

These impacts are assessed for each subsector: intermodal, bulk rail, inland waterway and coastal/short sea shipping. The majority of this assessment applies to the MSRS (I) grant, as MSRS (B) and WFG are based on specific cost build ups for a nominated flow, and therefore the impacts of tapering or withdrawal are specific to each flow.

The assessment is based on the current grant regime, including use of the current MSRS (I) model, as this has been used to determine all the grant awards currently being supported.

As a general comment, this section takes the proposed model outputs as being definitive summaries of Financial Need. Therefore if grant withdrawal or tapering moves a defined flow into loss it is assumed that a FOC will be very strongly driven to withdraw from carrying that traffic within 6 months, as it does not have the financial resources or incentive to support the flow internally,

6.2 Freight Industry Context

The section describes the current extent of the rail and inland waterway and coastal/short sea shipping freight industries. The focus is on rail as most of MSRS grant is provided to that sector. The importance of MSRS grant support and historical growth in rail freight since 2003/4 is described in section 6.2.1. A brief description of the inland waterway and coastal/short sea shipping sectors is given in section 6.2.2.

6.2.1 Rail Freight Industry

The UK rail freight industry currently comprises 6 licensed Freight Operating Companies (FOCs), each being an independent operating company which responds to standard commercial opportunities and financial considerations.

In addition to the FOCs the UK rail freight industry also comprises:

- Terminal operators who run private transhipment and storage terminals
- Road hauliers who purchase full train movements
- Network Rail's general and freight specific infrastructure
- Rolling stock providers (locomotives and wagons)
- Mechanical Handling Equipment providers

All of these stakeholders may be impacted by loss of business following tapering or withdrawal of grant.

All FOCs possess open access rights to the entire UK rail network and are essentially free market players who will normally carry traffic only so long as it is profitable to them. They either own or lease their locomotives, and wagons are owned or leased by them, private wagon suppliers or customers.

There is no explicit state support for FOCs, and no regulated requirement for them to run specific services or regulation of the rates they charge. Where grant assistance is available it is conditional on the realisation of the equivalent economic value of environmental benefit. The DfT scheme has a minimum BCR requirement of environmental benefits to grant awarded of 2:1, though in practice awards are rarely made below a BCR of 3:1.

The different operators have different business mixes and network coverage. The impact of a reduction of business in a specific market area will be different in every case. Previous structural market alterations (such as the closure of MG Rover in 2005) have had significant impacts in specific areas but the FOC has adapted by refocusing its operations. However with increasing use of leased assets it has become relatively easier for FOCs to withdraw from wider business areas at shorter notice, though this varies from operator to operator, and committed periods may be up to 5 years.

If assets are taken off lease they are returned to the lessor. They or the FOC may redeploy them elsewhere in Europe rather than continuing to seek work in the UK. This is especially true of intermodal wagons, which are normally standard European designs. Class 66 locos also have wide European certification and UK owned examples are currently operating in mainland Europe.

Profit margins within the industry are traditionally low and average around 5% of overall turnover. Profit margins earned on intermodal traffic tend to be lower than this.

Table 26 shows the growth in the UK rail freight market over the past 10 years, since the Company Neutral Revenue Scheme (CNRS) was introduced in 2004.

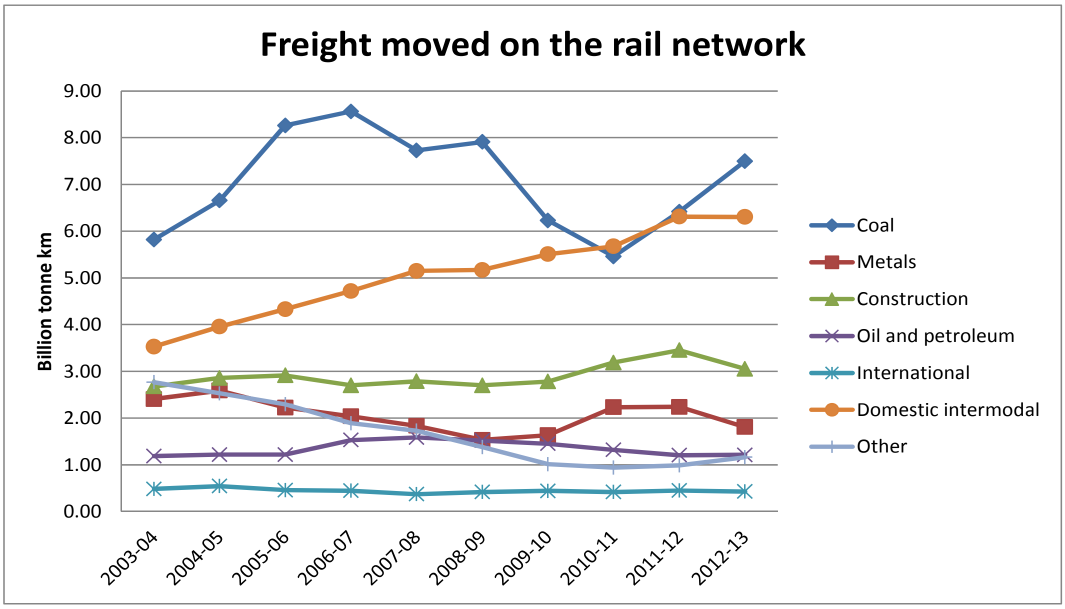
Table 26: Amount of freight moved on the rail network - billion tonne km

Financial year	Coal	Metals	Construction	Oil and petroleum	Europe	Domestic intermodal[8]	Other	Total
2003-04	5.82	2.41	2.68	1.19	0.48	3.53	2.77	18.87
2004-05	6.66	2.59	2.86	1.22	0.54	3.96	2.53	20.35
2005-06	8.26	2.22	2.91	1.22	0.46	4.33	2.29	21.70
2006-07	8.56	2.04	2.70	1.53	0.44	4.72	1.89	21.88
2007-08	7.73	1.83	2.79	1.58	0.37	5.15	1.73	21.18
2008-09	7.91	1.53	2.70	1.52	0.42	5.17	1.38	20.63
2009-10	6.23	1.64	2.78	1.45	0.44	5.51	1.01	19.06
2010-11	5.46	2.23	3.19	1.32	0.42	5.68	0.94	19.23
2011-12	6.41	2.24	3.45	1.20	0.45	6.31	0.99	21.06
2012-13	7.50	1.81	3.05	1.21	0.43	6.30	1.16	21.46
10 year growth	29%	-25%	14%	2%	-11%	79%	-58%	14%

Source: ORR

These results are shown in a graphical format in
Figure 17, which more clearly demonstrates the importance to the rail freight market of intermodal traffic as the principal source of consistent growth.

Figure 17: Rail network trends



Source: ORR

This demonstrates that only intermodal rail freight has grown consistently over time, and at a much higher rate over the past 10 years than any other sector.

[8] Title as used by ORR. This refers to the ports and domestic intermodal sector, but not traffic running through the Channel Tunnel (which falls into the European category)

Intermodal growth has been 79%, whilst overall freight traffic has grown by only 14%.

Over the same period, the growth in the total volume of container traffic moving through UK ports has been much lower at around 6% (with deep sea traffic being around half the total but growing faster) as shown in Table 27.

Table 27: Number of freight containers at UK ports – thousand teu

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	10 year growth
Containers	4,533	4,919	4,754	4,883	5,381	5,269	4,482	4,961	4,927	4,800	6%
Deep Sea containers	2,372	2,639	2,702	2,847	3,037	3,236	2,736	3,061	2,939	2,643	11%

Source: Department for Transport Statistics

This illustrates that rail's market share of intermodal containers has almost doubled over the last 10 years. This is primarily accounted for by the gauge clearance of key freight routes allowing the transport of high cube containers on standard wagons, and the provision of the MSRS grant support.

6.2.1.1 MSRS Support

The Company Neutral Revenue Scheme (CNRS) was introduced in 2004 to provide support for moving container traffic by rail.

CNRS was replaced by the Rail Environmental benefit Procurement Scheme (REPS) on 1 April 2007, which also included bulk freight. In turn REPS was replaced by the Mode Shift Revenue Support scheme – Intermodal (MSRS (I) and Bulk and Waterways (MSRS (B)), introduced on 1 April 2010.

Revenue support for intermodal traffic has been a constant presence during this period of market growth, though the overall grant budget has declined by 10% in the last 4 years. Nevertheless the availability of grant remains a critical factor in encouraging the movement of containers by rail, both as a tangible contribution to operational costs and as an indication of the endorsement by government of the concept of moving containers by rail. This was highlighted by grantees in the interviews.

Support is also available for bulk, inland waterway and waterborne traffic. In these cases grant is payable on a specific case by case basis, and applicants supply all relevant cost information on the relative road and rail/water transport for assessment. In practice all grant applications are assessed on a comparable value for money assessment.

The total value of grants awarded to date (up to the September 2013 bid round) for both the MSRS and WFG schemes are shown in Table 28. Note that the value of grants award is a gross amount, but where lower levels of traffic pass some of the amount awarded will be allocated but not spent.

Table 28: Total value of grants awarded by financial year.

Financial year	2011-12	2012-13	2013-14	2014-15
DfT grants awarded	£22,097,931	£21,969,255	£21,798,309	£20,001,971
Scottish Government grants awarded[9]	£920,382	£1,075,376	£797,994	
Total grants awarded	£23,018,313	£23,044,631	£22,596,303	£20,001,971

Source: DfT grant award notices and Scottish Government Table of Awards. DfT awards include awards made by the Welsh Government

The breakdown of grants to operators is shown in Table 29, derived from the public notices of award issued by DfT and Scottish Government. Some interpretation of the results has been undertaken where the figures are not fully broken down.

Table 29: Number of grant supported services 2012-13 (table shows recipient of grant and number of grants awarded to each recipient)

	FL	DBS	GBRf	DRS	Colas Rail	Others	Total
Intermodal	19	8	1	1	0	8[10]	37
Bulk and Waterways	0	19	0	0	1	3[11]	23
Waterborne						3	3
Total	19	27	1	1	1	11	62

Source: DfT grant award notices and Arup analysis

DfT has advised that the level of grant can be expected to run at approximately £18.0 million for England to financial year 2014/15, plus a further £1.1 million for Scotland and £0.1 million for Wales, making a total grant budget of £19.2m. The discrepancy between this figure and those contained in Table 28 above is explained by the fact that grants are awarded on a forward basis using an estimated maximum volume, and any underperformance is clawed back by DfT during the award period.

[9] Scottish Government grants awarded shown are for MSRS only. There was a further €2,000,000 grant awarded under the WFG scheme over the period May 2009 – May 2012 to Norfolk – Rosyth – Zeebrugge Ferry but it was not possible to include this in the table as the award does not break the grant down by year.
[10] P and O (1), Stobart (3), Argos (1), JG Russell (2), WH Malcolm (1)
[11] DFDS (1) - this is assessed outside the MSRS (I) model and categorised as bulk. Thames shipping (1) Manchester Ship Canal (1)

6.2.2 The Inland Waterway and Coastal/short sea shipping Industries

Volumes of freight moved by water transport (on inland waterways or by coastal/short sea shipping) are shown in Table 30. The total volume of 35 billion tonne km in 2012-13 is greater than the 21.5 billion tonne km moved by rail but over half of this is the movement of petroleum products, movements of which are likely to be financially viable in their own right and ineligible for MSRS support. The petroleum shipping market has declined by 37% over the study period.

If petroleum products are excluded, total volume shows a general decline over the period 2003-4 to 2011-12 from 15.0 to 13.4 billion tonne km per annum (btkm). This represents a reduction of 10.7 %.

Again excluding the petroleum sector, using 2011-12 data, the overall total moved of 13.4 btkm represents 63% of the comparable rail freight movements (21.1 btkm).

Table 30: Amount of freight moved by inland waterway and coastal/short sea shipping - billion tonne kilometres

Financial year	Coastal/short sea between UK ports	One port traffic	Inland waters	Total	Within total: petroleum products	Within total: non petroleum products
2003-04	33.0	26.4	1.6	60.9	46.9	15.0
2004-05	35.0	22.9	1.5	59.4	46.9	12.5
2005-06	39.0	20.3	1.6	60.9	47.2	13.7
2006-07	32.0	18.2	1.7	51.8	37.8	14.0
2007-08	35.0	15.0	1.7	50.8	36.4	14.4
2008-09	35.0	13.3	1.7	49.7	36.4	13.3
2009-10	35.0	12.8	1.3	48.6	36.4	12.2
2010-11	30.0	10.8	1.4	41.9	28.3	13.6
2011-12	31.3	10.3	1.4	43.0	29.6	13.4
2012-13	23.6	10.4	1.4	35.0	n/a.	n/a.
10 year change in volume (2003/4 – 20111/12)					-36.9%	-10.7%

Source: DfT Transport statistics Great Britain Table 0401

6.2.2.1 Grant Support

MSRS grants for traffic carried by inland waterways and WFG for coastal/short sea shipping traffic are shown in Table 31. An analysis (Table 32) comparing volumes of traffic and share of grant, excluding petroleum products, shows that rail accounts for 61% of the total traffic carried by rail and water but 97.9 % of the grant; conversely water carries 39% of traffic but receives only 2.1% of the total MSRS grant disbursed.

Table 31: Inland Waterways and Coastal/Short Sea Shipping: Total value of grants awarded by financial year.

Financial year	2011-12	2012-13	2013-14	2014-15
WFG Coastal/short sea Shipping Grants awarded[12]	£48,528	£593,566	£472,364	£236,727
MSRS (B) Inland Waterways Grants awarded	£7,308	£166,889	£189,072	£124,072

Source: DfT grant award notices

Table 32: Relative proportion of traffic carried and MSRS grant received

	Rail	Inland waterway and coastal/short sea shipping[13]	Total
Volume of traffic billion tonne km (% total)	21.1 (61%)	13.4 (39%)	34.5 (100%)
MSRS grant (£million) (% total)	£21.71 (97.9%)	£0.46[14] (2.1%)	£22.17 (100%)

The implications of this result are that as the funds spent on WFG are so limited withdrawal of these will, on the basis of the number of current grantees, have very little overall impact. This relates to a wider issue of why the uptake of Water Freight Grant has been so low.

It was beyond the present study scope to interview the water freight industry more widely to understand reasons for lack of applications; the industry may feel that it is hard to demonstrate Financial Need or that the application process, following a case-by- case approach, is too time consuming. We have however noted elsewhere that the water freight industry grantees felt strongly that the MSRS (I) support should be made available at the same grant rates to water operators.

In view of the fact that only 4 Waterborne Freight Grants have been awarded, and that they already automatically taper to zero after 3 years, impact analysis is impossible to determine without sight of the specific detail of the award, while the impact is too specific to be of general value. For this reason analysis has not been carried out for the Waterborne Freight Grants. Inland waterways are included in the MSRS (B) figures.

[12] Plus a further £2,000,000 awarded by Scottish Government to Norfolk-Rosyth-Zeebrugge Ferry which is not disaggregated by year
[13] Inland waterway and coastal/short sea shipping volumes exclude petroleum products
[14] Inland waterway and coastal/short sea shipping grant is an annual average of the four years in Table **31**

6.3 Impact Assessment

6.3.1 Overview

To determine the impact of withdrawal or tapering two scenario definitions have been considered

The assessment estimates the industry response to each scenario. Quantitative and qualitative assessments have then been carried out. The quantitative assessment estimates employment and Gross Value Added (GVA) impacts. The qualitative assessment sets these in the context of the broader supply chain, environment and other impacts.

6.3.2 Scenario Definition / Basis of Assessment

In the event that grants were reduced or removed, there are three possible responses by the industry for each freight movement which is currently supported by MSRS:

1. The movement continues to operate by rail and the increased costs have to be covered from within the industry
2. The movement ceases altogether as it is no longer viable.
3. The movement continues to operate but transfers to road as road costs are cheaper

Option 1 is not considered to be credible. As discussed above, profit margins within the industry are already low, and operators have commented that the levels of profitability experienced within the intermodal sector are significantly below their normal levels, as competition focusses largely on price. By definition the costs of bulk movement are already known to DfT and therefore excess profit would render flows ineligible for grant. Therefore the impact of removal of grant in total is extremely likely to have a direct impact on flow profitability. The only area where this may not apply is if wider commercial factors apply, such as the flow being an integral part of a wider and overall profitable contract, for example where a shipping line pays for a combination of flows from a port.

Option 2 is also considered unlikely. There are no cases in which rail has a market monopoly, as in all instances road competition is available. Customers' transport needs are not influenced by market providers, and therefore the loss of grant is highly likely to result in the switch of traffic back from rail to road. In that this switch is at the core of the logic under which the flows first qualified for grant assistance this is a reasonable assumption.

On this basis, we believe that FOCs will only consider option 1 if the margin being covered by grant is low, and then only for a proportion of cases. Option 2 is not a credible outcome.

In most cases therefore the impact of loss of grant is likely to result in the application of option 3 – transfer of traffic to road.

Two scenarios of changes to the current grant scheme have been considered:

1. Removal of the grants at the end of the scheme – the current scheme ends in March 2015
2. Tapering of the grants – the current scheme is tapered over the period March 2015 – March 2018, with tapering as follows:
   - March 2015 – 75% of current grant
   - March 2016 – 50% of current grant
   - March 2017 – 25% of current grant
   - March 2018 – grant is removed

For the purposes of this assessment, tapering has been treated as a reduction of the annual grant of 50%, as this would be the average rate over the three year period of the tapering. This review does not consider grant changes beyond the model period.

We have assessed FOC response to these two scenarios.

6.3.3 Quantitative Estimation of Industry Response

In 2012-13, MSRS grants supported the movement by rail of around 735,000 intermodal containers plus a further 18,500 within Scotland, as well as almost 1.5 million tonnes of bulk freight, based on data provided by DfT.

6.3.3.1 Intermodal

In order of size of grant payment, the routes awarded the largest grants in the 2013-14 and 2014-15 financial years are for the following flows:

- Felixstowe – West Midlands (Zone 2-14)
- Southampton – West Midlands (Zone 17-14)
- Felixstowe – Yorkshire (Zone 2-5)
- Southampton – North West (Zone 17-11)
- Midlands – Central Scotland (Zone 14-8)

As expected, the main flows supported are the mid distance flows where rail is less competitive with road.

Grant supported flows form a significant share of the total rail intermodal market. We estimate that the ratio of flows where some or all of the traffic is grant supported to total intermodal flows is as shown in Table 33 overleaf.

Table 33: Inter modal: estimate of share of intermodal services receiving MSRS (I) grant support

	Total FOC supported	Support to other grantees	Total
Intermodal grant supported	31	8	39
Total services daily	46	8	54
% grant supported	67%	100%	72%

In 2012-13, 39 intermodal rail freight movements (2 movements wholly within Scotland), and 23 bulk freight movements were supported by the MSRS grant. A further 2 waterborne movements in England and 1 in Scotland were supported by the WFG.

For intermodal rail freight, costs by road and rail are calculated for each zone pair movement and the Maximum Grant Rates matrix used. The Maximum Grant Rate is the difference in transport cost between road and rail per container, capped by the Environmental Benefit of the road movement. In practice DfT imposes a minimum BCR of 2:1 in terms of environmental benefits to grant amount applied for. The ratio of total rail cost to Maximum Grant Rate gives an indication of the proportion of costs which the operators are able to recover through the grant. The terms used in this report are set out in Section 1.5. Figure 18 shows the total port flows reported, and those for which grant has been awarded, in terms of their eligibility for MSRS support against the degree to which the grant compensates operators for their losses, that is the proportion of the total rail cost which is covered by the grant.

Figure 18: Grants awarded for port traffic

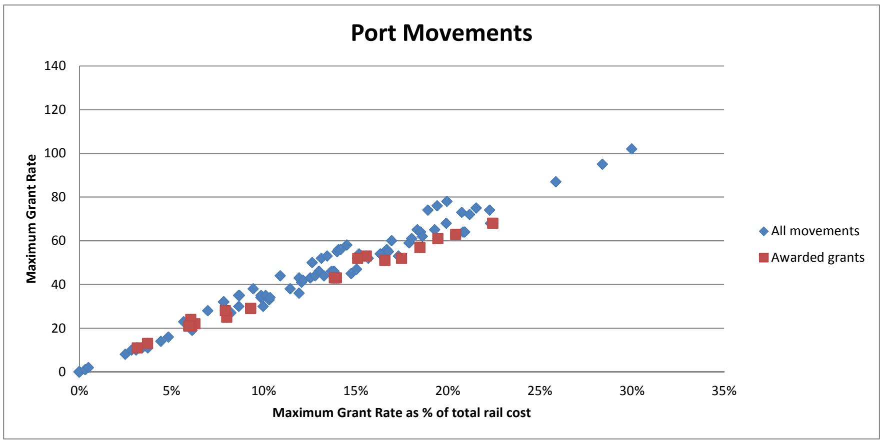
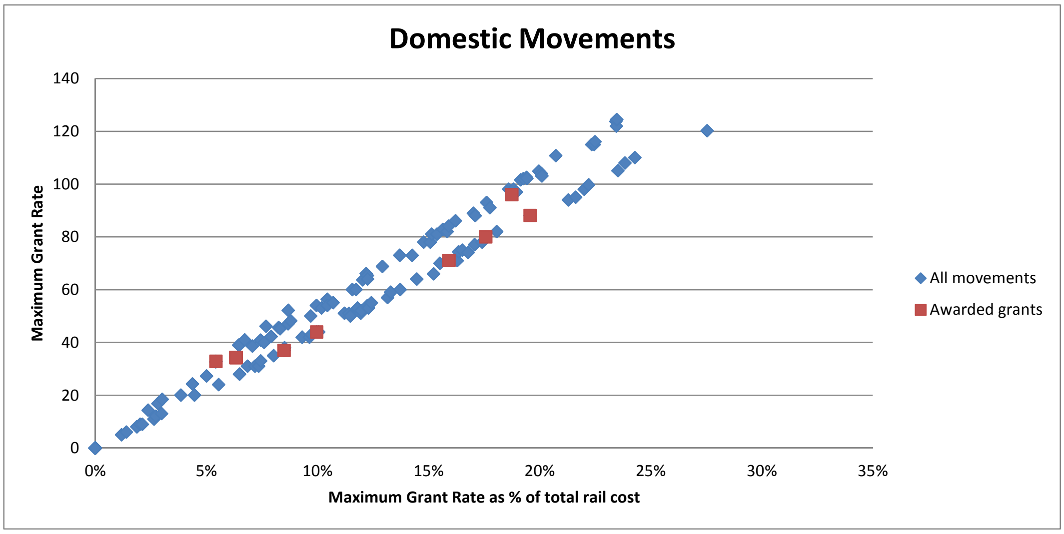


Figure 19 shows the equivalent figures for the domestic flows. In simple terms the further to the right and higher the location is on the graph, the higher is the need for grant, and the higher is the amount of grant being sought.

For port flows, the Maximum Grant Rates range from 1% of the total rail cost to more than 30%. For domestic flows the range is 1% to 28%. It would be expected that operators are more likely to apply for funding for movements where the grant will cover a higher percentage of the total cost rather than those where they would only cover a very small proportion of the cost. It is unlikely that it would be worthwhile for an operator to bid for funding where the maximum grant they could receive would cover only a very small percentage of their cost, even if it met the 2:1 BCR threshold.

Looking at port intermodal freight movements which have received MSRS funding, the Maximum Grant Rates as a proportion of the total rail costs range from 3% to 22%, whilst for domestic movements the range is 5% to 20%.

Figure 19: Grants awarded for domestic traffic



The higher the proportion of cost covered by the grant, the more vulnerable the flow will be to the removal of the grant. Where the grant covers a higher proportion of the total operating costs, removal or tapering would lead the operator to cover a larger cost deficit than for a flow where the grant covers a lower proportion of costs.

In the event that the grants were completely removed, those movements where the grant covers a higher percentage of total rail costs (towards the right of the charts above) would be the most likely to cease altogether or to switch to road, whilst those where the grant covers a lower percentage of costs (towards the left) would have some possibility of continuing, at least in the short term.

To estimate the impact of removing or tapering the current grants, the movements which received grants in 2012-13 have been grouped into six bands based on the percentage by which the operating cost would increase if the grant were removed or tapered. For each band we have, based on our judgment, produced an estimate of the probability that a movement would no longer operate by rail without the grant.

This gives the highest probability of loss to those in the largest cost increase category and implies that for cases where there is an increase of less than 10% of total cost operators may make some attempt to retain business, even on a marginal cost basis, given that a contribution to wider business overheads remains. Up to this point we assume an overall average of 50% of traffic flows will revert to road. Beyond a 10% increase in cost operators are extremely unlikely to retain any traffic (and then only for reason of wider contractual fit). In this instance fewer than 5% of flows are retained by rail.

This probability is applied to the flows falling into each category. Table 34 shows the numbers of movements in each category.

Table 34: % cost increase to FOC when grant is removed and likelihood that freight movements currently receiving grants would no longer operate by rail

	Removal of grant		**Tapering of grant**[15]		**Likelihood movement no longer operates by rail without grant**
Cost increase to FOC	**Intermodal port movements**	**Intermodal domestic movements**	**Intermodal port movements**	**Intermodal domestic movements**	
0-5%	4	0	13	7	30%
6-10%	9	7	8	2	60%
11-15%	2	1	6	3	95%
16-20%	6	1	0	0	100%
21-25%	3	3	0	0	100%
<26%	3	0	0	0	100%

This banding has been used in the tests to estimate the impact of the grant removal.

Of those flows refused by rail operators due to the cost increase, it is assumed that continuing demand would result in the movements transferring to road, and that because of the cost imbalance no other rail operator would seek to take them over. For the purposes of this calculation, it is assumed that no traffic flow would cease completely.

Table 35 shows the impact in terms of the numbers of freight movements currently receiving grants (with the number of movements rounded to whole numbers).

Table 35: Impact of removal or tapering of grants on intermodal freight movements

Impact	**Removal**		**Taper**	
	Port	**Domestic**	**Port**	**Domestic**
Continue by rail	7	3	12	6
Switch to road	20	9	15	6
Cease	0	0	0	0
Total	27	12	27	12

[15] This scenario reflects a 50% reduction in the grant rate based on the average situation over the three year tapering period as described in section 6.3.2

Overall, almost three quarters of the intermodal freight movements which are currently supported by the MSRS grant (74%) would no longer operate by rail if the grant were removed completely and more than half would no longer operate by rail if the grant was tapered (54%).

6.3.3.2 Bulk Rail and Inland Waterways

For bulk rail freight movements, there are no standard zone to zone costs and grant matrices as there are for intermodal movements, but instead each grant submission is assessed on a case by case basis. Assessing the employment impact of removing or tapering the grants is therefore more judgemental than for the intermodal market as information is not available on the relative road and rail costs for each bulk freight movement receiving a grant, or on the proportion of this cost that is related to specific elements.

However, in order to make an estimate of the impact, it has been assumed that the proportion of bulk freight movements that would switch to road or cease to operate as a result of grant removal or tapering would be the same as that for intermodal. It could be argued that this is actually optimistic, in that each bulk application is a well-argued case as to why grant is necessary to transfer the flow to rail, and therefore withdrawal would result in reversion to road in every case. However in the absence of sight of the specific data relating to each application this is believed to be a valid assumption.

The results of applying these percentages to the 23 bulk freight rail movements that received grants in 2012-13 are shown in Table 36.

Table 36: Impact of removal or tapering of grants on bulk freight movements

	Continue by rail	**Switch to road**	**Cease**
Grant removal	6	17	0
Grant tapering	11	12	0

There are two recipients of MSRS (Bulk) in the inland waterways sector at the moment, in Manchester and London.

We cannot comment conclusively on the impacts of tapering or withdrawal from the information that we have. It does however appear to be clear that MSRS (Bulk) is essential to help fund the start-up costs of services like these within the inland waterways sector, and that without it new flows would not be generated.

6.3.4 Employment and GVA Impacts

6.3.4.1 Intermodal Rail

To estimate the employment impact, each of the 2012-13 intermodal rail freight movements receiving grants have been categorised as continuing by rail or switching to road based on the numbers shown in Table 35. The movements within each category that have been allocated as switching have been chosen randomly.

The most recent road and rail cost figures from the proposed model have been used to calculate the cost per container in terms of employment. This uses direct labour costs where the figures are available, and for maintenance assumes that 30% is attributable to labour. For each movement where a grant was awarded in 2012-13, a calculation was then made of the reduction in employment costs for rail where a movement would switch to road, and the corresponding increase in road costs for movements that are expected to switch. Employment costs are generally higher for road than rail for the same volume of freight as road is more labour intensive, even though income per direct employee is lower.

The total change in employment costs was then converted into a change in employment income in terms of number of jobs, by dividing by an average rail industry salary (the driver salary of £45,483 for rail and £36,089 for road has been used as representative of an average salary in the industry and taken as an average to apply to all jobs impacted, ranging from management to yard staff). Employment income has been used rather than total employment costs, as not all the additional overheads will be saved if employee numbers reduce. The approach has been taken consistently across both road and rail sectors and we believe that this provides the required comparability.

Overall, the removal of the grants results in a loss of rail employment of £59.5 million, equivalent to 1,308 direct jobs.

The tapering of the grants results in a loss of rail employment of £37.7 million, equivalent to 829 direct jobs.

These employment losses may be offset to an extent by rises in road transport employment. This is estimated at an increase in road haulage employment of £72.1 million, equivalent to 1,997 direct jobs with the removal of grants, or £45.9 million, equivalent to 1,271 direct jobs with the tapering of the grants. In employment numbers therefore, more jobs would result from the transfer of traffic from rail to road, due to road transport's relative labour inefficiency.

6.3.4.2 Bulk Rail

The volume of freight moved in tonnes, and its equivalent number of lorry journeys was supplied by DfT. To estimate the employment cost of moving the bulk freight by rail and road, one lorry journey was assumed to be equivalent to one intermodal container moved by road or rail and the costs taken from the intermodal calculations described in section 1.3.4.1.

For bulk rail, the employment impact of removing the grant scheme is a rail labour cost reduction of £13.2 million or 289 jobs.

In the grant tapering scenario, the employment impact for rail is a reduction of £11.1 million or 244 jobs.

As is the case with intermodal rail, these losses may be offset by rises in road transport employment, estimated at £13.6 million or 378 jobs with the removal of the grants, or £11.2 million or 310 jobs with the tapering of the grant scheme.

6.3.4.3 Summary of Employment Impacts

The employment impacts are summarised in the tables overleaf.

Table 37: Employment impacts of grant taper

Employment impact			
	Intermodal movements	Bulk moves	Total
Rail jobs lost	-829	-244	-1,073
Road jobs gained	1,271	310	1,581
Net change in jobs	+442	+66	+508
Employment value £ million			
	Intermodal movements	Bulk moves	Total
Rail industry	-37.7	-11.1	-48.8
Road industry	45.9	11.2	57.1
Net impact	8.2	0.1	8.3

Table 38: Employment impacts of grant withdrawal

Employment impact			
	Intermodal movements	Bulk moves	Total
Rail jobs lost	-1,308	-289	-1,597
Road jobs gained	1,997	378	+2,375
Net change in jobs	689	89	+778
Employment value £ million			
	Intermodal movements	Bulk moves	Total
Rail industry	-59.5	-13.2	-72.6
Road industry	72.1	13.6	+85.7
Net impact	12.6	0.5	+13.1

However the value of the change in employment may not represent an increase in social welfare as the increase in jobs in this sector may be fulfilled by displacement within another area of the economy. This means there may be no net increase in overall employment nationally. Hence in line with the standard approach used by DfT the overall societal impacts summarised in Table 41 and Table 42 only include the environmental, congestion and exchequer impacts.

6.3.5 Monetised Impacts

6.3.5.1 Intermodal and bulk rail

The impacts of MSRS withdrawal that are quantified and reported in this section are:

- Additional congestion costs arising from road to rail transfer
- Additional environmental costs arising from rail to road transfer
- Employment impacts
- Exchequer impacts.

The movement of freight by rail rather than road provides substantial environmental benefits, which are monetised using the values in the DfT's Freight Mode Shift Benefits Values User Guide (April 2009) published by DfT, Scottish Government and Welsh Assembly. The majority of these benefits are congestion benefits.

Congestion costs arising from road to rail transfer, although calculated as part of DfT's Mode Shift Benefits Values, are actually economic costs with real effects on economic productivity; they are therefore presented separately from environmental benefits. These reflect the costs imposed on other vehicles in the form of longer journey times and changes to vehicle operating costs resulting from additional HGV traffic joining a road. It also reflects the impact of increased traffic on journey time variability. The average congestion value, weighted by articulated goods vehicle kilometres and their use of the road network, is quoted as 52.4 pence per lorry mile (Table 3 of the Freight Mode Shift Benefits Value User Guide). These values are currently being updated by DfT and restated in current prices.

The analysis has built up these estimates of cost and benefit separately for the withdrawal of MSRS (I) and MSRS (B). These two sets of estimates follow the same logic but use different values for employment and productivity. The additional lorry miles, which drive these results, have been estimated from the MSRS (I) model. For the bulk freight, the equivalent lorry miles provided by DfT for each grant supported rail freight movement have been used. Removing the MSRS (I) scheme would result in 95 million additional lorry miles whilst tapering the scheme would result in 60 million additional lorry miles, equivalent to 200,000 additional lorry miles per day. Whilst representing a small percentage increase, this change could add exponentially to congestions costs on already overcrowded trunk roads such as the A34 or A14. However our review cannot determine which flows would actually transfer, as we do not have the base data to judge the overall BCR of individual applications and levels of award.

To estimate the cost of the impact on congestion of the removal or tapering of the current grant scheme and the resulting switch of some rail freight traffic to road, the average congestion value was applied to the number of containers estimated to switch to road (as described in section 6.3.3.1) and the distance for each movement that would transfer to road.

This gives a total congestion cost resulting from the removal of the MSRS Intermodal scheme of £49.8 million and for the tapering of the grant scheme of £31.4 million.

With most of the additional journeys starting at ports, and with these focussed on a few key port gateways, there will be special pressure on local urban road systems in, for example, Felixstowe and Southampton.[16])

Environmental costs arising from road to rail transfer again originate from the DfT's Mode Shift Benefits Values and produce a net environmental impact (after allowing for the impact that rail movement has on the environment) of 24.1p per mile. This results in increased environmental impacts to society of £17.5m in the case of tapered grant, and £26.9m for full withdrawal.

Taking the societal benefits as a whole, MSRS can therefore be said to be generating £85.3m worth of welfare benefits for an expenditure of £20m, or a ratio of 4.27:1.

Employment losses to the intermodal rail freight industry are likely to be significant and severe in the case of some of the Freight Operating Companies. Our estimates are that between 65%-95% of existing rail container movements would transfer to road, raising serious doubts as to the sustainability of the remaining rail container operations. Our estimates suggest employment losses of the order of 1,308 (intermodal) and 289 (bulk) rail direct jobs in the case of total withdrawal of grant, with a lower impact of 829 (intermodal) and 244 (bulk) jobs for tapered withdrawal.

As rail freight is more efficient in the use of labour than road haulage, the transfer of volumes back to road would actually *generate* employment. Using the road and rail cost estimates applied elsewhere in this report the overall impact is estimated at an additional 800 jobs in road haulage. This would generate a notional increase in Gross Value Added estimated at £8.3 million per annum for tapered grant, and £13.1m for full withdrawal. This offsets the environmental impacts to an extent, though demonstrates the efficiency (and hence reduced impacts) of rail transport.

Additionally there are likely to be losses of indirect jobs at major terminals and in industries such as wagon supply, but these are not quantified as there would be similar counter-balancing indirect job increases in suppliers to road haulage.

The **Exchequer impacts** have been estimated by multiplying the changes in lorry miles outlined above by the MSB taxation impacts[17] to indicate additional government revenue derived from road transport movements, principally through the receipt of fuel duty. This process indicates a gain in tax revenues estimated at £23.5m (taper) and £36.1 million (withdrawal) per annum. In addition the reduction in government expenditure on grant support has been factored in at the 2014 projected annual grant budget of £19.2m. It is assumed in the taper case that this expenditure is reduced by 50%.

Wider taxation impacts (for example changes in corporation tax payment or income tax and NI changes have been ignored for this assessment.

[16] Average MSB values have been used; in practice these hide wide ranges and may disguise acute congestion issues on urban roads close to port gates. Trucks typically stack on the public highway, in order to meet pre-arranged "slot" times; these additional costs and the benefits of journey time reliability are not reflected in this benefits quantification. (source Arup: A160 dualing: Economic Impact Report)

[17] Road pays a duty of 57.95p per litre of diesel; rail pays 11.14p per litre (ignoring VAT). These equate to an additional net taxation revenue of 32.4 pence per lorry mile resulting from rail to road transfer.

These impacts are summarised in the tables below.

Table 39: Impacts of grant taper

Lorry miles, million per annum				
Additional lorry miles	Intermodal movements		Bulk moves	Total
	60.0		12.6	72.6
Impact to society				
	Road cost per mile, pence	Rail cost per mile, pence	Net cost per mile for transfer to road, pence	Total impact of additional road miles, £ million
Environmental	31.5	7.4	24.1	-17.5
Congestion	52.4	0.0	52.4	-38.1
Tax impact	34.1	1.7	32.4	+23.5

Table 40: Impacts of grant withdrawal

Lorry miles, million per annum				
Additional lorry miles	Intermodal movements		Bulk moves	Total
	95.0		16.6	111.6
Impact to society				
	Road cost per mile, pence	Rail cost per mile, pence	Net value per mile for transfer to road, pence	Total impact of additional road miles, £ million
Environmental cost	31.5	7.4	24.1	-26.9
Congestion cost	52.4	0.0	52.4	-58.5
Tax revenue impact	34.1	1.7	32.4	+36.1

6.3.5.2 Coastal/short sea shipping

As stated above, no estimate is made of the quantitative effects of tapering or withdrawing the WFG. Given the small number of awards, all made on a case specific basis using specific cost information, it would be reasonable to assume that if grant is not made available, traffic would not transfer to water, but would remain on road.

Given that unlike MSRS WFG is a tapered grant aimed primarily at establishing water movement rather than providing a continuing support it is possible that existing supported flows may continue after the 3 year support period, but we do not have access to the data to enable us to determine the sensitivity of the cases.

6.3.6 Summary of Quantitative Impacts

In total the cumulative direct impacts of withdrawing or tapering grant are shown on the following tables:

Table 41: Cumulative cost impacts of grant taper

Lorry miles, million per annum				
	Intermodal movements		Bulk moves	Total
Additional lorry miles	60.0		12.6	72.6
Impact to society				
	cost per mile, pence		Net cost per mile for transfer to road, pence	Total impact of additional road miles, £ million
	Road	Rail		
Environmental	31.5	7.4	24.1	17.5
Congestion	52.4	0.0	52.4	38.1
Tax impact	34.1	1.7	32.4	23.5
Overall impact, £ million per annum (1)				
Environmental impact			-17.5	
Congestion impact			-38.1	
Overall societal impact			**-55.6**	
Exchequer impact – increased tax income			+23.5	
Exchequer impact – reduced grant expenditure			+9.6	
Net impact			**-22.5**	

(1) Benefits are shown as positive values, costs are shown as negative values

This demonstrates that even allowing for a saving in annual grant payments of £9.6m per annum from a 50% reduction in grant spend, there is a net worsening in the national position of £22.5m.

Table 42: Cumulative cost impacts of grant withdrawal

Lorry miles, million per annum				
	Intermodal movements		Bulk moves	Total
Additional lorry miles	95.0		16.6	111.6
Impact to society				
	cost per mile, pence		Net cost per mile for transfer to road, pence	Total impact of additional road miles, £ million
	Road	Rail		
Environmental	31.5	7.4	24.1	-26.9
Congestion	52.4	0.0	52.4	-58.5
Tax impact	34.1	1.7	32.4	+36.1
Overall impact, £ million per annum (1)				
Environmental impact			-26.9	
Congestion impact			-58.5	
Overall societal impact			**-85.4**	
Exchequer impact – increased tax income			+36.1	
Exchequer impact – reduced grant expenditure			+19.2	
Net impact			**-30.0**	

(1) Benefits are shown as positive values, costs are shown as negative values

This demonstrates that even allowing for a saving in grant payments of £19.2m per annum for total grant abolition, there is a net worsening of the national position by £30.0m.

For both of the above scenarios, the congestion impact is based on an average congestion value. In reality, particular routes may have higher or lower congestion impacts than this. The congestion costs shown here could therefore be an under or over estimate of the actual impacts depending on which flows transfers to road with the grant removed or reduced. We do not have sight of the base data from the applications to know the relative BCRs of each flow and therefore its continuing eligibility.

6.3.7 Qualitative estimation of industry response

Interviews on the impacts of tapering or withdrawal have taken place with grantee FOCs.

Respondents were all very clear that the availability of grants brings rail prices into line with road prices, but did not produce a price advantage. With prices at parity customers could be tempted to use rail for perceived environmental benefits, convenience of storage at local terminals, and overall operational benefits. However an increase in price following grant withdrawal or even a 50% change in grant award would be enough lead to loss of business to end to end road transport. To an extent this is substantiated by comments from the few end user grantees who stated that their internal road costs were cheaper than rail without MSRS (I), which supports the model results.

In responses received grantees did not consider that there was much difference between a substantial reduction in support for specific flows or total withdrawal – the impact was believed to be the same in that it renders the traffic loss making in overall terms. Therefore we attach a very high health warning to the taper scenario as it would send strong signals to industry of a lack of Government faith in rail freight, so that the impacts in practice might be in line with those under the withdrawal scenario.

Our work on the recalculation of the grant rates would support this, in that the Maximum Grant Rates generated are close to those suggested by empirical data collected during the interview process, and do not indicate that there are areas where excess costs or surplus profit levels exist. Indeed the proposed model does not credit road or rail operators with any profit margin on their activities as it is purely a cost model.

One area is noteworthy as an exception to this. The costs which FOCs face as a direct charge for transferring a container from quay storage to a rail loading point and then loading it to a train are recognised as being set by ports themselves. This is outside the ability of FOCs to influence, and is in effect a 'take it or leave it' cost element.

Grantees also made a very strong comment about the signal the grant sends to both their clients, and their senior management team. MSRS and WFG were held to be significant indications of government policy to endorse the movement of goods by modes other than road. As a result there was industry acceptance that this both meant that rail freight (and especially intermodal freight) had a significant future as part of government transport planning, and that this support was likely to be maintained into the longer term.

In interviews many FOC respondents made comment that intermodal profitability levels were well below those of other parts of the business, and that their respective boards continued to support the sector because of the explicit government endorsement given by the grant regime. Loss of grant support would in their view make the allocation of resources to the sector harder to argue for or justify. We believe that there is a significant risk that this could result for grant curtailment. However we have not been able to quantify the extent to which this might happen.

A number of grantees have said in interviews that they believed that the approach of the end of the current grant model was already having an adverse impact by impacting on this certainty.

In addition to the direct impacts on the freight operators, the reduction or removal of the MSRS grant and resulting loss of rail freight movements currently supported by the grant may also result in wider impacts: these were outlined by grantees in summary, though not explained in detail.

- FOCs' wider intermodal business may be affected through inescapable shared costs being borne by a smaller traffic base. As a result formerly profitable flows may become unviable, which may cause additional flows that are currently profitable to cease. This is hard to quantify. Most operators made the point that if MSRS were not available or significantly reduced, (especially for the shorter distance port flows to the Midlands and Yorkshire) the remainder of the intermodal business might become unsustainable. This would be highly likely to lead to a decision to withdraw totally from the sector rather than continue to bear the remaining joint costs (locomotives and wagon provision, train planning and marketing offices) with a reduced traffic portfolio. At worst this would result in a complete withdrawal from container movement by the rail freight industry. Responses from FOCs and others suggest this could represent a total of between 1,000 and 1,600 jobs. However this may be an extreme outcome and it could be that some core flows, particularly those to Scotland and direct contract services to shipping lines, would remain on rail. It must also be borne in mind that greater use of road transport actually generates a counterbalancing *increase* in employment, due primarily to the reduced labour productivity inherent in road transport movements.

- With less freight being moved by rail, there may be an impact on terminal operators, particularly where there is a high proportion of grant supported traffic. This in turn might result in the loss of further freight flows that are using these terminals. The terminal network has grown over the last 20 years, and is starting to reach the point where some domestic intermodal flows are becoming a practical proposition (with grant support). Daventry to Grangemouth is perhaps the best example of this, but other opportunities are also appearing. The belief is that rationalisation of flows will lead to closures or mothballing of many terminals with resulting economic and employment impacts. This is assessed in Section 6.3.8 below
- Local road hauliers would see a reduction in local distribution work from the rail freight terminal to the final destination. This would however be balanced by an increase in long distance road haulage work as freight would switch to road throughout. This would be likely to transfer jobs to port areas rather than lead to overall employment reductions. Clearly the transfer to end to end road movement creates significant additional environmental impacts, including carbon emissions, pollution and congestion.
- The wagon industry may see an impact as a result of the grant being removed and rail movements reduced. With fewer movements by rail, operators would have a reduced wagon requirement and would reduce orders and leases for these wagons. The principal UK wagon builder, WH Davis at Mansfield, is currently building container flats for the UK rail industry to feed projected growth, and the loss of this market may have an impact on its future. In 2013 WH Davis announced it was expanding and creating 30 new jobs to service increased wagon production. There would also be an impact on the need for wagon maintenance.
- Ports would also suffer reduced revenue as they would lose fees currently received from rail operators for port shunts. As has been noted above, ports charge rail operators for additional container handling, and it is suspected that this includes a profit element over and above their direct costs.
- Network Rail would be affected by the removal of rail freight traffic resulting in a reduction in track access charge revenues, though this should be balanced by a reduction in track wear and tear and might also generate pathing opportunities for other freight or passenger traffic. Given other pressures on the network this is viewed as a neutral impact.
- Government investment in freight capacity and gauge enhancement would no longer deliver the anticipated benefits through the loss of intermodal traffic flows, and in some cases the reduction in grant may achieve the effect of terminating the traffic which the investment has been targeted to benefit. The

significant investment (especially from the Network Rail Discretionary Fund) on gauge enhancement has been predicated on the increasing importance of intermodal traffic. The CP5 and CP6 Electric Spine project also serves the freight market and improves the movement of intermodal traffic from the key south and east coast ports by electrifying core routes. If there was significant retrenchment in the intermodal market the value of this investment might need to be reviewed. The transfer of freight traffic from rail to road and resulting impact on the strategic road network from increased LGV traffic could necessitate further government investment in road capacity which would offset savings in MSRS expenditure.

6.3.8 Terminals

The principal impact on the rest of the industry is on terminals – many of these can be expected to close if there is a substantial loss of business, which would also result in further economic and employment impacts. As we cannot identify which flows might be loss during tapering it has not been possible to accurately quantify the impact of the loss of MSRS (I) on specific terminals, but our assessment of the impact of grant withdrawal or tapering on the rest of the rail freight industry following traffic losses outlined in section 6.3.3.1 above is summarised below.

Our estimates are made on the basis of a withdrawal of all grant supported flows. They envisage a scenario where if a significant proportion of total volume is lost the rest of the terminal operation ceases to be viable, or activity is concentrated on fewer surviving terminals. It is quite likely in such a scenario that other terminals would be 'mothballed' (retained in situ but with no staff or mechanical handling equipment). It must be emphasised however that this is merely an informal view of what might happen, and further work would be required to build up a detailed picture of projected impacts.

In summary it would appear that the majority of the existing English intermodal terminals would be significantly affected by the loss of MSRS support, with at least 10 terminals closing altogether or mothballed (retained in situ but out of use), and most of the remainder's activities being substantially reduced.

There would be less impact on Scottish terminals, primarily because their distance from the main deep sea ports renders the flows viable without grant, though the loss of domestic traffic would still create a significant impact. Although difficult to estimate quantitatively, the reduction in activity or closure of many of the terminals would result in job losses and would also have further indirect impacts on the supply chain supporting the terminals. These would be additional to the direct rail industry job losses discussed above.

If the grant were reduced rather than withdrawn then not all the impacts would be felt, but it is quite likely that the impact on specific terminals could still be as great.

6.4 Impact Assessment - Summary

To determine the impacts of either withdrawing MSRS totally, or tapering it to reduce grant award levels to zero after 3 years of operation, we have attempted to assess the impacts of traffic losses that would result from the loss of the grant on the industry, and on the wider economy. Our assumption throughout is that withdrawal of grant will switch traffic back to road – none will cease to move in total.

In the last 10 years the carriage of containers by rail has increased by 72% - a far greater amount than the total rise in containers coming into the UK. Around 700,000 containers are moved annually on MSRS supported flows, mainly for shorter distance movements from ports to the Midlands, or from the Midlands to Scotland. In addition 1.5 million tonnes of bulk freight are moved by rail and water with MSRS support.

By contrast WFG uptake has been scarce and to date only 4 grants have been awarded.

MSRS expenditure produces significant societal benefits, at a ratio of 4.27:1 for every £1 of grant expenditure (based on the total environmental and congestion cost impacts shown in Table 15).

We have assessed the impact of either tapering the grant towards zero or removing it entirely. Analysis demonstrates that grant awards have mainly been for flows with a medium support level (between 10 and 20% of total costs) and medium Maximum Grant Rate (between £20 and £80 per container). We have assumed that where grant support forms a relatively low (less than 10%) element of costs, there is a 50% likelihood that the traffic will switch back to road. Where grant support forms a higher element of costs, almost all traffic will switch back to road.

Impacts are significant. Road mileage increases by 73 million miles per annum in the case of tapered grant, and 112 million per annum in the case of total withdrawal. This illustrates that the impacts of tapering the grant are disproportionately large, due to the sensitive nature of the flows eligible for grant. A marginal cut in support quickly makes rail flows uncompetitive, and leads to transfer to road.

The net impact of tapering the grant is to worsen the national position by £22.5m per annum, and total withdrawal creates an annual disbenefit of £30.0m, even allowing for the saving in grant expenditure.

However, somewhat perversely transfer of traffic to road actually increases overall employment, as each container move is accompanied by a driver, demonstrating rail freight's superior labour productivity.

This ignores wider impacts on the rest of the rail industry, and in particular domestic rail terminals, which can be expected to be rationalised, with many (especially in the Midlands) closing altogether due to the loss of volume. Reducing the grant would also send a very clear indication of government policy favouring a switch away from rail, particularly for intermodal traffic, which is likely to have an impact on business decisions taken by the rail industry and key customers.

7 Conclusions

7.1 Introduction

This section summarises the work carried out in this research study. It follows the same structure as the list of requirements set out in Section 6.1 of the Specification[18].

The review has focussed on the operation of the Mode Shift Revenue Support and Waterborne Freight Grant schemes. This applies to both bulk and intermodal (container) movements. For the intermodal grant an existing model calculates the relative costs of moving equivalent containers by road and rail, and where rail is more expensive proposed Maximum Grant Rates, capped by the environmental benefit generated by the rail movement.

Our work has involved extensive interviews with stakeholders and grantees to understand the impact the grant has had on the rail and water industry, has reviewed and proposed a replacement for the model which supports the intermodal Mode Shift Revenue Support Grant, and gathered relevant cost data for road and rail container operations to populate a revised cost base within the model.

The report outlines how this work has been carried out, and the results of the analysis of the operation of the proposed model compared to the current model. Further work is under way to assess the impact the grant has on the rail freight industry, and what the impacts would be of reducing or cancellation of further awards.

7.2 Review of the Current Models

The functionality and operation of the two sub-models- one representing movements to and from ports and the other representing movements between inland terminals- has been thoroughly reviewed as part of this study. The key conclusions of this review of the model are as follows:

- Data sources are not always clearly referenced, and there is some 'hard coding' which could impact on spreadsheet operation if variables were changed in the future. Spreadsheet inputs are not particularly user friendly. These issues have all been addressed in the proposed model supplied to DfT
- The model divides England, Scotland and Wales into 18 zones. Users are generally content with this, and no change has been proposed. Zone centroids (the locations on which all distances are calculated) are however relatively random, and not representative. Revisions are proposed to make the centroids representative, which in turn impacts on the distance and cost calculations. Separate port centroids have been established for appropriate zones.
- Distance calculations were unattributed. Rail distances have been re-measured using GIS software and the new centroids, producing variations from distances in the current model. The proposed model uses the Strategic Freight Network as its base and is felt to be more representative of the actual rail network. Road distances continue to be calculated using the Transport Direct software.

[18] Abbreviated descriptions of the tasks are used in the sub section titles in this chapter.

(The Environmental Benefit output from this has not yet been updated, and when this is done may have an impact on Maximum Grant Rates suggested in this report).

- In the current model train productivity is lower than that represented by current practice (and no account is taken of gauge clearance). The proposed model increases the length of trains on the core network from 24 to 26 wagons. This improvement has been mitigated to an extent by a reduction in average container loading caused by the increasing proportion of 40' containers.
- Rail unit costs were unchanged from 2009 levels. They have been updated to current prices, using information provided by the FOCs and road operators.

The proposed model has substantially revised functionality, with sources of data referenced and input cells clearly labelled. It follows standard principles of best practice for spreadsheet construction and is built in a way that allows it to be modified with revised input data as appropriate. The intention is that it can be used interactively to generate and examine proposals for changes based on emerging cost or operational changes.

Comments made by grantees have been reviewed, and where appropriate recommendations have been made as to possible future model changes. Principal among these are the need to establish a new Zone 19 for Channel Tunnel traffic, the extension of MSRS (I) eligibility to coastal/short sea shipping flows, and creating greater awareness of eligibility of MSRS (I) for empty container flows.

7.3 Obtain and analyse cost information from stakeholders

19 stakeholder interviews were undertaken, and all current and recent MSRS grantees were approached. FOCs provided detailed rail cost information using a questionnaire format. Road cost information was obtained from grantees and the FTA Road Manager's Guide Operating Cost tables. Information obtained indicated that core rail costs had risen by lower than inflation, while core road industry costs had risen at above inflation. This was offset by a higher increase in road productivity which produced a broadly neutral end result.

The latest ORR track access charge determination has been incorporated into the model costs.

In many cases considerable variations were observed in the costs reported by FOCs. Where there was consistency the average of each cost item was used. Where there were large variations an agreed 20th percentile figure was used to represent the actions of an efficient operator.

7.3.1 Develop Model to incorporate intermediate rail stage ("split train") journeys

A model variation has been developed to represent the accurate costing of rail movements where restrictions require an alteration in the train configuration over part of the route. The result of this exercise is to show an increase in rail costs increasing Financial Need on these movements.

An associated test established that a new zone representing the Channel Tunnel portal at Dollands Moor produced a Financial Need for movements to the Midlands and the north of England.

7.4 Quality Assurance

Based on the findings of a quality review, recommendations were proposed aimed at ensuring transparency and correcting a number of minor computational errors. These have been incorporated into the final versions of the proposed freight grant models. The updates ensure that the proposed models are computationally sound and conform to a level of best practice that is appropriate for models of this description.

7.5 Identify routes where Financial Need will be reduced

Infrastructure changes since 2009, including upgrade to W10 on a number of sections of the Strategic Freight Network, have been incorporated into the model and changes in Financial Need have been identified (see section 0). The results are set out in scatter diagrams comparing the estimated Financial Need requirement to support rail haulage (compared to the road alternative) for each zone to zone movement. 59% of zone pairs in the port model have an identified Financial Need compared with 81% in the domestic model. These results support the view from the interviews that domestic movements are more likely to exhibit Financial Need than port related movements.

The results suggest that the number of zone pair movements with Financial Need remains broadly the same in both the port and domestic models.

7.6 Produce an interim determination of Maximum Grant Rates

An interim determination of Maximum Grant Rates was circulated in the Interim Report and presented at a workshop held on 13th November 2013 and subsequently commented on by attendees. Adjustments have been made for a number of factors raised in responses, and also to recognise the incorrect calculation of journey times in the Transport Direct environmental benefits calculator.

Maximum Grant Rate is in part determined by the capping of Environmental Benefits, and therefore the rates quoted in the report are not yet conclusive. However Maximum Grant Rates have risen in the majority of cases. A comparative test of the impact on the flows currently qualifying for grant has demonstrated that in the majority of cases the awards would have risen by at least the amount of inflation, and in only one case would a flow cease to be eligible for Intermodal MSRS.

7.7 Note operator comments and recommend scheme changes

Stakeholders made a number of positive comments on the operation of the schemes, and were reluctant to see too much change.

With reference to the MSRS (I) scheme key topics which received general support were:

- The inclusion of Channel Tunnel (Dollands Moor) in the MSRS (I) scheme;
- It would be helpful if intra-zonal movements could be included in the model (there appears to be no reasonable way of achieving this);
- Phasing of the grant to increase support in start-up years would be welcome;
- Queries were raised as to whether different grant rates should apply to 20 foot and 40/45 foot boxes. The overall conclusion of both grantees and Arup was that this was an inappropriate complication to a simple scheme methodology.

Overall stakeholders were clear that MSRS (I) had genuinely promoted rail intermodal growth.

There were no significant concerns raised about the MSRS (B) scheme, where recipients were content that the logistics of each separate flow were best represented by a customised application process using relevant cost data.

It is recognised that there are very few inland waterways applications. In part grantees and others in the waterborne sector felt that this is a reflection of the difficulties of moving inland waterborne freight in the UK. In practice we believe that more explicit support, or indication of prioritisation of funds for waterborne bulk grant applications, may serve to induce more industry interest.

There was however a strong view expressed by coastal/short sea shipping operators that the WFG system worked against the carriage of intermodal containers by sea. This is partly because rather than the MSRS (I) scheme, which publishes Maximum Grant Rates, applicants have to make a specific case for each application. It is also because unlike MSRS (I) the grant is explicitly time limited to 3 years to fund flows which are expected to become self-supporting by the end of the period. By contrast MSRS (I) can be renewed beyond the original 3 year term.

The shipping industry has expressed a desire to see the same rail Maximum Grant Rates being made available for equivalent zone pair movements by sea so that rail and sea modes can compete on an equivalent basis and deliver the same environmental benefits by transferring traffic away from road.

We have made the following positive recommendations:

- MSRS (I) should be extended to cover Channel Tunnel traffic
- The option should be made available for specific intra zonal intermodal flows to be considered under the MSRS (B) scheme.
- The current methodology of paying MSRS (I) irrespective of box length should be maintained.
- A simpler methodology for grantees to report their actual volumes moved should be established as soon as possible.
- MSRS (I) eligibility should be extended to cover coastal/short sea shipping at the published rates.
- Consideration should be given to lowering the qualifying threshold level of WFG grant cost/benefit to recognise that it is intended to fund the start up

period of a flow when operators are working to reach the higher break-even point of sea transport.

- MSRS (I) eligibility for empty container movements should be more generally understood.

7.8 Assess the impact of grant funding ending or being tapered

To determine the impacts of either withdrawing MSRS by March 2015 or tapering it out between 2015 and 2018 we have assessed the impacts of traffic losses on the industry and on the wider economy.

Our assumption is that withdrawal of grant will switch traffic back to road – no freight flow will cease completely.

In the last 10 years the carriage of containers by rail has increased by 72% and rail's share of the container market also has risen. 735,000 containers and 1.5 million tonnes of bulk freight are moved by rail and water with MSRS support, though uptake of WFG has been limited.

We have assessed the impact of either tapering the grant towards zero or removing it entirely. We assume that where grant support forms a relatively low (less than 10%) element of costs, there is a 50% likelihood that the traffic will switch back to road. Where grant support forms a higher element of costs, almost all traffic will switch back to road.

Impacts are significant. The net impact of tapering the grant is to worsen the national position by £22.5m per annum, and total withdrawal creates an annual disbenefit of £30.0m, even allowing for the saving in grant expenditure and increases in exchequer income through greater fuel duty revenues. Rail industry job losses would however be more than balanced by an increase in LGV driving jobs.

Domestic rail terminals can be expected to be rationalised, with many (especially in the Midlands) closing altogether due to the loss of volume. There is a risk that some FOCs may decide to withdraw from the intermodal business altogether.

Reducing the grant may send a wider message of lack of government support for rail and water transport which could have an impact on business decisions taken by the transport industry and key customers.

Appendix A

Detailed Terms of Reference

Review of Revenue Support Freight Grant Schemes

DETAILED REQUIREMENTS

The contractor will be required to:

a) Familiarise him/herself with the original document explaining the financial need calculations called “Mode Shift Revenue Support Scheme – Intermodal; February 2009” and the associated spreadsheet models on which current maximum grant rates for Intermodal MSRS are based. As these contain commercially sensitive information the contractor will be required to sign a confidentiality agreement beforehand. The spreadsheet models are Excel based and are relatively simple, involving no macros or other programming. There is one model for flows from ports, and another for domestic only flows, but they are based on the same design.

b) Obtain and analyse cost information from rail freight operators and from the road haulage industry and, taking into account the implied effect of the Office of the Rail Regulator’s (ORR’s) Interim Determination on track access charges from April 2014, provide an estimate of how much the average costs of rail exceed those of road freight and update figures for the financial need either in the spreadsheet models or in a bespoke replacement. MSRS estimates the financial need for freight movements between each of 18 zones; this structure can be retained if the contractor views it as still appropriate.

The comparison of costs should also consider routes where an intermediate stage to a journey would be needed, such as where train weight or length restrictions limit the train capacity on part of the route, resulting in additional handling costs of transferring containers to a different train for part of the journey where a shorter (more costly) train is required. Under current MSRS rules, in such circumstances eligibility is determined against the actual origin and final destination.

c) Propose and undertake a quality assurance process to ensure the outputs are fit to be used for the purpose intended, and the spreadsheets are free from errors. This could involve checking against known current rates for freight movement. The quality assurance process will need to be fully documented.

d) Take into account Network Rail’s planned track upgrades and identify routes for which there is or will be no financial need or where the financial need will be reduced.

e) Produce an interim determination of maximum grant rates and circulate to freight operators to allow them to comment. Where rates are queried/challenged, review the provisional rate, record the reasons for decisions and revise the grant rates accordingly. The rates will also need to be checked against the provisions in the ORR's Final Determination which is due to be published on 31 October.

f) Note any comments from freight operators on the current schemes, and make recommendations, as appropriate, for any changes to those schemes.

g) Assess the potential impact on the freight industry of grant funding ending in March 2015 or of it being tapered out between 2015 and 2018. This will need to include bulk rail freight, inland waterway traffic and short sea/coastal/short sea shipping as these are also covered by the grant schemes but are not subject to a financial need formula.

h) Produce a detailed confidential report for the Department, which it will share with the Scottish and Welsh Governments, and a summary report, without any information that could enable confidential information to be identified, suitable for external stakeholders.