Periodic Review 2013 – Conclusions on the allocation of the Variable Usage Charge

April 2013

CONTENTS

EXECUTIVE SUMMARY

The purpose of this document

Following careful consideration of consultation responses, the purpose of this document is to conclude on the proposals set out in our December 2012 consultation on the allocation of the Variable Usage Charge (VUC)[1]. We also respond to the detailed points raised by stakeholders in response to the consultation.

This document also sets out an updated estimate of average variable usage cost rates for all traffic (passenger and freight), passenger traffic and freight traffic. These rates are based on cost data included in our Strategic Business Plan (SBP), rather than the Initial Industry Plan (IIP), and an updated list of vehicle characteristics (attached to this conclusions document). Based on the updated SBP cost data and new list of vehicle characteristics, in Appendix 2 we set out a proposed VUC price list for CP5. Please note, however, that ultimately the final decision in relation to the level of VUC rates in CP5 rests with ORR. Moreover, although we are publishing this proposed price list now ahead of ORR's draft determination in June, it could well be the case that ORR's draft determination will necessitate changes to these prices.

The Variable Usage Charge

The VUC is designed to recover Network Rail's operating, maintenance and renewal costs that vary with traffic. The charge ensures that we are compensated for the wear and tear that results from traffic on the GB rail network. In 2011/12 we received £150m, £48m and £3m in VUC income from franchised passenger, freight, and open access operators respectively[2].

The VUC is levied on a 'national average' basis, therefore, the rate applicable to an individual vehicle is the same irrespective of where on the network that vehicle operates. The charge is levied on passenger operators on a pence per vehicle mile basis and is disaggregated by vehicle class. For freight operators, the charge is levied on a pound per thousand gross tonne mile basis (£/kgtm) and is disaggregated by vehicle class, commodity being transported and whether the vehicle is laden or tare.

The Variable Usage Charge and PR13

As part of the 2013 Periodic Review (PR13), it is Network Rail's responsibility to work and consult with the industry in order to re-calibrate the VUC for CP5, before proposing revised VUC rates to ORR. Ultimately, however, any decision on VUC rates for CP5 is a matter for ORR.

As noted in our December 2012 consultation, broadly speaking, re-calibration comprises two stages:

1. Estimating total variable usage costs; and

2. Apportioning total variable usage costs between individual vehicle classes.

[1] Available at: Closed consultations - Periodic review 2013 - Delivery plans - Network Rail
[2] Based on Network Rail's Regulatory Accounts for the year ending 31 March 2011.

It is necessary to re-calibrate charges in two stages because, at present, it is not possible to estimate 'bottom up' a separate variable usage cost for each vehicle class.

Prior to issuing the December 2012 consultation document, we had already carried out significant work in relation to stage one of re-calibrating the VUC, which allowed us to initially estimate total variable usage costs[3].

Our consultation, therefore, focused on the second stage of re-calibrating VUC rates – apportioning total variable usage costs between individual vehicle classes. Consistent with the existing approach, the proposed methodology set out in the consultation aimed to apportion variable usage costs in a cost reflective way between vehicle classes. Therefore, vehicles that cause less wear and tear on the network will attract a lower share of total variable usage costs than vehicles that cause more wear and tear.

Summary of responses to this consultation

We received 15 responses to our December 2012 VUC consultation from the following stakeholders:

- CrossCountry;
- DB Schenker (DBS);
- Department for Transport (DfT);
- Direct Rail Services (DRS);
- East Midlands Trains,
- Eversholt Rail;
- First Group;
- Freightliner;
- Freight Transport Association (FTA);
- GB Railfreight (GBRf);
- Rail Freight Group (RFG);
- The Association of Train Operating Companies (ATOC);
- Transport for London (TfL),
- Transport Scotland; and
- Virgin Trains.

We would like to take this opportunity to thank those stakeholders who took the time to respond to the consultation and / or attended one of the many industry workshops that we have hosted during PR13. We greatly value your feedback on our charging proposals. We have published non-confidential versions of the, above, consultation responses on our website[4].

Summary of conclusions on policy issues

Following careful consideration of the, above, responses we have concluded on each of the policy issues discussed in the consultation. We summarise our conclusions on each of these issues, below.

[3] This work was carried out in order to facilitate ORR placing on early cap on the average freight VUC and is available here: Closed consultations - Periodic review 2013 - Delivery plans - Network Rail
[4] Available at: Closed consultations - Periodic review 2013 - Delivery plans - Network Rail

Allocating vertical track variable usage costs

Vertical track variable usage costs account for approximately 60% of total variable usage costs and 70% of track variable usage costs. We consider that the work carried out by Serco to develop a revised equivalent track damage equation (a measure of 'track friendliness') in order to apportion these costs is a robust piece of analysis that represents a step-change improvement in our understanding of the drivers of vertical track damage.

However, initial analysis carried out by Serco and ourselves indicates that VUC rates for laden freight wagons, particularly bulk wagons, are likely to increase by between 50% and 100% if this revised equivalent track damage equation were to be adopted in CP5. We note that ORR has placed a cap on the average freight VUC rate of £1.68 per kgtkm (2011/12 prices end CP4 efficiency)[5] and that this would, to an extent, constrain the increase in freight VUC rates. However, because ORR has placed a cap on the average VUC rate, and this cap is not disaggregated by commodity or wagon type, the increase in VUC rates for laden bulk wagons is likely to still be very material.

Following the careful consideration of consultation responses, we believe that changes to charges of this scale would be inappropriate to introduce in CP5. The primary reason for our conclusion in this regard is because of the combined effect that these price changes would have with ORR's new Freight Specific Charge (FSC). We consider that this would cause too much 'price turbulence' for the market to bear. We are, therefore, proposing that, as part of the wider charges review that the industry has committed to in early CP5, to inform CP6, the revised equivalent track damage equation developed by Serco should be adopted from the start of CP6.

Allocating horizontal track variable usage costs

Horizontal track variable usage costs account for approximately 25% of total variable usage costs and 30% of track variable usage costs. We also consider that the analysis which we have carried out and the revised methodology that we have developed in order to apportion horizontal track variable usage costs in CP5 is robust and represents a significant improvement, relative to the existing allocation methodology developed in PR08.

However, in light of our proposal that the adoption of the revised equivalent track damage equation developed by Serco, which would be used to apportion the vast majority of track variable usage costs, should be deferred until the start of CP6. We do not consider that that it would be appropriate to introduce a revised methodology for apportioning the minority of track variable usage costs.

[5] We have shown ORR's cap on the average freight VUC rate in 2011/12 prices and at end CP4 efficiency consistent with its decision document. However, the cost data in the CP5 VUC model will be in 2012/13 prices, consistent with our SBP, and we will estimate VUC charge rates net our long-run maintenance and renewals efficiency assumption. Therefore, we have also calculated ORR's cap on the average freight VUC rate at end CP5 efficiency and in 2012/13 prices. Consistent with our SBP, we have assumed 15% maintenance and renewals efficiency by the end of CP5 and RPI of 3% in 2011/12. Based on these values we estimate ORR's capon the average freight VUC rate to be £1.47 per kgtkm in 2012/13 prices and at end CP5 efficiency. This was calculated as follows: (£1.68*(1-15%))*(1+3%) = £1.47. Assuming a miles to kilometre conversion factor of 1.6093 this equates to £2.37 per kgtm in 2012/13 prices and at end CP5 efficiency. Please note that CP5 VUC rates will be subject to a further uplift to reflect inflation between 2012/13 and the start of CP5 (2014/15).

Therefore, consistent with our proposal in relation to the revised equivalent track damage equation, we propose that, as part of the wider charges review that the industry has committed to in early CP5, to inform CP6, the revised methodology for apportioning horizontal track variable usage costs should be adopted from the start of CP6.

Allocating non-track (civils and signalling) variable usage costs

Civils and signalling variable usage costs make up 10% and 5% of total variable usage costs, respectively. We consider that there is merit in Serco's recommendations in relation to refining the methodologies for apportioning these costs. However, in light of our proposals to defer the implementation of the revised approaches for apportioning track variable usage costs until CP6. For CP5, we also propose retaining the existing approach to apportioning civils and signalling variable usage costs. Specifically, we propose:

- Retaining the existing axle load exponent of 4.83 in the structures damage equation (a measure of 'track friendliness') which is used to apportion metallic underbridge variable usage costs;

- Using the same existing structures damage equation to apportion civils variable usage costs that we propose including in CP5 but which were not included in CP4; and

- Continuing to apportion signalling variable usage costs using the existing equivalent track damage equation.

Vehicle characteristics that inform the allocation of variable usage costs

Vehicle characteristics are important inputs which inform the allocation of variable usage costs. Following the careful consideration of consultation responses, where appropriate, we have updated the list of vehicle characteristics (attached to this conclusions document). We have used these vehicle characteristics to apportion our estimate of variable usage costs and derive the draft CP5 VUC price list, set out in Appendix 2.

We propose confirming our proposal to refine the current freight operating speed estimates to reflect our recent analysis of the working timetable, which has been adjusted to exclude 'stopping time'. In addition, we propose confirming our proposal that the default approach for estimating the operating speed for passenger vehicle classes should be to use the existing formula[6]. However, if, based on timetable information, an operator is able to demonstrate that an alternative operating speed would be more appropriate, we would accept this for charging purposes. We have also updated passenger vehicle operating weights to reflect 50% passenger loading, on average, rather than the 100% currently assumed.

Following reasonable endeavours, as an industry, to set VUC rates based on a robust list of vehicle characteristics, we also propose that VUC rates for existing vehicles, not subject to vehicle modification, should be fixed for all of CP5.

[6] Operating Speed = $0.021.\text{Max. Speed}^{1.71}$

Temporary default rates

We propose adopting the proposal, set out in our consultation, that we should retain a default rate for freight vehicles and introduce a default rate for passenger vehicles, where an appropriate bespoke rate has not been approved by ORR. In addition, we propose that default rate bands should be introduced for passenger and freight vehicles and that the respective rate for each of these bands should be the highest relevant rate on the CP5 price list.

Rates for modified vehicles

We propose adopting the proposal, set out in our consultation, that where a vehicle is modified, mid-control period, the VUC rate should be adjusted accordingly. We agree with the respondents who noted that adjusting VUC rates in this way creates incentives for operators to modify vehicles to be more ‘track friendly’, therefore, reducing whole-industry costs.

Updated cost estimate and charge rates

As part of this document we have also updated our initial estimate of the average (passenger and freight) variable usage cost rate to reflect the latest SBP cost and traffic data. This refinement results in the average cost rate increasing from £1.3654 per kgtkm to £1.4406 per kgtkm (2012/13 prices end CP5 efficiency), which equates to an increase of 6%. The majority of this increase can be attributed to our revised estimate of track variable usage costs.

Based on this average cost rate in Appendix 2 we have included a draft VUC price list for CP5.

Following the population of the CP5 VUC model, we have estimated average passenger and freight variable usage cost rates of £1.5735 and £1.1210 per kgtkm respectively. The average freight variable usage cost rate of £1.1210 per kgtkm is lower the £1.47 per kgtkm cap set by ORR (2012/13 prices end CP5 efficiency).

Stakeholder engagement and next steps

We are committed to continuing to work closely with all stakeholders and developing CP5 VUC rates in a transparent and consultative way. As set out in the December 2012 consultation, we have taken considerable steps to engage with stakeholders and promote transparency in relation to the VUC in PR13. This conclusions document represents the next step in that process.

ORR is due to publish its Draft Determination in June 2013 which will cover access charges, including the VUC. It will then publish its Final Determination in October 2013, before auditing and approving the track access charge price lists in December 2013. The revised VUC rates are due to be implemented on 1 April 2014.

Please note that ultimately the final decision in relation to the level of VUC rates in CP5 rests with ORR and although we are publishing this proposed price list now, ahead of ORR’s Draft Determination, it could well be the case that ORR’s draft determination will necessitate changes to these prices.

The principal future milestones for the review are set out in the table, below:

Principal milestones	
12 June 2013	ORR Draft Determination
31 October 2013	ORR Final Determination
By 31 December 2013	Final pricelists made available
1 April 2014	Implement new VUC rates

1. INTRODUCTION

1.1. The Variable Usage Charge

As noted above, the VUC is designed to recover Network Rail's operating, maintenance and renewal costs that vary with traffic. The fixed costs associated with the GB rail network are charged primarily through the fixed track access charge (FTAC). Some freight commodities also contribute towards our fixed costs through freight-only line charges. The VUC ensures that we are compensated for the wear and tear that results from traffic on the GB rail network. In 2011/12 we received £150m, £48m and £3m in VUC income from franchised passenger, freight, and open access operators respectively[7].

Specifically, the charge recovers track, civils and signalling costs that vary with traffic. The table, below, provides a breakdown of the average CP5 variable usage cost rate by asset category and shows that the vast majority of variable usage costs are track related.

Breakdown of the average CP5 VUC rate

Asset type	Cost breakdown (%)
Track:	**85%**
Track maintenance and renewals	85%
Civils:	**10%**
Embankments renewals	1%
Metallic underbridge renewals	5%
Brick and Masonry underbridge renewals	4%
Culverts renewals	0%
Signalling:	**5%**
Maintenance	3%
Minor works points renewals	2%
Total	**100%**

VUC is levied on a 'national average' basis, therefore, the rate applicable to an individual vehicle is the same irrespective of where on the network that vehicle operates. The charge is levied on passenger operators on a pence per vehicle mile basis and is disaggregated by vehicle class. For freight operators, the charge is levied on a £/kgtm basis and is disaggregated by vehicle class, commodity being transported and whether the vehicle is laden or tare. The CP4 VUC price list is published on our website[8].

The charge is designed to be cost reflective and thus vehicles which cause less wear and tear on the network pay lower charges than those which cause greater wear and

[7] Based on Network Rail's Regulatory Accounts for the year ending 31 March 2011.
[8] Available at: http://www.networkrail.co.uk

tear. This approach provides an incentive for stakeholders to develop and deploy 'track-friendly' rolling stock, and make 'track-friendly' vehicle modifications. Because the charge is designed to be cost reflective it also means that we do not face a disincentive, from a wear and tear perspective, when accommodating additional traffic on the network.

1.2. Background

Broadly speaking, re-calibrating the VUC comprises two stages:

1. **Estimating total variable usage costs**. This stage involves determining a single national average variable usage cost rate for passenger and freight traffic on a pound per thousand gross tonne kilometre basis (£/kgtkm). It is then possible to multiply this average variable usage cost rate by a given traffic level in order to determine total variable usage costs.

2. **Apportioning variable usage costs between individual vehicle classes**. Following the determination of total variable usage costs, this stage involves apportioning these costs between the different vehicle classes operating on the network. The apportionment is based on individual vehicle characteristics and aims to reflect the relative wear and tear imposed on the network by each vehicle class.

As noted, above, it is necessary to re-calibrate charges in two stages because, at present, it is not possible to estimate 'bottom up' a separate variable usage cost for each vehicle class (i.e. on a standalone basis).

This primary purpose of our December 2012 consultation was to seek views on the second stage of re-calibrating VUC rate (i.e. the methodology for apportioning variable usage costs between individual vehicle classes). Hence, the primary focus of this document is also on this issue.

Prior to issuing the December 2012 consultation, we had already carried out significant work in relation to stage one of re-calibrating the VUC – estimating total variable usage costs. Specifically, we had consulted on our initial estimate of a single national average variable usage cost rate and, following careful consideration of consultation responses, concluded to ORR. The analysis in our consultation document was reviewed by the independent reporter, Arup[9]. Following this review ORR requested that we use reasonable endeavours to improve our variable usage cost estimates in respect of civil structures and earthworks. We wrote to ORR in response to its request in December 2012[10], providing further information in relation to the cost variability of civils structures and earthworks.

Please note that the cost estimates shown below are in 2012/13 prices and at end CP5 efficiency unless otherwise stated.

1.3. Structure of this document

The remainder of this document is structures as follows:

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[9] This work was carried out in order to facilitate ORR placing on early cap on the average freight VUC and is available here: Closed consultations - Periodic review 2013 - Delivery plans - Network Rail

[10] The letters on civils structures and earthworks are available at: Closed consultations - Periodic review 2013 - Delivery plans - Network Rail

- Vertical track costs allocation methodology: Conclusions.
- Horizontal track costs allocation methodology: Conclusions.
- Non-track costs allocation methodology: Conclusions.
- Vehicle characteristics, temporary default rates and rates for modified vehicles: Conclusions.
- Updated cost estimate and charge rates.
- Conclusion and next steps.
- Appendix 1 – Response to detailed points raised by stakeholders.
- Appendix 2 - Draft CP5 VUC price list.

1.4. Stakeholder engagement and next steps

We are committed to continuing to work closely with all stakeholders and developing CP5 VUC rates in a transparent and consultative way. As set out in the December 2012 consultation document, we have taken considerable steps to engage with stakeholders and promote transparency in relation to the VUC in PR13. This conclusions document represents the next step in that process.

ORR is due to publish its decision its draft determination in June 2013 which will cover access charges, including the VUC. It will then publish its final determination in October 2013 before auditing and approving the track access charge price lists in December 2013. The revised VUC rates are due to be implemented on 1 April 2014.

Please note that ultimately the final decision in relation to the level of VUC rates in CP5 rests with ORR and although we are publishing this proposed price list now, ahead of ORR's draft determination, it could well be the case that ORR's draft determination will necessitate changes to these prices.

The principal future milestones for the review are set out in the table, below:

Principal milestones	
12 June 2013	ORR Draft Determination
31 October 2013	ORR Final Determination
By 31 December 2013	Final pricelists made available
1 April 2014	Implement new VUC rates

2. VERTICAL TRACK COSTS ALLOCATION METHODOLOGY: CONCLUSIONS

2.1. Split between vertical and horizontal track variable usage costs

Summary of proposal in our consultation document

At present, in order to improve cost reflectivity, different methodologies are used to apportion track costs relating to vertical and horizontal rail forces. Hence, for CP5, it is necessary to estimate a split between vertical and horizontal track variable usage costs. In PR08 we estimated that 70% and 30% of track variable usage costs related to vertical and horizontal rail forces respectively. As part of our December 2012 consultation, we reviewed this spilt and proposed increasing the proportion of vertical track variable usage costs to 78% and reducing the horizontal proportion to 22%.

Brief summary of consultation responses

Consultation question 1
What is your view on the surface damage percentages estimated for each activity in Appendix 2 and our proposal that 78% and 22% of track variable usage costs should be attributed to vertical and horizontal rail forces respectively?

Some consultees including GBRf and TfL were supportive of our proposal that 78% and 22% of track variable usage costs should be attributed to vertical and horizontal rail forces respectively.

Other consultees such as DBS and ATOC believed that more work was needed before full support for our proposed approach could be given.

Network Rail conclusion

For reasons discussed in more detail, below, we are proposing deferring the implementation of the revised equivalent track damage equation (a measure of ‘track friendliness’), developed by Serco, for apportioning vertical track variable usage costs until CP6. Consistent with this, we are also proposing deferring the implementation of the revised methodology that we developed for apportioning horizontal track variable usage costs.

In light of our proposals, above, to broadly retain the existing approach to apportioning track variable usage costs between individual vehicle classes, we consider it appropriate to retain the existing percentage split between vertical and horizontal track variable usage costs. We do not believe that it would be appropriate to refine this aspect of the methodology whilst retaining the existing approach to cost allocation.

Therefore, for CP5, we propose retaining the CP4 split between vertical and horizontal track variable usage costs of 70% and 30%, respectively.

2.2. Methodology for allocating vertical track variable usage costs

Summary of proposal in our consultation document

We commissioned Serco to review and re-calibrate the CP4 equivalent track damage equation shown below:

$$\textbf{Equivalent Track Damage} = Ct * A^{0.49} * S^{0.64} * U^{0.19} \textbf{ (per tonne.mile)} * GTM$$

Where:
Ct = 0.89 for loco-hauled passenger stock and multiple units, and 1 for all other vehicles
A = axle load (tonnes)
S = vehicle operating speed (miles/hour)
U = un-sprung mass (kg/axle)
GTM = Gross Tonne Miles

Note: The axle load exponent of 0.49 is used when the formula is expressed in terms of per tonne.mile and 1.49 when expressed in terms of per axle.mile, given that there is an additional axle load multiplier in GTM.

The, above, equivalent track damage equation is a measure of track friendliness used to apportion vertical track variable usage costs. Serco proposed the following revised track damage formula to apportion vertical track usage costs in CP5:

Proposed VTISM-derived track damage formula based on a hybrid fit:

Relative damage (per axle.mile) $= 0.473.e^{0.133A} + 0.015.S.U - 0.009.S - 0.284.U - 0.442$

where:
A = Axle load (tonnes), within the range: 5 to 25 tonnes
S = Operating speed (mph), within the range: 25 to 100 mph
U = Un-sprung mass (tonnes / axle), within the range: 1 to 3 tonnes

If this new formula were to be implemented in CP5, generally a greater share of variable usage costs would be allocated to vehicles with higher axle loads and un-sprung mass (e.g. laden bulk freight vehicles) and a lower share would be allocated to vehicles with a high operating speed (e.g. high-speed passenger vehicles), than in CP4.

In our December 2012 consultation, we noted that freight operators may require more time to understand the analysis underpinning the new track damage formula proposed by Serco. We, therefore, suggested that deferring this work into the charges review that the industry has committed to carry out during the early stages of CP5, to inform charges in CP6, should be considered as an option.

Brief summary of consultation responses

Consultation question 2
Do you have any comments on the analysis carried out by Serco in order to re-calibrate the existing equivalent track damage equation?

ATOC stated that it considered, overall, the Serco analysis was a sound piece of work. However, it had significant reservations about some of the detail of the work. Train operating companies (TOCs) generally either supported ATOC's view or broadly supported the Serco analysis.

Freight operating companies (FOCs) generally considered that the Serco analysis requires further scrutiny. Freightliner commissioned independent consultants, Transportation Technology Centre Inc (TTCI), to carry out a preliminary review of the Serco report. TTCI identified several areas of the Serco analysis which it considers warrant further investigation. In terms of next steps, Freightliner suggested that TTCI undertake a fuller review which would take approximately 4-6 weeks.

Consultation question 3
Do you consider that for CP5 we should use the revised 'hybrid' track damage formula derived by Serco, incorporating the existing Ct factor in its current format, to apportion vertical track variable usage costs between vehicle classes? Or Do you consider that the existing equivalent track damage formula should be retained for CP5, alongside a commitment from the industry to, as part of the wider charges review in early CP5, to better understand the Serco analysis for potential implementation in CP6? Ultimately any decisions on charges for CP5 will, however, be a matter for ORR. If it were to be concluded that the existing equivalent track damage equation should be retained for CP5, we would also propose using this equation to apportion the relevant non-track variable usage costs, rather than the revised 'hybrid' track damage formula recommended by Serco.

TOCs and ATOC broadly supported using the revised equivalent track damage formula, developed by Serco, to apportion vertical track variable usage costs in CP5, subject to a few clarifications and modifications.

FOCs, the Rail Freight Group and Transport Scotland supported deferring the Serco work into the charges review that the industry has committed to carry out during the early stages of CP5, to inform charges in CP6. DfT were also sympathetic towards the deferral of this work.

Network Rail conclusion

We consider that the work carried out by Serco to develop a revised equivalent track damage equation is a robust piece of analysis that represents a step-change improvement in our understanding of the drivers of vertical track damage. Considerable work to improve our understanding of these issues has been carried out since the existing equivalent track damage equation was developed prior to Control Period 3 (CP3). To a large extent, these improvements have been captured in the cross-industry Vehicle Track Interaction Strategic Model (VTISM), which Serco used to derive the revised equivalent track damage equation. Consistent with the Serco analysis, we also consider that the development of VTISM represents a step-change improvement in our understanding and ability to model track wear and tear, relative to the Infrastructure Cost Model (track module) which was used in PR08.

However, initial analysis carried out by Serco and ourselves indicates that VUC rates for laden freight wagons, particularly bulk wagons, are likely to increase by between 50% and 100% if this revised equivalent track damage equation were to be adopted in CP5. We note that ORR has placed a cap on the average freight VUC rate of £1.68 per kgtkm (2011/12 prices end CP4 efficiency)[11] and that this would, to an extent, constrain the increase in freight VUC rates. However, because ORR has placed a cap on the average VUC rate, and this cap is not disaggregated by commodity or wagon type, the increase in VUC rates for laden bulk wagons is likely to still be very material. We note that ORR has not yet set out, precisely, how the cap on VUC rates would apply in CP5. Therefore, there is still some uncertainty with regards to this. We have set out our view in relation to the interpretation of the cap in the consultation document that we issued on phasing the freight-specific charge (FSC) and other issues. Specifically, we stated the following:

"We view the cap applying ex ante and relating to the average freight VUC rate in the CP5 VUC model, rather than the average outturn freight VUC rate, for example. If, following the population of the CP5 VUC model, the average freight VUC rate exceeds the cap set by ORR, our view is that all freight VUC rates would be reduced by the same percentage (i.e. the percentage difference between the average freight VUC rate in the model and the cap set by ORR) so that the average charge does not exceed the cap. We also consider that any difference between the average charge and the cap would be recovered through passenger fixed track access charges (or any network grant income received in lieu of fixed track access charges), rather than passenger VUCs.

By way of an example, if following the population of the CP5 VUC model it was the case that the average freight VUC rate was £1.78 per kgtkm, £0.10 per kgtkm (6%) higher than ORR's cap of £1.68 per kgtkm. We would propose reducing all freight VUC rates by 6%[12], irrespective of how rates for individual vehicles have changed relative to CP4. We consider that this approach would avoid unduly discriminating between different vehicle / commodity types and retain the relative price differential between different vehicle / commodity types, reflecting their relative 'track friendliness'."[13].

Following careful consideration of consultation responses, we consider that changes to charges of this scale would be inappropriate to introduce in CP5. The primary reason for our conclusion in this regard is because of the combined effect that these price changes would have with ORR's new FSC. We consider that this would cause too much 'price turbulence' for the market to bear. This view was broadly echoed by freight stakeholders and funders who responded to this consultation. We are mindful,

[11] We have shown ORR's cap on the average freight VUC rate in 2011/12 prices and at end CP4 efficiency consistent with its decision document. However, the cost data in the CP5 VUC model will be in 2012/13 prices, consistent with our SBP, and we will estimate VUC charge rates net our long-run maintenance and renewals efficiency assumption. Therefore, we have also calculated ORR's cap on the average freight VUC rate at end CP5 efficiency and in 2012/13 prices. Consistent with our SBP, we have assumed 15% maintenance and renewals efficiency by the end of CP5 and RPI of 3% in 2011/12. Based on these values we estimate ORR's capon the average freight VUC rate to be £1.47 per kgtkm in 2012/13 prices and at end CP5 efficiency. This was calculated as follows: (£1.68*(1-15%))*(1+3%) = £1.47. Assuming a miles to kilometre conversion factor of 1.6093 this equates to £2.37 per kgtm in 2012/13 prices and at end CP5 efficiency. Please note that CP5 VUC rates will be subject to a further uplift to reflect inflation between 2012/13 and the start of CP5 (2014/15).

[12] 6% reflecting (0.1/1.68)*100%

[13] Available here: Closed consultations - Periodic review 2013 - Delivery plans - Network Rail

however, that in response to the consultation passenger stakeholders expressed broad support for introducing the revised equivalent track damage equation developed by Serco.

Therefore, we are proposing that, as part of the wider charges review that the industry has committed to in early CP5 to inform CP6, the revised equivalent track damage equation developed by Serco should be adopted from the start of CP6.

We consider that this approach would be consistent with the guidance provided to us by ORR to develop charges to be more cost reflective but would also provide train operators with sufficient time to prepare for what would be a material change to the current charging structure. In addition, it will provide more time for consideration of ATOC's concerns in relation to how the modelling results for the 100mph scenarios were treated in the Serco analysis.

3. HORIZONTAL TRACK COSTS ALLOCATION METHODOLOGY: CONCLUSIONS

3.1. Methodology for allocating horizontal track variable usage costs

Summary of proposal in our consultation document

In our December 2012 consultation we also reviewed the existing approach to apportioning horizontal track variable usage costs between individual vehicle classes and invited stakeholders to comment on our proposal to update the existing damage calculation methodology to incorporate the following 4 refinements:

- Include separate components for grinding, RCF and wear;
- Include a coefficient of friction on the flange of 0.1 to better reflect the effect of flange lubrication;
- Include sample track alignment variations; and
- Include values of $T\gamma$ for the trailing wheelset of a bogie.

Brief summary of consultation responses

Consultation question 4
Do you have any comments on the analysis in Appendix 3? What is your view on our proposal to update the existing methodology such that it incorporates a new damage calculation methodology (comprised of separate components for grinding, RCF and wear), a coefficient of friction on the flange of 0.1 (to reflect better lubrication), sample track alignment variations and values of $T\gamma$ for the trailing wheelset of a bogie?

Some consultees such as ATOC and TfL broadly supported our proposed revisions to the CP4 methodology, although ATOC requested clarification in relation to a couple of points. Cross Country noted that the new methodology does not include reference to different wheel profiles which it understands have an impact on horizontal track damage.

Freight stakeholders generally considered that the analysis was incomplete due to the lack of validated freight vehicle dynamics models. As such, GBRf and Freightliner did not support using the revised methodology to apportion horizontal track variable usage costs in CP5. DBS stated that the revised methodology should only be used for vehicles that have been assessed against validated vehicle dynamics models.

Network Rail conclusion

We consider that the analysis which we carried out and the revised methodology that we developed in order to apportion horizontal track variable usage costs is robust and represents a significant improvement in the cost allocation methodology, relative to that used in CP4.

However, in light of our proposal that the adoption of the revised equivalent track damage equation developed by Serco, to apportion the vast majority of track variable usage costs (c.70%), should be deferred until the start of CP6, we do not consider that it would be appropriate to introduce a revised methodology for apportioning the minority (c.30%) of track variable usage costs in CP5. We believe that it is important to consider the VUC methodology in the round and that any material changes to the VUC cost allocation methodology should be introduced at the same time.

Therefore, consistent with our proposal in relation to implementing the revised equivalent track damage equation, we propose that, as part of the wider charges review that the industry has committed to in early CP5, the revised methodology for apportioning horizontal track variable usage costs should be adopted from the start of CP6.

We consider that this approach would provide more time to address issues raised in consultation responses, including obtaining a greater number of freight vehicle models and the points of clarification raised by passenger stakeholders. Moreover, we believe that it is consistent with ORR's guidance that we should develop charges such that they are more cost reflective, albeit we propose continuing this development into CP5.

Although we are not proposing adopting the revised methodology for apportioning horizontal track costs until CP6, we do consider that there would be considerable merit in making a small refinement to the existing cost allocation methodology. As set out in our December consultation, horizontal track variable usage costs are allocated between freight and passenger vehicles depending on the 'curving class' assigned to each vehicle type (the 'curving class' is a way of categorising vehicles according to the rail surface damage or the 'horizontal track damage' (wear and rolling contact fatigue) that they generate). In PR08 freight wagons were allocated to one of four generic curving classes (two axle, three piece, NACO or Y25). Most wagons were allocated a Y25 curving class. There were significantly more, approximately 20, generic curving classes available for passenger coaches to be allocated to.

Clearly, from a cost reflectivity perspective, it is better to have more rather than fewer curving classes because this will increase the likelihood of one of the generic curving classes appropriately reflecting actual curving behaviour for a particular vehicle. Therefore, if suitable vehicle data can be obtained (e.g. for TF25 and SCT bogied vehicles) we would support generating new curving classes to reflect this. We are currently working with stakeholders in relation to obtaining the necessary vehicle data in order to facilitate this. Based on feedback from stakeholders, we have allocated some freight vehicles a TF25 curving class. However, due to the absence, at present, of suitable vehicle data this is currently assumed to be identical to an Y25 curving class. We propose updating this interim assumption upon the timely receipt of suitable vehicle data from stakeholders.

3.2. Provision of vehicle dynamics models

Summary of proposal in our consultation document

Reflecting the small number of freight curving classes currently available, as part of our consultation, we also invited stakeholders to provide us with access to tare and laden vehicle dynamics models for freight vehicles, to make the surface damage component of the VUC as cost reflective as possible in CP5.

Brief summary of consultation responses

Consultation question 5
Would you like to provide any tare and laden vehicle dynamics models in order to facilitate revising an existing, or creating a new, curving class for CP5?

DBS and GBRf noted that they have contacted the owner of a validated vehicle dynamics model for the 'low track force' TF-25 bogie, which is used on a wide variety of modern freight vehicles, and that the owner is now in discussions with Network Rail with the aim of supporting the analysis.

Virgin Trains considered that Network Rail already had access to a validated Class 390 vehicle model. Cross Country and TfL were also interested in providing vehicle dynamic models, where possible, in order to facilitate revising existing, or creating new, curving classes for CP5.

Network Rail conclusion

As noted above, we are currently working with stakeholders in relation to obtaining the necessary vehicle data in order to generate some additional 'curving classes' for CP5. We propose generating any new curving classes upon the timely receipt of suitable vehicle data from stakeholders.

We were previously provided access to a Class 390 vehicle model. However, this was under an agreement for its use within a particular project. In order to use it for charging purposes we would require the agreement of the owner of the vehicle model.

We would welcome TfL providing us with the vehicle dynamic model for the winning Crossrail train so that we can calculate a bespoke rate for charging purposes in CP5.

4. NON-TRACK COSTS ALLOCATION METHODOLOGY: CONCLUSIONS

4.1. Methodology for allocating civils variable usage costs

Summary of proposal in our consultation document

Serco was also commissioned to review the existing approach to apportioning civils variable usage costs. Further to Serco's review, in our December 2012 consultation we proposed retaining the existing equivalent structures damage equation (set out, below) for apportioning metallic underbridge variable usage costs, however, using a modified axle load exponent of 4 rather than 4.83.

Equivalent Structures Damage = $Ct.A^{3.83}.S^{1.52}$ (per tonne.mile).GTM

Where:
Ct is a constant: 1.20 for two-axle freight wagons, and 1 for all other vehicles
A is the axle load (tonnes)
S is the operating speed (miles/hour)
GTM is the Gross Tonne Miles

Note: The axle load exponent of 3.83 is used when the formula is expressed in terms of per tonne.mile and 4.83 when expressed in terms of per axle.mile, given that there is an additional axle load multiplier in GTM.

Consistent with Serco's recommendation, we also proposed using the revised VTISM derived equivalent track damage equation to apportion embankments, culverts and brick and masonry underbridge variable usage costs.

Brief summary of consultation responses

Consultation question 6
What is your view on our proposal to retain the existing equivalent structures damage equation for apportioning metallic underbridge variable usage costs but using a modified axle load exponent of 4 rather than 4.83?

The majority of consultees supported our proposal to retain the existing equivalent structures damage equation for apportioning metallic underbridge variable usage costs but using a modified axle load exponent of 4 rather than 4.83. Freightliner, however, noted that there is limited knowledge and experience on this issue, and stated that the proposal appears to be on "*reasonably unjustifiable grounds*"[14].

Consultation question 7
What is your view on our proposal to use the revised equivalent track damage equation for apportioning embankments, culverts and brick and masonry underbridge variable usage costs?

[14] Freightliner response to Network Rail's December 2012 consultation on the allocation of the Variable Usage Charge.

ATOC and the majority of TOCs broadly supported our proposal to use the revised equivalent track damage equation for apportioning embankments, culverts and brick & masonry underbridge variable usage costs.

In contrast, the majority of FOCs did not support using the revised equivalent track damage equation to apportion these costs. GBRf considered that the existing equivalent track damage equation should be used. DBS stated that the methodology used to apportion embankment renewals costs in CP4 should continue to be used for CP5 and extended to include culverts and brick and masonry underbridges.

Network Rail conclusion

We do not have any reason to doubt that, based on the literature review that Serco carried out, there is likely to be merit in using a modified axle load exponent of 4 rather than 4.83 in the structures damage equation used to apportion metallic underbridge variable usage costs. However, in light of our proposals to defer the implementation of the revised methodologies for apportioning vertical and horizontal track variable usage costs until CP6, we consider that it would be more appropriate to retain the existing axle load exponent of 4.83 in the structures damage equation. We do not believe that it would be appropriate to broadly retain the existing approach to apportioning track variable usage costs (which account for approximately 85% of variable usage costs) but introduce a revised approach for apportioning metallic underbridge variable usage costs (which account for approximately 5% of variable usage costs).

In light of our proposal to defer adopting the revised equivalent track damage equation used to apportion vertical track variable usage costs until CP6, we consider that it is appropriate to retain the existing approach to apportioning civils variable usage costs (i.e. using the current equivalent structures damage equation, above). We believe that using this equation to apportion civils variable costs would be more cost reflective than using the existing equivalent track damage equation because it does not contain an un-sprung mass term. A vehicles un-sprung mass is less relevant to the apportionment of civils variable usage costs because, unlike track costs, we are not seeking to apportion wear and tear costs that arise at the wheel/rail interface. Between a bridge and the rail there is some resilience in the track and ballast component system which means that a vehicles un-sprung mass has less effect on the structure. A more relevant consideration with respect to civils structures is axle spacing. Closely spaced axles, for example, cause a more locally concentrated loading on the deck or arch barrel as they pass over a bridge, adversely impacting the structure.

As part of the wider charges review in early CP5, to inform charges in CP6, we consider that further consideration should be given to refining the existing approach to apportioning civils variable usage costs.

4.2. Methodology for allocating signalling variable usage costs

Summary of proposal in our consultation document

Serco also reviewed whether it was appropriate to continue apportioning signalling variable usage costs on the same basis as vertical track variable usage costs (i.e. using the equivalent track damage equation). Based on Serco's review, we proposed a slight revision to the existing approach. Specifically, we proposed that it would be more cost reflective to apportion the 50% of the signalling variable usage costs assumed to be load related using the revised equivalent track damage formula, and the remaining 50% based on train movements (vehicle miles).

Brief summary of consultation responses

Consultation question 8
What is your view on our proposal to apportion the 50% of signalling variable usage costs estimated to be load-related using the equivalent track damage formula and the 50% of signalling variable usage costs estimated not be load-related based on vehicle miles?

The majority of consultees supported or were content with our proposal to apportion the 50% of the signalling variable usage costs assumed to be load-related using the revised equivalent track damage formula, and the remaining 50% based on train movements (vehicle miles). Whilst it was prepared to accept this approach, ATOC considered that it was unnecessarily complicated.

Freightliner stated we had not provided sufficient evidence in relation to how axle load, un-sprung mass and speed affect the wear and tear of signalling assets. It considered that signalling variable usage costs should be allocated wholly on train miles.

Network Rail conclusion

We have no reason to doubt that there is likely to be merit in distinguishing between load-related and non-load-related signalling variable usage costs as part of the cost allocation methodology. Similar to our proposal in relation to the structures damage equation, we do not consider that it would be appropriate to broadly retain the existing approach to apportioning track variable usage costs (which account for approximately 85% of variable usage costs) but introduce a revised approach for apportioning signalling variable usage costs (which account for approximately 5% of variable usage costs). We consider that this should, however, be taken forward for further consideration as part of the accelerated charges review for CP6.

5. VEHICLE CHARACTERISTICS, TEMPORARY DEFAULT RATES AND RATES FOR MODIFIED VEHICLES: CONCLUSIONS

5.1. Vehicle characteristics that will inform the allocation of variable usage costs

Summary of proposal in our consultation document

In our December 2012 consultation, we included a draft list of vehicle characteristics for stakeholders' review. We noted that these characteristics will be an important input into CP5 VUC rates because they underpin the allocation of variable usage costs between individual vehicle classes.

Brief summary of consultation responses

Consultation question 9
What is your view on the draft list of vehicle characteristics contained in the spreadsheet attached to the covering email accompanying this consultation? Do you consider that any of these should be amended (if so, please provide supporting evidence where possible)?

Several TOCs and FOCs provided very helpful feedback on the draft list of vehicle characteristics included in the consultation document. DBS provided particularly extensive comments, which were discussed at a separate follow-up meeting.

ATOC and TOCs did not accept the definition of vehicle operating weight for passenger vehicles, which assumes 100% passenger loading. ATOC considered that 50% would be a more appropriate assumption.

Network Rail conclusion

We would like thank those respondents who provided feedback on the draft list of vehicle characteristics included in our consultation document. Following the careful consideration of stakeholder comments, where appropriate, we have updated the list of vehicle characteristics attached to this document.

This update includes revising the operating weight of passenger vehicles to reflect 50% passenger loading, on average, rather than the 100% currently assumed. We agree with ATOC that this is likely to be a more reasonable and cost reflective assumption.

We have also, where appropriate, updated the list of vehicle characteristics for freight vehicles to reflect the submissions that we received in response to our 'suspension bandings' conclusion letter[15]. In this letter we invited stakeholders to carry out analysis using the new Ride Force Count (RFC) methodology in order to generate a revised suspension factor (a measure of the friendliness of the freight vehicles suspension). We received RFC submissions, with respect to 8 freight wagons, from

[15] Available at: Closed consultations - Periodic review 2013 - Delivery plans - Network Rail

three stakeholders. We have noted in the list of vehicle characteristics attached to this document where we have made amendments to the list published as part of the consultation document, including in response to the suspension bandings conclusions letter.

We have used the list of vehicle characteristics attached to this document, in the CP5 VUC model that we have developed, to apportion variable usage costs between individual vehicles and derive VUC rates. We propose using these characteristics as the basis for setting VUC rates in CP5. The draft CP5 VUC price list set out in Appendix 2 is based on these characteristics.

A lot of the very helpful comments that we received from DBS on the draft list of vehicle characteristics have been reflected in the draft CP5 VUC price list. Nevertheless, DBS also identified potential issues where there would be merit in further investigation. At the follow-up meeting, set-up to discuss these issues, DBS suggested that it carries out further research to confirm the characteristics of vehicles where it considers that there are potential inaccuracies. However, due to the number of inaccuracies to be investigated and the need to issue this conclusions document (and the draft CP5 price list) in a timely manner, DBS was not able to complete its research in time so that all of its conclusions could be included in the list of vehicle characteristics attached to this conclusions document. DBS and Network Rail, however, agreed that it is important to try to ensure that the list of vehicle characteristics, that CP5 charges will be based on, is as accurate as possible. Therefore, DBS intends to continue its research and feedback any further inaccuracies it discovers in due course in the hope that they may still be incorporated into the CP5 VUC model. Network Rail supports this approach but notes that the final decision in this respect, like all charging issues, rests with ORR.

In our consideration of feedback received from stakeholders we have, of course, assumed that revised data is an accurate reflection of the vehicles that those stakeholders own / operate. Network Rail does not have the resources to check every single vehicle characteristic.

5.2. ‘Locking down’ VUC rates

Summary of proposal in our consultation document

In our consultation, we also proposed ‘locking down’ VUC rates for existing vehicles, not subject to vehicle modification, for the whole of CP5 (2014-2019).

Brief summary of consultation responses

Consultation question 10
What is your view on our proposal that for existing vehicles, not subject to vehicle modification, VUC rates should ‘locked down’ for CP5?

With the exception of Freightliner, the majority of consultees supported, in principle, our proposal, to ‘lock down’ VUC rates for existing vehicles that are not subject to vehicle modification.

Although it supported the proposal, ATOC believed that changes to maintenance practice (e.g. fitment of alternative composition brake pads), or operating duty for a vehicle which involves a change to either the maximum speed or operating speed should justify a review of VUCs within CP5. Consistent with this, CrossCountry suggested that the definition of vehicle modification should encompass changes such as re-deployment of rolling stock which impact on operating speed.

Network Rail conclusion

We propose confirming the proposal in our consultation document in relation to 'locking down' VUC rates for CP5. Namely that following reasonable endeavours, as an industry, to set VUC rates based on a robust list of vehicle characteristics. Following the commencement of CP5 (1 April 2014) VUC rates for existing vehicles, not subject to vehicle modification, should be locked down for the remainder of the control period.

As set out in our consultation document, we consider that this approach will:

- Provide certainty for all parties with respect to VUC rates;
- Reduce administrations costs mid-control period; and
- Provide a stronger incentive for stakeholders to review vehicle characteristics as part of the consultation process.

We also propose, that the definition of vehicle modification should include changes to maintenance practice (e.g. fitting different break pads which require the limiting of a vehicles maximum speed) and, in certain circumstances, the re-deployment of rolling stock which impacts a vehicle's operating speed.

With respect to the re-deployment of rolling stock or changes to operating duty, we propose that it would only be practical to reflect such changes in VUC rates where a vehicle class is not used by multiple operators on multiple routes. The reason for this is that, where a vehicle class is used by more than one operator, it is not uncommon for one of the operators to sub-lease vehicles to another. If, in this situation, operators paid a different VUC rate with respect to the same vehicle class (reflecting the difference in operating duties), it would give rise to a perverse situation where identical vehicles which are part of the same train set would be charged different VUC rates for the same journey, which we consider would be inappropriate. Our Track Access Billing System (TABS) levies charges on a vehicle basis, rather than an operator basis, and thus it would be 'blind' to the fact that a vehicle has been sub-leased to another operator with a different operating speed and, therefore, a different VUC rate should be applied.

5.3. Estimating freight operating speeds

Summary of proposal in our consultation document

In our consultation, we also proposed basing freight VUC rates on updated operating speed information derived from the Working Timetable and adjusted such that it excludes 'stopping time'.

Brief summary of consultation responses

Consultation question 11
What is your view on our revised freight operating speed estimates and the methodology used to derive them? Would you like to provide any further information in relation to freight operating speeds?

All consultees broadly supported the revised freight operating speed estimates and the methodology used to derive them as proposed in our consultation document.

Network Rail conclusion

Consistent with the proposal set out in our consultation, we propose updating the freight operating speeds used for charging purposes to reflect our analysis of the Working Timetable. In our consultation we highlighted a minority of commodities for which, at the time, it was not possible to develop an updated operating speed estimate based on the Working Timetable. As a temporary solution we mapped these commodities to other commodities, for which data was available, and that we considered were likely to have a similar speed profile. This mapping is set out in the table, below:

Mapping	
Commodity where data was not available	**Mapped to**
Domestic Intermodal	European Intermodal
Engineering haulage	Industrial Minerals
Enterprise	General Merchandise
European Conventional	General Merchandise
Other	Domestic Waste
Biomass	Coal ESI

Following the publication of our consultation, we have carried out further analysis, based on the Working Timetable, in order to derive operating speed estimates for the, above, ‘missing’ commodities. However, we have been unable to gather a consistent set of schedules in the working timetable for engineering haulage. Therefore, it has been necessary to continue to use the mapping in the table, above, for this commodity. The table, below, summarises the freight operating speeds that we propose using as an input to estimating freight VUC rates. These speeds reflect the additional analysis that we have carried out in relation to the ‘missing’ commodities and a 14% uplift, as set out in the consultation, in order to exclude ‘stopping time’.

Commodity	CP5 Average Speed (mph)	CP5 Average Speed excluding ‘stopping time’ (mph)	CP4 speed (mph)	
			Laden	Empty
Coal (other)	22	25	35	41
Iron Ore	22	25	32	41
Steel	22	25	35	41
Domestic Waste	21	24	40	50
Construction Materials	26	29	35	41
Petroleum	20	23	35	41
Coal (ESI)	21	24	32	41
European Intermodal	33	38	46	47

Domestic Automotive	22	25	46	47
European Automotive	27	31	46	47
Industrial Minerals	16	18	35	41
General Merchandise	26	30	40	50
Royal Mail	69	78	67	67
Mail and Premium Logistics	69	78	67	67
Domestic Intermodal	29	33	46	47
Engineering haulage	16	19	35	41
Enterprise	24	27	40	50
European Conventional	28	31	40	50
Other	22	25	38	41
Biomass	30	34	35	41
Chemicals	14	16	35	41

The proposed list of freight vehicle characteristics, attached to this consultation document, incorporates the operating speed values shown, above.

5.4. Estimating passenger operating speeds

Summary of proposal in our consultation document

In our consultation, we also proposed estimating passenger operating speeds using the existing CP4 formula, shown below:

$$\textbf{Operating Speed} = 0.021.\textbf{Max. Speed}^{1.71}$$

However, if an operator is able to demonstrate that an alternative operating speed would be more appropriate based on analysis of the time table, then we would accept this for charging purposes.

Brief summary of consultation responses

Consultation question 12
What is your view on our proposal that the default approach should be that passenger operating speeds are estimated using the existing CP4 formula unless evidence, based on the timetable, that an alternative operating speed is more appropriate is provided? Would you like to provide any evidence, based on the timetable, that an alternative operating speed is more appropriate?

ATOC supported our proposal subject to the definition of vehicle maximum speed being set at the lower of maximum vehicle speed defined at new build, maximum vehicle speed specified by the current operator, or maximum route speed.

CrossCountry, London Midland and First Great Western provided revised operating speed estimates for specific vehicles based on their own analysis of the timetable.

TfL considered that evidence from the timetable should be used to validate the existing CP4 formula.

Network Rail conclusion

We propose confirming our proposal that the default approach for estimating the operating speed for passenger vehicle classes should be to use the existing formula set out, above.

We consider that this represents a reasonable and pragmatic way of estimating the operating speed of a vehicle and note that information in relation to a vehicles maximum speed is, generally, readily available.

However, we also propose that if an operator is able to demonstrate that an alternative operating speed would be more appropriate (as some passenger operators have done in response to this consultation), we would also accept this for charging purposes. In practice this is likely to be based on timetable information.

As suggested by ATOC, we propose that the definition of a passenger vehicles maximum speed is set at the lower of maximum vehicle speed defined at new build, maximum vehicle speed specified by the current operator, or maximum route speed. If, for example, an operator limits the maximum speed of a vehicle to less than that which it was capable of when it was built, therefore, reducing track wear and tear, we consider that this should be reflected in its VUC.

However, where a vehicle class is used by multiple operators on multiple routes, we propose using a single operating speed value for charging purposes. As noted, above, we understand that where a vehicle class is used by more than one operator, it is not uncommon for one of the operators to sub-lease vehicles to another. If, in this situation, operators paid a different VUC rate with respect to the same vehicle class (reflecting the difference in assumed operating speeds), it would give rise to a perverse situation where identical vehicles which are part of the same train set would be charged different VUC rates for the same journey, which we consider would be inappropriate. TABS levies charges on a vehicle basis, rather than an operator basis, and thus it would be ‘blind’ to the fact that a vehicle has been sub-leased to another operator with a different operating speed and, therefore, a different VUC rate should be applied.

5.5. Temporary default rates

Summary of proposal in our consultation document

In our consultation, we also proposed retaining a default rate for freight vehicles and introducing a default rate for passenger vehicles in CP5, where a bespoke VUC rate has not been determined by ORR.

Brief summary of consultation responses

Consultation question 13
What is your view on our proposal to retain a default rate for freight vehicles and introducing a default rate for passenger vehicles in CP5?

All consultees broadly supported our proposal to retain a default rate for freight vehicles and introduce a default rate for passenger vehicles in CP5. TfL expressed support on the basis that Network Rail commits to reasonable timescales for processing the data required to create a new VUC rate for new or modified vehicles.

Network Rail conclusion

We propose confirming the proposal, set out in our consultation, that we should retain a default rate for freight vehicles and introduce a default rate for passenger vehicles, where an appropriate bespoke rate has not been approved by ORR.

If a vehicle class is not included on the draft CP5 VUC price list set out in Appendix 2, which is predicated on the draft list of vehicle characteristics attached to this conclusions document, we propose that it should start CP5 on a default rate until an appropriate bespoke rate can be agreed.

In response to the representation from TfL, we continue to be committed to processing the data required to generate a new VUC rate in a timely manner. We note, however, that in some instances these characteristics can take some time to obtain, and then agree.

5.6. Temporary default rate bands

Summary of proposal in our consultation document

In our consultation, we also proposed introducing default rate 'bands' for passenger and freight vehicles. We proposed that the respective rate for each of these bands should be set at the highest relevant vehicle rate on the CP5 price list. For passenger vehicles we proposed the following bands:

- Locomotive;
- Multiple unit (motor);
- Multiple unit (trailer); and
- Coach.

For freight vehicles we proposed the following bands:

- Locomotive;
- Wagon (laden); and
- Wagon (unladen).

Brief summary of consultation responses

Consultation question 14
What is your view on our proposed default rate 'bands' and that the respective rate for each of these bands should be the highest relevant vehicle rate on the CP5 price list?

ATOC and TOCs broadly supported our proposal to set the respective rate for each default band based on the highest relevant rate on the CP5 price list. TfL supported the proposal on the basis that there is an adjustment made to compensate for any difference between the default rate and bespoke rate, once the bespoke rate is calculated.

Freightliner agreed in principle that it would be sensible to set a default rate towards the higher end of the vehicle charges range. However, it considered before implementation Network Rail should issue clear guidelines on what information is required to calculate locomotive and wagon charges.

DBS and DRS opposed our proposal and considered that the default rate for freight vehicles should remain at an average level across all vehicle types and commodities. GBRf and DBS suggested that the provision of the relevant vehicle characteristic information should be incorporated into the existing vehicle compatibility process.

RFG and FTA suggested that there could be merit in further disaggregating the freight default bands by wagon type (e.g. hopper and flat).

Network Rail conclusion

We propose adopting the proposal, set out in our consultation, that we should introduce default rate bands for passenger and freight vehicles and that the respective rate for each of these bands should be the highest relevant vehicle rate on the CP5 price list. The table, below, sets out our proposed default rate bands for passenger and freight vehicles, based on the draft priced CP5 list (see Appendix 2).

(2012/13 prices end CP5 efficiency)

Operator	Band	Rate
Passenger (pence per vehicle mile)	locomotive	105.49
	multiple unit (motor)	25.96
	multiple unit (trailer)	16.60
	coach	15.40
Freight (£/KGTM)	locomotive	7.39
	wagon (laden)	3.33
	wagon (unladen)	2.29

We consider that our proposal will ensure that we are compensated for wear and tear on the network and introduce a strong incentive for operators to provide the necessary vehicle characteristic information when a new vehicle is introduced. We do not believe that continuing to set default rates at a national average level, as proposed by DBS and DRS, would appropriately remedy the weak incentives that operators currently face to provide vehicle characteristic information.

Consistent with the representation from TfL, our proposal is that following the calculation of an appropriate bespoke rate, all journeys during the control period (including those already charged at the default rate) are re-charged at the ORR approved bespoke rate. Income already received at the default rate would be refunded (i.e. the net impact on operators will be the difference between the default and ORR approved bespoke rate).

We support Freightliner’s view that it would be helpful if further guidance was issued in relation to the calculation of VUC rates. Therefore, prior to the commencement of CP5, we will issue guidance to stakeholders setting out the information required and details of the end-to-end process for calculating VUC rates. We will strive to work collaboratively with key stakeholders when developing this guidance.

We understand why GBRf and DBS have suggested incorporating the provision of vehicle characteristic information into the existing vehicle compatibility process, however, we do not propose taking this suggestion forward in CP5. We do not consider that it would be appropriate to conflate the vehicle compatibility process with the charging one because they serve very different purposes. The compatibility process aims to ensure that the introduction of a new vehicle does not import new uncontrolled risks onto the network. In contrast, the charging process seeks to ensure that each vehicle is charged an appropriate rate such that we are compensated for the additional wear and tear imposed on the network. We have also confirmed that there are limited synergies between the two processes and that information required as part of the compatibility process is, typically, different to that required for charging purposes.

In response to the representations from RFG and FTA, given that default rates are designed to be a temporary measure, and only applicable to a small number of vehicles, we do not consider it necessary to further disaggregate the bands by wagon type. We believe that doing so would introduce a disproportionate amount of complexity into this aspect of VUC rates.

5.7. Rates for modified vehicles

Summary of proposal in our consultation document

In our consultation document, we proposed that where an entire vehicle class or individual vehicle is modified mid-control period, its VUC rate should be adjusted accordingly. This adjustment would continue to follow the standard process and require approval by ORR.

Brief summary of consultation responses

Consultation question 15
What is your view on our proposal to adjust VUC rates during the control period in light of vehicle modifications?

All consultees broadly supported our proposed approach to adjust VUC rates during the control period in light of vehicle modifications. Several respondents noted that this creates incentives for operators to modify vehicles to be more ‘track friendly’, therefore, reducing whole-industry costs.

ATOC supported the proposal but considered that changes in vehicle deployment and vehicle maintenance practices which bring changes to operational speed should also be eligible for such an adjustment.

RFG and FTA supported our proposed approach but considered that we should be clear in the long-term over the type of characteristics we wish to incentivise.

Network Rail conclusion

We propose confirming the proposal, set out in the consultation document, that where an entire vehicle class or individual vehicle is modified mid-control period, its VUC rate should be adjusted accordingly. We agree with the respondents who noted that adjusting VUC rates in this way creates incentives for operators to modify vehicles, during the control period, to be more ‘track friendly’, therefore, reducing whole-industry costs.

As noted, above, we support ATOC's proposal that the definition of vehicle modification should include changes to maintenance practices which impact upon operating speed (e.g. fitting different break pads which require the limiting of a vehicles maximum speed) and thus result in a different level of wear and tear on the network.

With respect to the re-deployment of rolling stock or changes to operating duty, we propose that it would only be practical to reflect such changes in VUC rates where a vehicle class is not used by multiple operators on multiple routes. The reason for this is that, where a vehicle class is used by more than one operator, it is not uncommon for one of the operators to sub-lease vehicles to another. If, in this situation, operators paid a different VUC rate with respect to the same vehicle class (reflecting the difference in operating duties), it would give rise to a perverse situation where identical vehicles which are part of the same train set would be charged different VUC rates for the same journey, which we consider would be inappropriate. TABS levies charges on a vehicle basis, rather than an operator basis, and thus it would be 'blind' to the fact that a vehicle has been sub-leased to another operator with a different operating speed and, therefore, a different VUC rate should be applied.

6. UPDATED COST ESTIMATE AND CHARGE RATES

Following our November 2011 'freight caps' consultation[16], in March 2012[17] we provided ORR with an initial estimate of average CP5 variable usage cost rates. These costs rates were based on IIP cost and traffic data, which was the latest available at the time, and were designed to inform ORR's decision in relation to placing an early cap on the average freight VUC rate for CP5.

In January 2013 Network Rail published its SBP[18], as part of this plan it included an updated average variable usage cost rate which was predicated on updated cost and traffic data. This cost and traffic data is currently the latest available and is being reviewed by ORR.

The table, below, summarises our SBP and IIP average variable usage cost rates relative to those derived in PR08, on a like-for-like basis in terms of price base and efficiency.

Cost rates (£/kgtkm 2012/13 prices and end CP5 efficiency)

	SBP data	IIP data	PR08 data
Passenger	1.5735	1.3993	1.3546
Freight	1.1210	1.2789	1.2141
Total (passenger and freight average)	**1.4406**	**1.3654**	**1.3099**

The, above, table shows that the average (passenger and freight) variable usage cost rate has increased by approximately 6% (£0.08 per kgtkm) as result of updating our IIP cost estimate to reflect the latest SBP cost and traffic data. The majority of this increase is due to an increase in our estimate of track variable usage costs, which has been driven by the following factors:

- A revised level of plain line track and S&C renewals;
- Increasing tamping and stoneblowing to give acceptable track quality; and
- Higher baseline volumes for other maintenance activities.

The remaining increase results from an increase in our estimate of civils and signalling variable usage costs. In particular, an increase in our estimate of the long-run average cost of renewing metallic underbridges.

The, above, table also sets out an average freight variable usage cost rate of £1.1210 per kgtkm (2012/13 prices end CP5 efficiency). This is lower than ORR's cap on the average freight variable usage cost rate of £1.47 per kgtkm (2012/13 prices end CP5 efficiency)[19]. Therefore, it has not been necessary to adjust freight

[16] Available at: Closed consultations - Periodic review 2013 - Delivery plans - Network Rail
[17] Available at: Closed consultations - Periodic review 2013 - Delivery plans - Network Rail
[18] Available at: Network Rail - Strategic business plan 2014-19 (CP5)
[19] In its decision document ORR's cap on the average freight VUC rate was £1.68 per kgtkm in 2011/12 prices and at end CP4 efficiency. However, the cost data in the CP5 VUC model will be in 2012/13 prices, consistent with our SBP, and we will estimate VUC charge rates net our long-run maintenance and renewals efficiency assumption. Therefore, we have also calculated ORR's cap on the average freight VUC rate at end CP5 efficiency and in 2012/13 prices. Consistent with our SBP, we have assumed 15% maintenance and renewals efficiency by the end of CP5 and RPI of 3% in 2011/12. Based on these values we estimate ORR's capon the average freight VUC rate to be £1.47 per kgtkm in 2012/13 prices and at end CP5 efficiency. This was calculated as follows: (£1.68*(1-15%))*(1+3%) = £1.47. Please note that CP5 VUC rates will be subject to a further uplift to reflect inflation between 2012/13 and the start of CP5 (2014/15).

VUC rates in any way such that they are consistent with the cap on the average freight VUC rate set by ORR.

The table, above, also indicates that our SBP average variable usage cost rate is approximately 10% (£0.13 per kgtkm) higher than in PR08. In addition, to the increase in track variable usage costs noted, above, a key driver of this increase has been the inclusion of non-track variable usage cost categories that were not included in PR08 (i.e. brick and masonry underbridge renewals, culverts renewals and minor works points renewals). These cost categories have been included for CP5 on the basis that we now understand that these costs vary with traffic. Non-track variable usage costs remain, however, a small proportion of total variable usage costs. The table, below, illustrates this and provides a breakdown of the average (passenger and freight) CP5 variable usage cost rate by asset category:

Asset type	**Cost breakdown (%)**
Track:	**85%**
Track maintenance and renewals	85%
Civils:	**10%**
Embankments renewals	1%
Metallic underbridge renewals	5%
Brick and Masonry underbridge renewals	4%
Culverts renewals	0%
Signalling:	**5%**
Maintenance	3%
Minor works points renewals	2%
Total	**100%**

<u>The recovery of coal spillage costs</u>

In response to our consultation on coal charges[20], Freightliner queried how the cost impact of coal spillage is accounted for in our estimate of variable usage costs. It noted that the same Network Rail staff ‘on the ground’ carry our coal and non-coal related maintenance and thus it was not clear that coal spillage imposed an additional cost on the business.

In light of this query, we have reviewed the relationship between the VUC and coal spillage charge in more detail. In particular, we have reviewed the extent to which the track modelling that we carried out in order to estimate average (passenger and freight) track variable usage costs, using VTISM and the Strategic Route Section Maintenance Model (SRSMM), reflects the cost impact of coal spillage.

We estimate the cost impact of coal spillage to be £4.02m per annum (2012/13 prices end CP5 efficiency). A breakdown of this cost estimate is shown in the table, below.

[20] Available at: http://www.networkrail.co.uk/publications/delivery-plans/control-period-5/periodic-review-2013/pr13-closed-consultations/

Estimate of CP5 coal spillage costs (2012/13 prices end CP5 efficiency)

Cost Category	**£m**
Cost of clean-up and delay minutes	0.11
Cost of Rail Vac, Tube Cube and manual interventions	1.14
Cost of point end service life reductions	1.38
Cost of Plain Line service life reductions	1.39
Total	**4.02**

The, above, estimate of coal spillage costs gives rise to a CSC rate of 52.78 pence per 1000 gross tonne miles or 32.80 pence per 1000 gross tonne kilometres[21] (2012/13 prices and end CP5 efficiency).

We have confirmed that the majority of the coal spillage costs shown in the table, above, are included in our estimate of track variable usage costs. Specifically, maintenance activities (i.e. clean-up costs, Tube Cube and manual interventions) are accounted for in the SRSMM and the cost of point end and plain line track service life reductions are accounted for in VTISM. The cost of delay minutes and Rail Vac are not included in our variable usage cost modelling. VTISM and SRSMM do not estimate delay minutes and, due to its specialised nature, Rail Vac costs are contracted out by the Delivery Unit and thus excluded from the central cost modelling.

In summary, therefore, we estimate that approximately 85% of coal spillage costs are already accounted for in our estimate of variable usage costs, and the initial CP5 average (passenger and freight) variable usage cost rate of £1.4637 per kgtkm that we derived (2012/13 prices and end CP5 efficiency).

In order to avoid recovering the cost impact of coal spillage twice, through the coal spillage charge and the VUC, we propose netting off the relevant coal spillage costs (i.e. clean-up costs, Tube Cube, manual interventions and service life reductions) from our CP5 estimate of track variable usage costs. We have calculated the quantum of coal spillage costs to be netted off track variable usage costs by multiplying the volume of freight traffic carrying coal in the CP5 VUC model by the proposed CP5 coal spillage charge rate, reduced pro-rate to reflect the coal spillage costs not included in the VUC cost modelling. This adjustment results in the exclusion of approximately £3.6m (2012/13 prices and end CP5 efficiency) from our estimate of track variable usage costs and reduces the CP5 average (passenger and freight) variable usage cost rate from £1.4637 per kgtkm to £1.4406 per kgtkm (2012/13 prices and end CP5 efficiency).

For the avoidance of doubt, we have netted off the relevant coal spillage costs, from our estimate of total track variable usage costs, prior to these costs being allocated between the different passenger and freight vehicle types. We consider this to be appropriate because when we estimated total track variable usage costs we did so by deriving a single (passenger and freight) national average cost rate. We also

[21] 1.6093 being the miles to kilometres conversion factor.

consider that if we were to only net these costs off coal VUC rates, it would unduly discriminate against non-coal wagons. Coal spillage costs are incremental to the wear and tear costs recovered through the VUC and, therefore, we would not consider it appropriate for a coal wagon to pay a lower VUC rate than an identical non-coal carrying wagon.

Therefore, although this ‘double count’ does not reduce our estimate of coal spillage costs, it does reduce our estimate of track variable usage costs.

We have confirmed that this issue is limited to our initial estimate of CP5 track variable usage costs and that the CP4 VUC rates were not overstated. In PR08, we estimated track variable usage costs using the Infrastructure Cost Model (ICM) (track module), not VTISM or the SRSMM. VTISM and the SRSMM are considerably more sophisticated than the ICM (track module). The ICM (track module) did not estimate an accelerated reduction in asset life, or increased maintenance activity, as a result of coal spillage. Specifically, it estimated frequency of renewals based on service life and tonnage and maintenance activity based on the relevant standards, neither of which took account of coal spillage.

Based on the, above, average variable usage cost rate (adjusted for the coal double count), the cost allocation methodologies set out in this document, and the list of vehicle characteristics attached to this consultation. In Appendix 2, we have included a draft VUC price list for CP5. Please note that although we are publishing this proposed price list now, ahead of ORR’s Draft Determination, it could well be the case that ORR’s draft determination will necessitate changes to these prices. Also, ultimately, any decision in relation to VUC rates in CP5 is a matter for ORR.

Following any refinements required by ORR, the intention is that the draft VUC price list, set out in Appendix 2, will replace that currently referred to in Schedule 7 of operators track access agreements. We note, however, that the charging arrangements for charter and heritage operators are quite bespoke and, typically, do not refer to the published price list. We propose considering in more detail the most appropriate way of updating VUC rates for these operators between now and ORR’s draft determination in June 2013.

7. CONCLUSION AND NEXT STEPS

The VUC is an important source of income for Network Rail and a significant cost to train operators. Consistent with our general approach for all existing track access charges, as part of PR13, we have reviewed whether the current charging arrangements continue to be appropriate.

As set out, above, following the careful consideration of consultation responses, we are proposing to retain broadly the existing approach to allocating track variable usage costs between individual vehicle classes. Whilst we consider that the work carried out by Serco and Network Rail in reviewing the VUC cost allocation methodology is robust, we are not proposing making significant changes until CP6. Our initial analysis indicates that the allocation of variable usage costs would change materially if the changes to the vertical and horizontal track cost allocation methodologies were adopted. In particular, VUC rates for laden freight wagons, particularly bulk wagons, would increase by between 50% and 100%, if the increase was not constrained. We consider that changes to charges of this scale would be inappropriate to introduce in CP5 when considered alongside ORR's new FSC. Therefore, we are proposing that, as part of the wider charges review that the industry has committed to in early CP5, the revised approach to apportioning track variable usage costs should be adopted from the start of CP6.

In light of our proposals to defer the implementation of the revised methodologies for apportioning track variable usage costs, we are also proposing to retain the same approach to apportioning civils and signalling variable usage costs.

Following the careful consideration of consultation responses, where appropriate, we have updated the list of vehicle characteristics (attached to this conclusions document). We have used these vehicle characteristics to apportion our estimate of variable usage costs and derive the draft CP5 VUC price list, set out in Appendix 2.

We are proposing that following reasonable endeavours, as an industry, to set VUC rates based on a robust list of vehicle characteristics. In CP5, VUC rates for existing vehicles, not subject to vehicle modification, should be 'locked down' for the remainder of the control period.

We propose confirming our proposal to retain a default rate for freight vehicles and introduce a default rate for passenger vehicles, where an appropriate bespoke rate has not been approved by ORR. In addition, we consider that default rate bands should be introduced for passenger and freight vehicles and that the respective rate for each of these bands should be the highest relevant existing rate on the CP5 price list. We also believe that where an entire vehicle class or individual vehicle is modified mid-control period the VUC rate should be adjusted accordingly.

We have updated our initial estimate of the average (passenger and freight) variable usage cost rate to reflect the latest SBP cost and traffic data, rather than IIP cost and traffic data. This refinement results in the average cost rate increasing from £1.3654 to £1.4406, which equates to an increase of 6%. The majority of this increase can be attributed to our revised estimate of track variable usage costs.

Ultimately, any decision in relation to VUC rates in CP5 is a matter for ORR. Although we are publishing this proposed price list now, ahead of ORR's Draft Determination, it could well be the case that ORR's draft determination will necessitate changes to these prices.

ORR is due to publish its Draft Determination in June 2013, which will cover access charges, including the VUC. It will then publish its Final Determination in October 2013 before auditing and approving the track access charge price lists in December 2013. The revised VUC rates are due to be implemented on 1 April 2014.

The principal future milestones for this review are set out in the table, below:

Principal milestones	
12 June 2013	ORR Draft Determination
31 October 2013	ORR Final Determination
By 31 December 2013	Final pricelists made available
1 April 2014	Implement new VUC rates

APPENDIX 1 – RESPONSE TO DETAILED POINTS RAISED BY STAKEHOLDERS

Split between vertical and horizontal track variable usage costs

Consultation question 1
What is your view on the surface damage percentages estimated for each activity in Appendix 2 and our proposal that 78% and 22% of track variable usage costs should be attributed to vertical and horizontal rail forces respectively?

GB Railfreight, Transport Scotland and Transport for London; support our proposal that 78% and 22% of track variable usage costs should be attributed to vertical and horizontal rail forces respectively. East Midlands Trains and DRS were also broadly supportive.

Conversely, Freightliner, DBS, Virgin Trains, CrossCountry and ATOC stated that the consultation document did not include adequate information on the underlying analysis and calculations with regards to the proposed 78% and 22% track variable usage costs split. Consequently, these operators stated that they could not support Network Rail's proposed split between vertical and horizontal track variable usage costs, until further information and analysis is provided.

Network Rail response

As set out above, in light of our proposals which broadly retain the existing approach to apportioning variable usage costs between individual vehicle classes, we also consider it appropriate to retain the existing split between vertical and horizontal track variable usage costs. We do not think that it would be appropriate to refine this aspect of the methodology whilst broadly retaining the existing approach to cost allocation. Therefore, we propose retaining a 70% and 30% split between vertical and horizontal track variable usage costs of respectively.

Revised equivalent track damage equation methodology

Consultation question 2
Do you have any comments on the analysis carried out by Serco in order to re-calibrate the existing equivalent track damage equation?

ATOC highlighted that although Serco initially identified that there was less track damage for some 100mph cases than equivalent cases at lower speeds; Serco did not include these results, in its subsequent analysis. ATOC believed that this was unreasonable. It suggested that Serco should use simple hand calculations, based on the two sets of unit costs (for 100+mph and for lower speed routes) and using the existing VTISM work volumes, produce a revised set of costs for all required operating speeds, including for 100mph. ATOC believed that this new data could then be used to define a new, complete and appropriately robust and dependable track damage function.

ATOC also considered our proposal to retain the Ct constant (used in the existing equivalent track damage equation) in the revised equivalent track damage equation, developed by Serco, would be inappropriate and have a material and inaccurate influence on VUCs.

GBRf stated that the appropriate selection of the generic ride force model must be influenced by the type of suspension chosen in the model. It believes that there is not sufficient data presented in the Serco report to determine all of the assumed suspensions. It also states that there does not seem to be any sensitivity analysis presented around some of the key assumptions. GBRf also considered that there was no evidence of an audit process or a peer review of the Serco report. It stated that this needed to be completed, along with further work, to substantiate or refute the initial findings, as part of the PR13 access charging review.

DBS stated that; compared to the VTISM 'hybrid' formula, the VTISM power formula generates results that have a 'better fit' to the underlying assertions put forward by Serco (i.e. that axle weight and unsprung mass have a greater effect and speed a lesser effect on track damage than previously thought). DBS believes that in striving for a 'better fit' to the VTISM data, the Serco results have been compromised on conforming to the underlying principles.

Network Rail response

We consider that the approach set out in the Serco report to modelling track damage in the 100mph traffic scenarios (i.e. extrapolating them from the other scenarios) is broadly reasonable in the absence of more disaggregated unit cost data. We recognise, however, that if unit cost data disaggregated by route type was available then there could be merit in using this to refine the Serco analysis. We propose that further consideration should be given to this issue as part of the accelerated charges review in early CP5, to inform charges in CP6. This review could also consider further ATOC's view that the Ct constant that we proposed including to represent the power-related aspects of track damage should be excluded.

In response to GBRf, VTISM contains a set of validated industry-approved generic models for a range of passenger and freight vehicles. As explained in the Serco report, an appropriate generic ride force model was chosen using the closest matching reference axle load and ride speed, from which VTISM extrapolates to obtain the estimated ride forces for the given artificial vehicle axle load and speed. It should be noted that the ride forces have a lesser contribution to overall vertical forces with axle load and un-sprung mass dominating so the use of generic models is acceptable. In addition, a freight 'suspension band' overlay is also applied when allocating vertical track variable usage costs so that track friendly freight suspension types will attract a discount.

Regarding a review of the process, we note that VTISM has been developed and validated in stages involving stakeholder input, review and acceptance from across the rail industry over several years. Further information on this can be obtained from RSSB. Network Rail also facilitated a workshop where Serco provided an overview of the detailed models and data used in VTISM and the process used to set-up VTISM for this analysis.

Separately, we note that VTISM has been reviewed by the independent reporter, Arup, several times as part of the wider PR13 work programme and the results of these reviews have been broadly positive. Network Rail would, of course, fully co-operate with any further review of VTISM, specifically, in relation to this analysis.

In response to the representation from DBS the 'better fit' of the hybrid formula is characterised not only by the overall degree of fit measure but also by the other statistical measures as described in Appendix 1 of the Serco report (correlation coefficient and adjusted R-Square). We recognise that the hybrid equation is not perfect but it achieves the best fit overall using an equation that is not overly complex.

Revised equivalent track damage equation implementation

Consultation question 3
Do you consider that for CP5 we should use the revised 'hybrid' track damage formula derived by Serco, incorporating the existing Ct factor in its current format, to apportion vertical track variable usage costs between vehicle classes? Or Do you consider that the existing equivalent track damage formula should be retained for CP5, alongside a commitment from the industry to, as part of the wider charges review in early CP5, to better understand the Serco analysis for potential implementation in CP6? Ultimately any decisions on charges for CP5 will, however, be a matter for ORR. If it were to be concluded that the existing equivalent track damage equation should be retained for CP5, we would also propose using this equation to apportion the relevant non-track variable usage costs, rather than the revised 'hybrid' track damage formula recommended by Serco.

DBS, DRS, GBRf, RFG and Transport Scotland supported deferring the Serco work, to provide more time and consideration to the outcomes and implications of the analysis. DfT also sympathised with this view stating that it is important that if necessary, further research is undertaken before any financial decisions are taken on charges.

In contrast, ATOC supported implementing the revised 'hybrid' track damage formula, subject to a few clarifications and revisions. Virgin Trains concurred with ATOC on this issue.

Similar to ATOC, CrossCountry noted that VTISM is currently the best method for evaluation of the wheel/rail interface, therefore, it follows that there is logic to follow the hybrid fit. However, it noted the significant commercial implications of this and questions over the accuracy of the Serco assessment.

TfL also supported the use of the revised 'hybrid' track damage formula, derived by Serco, to apportion vertical track variable usage costs between vehicle classes. However, it noted that the approach used must be able to assess fully the impact of vehicles with one motor bogie and one trailer bogie on the track, as well as vehicles with one motored axle and one trailer axle.

<u>Network Rail response</u>

As noted above, we consider that the work carried out by Serco to develop a revised equivalent track damage equation is a robust piece of analysis that represents a step-change improvement in our understanding of the drivers of vertical track damage.

However, based on initial analysis carried out by Serco and ourselves, which indicates VUC rates for laden freight wagons, particularly bulk wagons, would increase by between 50% and 100%. We note that ORR has placed a cap on the average freight VUC rate of £1.68 per kgtkm (2011/12 prices end CP4 efficiency)[22] and that this would, to an extent, constrain the increase freight VUC rates for particularly wagons and commodities. However, because ORR has placed a cap on the average VUC rate, and this cap is not disaggregated by commodity or wagon type, the increase in VUC rates for laden bulk wagons is likely to still be very material.

Following the careful consideration of consultation responses, we consider that changes to charges of scale, combined with the impact of the FSC, would be inappropriate to introduce in CP5. Therefore, we are proposing that, as part of the wider charges review that the industry has committed to in early CP5, the revised equivalent track damage equation, developed by Serco, should be adopted from the start of CP6.

Revised horizontal track cost allocation methodology

Consultation question 4
Do you have any comments on the analysis in Appendix 3? What is your view on our proposal to update the existing methodology such that it incorporates a new damage calculation methodology (comprised of separate components for grinding, RCF and wear), a coefficient of friction on the flange of 0.1 (to reflect better lubrication), sample track alignment variations and values of $T\gamma$ for the trailing wheelset of a bogie?

Virgin Trains has sought to understand the following issues in more detail:

- The implications of revision of the surface damage formula for the fleets of tilting trainsets (Class 221 and 390) that they operate;
- An assessment of the difference between the current CP4 horizontal track variable usage cost and that calculated using the new damage calculation methodology, whilst ensuring that the increased cant deficiency operation permitted by the trainset tilting systems is included; and
- The scope of the assessment is extended to understand the effect of moving from the P8 to what WCTL consider to be the ‘track friendly’ P12 wheel profile.

GBRf stated that results of this new methodology significantly increases the damage caused by an Y25 bogie. It also noted that it has sought input from those who have worked on the development of the model and who consider that the proposed approach is not a reliable predictor of friction based suspensions. Therefore, until the model is better suited to dealing with friction based suspensions, GBRf does not support the introduction of the revised methodology.

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[22] We have shown ORR’s cap on the average freight VUC rate in 2011/12 prices and at end CP4 efficiency consistent with its decision document. However, the cost data in the CP5 VUC model will be in 2012/13 prices, consistent with our SBP, and we will estimate VUC charge rates net our long-run maintenance and renewals efficiency assumption. Therefore, we have also calculated ORR’s cap on the average freight VUC rate at end CP5 efficiency and in 2012/13 prices. Consistent with our SBP, we have assumed 15% maintenance and renewals efficiency by the end of CP5 and RPI of 3% in 2011/12. Based on these values we estimate ORR’s capon the average freight VUC rate to be £1.47 per kgtkm in 2012/13 prices and at end CP5 efficiency. This was calculated as follows: (£1.68*(1-15%))*(1+3%) = £1.47. Assuming a miles to kilometre conversion factor of 1.6093 this equates to £2.37 per kgtm in 2012/13 prices and at end CP5 efficiency. Please note that CP5 VUC rates will be subject to a further uplift to reflect inflation between 2012/13 and the start of CP5 (2014/15).

CrossCountry stated that the horizontal track cost allocation methodology did not include reference to different wheel profiles, which it noted was understood to have an impact on horizontal track damage.

DBS believed that the significant work carried out by the industry on rolling contact fatigue (RCF) following the Hatfield derailment in 2000 concluded that RCF was caused primarily by passenger trains given their higher speeds. The only circumstance found where RCF is caused by freight trains is on the lower rail of canted track in cases where freight trains traverse the track at lower than the balancing speed. It stated that, given that freight trains do not require canted track in any case, it wanted to understand how the fact that freight trains are not the major cause of RCF has been recognised in the proposed methodology.

ATOC welcomed our initiative to improve the CP4 calculation process. It acknowledged that this process is, of necessity, technically intricate and will benefit from the use of simplifying assumptions. Notwithstanding this, ATOC has requested that Network Rail clarify the following two points with regards to damage cost calculations:

- Why is it necessary to introduce grinding costs; and

- Crack growth rates are definitely not linear to a crack depth of 5mm.

Regarding friction coefficients, ATOC welcomed the work on friction coefficients and believed it to be sound. However, it noted that the good work done on this subject should be supported by reference to published work which supports the Network Rail choice of friction coefficients of 0.1 on the wheel flange and 0.4 on the tread.

ATOC also welcomed evolution in calculating rail surface damage; however, it did not welcome the inclusion of this damage from the trailing wheelset of a bogie as it suspects that it is not significant relative to other types of surface damage. It suggested that Network Rail should quantify the likely value of these costs in order to justify the increased complexity of the calculation process.

<u>Network Rail response</u>

In light of our proposal to defer the implementation of the revised methodology for allocating horizontal track variable usage costs until CP6, we note that the accelerated charges review in early CP5, to inform charges in CP6, affords us the opportunity to consider the points raised by stakeholders, above, in more detail. However, we provide an initial to response to these representations, below.

One of the benefits of tilting trains is a reduction in wheel/rail forces on the leading wheelset which occurs at higher cant deficiencies, leading to reduced surface damage. Since the proposed surface damage methodology depends on the wheel/rail forces on different curves then the benefit of tilting trains could be correctly accounted for by undertaking the assessment at a higher cant deficiency, as is currently used in the existing VTAC procedure. Regarding the P12 wheel profile, although the use of this wheel profile has shown benefits to train operators/maintainers (for some fleets) of increased wheelset life, research for the Vehicle / Track Systems Interface Committee (V/T SIC) has (so far) not demonstrated a significant reduction in rail surface damage. Sample VUC calculations have predicted a small decrease in VUC rates for vehicles with P12 wheels but this has not been a significant benefit to train operators. Work is continuing in this area to better quantify the benefit and we are not opposed to using a 'typical' P12 wheel instead of the 'typical' P8 wheel currently used to be able to define curving classes for vehicles with P12 wheels.

Regarding the comments on modelling friction damped suspensions, it is recognised that the behaviour of these suspensions can be very non-linear and requires careful consideration when constructing the model. However, the simulation process remains the same: a well modelled friction damped suspension can give good predictions of typical curving forces for input to the track damage model. The proposed inclusion of real track irregularity data in the simulations would assist in this since it would help to prevent parts of the suspension 'locking up' due to friction.

As noted, above, although we believe that reductions in surface damage can be obtained with appropriate wheel profiles, V/T SIC research to date has not shown a significant benefit in surface damage (although increases in wheelset life have been obtained). Research is continuing and Network Rail is not opposed to using alternative wheel profiles to determine VUC rates.

We would highlight that the surface damage term is designed to account for both wear and rolling contact fatigue, not just RCF, generated by vehicles. We also note that the inclusion of the forces from the trailing axle of a bogie would account for the damage incurred on the low rail of tight radius curves from vehicles running at cant excess, which (as noted above) are primarily freight vehicles. We also note that freight vehicles can contribute to RCF damage and the inclusion of the RCF damage term in the assessment of the behaviour of freight vehicles provides an incentive for manufacturers to construct vehicles which do not cause RCF.

Rail grinding is a necessary activity to control rail surface damage and restore the rail profiles (for both wear and RCF) and, therefore, we consider that it should be included in the costs of rail surface damage. Without grinding rail life would be shorter, both from an increase in crack growth and also from a loss of profile shape leading to instability and poor vehicle riding. Network Rail believe that grinding is a legitimate cost to include in the analysis and without it rail replacement costs would increase because of the shorter rail lives.

Network Rail agree that the assumption of linear crack growth is an approximation. Unfortunately, existing research and knowledge is unable to provide a better model which could be included in the VUC model - the actual crack growth rate depends on a wider range of parameters than are available here and there are no accepted/validated models of RCF crack growth. Current Network Rail track maintenance standards specify the crack depth at which rail should be replaced and control measures based on visual assessments of surface crack length. These two criteria have been equated in the definition of the crack growth rate and this is considered to be the most appropriate definition with the present level of industry knowledge.

Provision of vehicle dynamics models

Consultation question 5
Would you like to provide any tare and laden vehicle dynamics models in order to facilitate revising an existing, or creating a new, curving class for CP5?

DBS stated that it is aware that its sister Company, Axiom Rail, who possesses the validated vehicle dynamics model for the 'low track force' TF-25 bogie, which is used on a wide variety of modern freight vehicles, has recently written to Network Rail suggesting a possible way of addressing the issues of commercial sensitivity. DBS hopes that Network Rail will consider Axiom Rail's suggestion positively and that this proposal could also be used to obtain relevant information from other validated vehicle dynamics models.

GBRf stated that it has contacted the supplier of the TF25 bogie, Axiom Rail Ltd, whom it believes are now in discussions with Network Rail regarding either supplying the models or supporting Network Rail in carrying out the required analysis.

DBS considered that not all 2-axle freight vehicles should be considered in Suspension Bands 1 and 2 and, therefore, be allocated a more detrimental curving class.

Virgin Trains consider that Network Rail already has access to a Class 390 vehicle model. It noted that, if this not the case, then it would progress the provision with Alstom Transportation.

CrossCountry expressed an interest in providing dynamic models to refine curving classes for CP5. It noted that it was exploring this with its maintenance providers, and would like to understand the required timescales to set a CP5 price.

TfL stated that it would be content to share the dynamic model for the winning train that will provide services on the Crossrail network, once the bidding process is complete.

<u>Network Rail response</u>

We are currently working with stakeholders in relation to obtaining the necessary vehicle data in order to generate some additional 'curving classes' for CP5. We propose generating any new curving classes upon the timely receipt of suitable vehicle data from stakeholders.

With respect to the suspension bands for 2-axle freight vehicles it is noted that suspension bands can now be allocated using the Ride Force Count methodology. It is therefore considered that this technique should be used if it is considered that vehicles are allocated to the wrong suspension band.

We were previously provided access to a Class 390 vehicle model. However, this was under an agreement that it would be used for a particular project. In order to use it for charging purposes we would require the agreement of the owner of the vehicle model.

Ideally, we would have liked to have received vehicle dynamic models in response to this consultation, or shortly after the consultation closed, such that we could use them to inform the draft price list appended to this conclusions document. There is likely to still be an opportunity to refine the vehicle characteristics which underpin the CP5 VUC price list. However, any amendments will have to be agreed by ORR.

We would welcome TfL providing us with the vehicle dynamic model for the winning Cross Rail train so that we can calculate a bespoke CP5 VUC rate.

Modifying the existing equivalent structures damage equation

Consultation question 6
What is your view on our proposal to retain the existing equivalent structures damage equation for apportioning metallic underbridge variable usage costs but using a modified axle load exponent of 4 rather than 4.83?

Virgin Trains, GBRf, TfL, DBS and ATOC broadly supported retaining the existing equivalent structures damage equation for apportioning metallic underbridge variable usage costs, however, using a modified axle load exponent of 4 rather than 4.83.

Freightliner stated that there is limited knowledge and experience on this issue, and noted that the temptation to accept this proposal appears to be on "*reasonably unjustifiable grounds*"[23].

Network Rail response

We do not have any reason to doubt that, based on the literature review that Serco carried out, there is likely to be merit in using a modified axle load exponent of 4 rather than 4.83 in the structures damage equation used to apportion metallic underbridge variable usage costs. However, in light of our proposals to defer the implementation of the revised methodologies for apportioning vertical and horizontal track variable usage costs until CP6, we consider that it would be more appropriate to retain the existing axle load exponent of 4.83 in the structures damage equation. We do not believe that it would be appropriate to retain the existing approach to apportioning track variable usage costs (which account for approximately 85% of variable usage costs) but introduce a revised approach for apportioning metallic underbridge variable usage costs (which account for approximately 5% of variable usage costs).

Methodology for apportioning new civils variable usage costs

Consultation question 7
What is your view on our proposal to use the revised equivalent track damage equation for apportioning embankments, culverts and brick and masonry underbridge variable usage costs?

Virgin Trains, TfL and ATOC, broadly supported using the revised equivalent track damage equation for apportioning embankments, culverts and brick and masonry underbridge variable usage costs.

In contrast, GBRf, DBS and DRS opposed using the revised equivalent track damage equation. DBS was concerned that the apportionment of embankments, culverts and brick and masonry underbridges variable usage costs would be carried out using an equation that was not devised for these asset types but was being used because its provenance is known. Similarly, Freightliner stated that it did not feel that sufficient work in understanding the cause of wear and damage has been carried out to give a

[23] Freightliner response to Network Rail's December 2012 consultation on the allocation of the Variable Usage Charge.

reasonable opinion or judgement on changing this calculation method and, therefore, believed that no change should be implemented.

DBS stated that the methodology used to apportion embankment renewals variable usage costs in CP4 should continue to be used in CP5 and extended to include culverts and brick and masonry underbridge renewals, until the axle load, speed and spacing components can be concluded upon.

Network Rail response

In light of our proposal to defer adopting the revised equivalent track damage equation used to apportion vertical track variable usage costs until CP6, we consider that it is appropriate to retain the existing approach to apportioning civils variable usage costs (i.e. using the current equivalent structures damage equation, above). We believe that using this equation to apportion civils variable costs would be more cost reflective than using the existing equivalent track damage equation because it does not contain an un-sprung mass term. A vehicles un-sprung mass is less relevant to the apportionment of civils variable usage costs because, unlike track costs, we are not seeking to apportion wear and tear costs that arise at the wheel/rail interface. Between a bridge and the rail there is some resilience in the track and ballast component system which means that a vehicles un-sprung mass has less affect on the structure. A more relevant consideration with respect to civils structures is axle spacing. Closely spaced axles, for example, cause a more locally concentrated loading on the deck or arch barrel as they pass over a bridge, adversely impacting the structure.

As part of the wider charges review in early CP5, to inform charges in CP6, we consider that further consideration should be given to refining the existing approach to apportioning civils variable usage costs.

Methodology for apportioning signalling variable usage costs

Consultation question 8
What is your view on our proposal to apportion the 50% of signalling variable usage costs estimated to be load related using the equivalent track damage formula and the 50% of signalling variable usage costs estimated not be load related based on vehicle miles?

Virgin Trains, TfL and DRS supported our proposed approach to apportion the 50% of signalling variable usage costs estimated to be load related using the equivalent track damage formula and the 50% of signalling variable usage costs estimated not be load related based on vehicle miles. ATOC also supported this approach, however, considered it to be unduly complicated.

In contrast, Freightliner stated that it did not believe that Network Rail has provided sufficient evidence to justify the proposed revised approach and, therefore, did not support it. It considered that signalling variable usage costs should be allocated wholly on train miles.

Network Rail response

We have no reason to doubt that there is likely to be merit in distinguishing between load-related and non-load-related signalling variable usage costs as part of the cost allocation methodology. However, similar to our proposal in relation to the structures damage equation, we do not consider that it would be appropriate to broadly retain the existing approach to apportioning track variable usage costs (which account for approximately 85% of variable usage costs) but introduce a revised approach for apportioning signalling variable usage costs (which account for approximately 5% of variable usage costs). We consider that this should, however, be taken forward for further consideration as part of the accelerated charges review for CP6.

Vehicle characteristics – List of characteristics

Consultation question 9
What is your view on the draft list of vehicle characteristics contained in the spreadsheet attached to the covering email accompanying this consultation? Do you consider that any of these should be amended (if so, please provide supporting evidence where possible)?

Virgin confirmed that the stated 'Tare Weight including passengers' values are correct, if 100% passenger loading values continue to be used. Virgin also supported ATOC's view that a 50% passenger loading value should be employed for the 'Tare Weight including passengers' values. On this basis, Virgin stated that the relevant mass values, with 50% passenger loading are:

- Class 221/M = 58.78 tonnes;
- Class 390/M = 54.50 tonnes; and
- Class 390/T = 52.21 tonnes.

CrossCountry noted that the tare weight including passengers (assuming that 100% of seats are filled) is not the typical weight of a passenger vehicle. It stated that it would be more accurate to include reference to an average load factor.

Virgin Trains noted that it operates a fleet of 21-off Class 221 Tilting trainsets (Painted numbers 221 101 to 221 118 & 221 142 to 221 144) up to a maximum speed of 125 mph, and therefore accepted Network Rail's proposal to increase the maximum speed to reflect this. It also accepted that the 'curving class' requires revision to cover the tilting train operation.

In relation to vehicle speeds, CrossCountry noted that the real operating speed of its Voyager trains (Class 220 and Class 221) is lower than that defined by the formulaic approach. As such, along with London Midland and First Great Western, CrossCountry provided us with analysis of actual operating speed for a number of vehicle classes. Each analysis was based on the working timetable for representative journeys by the vehicle class, and excluded dwell time in the speed calculations. The results of each analysis are as follows:

- London Midland's analysis demonstrated that the operating speed of the class 172 vehicles should decrease from 55.24mph to 33.10mph

- CrossCountry's analysis showed that the operating speed of the class 170 vehicles should decrease from 55.24mph to 55mph, the class 220 and 221 vehicles should be 69mph following the increase in maximum speed to 125mph, and the class 43 vehicles should be reduced from 80.90mph to 75mph.

- First Great Western's analysis demonstrated that the operating speed of the class 43 vehicles should decrease from 80.90mph to 71mph.

DBS provided detailed comments with regards to the draft vehicle characteristics list. It also requested to meet Network Rail to discuss this further.

Network Rail response

We would like thank those respondents who provided feedback on the draft list of vehicle characteristics included in our consultation. Following the careful consideration of stakeholder comments, where appropriate, we have updated the list of vehicle characteristics attached to this document. We have noted in the attached spreadsheet where we have made amendments to the list published as part of our December 2012 consultation.

We agree with ATOC and Virgin that, on average, assuming 50% Passenger loading is a more reasonable assumption. Therefore, we have updated the passenger vehicles weights to be consistent with this. We have used TOPS in order to identify the tare weight of each vehicle class and number of passenger seats. We have retained the assumption that the average passenger weighs 75kg. Our analysis indicates that this equates to an average mark-up of 6% on the tare weight. The recalculated tare weights (including passengers) have, on average, reduced relative to the vehicle weights assumed in CP4. For some vehicle classes, the estimated vehicle weight has increased. However, we consider the updated information to be more accurate. Virgin provided Network Rail with weights of their vehicles under the assumption of a 50% passenger loading value. Following discussions with Virgin, these weights have been slightly amended to be consistent with our assumption of an average passenger weight of 75kg. The updated tare weights (including passengers), which we have accepted for charging purposes, are as follows:

- Class 221/M = 58.65 tonnes;
- Class 390/M = 54.38 tonnes; and
- Class 390/T = 52.06 tonnes.

Where operators have provided information on the operating speed of their vehicles, we have reflected this in the list of vehicle characteristics attached to this document.

However, both CrossCountry and First Great Western have provided different operating speeds for the class 43s that they operate. Whilst we understand that these vehicles will run at different speeds depending on the nature of their journeys, having a separate rate for each operator is problematic from a billing perspective. We understand that sometimes vehicles are transferred between operators. The result of this would be that an operator could be charged two different rates for two identical vehicles running the same route at the same speeds. To avoid this issue, we therefore propose calculating a weighted average of the two speeds provided, based on the number of vehicles run by each operator. We have confirmed the fleet size of CrossCountry and First Great Western, and calculated the weighted average to be 71.19mph. This has been updated in our list of vehicle characteristics.

A lot of the very helpful comments that we received from DBS on the draft list of vehicle characteristics have been reflected in the draft CP5 VUC price list. Nevertheless, DBS also identified potential issues where there would be merit in further investigation. At the follow-up meeting, set-up to discuss these issues, DBS suggested that it carries out further research to confirm the characteristics of vehicles where it considers that there are potential inaccuracies. However, due to the number of inaccuracies to be investigated and the need to issue this conclusions document (and the draft CP5 price list) in a timely manner, DBS was not able to complete its research in time so that all of its conclusions could be included in the list of vehicle characteristics attached to this conclusions document. DBS and Network Rail, however, agreed that it is important to try to ensure that the list of vehicle characteristics, on which the CP5 charges will be based, is as accurate as possible. Therefore, DBS intends to continue its research and feedback any further inaccuracies it discovers in due course in the hope that they may still be incorporated into the CP5 VUC model. Network Rail supports this approach but notes that the final decision in this respect, like all charging issues, rests with ORR.

We have used the list of vehicle characteristics, attached to this document, as the basis for developing the draft CP5 VUC price list set out in Appendix 2.

In our consideration of feedback received from stakeholders we have, of course, assumed that revised data is an accurate reflection of the vehicles that those stakeholders own / operate. Network Rail does not have the resources to check every single vehicle characteristic.

Vehicle characteristics – 'Locking down' VUC rates

Consultation question 10
What is your view on our proposal that for existing vehicles, not subject to vehicle modification, VUC rates should 'locked down' for CP5?

Virgin Trains and DRS supported our proposal to 'lock down' VUC rates in CP5, for vehicles not subject to modification. RFG also broadly supported our proposal and suggested that, it would be helpful if Network Rail gave long term certainty to the market on those characteristics which it wished to encourage or discourage in wagon design, build and use.

CrossCountry also agreed in principle with our proposed approach, but believed that the definition of 'vehicle modification' needed to be clarified to ensure it is sufficiently wide, so that changes such as re-deployment of stock that makes a change to its operating speed could be accommodated. Similarly, ATOC supported the proposal but stated that changes to maintenance practice, or operating duty should also justify a review of VUC within CP5.

TfL were content with our proposal, but suggested that there should be a mechanism permitting any individual rate to be recalculated in the event that a particular rate can be demonstrated to have been calculated incorrectly. This view was also broadly echoed by GBRf.

DBS also supported this proposal. It noted, however, that if this approach was adopted, Network Rail should notify industry parties of the latest date that amendments can still be provided, to give a final opportunity for the accuracy of the vehicle characteristics list to be improved.

In contrast, Freightliner did not agree with our proposal. It believed that if errors were found in vehicle characteristics and were not amended appropriately, then it could lead to discrimination between freight operators, which could impact on tenders being won or lost.

Network Rail response

As set out above, we propose confirming the proposal in our consultation document in relation to 'locking down' VUC rates for CP5. Namely that following reasonable endeavours, as industry, to set VUC rates based on a robust list of vehicle characteristics. Following the commencement of CP5 (1 April 2014) VUC rates for existing vehicles, not subject to vehicle modification, should be fixed for the remainder of the control period.

As set out in our consultation document: we consider that this approach will:

- Provide certainty for all parties with respect to VUC rates;
- Reduce additional administration costs mid-control period; and
- Provide a stronger incentive for stakeholders to provide vehicle characteristics as part of the consultation process.

We also propose, consistent with the consultation responses, that the definition of vehicle modification should include changes to maintenance practice (e.g. fitting different break pads which require the limiting of a vehicles maximum speed) and, in certain circumstances, the re-deployment of rolling stock which impacts a vehicle's operating speed.

With respect to the re-deployment of rolling stock or changes to operating duty, we propose that it would only be practical to reflect such changes in VUC rates where a vehicle class is not used by multiple operators on multiple routes. The reason for this is that, where a vehicle class is used by more than one operator, it is not uncommon for one of the operators to sub-lease vehicles to another. If, in this situation, operators paid a different VUC rate with respect to the same vehicle class (reflecting the difference in operating duties), it would give rise to a perverse situation where identical vehicles which are part of the same train set would be charged different VUC rates for the same journey, which we consider would be inappropriate. TABS levies charges on a vehicle basis, rather than an operator basis, and thus it would be 'blind' to the fact that a vehicle has been sub-leased to another operator with a different operating speed and, therefore, a different VUC rate should be applied.

Vehicle characteristics – Freight operating speeds

Consultation question 11
What is your view on our revised freight operating speed estimates and the methodology used to derive them? Would you like to provide any further information in relation to freight operating speeds?

GBRf, DRS, FTA, RFG, DBS and ATOC all broadly supported our proposed approach to deriving updated freight operating speed estimates.

TfL also supported our proposed approach, provided that the exclusion of stopping time does not make the predicted amount of track and asset damage caused by a freight train during its operation less accurate.

Network Rail response

Consistent with the proposal set out in our December 2012 consultation document, we propose updating the freight operating speeds used for charging purposes to reflect our analysis of the working timetable. In our consultation document we highlighted a minority of commodities for which, at the time, it was not possible to develop an updated operating speed estimate based on the working timetable. As a temporary solution we mapped these commodities to other commodities, for which data was available, and that we considered were likely to have a similar speed profile. This mapping is set out in the table, below:

Mapping	
Commodity where data was not available	**Mapped to**
Domestic Intermodal	European Intermodal
Engineering haulage	Industrial Minerals
Enterprise	General Merchandise
European Conventional	General Merchandise
Other	Domestic Waste
Biomass	Coal ESI

Following the publication of our consultation, we have carried out further analysis, based on the Working Timetable, in order to derive operating speed estimates for the, above, 'missing' commodities. However, we have been unable to gather a consistent set of schedules in the working timetable for engineering haulage. Therefore, it has been necessary to continue to use the mapping in the table, above, for this commodity. The table, below, summarises the freight operating speeds that we propose using as an input to estimating freight VUC rates. These speeds reflect the additional analysis that we have carried out in relation to the 'missing' commodities and a 14% uplift, as set out in the consultation, in order to exclude 'stopping time'.

Commodity	**CP5 Average Speed (mph)**	**CP5 Average Speed excluding 'stopping time' (mph)**	**CP4 speed (mph)**	
			Laden	**Empty**
Coal (other)	22	25	35	41
Iron Ore	22	25	32	41
Steel	22	25	35	41
Domestic Waste	21	24	40	50
Construction Materials	26	29	35	41
Petroleum	20	23	35	41
Coal (ESI)	21	24	32	41
European Intermodal	33	38	46	47
Domestic Automotive	22	25	46	47
European Automotive	27	31	46	47
Industrial Minerals	16	18	35	41
General Merchandise	26	30	40	50
Royal Mail	69	78	67	67
Mail and Premium Logistics	69	78	67	67
Domestic Intermodal	29	33	46	47
Engineering haulage	16	19	35	41
Enterprise	24	27	40	50
European Conventional	28	31	40	50

Other	22	25	38	41
Biomass	30	34	35	41
Chemicals	14	16	35	41

The proposed list of freight vehicle characteristics, attached to this consultation document, incorporates the operating speed values shown, above.

We consider that excluding stopping time when estimating operating speed serves to improve the cost reflectivity of VUC rates.

Vehicle characteristics – Passenger operating speeds

Consultation question 12
What is your view on our proposal that the default approach should be that passenger operating speeds are estimated using the existing CP4 formula unless evidence, based on the timetable, that an alternative operating speed is more appropriate is provided? Would you like to provide any evidence, based on the timetable, that an alternative operating speed is more appropriate?

Both Virgin Trains and ATOC broadly supported our proposal. ATOC supported using the existing formula, with one slight modification. The definition of vehicle maximum speed should be set at the lower of maximum vehicle speed defined at new build, maximum vehicle speed specified by the current operator or maximum route speed. In addition, ATOC did not consider that that the review of established operating speeds should be restricted solely to timetable information and that changes in vehicle maintenance practices should also be considered.

CrossCountry noted the importance of timetabled operating speed in calculating the VUC. It noted that, overall timetabled speeds are often much slower than the maximum speed of the rolling stock because timetabling complexities across boundaries often prevent optimisation of the timetabled paths. CrossCountry also included data derived from the Working Timetable as evidence for its actual operating speed.

TfL considered that evidence from the existing timetable should be used to validate the existing CP4 formula

Network Rail response

As set out above, we propose that the default approach for estimating the operating speed for passenger vehicle classes should be to use the existing formula shown, below:

$$\textbf{Operating Speed} = \mathbf{0.021.Max.\ Speed^{1.71}}$$

We consider that this represents a reasonable and pragmatic approach to estimating a vehicles operating speed based on of the vehicles maximum speed, which is generally more readily available.

However, we also propose that if based on timetable information an operator is able to demonstrate that an alternative operating speed would be more appropriate (as some passenger operators have done in response to this consultation); we would accept this for charging purposes.

As suggested by ATOC, we propose that the definition of a passenger vehicles maximum speed is set at the lower of maximum vehicle speed defined at new build, maximum vehicle speed specified by the current operator, or maximum route speed. If, for example, an operator limits the maximum speed of a vehicle to less than that which it was capable of when it was built, therefore, reducing track wear and tear, we consider that this should be reflected in its VUC.

However, where a vehicle class is used by multiple operators on multiple routes, we propose using a single operating speed value for charging purposes. As noted, above, we understand that where a vehicle class is used by more than one operator, it is not uncommon for one of the operators to sub-lease vehicles to another. If, in this situation, operators paid a different VUC rate with respect to the same vehicle class (reflecting the difference in assumed operating speeds), it would give rise to a perverse situation where identical vehicles which are part of the same train set would be charged different VUC rates for the same journey, which we consider would be inappropriate. TABS levies charges on a vehicle basis, rather than an operator basis, and thus it would be ‘blind’ to the fact that a vehicle has been sub-leased to another operator with a different operating speed and, therefore, a different VUC rate should be applied.

As noted in our response to consultation question nine, where CrossCountry has provided operating speeds based on the working timetable, we have taken these into account in our vehicle characteristics list.

We agree with TfL that there would be merit in using evidence from the existing timetable to validate the CP4 formula. However, the amount of analysis that would need to be carried out in order to do this would be considerable and should not be underestimated. We note that, as part of this consultation, we have provided passenger operators with an opportunity to validate our operating speed estimates using timetable data.

Temporary default rates

Consultation question 13
What is your view on our proposal to retain a default rate for freight vehicles and introducing a default rate for passenger vehicles in CP5?

Virgin Trains, GBRf, Freightliner, FTA, Transport Scotland, CrossCountry, RFG, DBS, ATOC and DRS all supported our proposal to retain a default rate for freight vehicles and introduce a default rate for passenger vehicles in CP5.

TfL also supported our proposed approach, however, this was on the basis that Network Rail commits to reasonable timescales for processing the data required to create a new VUC rate for new or modified vehicles.

Network Rail response

As set out above, we propose that that a default rate should be retained for freight vehicles and one introduced for passenger vehicles, where an appropriate bespoke rate has not been approved by ORR.

In response to the representation from TfL, we continue to be committed to processing the data required to generate a new VUC rate in a timely manner. We note, however, that in some instances that these characteristics can take some time to obtain, and then agree.

Temporary default rate bands

Consultation question 14
What is your view on our proposed default rate 'bands' and that the respective rate for each of these bands should be the highest relevant vehicle rate on the CP5 price list?

Virgin Trains, CrossCountry and ATOC supported our proposed approach. TfL was also supportive subject to an adjustment to compensate for any difference between the default and bespoke rates, once the bespoke rate is calculated.

Both DBS and DRS opposed our proposed approach, and instead considered that the default rate for freight vehicles should remain at an average level across all vehicle types and commodities. DBS believed that Network Rail should bear an equal (if not greater) responsibility to populate the correct information, whilst DRS stated that the proposed approach could financially disadvantage an operator.

GBRf stated that the use of default rate bands may be minimised, by making it a requirement to supply vehicle characteristic data, as part of the vehicle compatibility process.

RFG and FTA suggested that it may be beneficial to the market if the default rate is based by commodity wagon types.

Freightliner agreed with the proposed approach in principle. However, it noted that before this change is implemented, Network Rail must issue clear guidelines on what information is required to calculate locomotive and wagon charges. Freightliner further noted that, by insisting on a Vampire model, Network Rail is importing costs into the industry, as the models cost about £40k to create. It noted that, as models are not available for older wagons and locomotives, Freightliner do not understand how charges can be calculated for these older models and not for the new ones.

Network Rail response

As set out above, we propose confirming our proposal that default rate bands should be introduced for passenger and freight vehicles and that the respective rate for each of these bands should be the highest relevant vehicle rate on the CP5 price list. The table, below, sets out our proposed default rate bands for passenger and freight vehicles, based on the draft priced CP5 list, see Appendix 2.

(2012/13 prices end CP5 efficiency)

Operator	Band	Rate
Passenger (pence per vehicle mile)	Locomotive	105.49
	multiple unit (motor)	25.96
	mltiple unit (trailer)	16.60
	Coach	15.40
Freight (£/KGTM)	Locomotive	7.39
	wagon (laden)	3.33
	wagon (unladen)	2.29

We consider that our proposal will ensure that we are compensated for wear and tear on the network and introduce a strong incentive for operators to provide the necessary vehicle characteristic information. We do not believe that continuing to set default rates at a national average level, as proposed by DBS and DRS, would appropriately remedy the weak incentives that operators currently face to provide vehicle characteristic information, in some instances.

Consistent with the representation from TfL, our proposal is that following the calculation of an appropriate bespoke rate, all journeys in the control period (including those already charged at the default rate) are re-charged at the ORR approved bespoke rate. Income already received at the default rate would be refunded (i.e. the net impact on operators will be the difference between the default and ORR approved bespoke rate).

We understand why GBRf and DBS have suggested incorporating the provision of vehicle characteristic information into the existing vehicle compatibility process, however, we do not propose taking this suggestion forward in CP5. We do not consider that it would be appropriate to conflate the vehicle compatibility process with the charging one because they serve very different purposes. The compatibility process aims to ensure that the introduction of a new vehicle does not import new uncontrolled risks onto the network. In contrast, the charging process seeks to ensure that each vehicle is charged an appropriate rate such that we are compensated for the wear and tear imposed on the network. We have confirmed that there are limited synergies between the two processes and that information required as part of the compatibility process is typically different to that required for charging purposes.

In response to the representations from RFG and FTA, given that default rates are designed to be a temporary measure, and only applicable to a small number of vehicles, we do not consider it necessary to further disaggregate the bands by wagon type. We believe that doing so would introduce a disproportionate of complexity into this aspect of VUC rates.

We support Freightliner's view that it would be helpful if further guidance was issued in relation to the calculation of VUC rates. Therefore, prior to the commencement of CP5, we will issue guidance to stakeholders setting out the information required and end-to-end process for calculating VUC rates. We strive to work collaboratively with key stakeholders when developing this guidance.

Freightliner stated that, by insisting on a Vampire model, Network Rail is importing costs into the industry, as the models cost about £40k to create. Freightliner noted that, as models are not available for older wagons and locomotives, it does not understand how charges can be calculated for these older vehicles and not for the new ones.

We would also like to clarify that, at present, we do not insist on the provision of a vampire model in order to calculate a VUC rate and, therefore, we are not importing costs into the industry, as suggested by Freightliner. The provision of a vampire model is optional and in the absence of a model we will assign a new vehicle to the most relevant generic curving class contained in the VUC model. In CP4, the majority of freight vehicles were assigned a Y25 curving class. Some operators, however, opt to provide a vampire model in order to enable a bespoke curving class to derived and used as an input to calculating a VUC rate.

Rates for modified vehicles

Consultation question 15
What is your view on our proposal to adjust VUC rates during the control period in light of vehicle modifications?

Virgin Trains, Freightliner, GBRf, Eversholt Rail, DBS, TfL, CrossCountry and RFG supported our proposal to adjust VUC rates during the control period in light of vehicle modifications. CrossCountry also supported this approach but noted expressed concern regarding the broadness of the definition of 'vehicle modification'.

ATOC also expressed support for our proposed approach, and suggested that changes in relation to vehicle deployment and vehicle maintenance practices, which result in changes to operating speed, should also be eligible for such adjustment. Similar to the FTA, RFG stated that we should be clear, in the long-term, over the type of characteristics that we wish to incentivise.

DRS stated that this proposal should apply if an operator made the modifications of its own volition. However, if the operator made the modifications through circumstances out of its control, and if the outcome of this was to be a VUC rate increase, it believed that this would be unfair and could have an adverse affect on the operators business.

<u>Network Rail response</u>

As set out above, we propose confirming our proposal that where an entire vehicle class or individual vehicle is modified mid-control period the VUC rate should be adjusted accordingly. We agree with the respondents who noted that adjusting VUC rates in this way creates incentives for operators to modify vehicles, during the control period, to be more 'track friendly', therefore, reducing whole-industry costs.

As noted, above, we support ATOC's proposal that the definition of vehicle modification should include changes to maintenance practices which impact upon operating speed (e.g. fitting different break pads which require the limiting of a vehicles maximum speed) and thus result in a different level of wear and tear on the network.

With respect to the re-deployment of rolling stock or changes to operating duty, we propose that it would only be practical to reflect such changes in VUC rates where a vehicle class is not used by multiple operators on multiple routes. The reason for this is that, where a vehicle class is used by more than one operator, it is not uncommon for one of the operators to sub-lease vehicles to another. If, in this situation, operators paid a different VUC rate with respect to the same vehicle class (reflecting the difference in operating duties), it would give rise to a perverse situation where identical vehicles which are part of the same train set would be charged different VUC rates for the same journey, which we consider would be inappropriate. TABS levies charges on a vehicle basis, rather than an operator basis, and thus it would be 'blind' to the fact that a vehicle has been sub-leased to another operator with a different operating speed and, therefore, a different VUC rate should be applied.

In response to the representations from RFG and FTA, VUC rates are designed to be cost reflective and thus provide a natural incentive to vehicle owners and operators to develop and modify rolling stock to be more 'track friendly'. We continue to support the development and modification of rolling stock to be 'track friendly' and the deployment of this rolling stock vehicles in a manner which makes the most efficient use of the network.

We do not consider that VUC rates should only be adjusted to reflect vehicle modifications made of an operators own volition. VUC rates are designed to be cost reflective such that we recover our efficient wear and tear costs. Therefore, it is important that if a vehicle is modified, irrespective of the reason, it is reflected in its charges. Failure to do so would expose Network Rail to potential windfall gains and losses, and operators to being potentially over and under charged.

Other issues raised by stakeholders

In addition to the consultation questions, we welcomed comments from stakeholders on any other aspect of the PR13 VUC work programme. We received detailed comments from ATOC and Freightliner on certain aspects of the consultation and accompanying Serco report. These comments were not in direct response to any of the consultation questions, hence, we respond to them, below, as part of the "other issues raised by stakeholders" section.

<u>ATOC</u>

ATOC reviewed the consultation document and Serco report and noted the following detailed points:

- It is not clear why results are in the range of 1 to 14, when this is the cost ratio from a nominal 20% traffic increase relative to the 100% base case.

- In relation to civils variable usage costs (paragraph four iii), ATOC considered that this paragraph wass not evidence based and recommended that it should be deleted.

- That its views in relation to the apportionment of civils and signalling costs were not well represented in the report. It stated that its view was as follows:

    - Regrets that Network Rail has not done more to provide sound asset models during CP4.

    - Believes that in the absence of sound asset models and given the low costs associated with vehicle damage to brick and masonry underbridges, embankments and culverts, Network Rail might just as well use the track damage formula as any other calculation, and gaining some simplification in the overall calculation of VUCs.

- Recommend as a matter of urgency that Network Rail action the development of sound asset degradation models for these asset classes

Network Rail response

The cost impact (range 1 to 14 per axle per mile) is independent of the traffic increase used (20%) and we would expect the same result if a different level of traffic increase had been used (e.g. 10%). The important consideration is that total tonnage remains constant for each axle load case and, therefore, the number of vehicles was adjusted to maintain constant tonnage. The resultant costs from VTISM, therefore, reflect the level of damage associated with the axle load only and is not skewed by a change in tonnage.

In relation to civils variable usage costs, Network Rail remains of the opinion that modern trains with increased power and improved traction accelerate more quickly and this is causing structures, in some locations, to show new signs of deterioration due to being subjected to higher speeds than in the past. However, we have asked Serco to update its report and clarify that this view pertains to freight vehicles, rather than passenger ones.

Network Rail has asked Serco to update its report to reflect ATOC's view in relation to civils and signalling assets as set out, above.

Freightliner

Freightliner reviewed the consultation document and Serco report and noted the following detailed points:

- It is unclear as to whether the intention of earlier consultations, including the ORR consultation in May 2012, was to have two separate 'pots' for passenger and freight and then apply the Serco work.

- How civil structures are dealt with in the VTISM model that is run over 35 years with costs based on activity arising. Freightliner wanted to understand how Network Rail would treat, if for example, cost is planned in the coming 10 years but not for the next 140 years.

- How can it be sure that this latest Serco view is more robust than previous understanding, and will not radically change again in the future.

- The work that has been undertaken and commissioned by Network Rail assumes that the rail network is maintained to passenger standards and then freight trains are operated over those high standard routes. It notes that if a different assumption was made that assumed tracks only had to be maintained to a standard suitable for freight traffic then the resultant answer may be a much lower freight VUC.

- Network Rail's modelling expects the full costs of the maintenance and renewal of the network to be paid for by operators during the respective control period, without considering whether renewal activity has an asset life beyond the control period. Freightliner consequently believed that high renewal costs in any particular control period lead to disproportionately high costs for the industry that may be reduced through a better capitalisation policy for the renewals undertaken.

Network Rail response

The intention has always been to have 'one pot' of variable usage costs which are then apportioned between the different passenger and freight vehicle classes in order to derive VUC rates for each vehicle class. This approach is consistent with that adopted in PR08 and is part of the reason why it was necessary to place a confidence interval around our initial estimate of VUC cost rates, set out in our March 2012 'freight caps' conclusions letter to ORR.

VTISM is a track model and, therefore, is not used to model civil structures renewal costs. These costs are forecast in a model called CeCost. As noted by Freightliner, we model these costs over a 35-year period in order to derive a long-run average cost estimate which seeks to 'smooth out' periodic renewal costs. If a structure is due for renewal in the next 10 years, but not for the next 140 years, then this cost would be included in our current long-run cost estimate because the renewal falls due within the 35-year modelling horizon. Equally, if a structure is not due to be renewed in the next 35 years but is in the next 140 years then this cost would be excluded from our 35-year cost forecast

A key reason why we are confident that the revised methodology developed by Serco for apportioning vertical track variable usage costs represents an improvement on the existing approach is that it is based on VTISM. As an industry, our understanding of the drivers of track wear and tear has moved on since the previous methodology was developed prior to CP3 and to a large extent these improvements have been captured in VTISM. VTISM has been developed and validated in stages involving stakeholder input, review and acceptance from across the rail industry over several years. However, as discussed, above, following the careful consideration of consultation responses, we consider that changes to charges of this scale would be inappropriate to introduce in CP5.

The VTISM modelling assumes that the network is maintained to standards which reflect reality; these standards will vary across the network. We do not consider that it would be appropriate to model track damage based on a hypothetical scenario and set of track policies that assumes that there is no passenger traffic on the network. We note, however, that when we have modelled variable costs by route type, freight and other low criticality routes tend to have a higher marginal cost per additional gross tonne mile than high-speed passenger routes. Therefore, it is not clear that in hypothetical, freight only, scenario variable usage costs would be lower.

As noted above, we model renewal costs on long-run average basis (35-year) in order to 'smooth' the periodic impact of renewals. Therefore, we do not consider that our approach to estimating variable costs results in disproportionately high costs in a particular control period.

Freightliner also commissioned Transportation Technology Centre Inc. (TTCI) to undertake preliminary analysis of the proposed methodology for allocating the VUC in CP5, as set out in the Serco report. It indicated that the following factors may warrant additional investigation.

- The data sampling method to select the routes and their representation of the population of track in the network.

- For the representative route, a sample size of 5 percent with a stated +/- 1.5-percent error was used, equalling 923 miles. The selected lines were about 50 miles each. It requested to know what the error is for the smaller data set.

- What period was used when calculating average traffic and tonnage. TTCI wanted to know if that period was representative of normal operations.

- The simulation design uses three operating conditions with four levels for axle load, four levels for speed, and three for unsprung mass. TTCI wanted to know how the values for each of these operating conditions were selected, and if they were representative of the majority of operating conditions.

- If there is a correlation between the three vehicles factors (axle load, operating speed, and unsprung mass) – as this could artificially skew the regression analysis.

- Further analysis to determine the normality of the residuals and the variation of the fits versus the residuals.

- Further review of the underlying data to understand the best-fit lines on the charts illustrated on pages 19-21 of the Serco report.

- Unexpected results at operating speeds of 100 mph under all axle loads considered and at 75 mph under 25-tonne axle loads. TTCI noted that the data was excluded for specific known causes stated as being unrelated. The model was then extrapolated for 75 to 100 mph. TTCI suggested a review of the underlying data to understand the method and confidence intervals of the extrapolation.

Network Rail response

As set out in section 3.1 (step 1) of the Serco report, a representative sample of track was used in the analysis by randomly selecting track sections from the track database using a database filtering query (see Table 4 of the Serco report). Table 5 confirms that the samples chosen contain a similar distribution of route types as the whole network for each line speed range.

To clarify, approximately 923 miles (5%) of plain-line and 50 miles (6%) of S&C was selected for each line speed sample, as shown in Table 5 of the Serco report.

The traffic / tonnage data set used in VTISM is a snapshot (based on an average of two years of traffic) derived from Network Rail's traffic systems called ACTRAFF and NETRAFF. The data was prepared by Network Rail and used in VTISM to support their SBP (the process and databases were documented and supplied to ORR as part of its independent review).

The range of values chosen for each operating condition (axle load, speed and un-sprung mass) was chosen to cover the majority of vehicle operating conditions that exist on the network. Moreover, the remit of the Serco analysis, including the range of values, was developed collaboratively with an industry working group. The variant cases were selected to support curve-fitting.

There is no obvious biasing in the results. The artificial vehicle used in the Serco analysis is defined by its maximum speed and each axle is defined separately with the axle load and un-sprung mass. Multiple VTISM runs were carried out to cover all combinations of the artificial vehicle input variables and the regression analysis accounts for the combined effects.

The goodness of fit parameters are not intended to describe the accuracy of the formula (which is a VTISM validation issue) but rather the precision (how well can the formula reproduce the VTISM results). As set out in the report, Serco used a standard 'least squares fit' to the VTISM results which produced a reasonable fit using the hybrid equation. Compared with the other equations, the hybrid equation has the best correlation and R-squared as well as a normal distribution of residuals with lowest standard deviation of 23% and mean of the residuals closest to zero (i.e. it predicts the VTISM results closest to the target and with smallest spread / highest precision around the target).

The best-fit lines were established using a standard 'least squares fit' to the VTISM results (i.e. minimising the sum of the squared residual). As stated in section 3.3 of the Serco report, several different forms of equations were trialled (including power, quadratic, exponential and cubic functions) and it was determined that the most appropriate, robust function was a hybrid. This took into account the need to maximise precision without 'over-fitting'. Network Rail and Serco consider that, taking into account the variation in costs associated with using network average unit costs across all line speeds, it was reasonable to extrapolate the trend in relative damage between 75 and 100 mph (assuming that renewal costs for high speed routes would be higher than the average network unit cost used in the VTISM analysis due to the better track construction methods, improved track geometry quality techniques and higher cost of possessions on higher speed routes). We recognise, however, that if unit cost data disaggregated by route type was available then there could be merit in using this to refine the Serco analysis. We propose that further consideration should be given to this issue as part of the accelerated charges review in early CP5, to inform charges in CP6.

APPENDIX 2 – DRAFT CP5 VUC PRICE LIST

Draft passenger VUC price list (2012/13 prices end CP5 efficiency)

Vehicle Name	pence/vehicle mile
1	5.18
2	6.03
3	8.69
3	8.69
4	14.46
4A	10.62
31/1	51.12
25/3	36.99
121/M	5.94
139/M	1.84
142/M	5.11
143/M	4.91
144/M	4.91
150/M	5.64
153/M	6.18
155/M	5.92
156/M	5.79
158/M	7.10
159/M	7.09
165/M	5.95
165/M	5.95
166/M	6.21
166/M	6.21
168/M	9.68
170/M	8.88
170/M	8.82
171/M	9.94
172/M	5.08
175/M	14.09
180/M	17.54
180/M	17.54
185/M	13.60
185/M	13.60
220/M	13.99
221/M	19.43
222/M	12.88
313/M	6.23
313/T	5.24

314/M	5.95
314/T	5.49
315/M	6.88
315/T	4.22
317/M	13.82
317/T	5.60
318/M	13.30
318/T	5.27
319/M	14.56
319/T	5.51
320/M	9.96
320/T	5.48
321/M	12.94
321/T	5.57
322/M	13.84
322/T	5.89
323/M	6.57
323/T	5.88
33/2	36.56
332/M	10.18
332/T	9.77
333/M	11.39
333/T	9.96
334/M	10.75
334/T	8.63
350/M	13.47
350/T	9.98
350/1/M	14.82
350/1/T	10.89
357/M	8.13
357/T	8.12
360/M	10.90
360/M	10.90
360/T	10.06
360/T	10.06
365/M	8.66
365/T	6.45
37/4	47.30
373/M	25.96
373/T	13.03
375/M	8.85
375/T	6.63
376/M	6.21
376/T	5.25
377/M	8.32

377/T	7.53
378/M	6.32
378/T	5.45
379/M	8.55
379/T	7.58
380/M	11.14
380/T	9.58
390/M	17.86
390/T	16.60
395/M	10.26
395/T	10.14
43/0	43.31
43/0	43.31
442/M	13.73
442/T	7.42
444/M	14.00
444/T	9.98
444HB/M	11.13
444HB/T	7.70
450/M	11.83
450/T	7.98
450HB/M	9.55
450HB/T	6.32
455/M	7.22
455/T	4.10
456/M	6.98
456/T	4.43
458/M	10.45
458/T	7.34
460/M	11.13
460/T	7.94
465/M	7.00
465/T	4.59
466/M	7.29
466/T	4.82
47/4	59.76
47/7	58.33
507/M	7.04
507/T	4.48
508/M	6.83
508/T	4.48
57/0	56.82
57/3	56.97
57/6	56.97
67/0	65.35

73/1	**35.61**
73/2	**35.61**
90/0	**49.57**
91/1	**55.50**
98/4	**31.60**
98/5	**75.22**
98/8	**105.49**
LU4/M	**3.46**
LU5/M	**3.65**
NZ5/H	**11.86**
NZ5/J	**15.40**
NZ5/K	**11.07**
VA	**11.86**
D	**7.54**
WA	**14.02**

Draft freight VUC price list (2012/13 prices end CP5 efficiency)

Vehicle Name	Commodity	£/kGTM
1	Other	**1.04**
2	Other	**1.20**
3	Other	**1.33**
4	Other	**1.98**
26/1	Other	**3.99**
31/1	Construction Materials	**4.00**
31/1	Other	**3.81**
09/2	Coal ESI	**2.38**
09/2	Industrial Minerals	**2.10**
09/2	Other	**2.43**
20/3	Chemicals	**3.52**
20/3	Coal ESI	**3.96**
20/3	Construction Materials	**4.21**
20/3	Domestic Intermodal	**4.40**
20/3	Mail and Premium Logistics	**6.51**
20/3	Other	**4.00**
20/3	Steel	**3.98**
25/3	Other	**3.98**
08/9	Domestic Automotive	**2.42**
08/9	Enterprise	**2.50**
20/9	Coal ESI	**3.96**
20/9	Construction Materials	**4.21**
20/9	Enterprise	**4.11**
20/9	Other	**4.01**
08/0	Chemicals	**2.01**
08/0	Coal ESI	**2.38**

08/0	Construction Materials	**2.59**
08/0	Domestic Automotive	**2.42**
08/0	Domestic Intermodal	**2.75**
08/0	Enterprise	**2.50**
08/0	Other	**2.42**
08/0	Petroleum	**2.33**
08/0	Steel	**2.42**
09/0	Coal ESI	**2.37**
20/0	Coal ESI	**3.96**
20/0	Construction Materials	**4.21**
20/0	Enterprise	**4.11**
20/0	Other	**4.01**
31/4	Other	**3.81**
31/6	Coal ESI	**3.77**
31/6	Coal Other	**3.81**
31/6	Other	**3.81**
33/0	Other	**3.96**
33/2	Other	**3.51**
37/0	Chemicals	**3.39**
37/0	Domestic Intermodal	**4.18**
37/0	Other	**3.82**
37/0	Domestic Automotive	**3.82**
37/0	European Automotive	**4.09**
37/0	European Intermodal	**4.40**
37/0	Coal ESI	**3.77**
37/0	Iron Ore	**3.82**
37/0	Mail and Premium Logistics	**6.10**
37/0	Royal Mail	**6.10**
37/0	Coal Other	**3.82**
37/0	Construction Materials	**4.00**
37/0	Domestic Waste	**3.77**
37/0	Engineering Haulage	**3.49**
37/0	Enterprise	**3.91**
37/0	European Conventional	**4.09**
37/0	General Merchandise	**4.05**
37/0	Industrial Minerals	**3.49**
37/0	Petroleum	**3.73**
37/0	Steel	**3.82**
37/0	Biomass	**4.23**
37/4	Chemicals	**3.36**
37/4	Industrial Minerals	**3.46**
37/4	Other	**3.80**
37/4	Steel	**3.80**
37/4	Domestic Automotive	**3.80**
37/4	Domestic Intermodal	**4.17**

37/4	European Automotive	**4.08**
37/4	European Intermodal	**4.40**
37/4	Coal ESI	**3.76**
37/4	Iron Ore	**3.80**
37/4	Mail and Premium Logistics	**6.16**
37/4	Royal Mail	**6.16**
37/4	Coal Other	**3.80**
37/4	Construction Materials	**3.99**
37/4	Domestic Waste	**3.76**
37/4	Engineering Haulage	**3.46**
37/4	Enterprise	**3.90**
37/4	European Conventional	**4.08**
37/4	General Merchandise	**4.04**
37/4	Petroleum	**3.71**
37/4	Biomass	**4.22**
37/5	Chemicals	**3.36**
37/5	Coal ESI	**3.76**
37/5	Domestic Intermodal	**4.17**
37/5	Other	**3.80**
37/5	Steel	**3.80**
37/5	Domestic Automotive	**3.80**
37/5	Petroleum	**3.71**
37/5	European Automotive	**4.08**
37/5	European Intermodal	**4.40**
37/5	Biomass	**4.22**
37/5	Iron Ore	**3.80**
37/5	Mail and Premium Logistics	**6.16**
37/5	Royal Mail	**6.16**
37/5	Coal Other	**3.80**
37/5	Construction Materials	**3.99**
37/5	Domestic Waste	**3.76**
37/5	Engineering Haulage	**3.46**
37/5	Enterprise	**3.90**
37/5	European Conventional	**4.08**
37/5	General Merchandise	**4.04**
37/5	Industrial Minerals	**3.46**
37/6	Chemicals	**3.39**
37/6	Coal ESI	**3.77**
37/6	Construction Materials	**4.00**
37/6	Domestic Automotive	**3.82**
37/6	Domestic Intermodal	**4.18**
37/6	Enterprise	**3.91**
37/6	Other	**3.82**
37/6	Steel	**3.82**
37/6	European Automotive	**4.08**

37/6	European Intermodal	**4.40**
37/6	Iron Ore	**3.80**
37/6	Mail and Premium Logistics	**6.16**
37/6	Royal Mail	**6.16**
37/6	Coal Other	**3.80**
37/6	Domestic Waste	**3.76**
37/6	Engineering Haulage	**3.46**
37/6	European Conventional	**4.08**
37/6	General Merchandise	**4.04**
37/6	Industrial Minerals	**3.46**
37/6	Petroleum	**3.71**
37/6	Biomass	**4.22**
47/2	Other	**3.78**
47/2	Domestic Automotive	**3.80**
47/2	Domestic Intermodal	**4.17**
47/2	European Automotive	**4.08**
47/2	European Intermodal	**4.40**
47/2	Coal ESI	**3.76**
47/2	Iron Ore	**3.80**
47/2	Mail and Premium Logistics	**6.16**
47/2	Royal Mail	**6.16**
47/2	Chemicals	**3.36**
47/2	Coal Other	**3.80**
47/2	Construction Materials	**3.99**
47/2	Domestic Waste	**3.76**
47/2	Engineering Haulage	**3.46**
47/2	Enterprise	**3.90**
47/2	European Conventional	**4.08**
47/2	General Merchandise	**4.04**
47/2	Industrial Minerals	**3.46**
47/2	Petroleum	**3.71**
47/2	Steel	**3.80**
47/2	Biomass	**4.22**
47/4	Coal ESI	**3.71**
47/4	Construction Materials	**3.99**
47/4	Domestic Intermodal	**4.21**
47/4	Enterprise	**3.88**
47/4	Other	**3.77**
47/4	Domestic Automotive	**3.80**
47/4	European Automotive	**4.08**
47/4	European Intermodal	**4.40**
47/4	Iron Ore	**3.80**
47/4	Mail and Premium Logistics	**6.16**
47/4	Royal Mail	**6.16**
47/4	Chemicals	**3.36**

47/4	Coal Other	**3.80**
47/4	Domestic Waste	**3.76**
47/4	Engineering Haulage	**3.46**
47/4	European Conventional	**4.08**
47/4	General Merchandise	**4.04**
47/4	Industrial Minerals	**3.46**
47/4	Petroleum	**3.71**
47/4	Steel	**3.80**
47/4	Biomass	**4.22**
47/7	Coal Other	**3.77**
47/7	Construction Materials	**3.99**
47/7	Domestic Intermodal	**4.21**
47/7	European Intermodal	**4.47**
47/7	Other	**3.77**
47/7	Steel	**3.77**
47/7	Domestic Automotive	**3.80**
47/7	European Automotive	**4.08**
47/7	Coal ESI	**3.76**
47/7	Iron Ore	**3.80**
47/7	Mail and Premium Logistics	**6.16**
47/7	Royal Mail	**6.16**
47/7	Chemicals	**3.36**
47/7	Domestic Waste	**3.76**
47/7	Engineering Haulage	**3.46**
47/7	Enterprise	**3.90**
47/7	European Conventional	**4.08**
47/7	General Merchandise	**4.04**
47/7	Industrial Minerals	**3.46**
47/7	Petroleum	**3.71**
47/7	Biomass	**4.22**
50/0	Other	**3.77**
56/0	Construction Materials	**4.07**
56/0	Domestic Automotive	**3.82**
56/0	Other	**3.82**
56/0	Domestic Intermodal	**4.17**
56/0	European Automotive	**4.08**
56/0	European Intermodal	**4.40**
56/0	Coal ESI	**3.76**
56/0	Iron Ore	**3.80**
56/0	Mail and Premium Logistics	**6.16**
56/0	Royal Mail	**6.16**
56/0	Chemicals	**3.36**
56/0	Coal Other	**3.80**
56/0	Domestic Waste	**3.76**
56/0	Engineering Haulage	**3.46**

56/0	Enterprise	**3.90**
56/0	European Conventional	**4.08**
56/0	General Merchandise	**4.04**
56/0	Industrial Minerals	**3.46**
56/0	Petroleum	**3.71**
56/0	Steel	**3.80**
56/0	Biomass	**4.22**
57/0	Chemicals	**3.30**
57/0	Construction Materials	**3.99**
57/0	Domestic Intermodal	**4.19**
57/0	Other	**3.78**
57/0	Domestic Automotive	**3.80**
57/0	European Automotive	**4.08**
57/0	European Intermodal	**4.40**
57/0	Coal ESI	**3.76**
57/0	Iron Ore	**3.80**
57/0	Mail and Premium Logistics	**6.16**
57/0	Royal Mail	**6.16**
57/0	Coal Other	**3.80**
57/0	Domestic Waste	**3.76**
57/0	Engineering Haulage	**3.46**
57/0	Enterprise	**3.90**
57/0	European Conventional	**4.08**
57/0	General Merchandise	**4.04**
57/0	Industrial Minerals	**3.46**
57/0	Petroleum	**3.71**
57/0	Steel	**3.80**
57/0	Biomass	**4.22**
57/3	Coal Other	**3.77**
57/3	Construction Materials	**3.99**
57/3	Domestic Intermodal	**4.20**
57/3	Other	**3.77**
57/3	Domestic Automotive	**3.80**
57/3	European Automotive	**4.08**
57/3	European Intermodal	**4.40**
57/3	Coal ESI	**3.76**
57/3	Iron Ore	**3.80**
57/3	Mail and Premium Logistics	**6.16**
57/3	Royal Mail	**6.16**
57/3	Chemicals	**3.36**
57/3	Domestic Waste	**3.76**
57/3	Engineering Haulage	**3.46**
57/3	Enterprise	**3.90**
57/3	European Conventional	**4.08**
57/3	General Merchandise	**4.04**

57/3	Industrial Minerals	**3.46**
57/3	Petroleum	**3.71**
57/3	Steel	**3.80**
57/3	Biomass	**4.22**
59/0	Construction Materials	**4.02**
59/0	Domestic Waste	**3.72**
59/0	Other	**3.78**
59/0	Domestic Automotive	**3.80**
59/0	Domestic Intermodal	**4.17**
59/0	European Automotive	**4.08**
59/0	European Intermodal	**4.40**
59/0	Coal ESI	**3.76**
59/0	Iron Ore	**3.80**
59/0	Mail and Premium Logistics	**6.16**
59/0	Royal Mail	**6.16**
59/0	Chemicals	**3.36**
59/0	Coal Other	**3.80**
59/0	Engineering Haulage	**3.46**
59/0	Enterprise	**3.90**
59/0	European Conventional	**4.08**
59/0	General Merchandise	**4.04**
59/0	Industrial Minerals	**3.46**
59/0	Petroleum	**3.71**
59/0	Steel	**3.80**
59/0	Biomass	**4.22**
59/1	Coal ESI	**3.72**
59/1	Construction Materials	**4.02**
59/1	Enterprise	**3.90**
59/1	Other	**3.78**
59/1	Royal Mail	**7.02**
59/1	Domestic Automotive	**3.80**
59/1	Domestic Intermodal	**4.17**
59/1	European Automotive	**4.08**
59/1	European Intermodal	**4.40**
59/1	Iron Ore	**3.80**
59/1	Mail and Premium Logistics	**6.16**
59/1	Chemicals	**3.36**
59/1	Coal Other	**3.80**
59/1	Domestic Waste	**3.76**
59/1	Engineering Haulage	**3.46**
59/1	European Conventional	**4.08**
59/1	General Merchandise	**4.04**
59/1	Industrial Minerals	**3.46**
59/1	Petroleum	**3.71**
59/1	Steel	**3.80**

59/1	Biomass	**4.22**
59/2	Coal ESI	**3.72**
59/2	Construction Materials	**4.02**
59/2	Domestic Intermodal	**4.26**
59/2	Domestic Waste	**3.72**
59/2	Enterprise	**3.90**
59/2	Industrial Minerals	**3.35**
59/2	Other	**3.78**
59/2	Petroleum	**3.66**
59/2	Steel	**3.78**
59/2	Domestic Automotive	**3.80**
59/2	European Automotive	**4.08**
59/2	European Intermodal	**4.40**
59/2	Iron Ore	**3.80**
59/2	Mail and Premium Logistics	**6.16**
59/2	Royal Mail	**6.16**
59/2	Chemicals	**3.36**
59/2	Coal Other	**3.80**
59/2	Engineering Haulage	**3.46**
59/2	European Conventional	**4.08**
59/2	General Merchandise	**4.04**
59/2	Biomass	**4.22**
60/0	Chemicals	**2.45**
60/0	Coal ESI	**2.97**
60/0	Coal Other	**3.04**
60/0	Construction Materials	**3.29**
60/0	Domestic Automotive	**3.04**
60/0	Domestic Intermodal	**3.54**
60/0	Domestic Waste	**2.97**
60/0	Enterprise	**3.16**
60/0	European Intermodal	**3.86**
60/0	Industrial Minerals	**2.59**
60/0	Iron Ore	**3.04**
60/0	Other	**3.04**
60/0	Petroleum	**2.91**
60/0	Steel	**3.04**
60/0	European Automotive	**3.41**
60/0	Mail and Premium Logistics	**6.46**
60/0	Royal Mail	**6.46**
60/0	Engineering Haulage	**2.58**
60/0	European Conventional	**3.41**
60/0	General Merchandise	**3.35**
60/0	Biomass	**2.66**
66/0	Chemicals	**1.46**
66/0	Coal ESI	**1.96**

66/0	Coal Other	**2.02**
66/0	Construction Materials	**2.26**
66/0	Domestic Automotive	**2.02**
66/0	Domestic Intermodal	**2.50**
66/0	Domestic Waste	**1.96**
66/0	Enterprise	**2.14**
66/0	European Automotive	**2.38**
66/0	European Conventional	**2.38**
66/0	European Intermodal	**2.80**
66/0	Industrial Minerals	**1.59**
66/0	Iron Ore	**2.02**
66/0	Other	**2.02**
66/0	Petroleum	**1.89**
66/0	Royal Mail	**5.25**
66/0	Steel	**2.02**
66/0	Biomass	**2.56**
66/0	General Merchandise	**2.32**
66/0	Engineering Haulage	**1.59**
66/0	Mail and Premium Logistics	**5.25**
66/3	Coal ESI	**1.97**
66/3	Construction Materials	**2.28**
66/3	Domestic Intermodal	**2.52**
66/3	Domestic Waste	**1.97**
66/3	Other	**2.03**
66/3	Petroleum	**1.91**
66/3	Steel	**2.03**
66/3	Domestic Automotive	**2.03**
66/3	European Automotive	**2.40**
66/3	European Intermodal	**2.82**
66/3	Iron Ore	**2.03**
66/3	Mail and Premium Logistics	**5.32**
66/3	Royal Mail	**5.32**
66/3	Chemicals	**1.47**
66/3	Coal Other	**2.03**
66/3	Engineering Haulage	**1.60**
66/3	Enterprise	**2.15**
66/3	European Conventional	**2.40**
66/3	General Merchandise	**2.34**
66/3	Industrial Minerals	**1.60**
66/3	Biomass	**2.58**
66/4	Biomass	**2.58**
66/4	Chemicals	**1.47**
66/4	Coal ESI	**1.97**
66/4	Coal Other	**2.03**
66/4	Construction Materials	**2.28**

66/4	Domestic Intermodal	**2.52**
66/4	Domestic Waste	**1.97**
66/4	Other	**2.03**
66/4	Petroleum	**1.91**
66/4	Steel	**2.03**
66/4	Domestic Automotive	**2.03**
66/4	European Automotive	**2.40**
66/4	European Intermodal	**2.82**
66/4	Iron Ore	**2.03**
66/4	Mail and Premium Logistics	**5.32**
66/4	Royal Mail	**5.32**
66/4	Engineering Haulage	**1.60**
66/4	Enterprise	**2.15**
66/4	European Conventional	**2.40**
66/4	General Merchandise	**2.34**
66/4	Industrial Minerals	**1.60**
66/5	Biomass	**2.58**
66/5	Coal ESI	**1.97**
66/5	Coal Other	**2.03**
66/5	Construction Materials	**2.28**
66/5	Domestic Intermodal	**2.52**
66/5	Domestic Waste	**1.97**
66/5	Enterprise	**2.15**
66/5	European Intermodal	**2.82**
66/5	Industrial Minerals	**1.60**
66/5	Iron Ore	**2.03**
66/5	Other	**2.03**
66/5	Petroleum	**1.91**
66/5	Steel	**2.03**
66/5	Domestic Automotive	**2.03**
66/5	European Automotive	**2.40**
66/5	Mail and Premium Logistics	**5.32**
66/5	Royal Mail	**5.32**
66/5	Chemicals	**1.47**
66/5	Engineering Haulage	**1.60**
66/5	European Conventional	**2.40**
66/5	General Merchandise	**2.34**
66/6	Coal ESI	**1.97**
66/6	Coal Other	**2.03**
66/6	Construction Materials	**2.28**
66/6	Domestic Automotive	**2.03**
66/6	Domestic Intermodal	**2.52**
66/6	Domestic Waste	**1.97**
66/6	Industrial Minerals	**1.60**
66/6	Iron Ore	**2.03**

66/6	Other	**2.03**
66/6	European Automotive	**2.40**
66/6	European Intermodal	**2.82**
66/6	Mail and Premium Logistics	**5.32**
66/6	Royal Mail	**5.32**
66/6	Chemicals	**1.47**
66/6	Enterprise	**2.15**
66/6	European Conventional	**2.40**
66/6	General Merchandise	**2.34**
66/6	Petroleum	**1.91**
66/6	Steel	**2.03**
66/6	Biomass	**2.58**
66/6	Engineering Haulage	**1.60**
66/7	Biomass	**2.58**
66/7	Coal ESI	**1.97**
66/7	Construction Materials	**2.28**
66/7	Domestic Intermodal	**2.52**
66/7	European Intermodal	**2.82**
66/7	Other	**2.03**
66/7	Petroleum	**1.91**
66/7	Steel	**2.03**
66/7	Domestic Automotive	**2.03**
66/7	European Automotive	**2.40**
66/7	Iron Ore	**2.03**
66/7	Mail and Premium Logistics	**5.32**
66/7	Royal Mail	**5.32**
66/7	Chemicals	**1.47**
66/7	Coal Other	**2.03**
66/7	Domestic Waste	**1.97**
66/7	Engineering Haulage	**1.60**
66/7	Enterprise	**2.15**
66/7	European Conventional	**2.40**
66/7	General Merchandise	**2.34**
66/7	Industrial Minerals	**1.60**
66/8	Biomass	**2.58**
66/8	Coal ESI	**1.97**
66/8	Coal Other	**2.03**
66/8	Construction Materials	**2.28**
66/8	Domestic Intermodal	**2.52**
66/8	Engineering Haulage	**1.60**
66/8	European Intermodal	**2.82**
66/8	Industrial Minerals	**1.60**
66/8	Mail and Premium Logistics	**5.32**
66/8	Other	**2.03**
66/8	Petroleum	**1.91**

66/8	Steel	**2.03**
66/8	Domestic Automotive	**2.03**
66/8	European Automotive	**2.40**
66/8	Iron Ore	**2.03**
66/8	Royal Mail	**5.32**
66/8	Chemicals	**1.47**
66/8	Domestic Waste	**1.97**
66/8	Enterprise	**2.15**
66/8	European Conventional	**2.40**
66/8	General Merchandise	**2.34**
66/9	Coal ESI	**1.97**
66/9	Coal Other	**2.03**
66/9	Construction Materials	**2.28**
66/9	Domestic Intermodal	**2.52**
66/9	Domestic Waste	**1.97**
66/9	Industrial Minerals	**1.60**
66/9	Other	**2.03**
66/9	Domestic Automotive	**2.03**
66/9	European Automotive	**2.40**
66/9	European Intermodal	**2.82**
66/9	Iron Ore	**2.03**
66/9	Mail and Premium Logistics	**5.32**
66/9	Royal Mail	**5.32**
66/9	Chemicals	**1.47**
66/9	Engineering Haulage	**1.60**
66/9	Enterprise	**2.15**
66/9	European Conventional	**2.40**
66/9	General Merchandise	**2.34**
66/9	Petroleum	**1.91**
66/9	Steel	**2.03**
66/9	Biomass	**2.58**
67/0	Coal ESI	**3.73**
67/0	Coal Other	**3.80**
67/0	Construction Materials	**4.05**
67/0	Domestic Automotive	**3.80**
67/0	Domestic Intermodal	**4.31**
67/0	Domestic Waste	**3.73**
67/0	Enterprise	**3.92**
67/0	European Automotive	**4.18**
67/0	European Conventional	**4.18**
67/0	European Intermodal	**4.64**
67/0	Industrial Minerals	**3.35**
67/0	Other	**3.80**
67/0	Petroleum	**3.67**
67/0	Royal Mail	**7.39**

67/0	Steel	**3.80**
67/0	Iron Ore	**3.80**
67/0	Mail and Premium Logistics	**7.39**
67/0	Chemicals	**3.22**
67/0	Engineering Haulage	**3.35**
67/0	General Merchandise	**4.12**
67/0	Biomass	**4.38**
73/1	Construction Materials	**4.15**
73/1	Other	**3.95**
73/2	Construction Materials	**4.15**
73/2	Domestic Intermodal	**4.35**
73/2	Other	**3.95**
73/2	Steel	**3.95**
86/1	Other	**3.99**
86/1	Domestic Automotive	**3.99**
86/1	Domestic Intermodal	**4.44**
86/1	European Automotive	**4.33**
86/1	European Intermodal	**4.72**
86/1	Coal ESI	**3.93**
86/1	Iron Ore	**3.99**
86/1	Mail and Premium Logistics	**6.97**
86/1	Royal Mail	**6.97**
86/1	Chemicals	**3.46**
86/1	Coal Other	**3.99**
86/1	Construction Materials	**4.22**
86/1	Domestic Waste	**3.93**
86/1	Engineering Haulage	**3.58**
86/1	Enterprise	**4.10**
86/1	European Conventional	**4.33**
86/1	General Merchandise	**4.27**
86/1	Industrial Minerals	**3.58**
86/1	Petroleum	**3.87**
86/1	Steel	**3.99**
86/1	Biomass	**4.50**
86/2	Other	**3.99**
86/2	Domestic Automotive	**3.99**
86/2	Domestic Intermodal	**4.44**
86/2	European Automotive	**4.33**
86/2	European Intermodal	**4.72**
86/2	Coal ESI	**3.93**
86/2	Iron Ore	**3.99**
86/2	Mail and Premium Logistics	**6.97**
86/2	Royal Mail	**6.97**
86/2	Chemicals	**3.46**
86/2	Coal Other	**3.99**

86/2	Construction Materials	**4.22**
86/2	Domestic Waste	**3.93**
86/2	Engineering Haulage	**3.58**
86/2	Enterprise	**4.10**
86/2	European Conventional	**4.33**
86/2	General Merchandise	**4.27**
86/2	Industrial Minerals	**3.58**
86/2	Petroleum	**3.87**
86/2	Steel	**3.99**
86/2	Biomass	**4.50**
86/5	Domestic Intermodal	**4.44**
86/5	Domestic Automotive	**3.99**
86/5	European Automotive	**4.33**
86/5	European Intermodal	**4.72**
86/5	Coal ESI	**3.93**
86/5	Iron Ore	**3.99**
86/5	Mail and Premium Logistics	**6.97**
86/5	Royal Mail	**6.97**
86/5	Chemicals	**3.46**
86/5	Coal Other	**3.99**
86/5	Construction Materials	**4.22**
86/5	Domestic Waste	**3.93**
86/5	Engineering Haulage	**3.58**
86/5	Enterprise	**4.10**
86/5	European Conventional	**4.33**
86/5	General Merchandise	**4.27**
86/5	Industrial Minerals	**3.58**
86/5	Other	**3.99**
86/5	Petroleum	**3.87**
86/5	Steel	**3.99**
86/5	Biomass	**4.50**
86/6	Domestic Intermodal	**4.44**
86/6	Domestic Automotive	**3.99**
86/6	European Automotive	**4.33**
86/6	European Intermodal	**4.72**
86/6	Coal ESI	**3.93**
86/6	Iron Ore	**3.99**
86/6	Mail and Premium Logistics	**6.97**
86/6	Royal Mail	**6.97**
86/6	Chemicals	**3.46**
86/6	Coal Other	**3.99**
86/6	Construction Materials	**4.22**
86/6	Domestic Waste	**3.93**
86/6	Engineering Haulage	**3.58**
86/6	Enterprise	**4.10**

86/6	European Conventional	**4.33**
86/6	General Merchandise	**4.27**
86/6	Industrial Minerals	**3.58**
86/6	Other	**3.99**
86/6	Petroleum	**3.87**
86/6	Steel	**3.99**
86/6	Biomass	**4.50**
89/5	Coal ESI	**3.83**
89/5	Steel	**3.87**
90/0	Coal ESI	**3.79**
90/0	Construction Materials	**4.08**
90/0	Domestic Automotive	**3.85**
90/0	Domestic Intermodal	**4.32**
90/0	Enterprise	**3.97**
90/0	European Conventional	**4.20**
90/0	European Intermodal	**4.61**
90/0	Other	**3.85**
90/0	Petroleum	**3.73**
90/0	Royal Mail	**7.00**
90/0	European Automotive	**4.33**
90/0	Iron Ore	**3.99**
90/0	Mail and Premium Logistics	**6.97**
90/0	Chemicals	**3.46**
90/0	Coal Other	**3.99**
90/0	Domestic Waste	**3.93**
90/0	Engineering Haulage	**3.58**
90/0	General Merchandise	**4.27**
90/0	Industrial Minerals	**3.58**
90/0	Steel	**3.99**
90/0	Biomass	**4.50**
92/0	Construction Materials	**3.98**
92/0	Domestic Automotive	**3.74**
92/0	Domestic Intermodal	**4.22**
92/0	Enterprise	**3.86**
92/0	European Automotive	**4.10**
92/0	European Conventional	**4.10**
92/0	European Intermodal	**4.51**
92/0	Other	**3.74**
92/0	Petroleum	**3.62**
92/0	Royal Mail	**6.94**
92/0	Steel	**3.74**
92/0	Coal ESI	**3.68**
92/0	Iron Ore	**3.74**
92/0	Mail and Premium Logistics	**6.94**
92/0	Chemicals	**3.20**

92/0	Coal Other	**3.74**
92/0	Domestic Waste	**3.68**
92/0	Engineering Haulage	**3.32**
92/0	General Merchandise	**4.04**
92/0	Industrial Minerals	**3.32**
92/0	Biomass	**4.28**
97/3	Coal ESI	**3.77**
97/3	Petroleum	**3.73**
BAAM (L)	Steel	**1.56**
BAAT (L)	Industrial Minerals	**2.20**
BAAT (T)	Steel	**1.14**
BAAT (L)	Steel	**2.55**
BAAU (T)	Enterprise	**0.96**
BAAU (T)	Industrial Minerals	**0.79**
BAAU (L)	Industrial Minerals	**1.40**
BAAU (L)	Industrial Minerals	**1.40**
BAAU (T)	Steel	**0.92**
BAAU (L)	Steel	**1.70**
BAAU (L)	Steel	**1.70**
BAAV (T)	Enterprise	**0.96**
BAAV (L)	Industrial Minerals	**1.38**
BAAV (T)	Steel	**0.92**
BAAV (L)	Steel	**1.71**
BBAA (T)	Steel	**0.95**
BBAA (L)	Steel	**1.80**
BBAB (T)	Enterprise	**0.97**
BBAB (T)	Industrial Minerals	**0.79**
BBAB (L)	Industrial Minerals	**1.36**
BBAB (T)	Other	**0.93**
BBAB (T)	Steel	**0.93**
BBAB (L)	Steel	**1.75**
BBAC (T)	Enterprise	**0.99**
BBAC (L)	Enterprise	**1.32**
BBAC (T)	Industrial Minerals	**0.80**
BBAC (L)	Industrial Minerals	**1.39**
BBAC (T)	Other	**0.95**
BBAC (T)	Steel	**0.95**
BBAC (L)	Steel	**1.80**
BBAF (T)	Industrial Minerals	**0.79**
BBAF (L)	Industrial Minerals	**1.48**
BBAF (L)	Other	**2.05**
BBAF (T)	Steel	**0.93**
BBAF (L)	Steel	**1.80**
BBAS (T)	Enterprise	**0.97**
BBAS (T)	Industrial Minerals	**0.79**

BBAS (L)	Industrial Minerals	**1.41**
BBAS (T)	Other	**0.94**
BBAS (T)	Steel	**0.94**
BBAS (L)	Steel	**1.78**
BBAT (T)	Industrial Minerals	**0.99**
BBAT (L)	Industrial Minerals	**2.25**
BBAT (T)	Steel	**1.14**
BBAT (L)	Steel	**2.61**
BCAA (T)	Enterprise	**1.00**
BCAA (T)	Industrial Minerals	**0.81**
BCAA (L)	Industrial Minerals	**1.51**
BCAA (T)	Other	**0.96**
BCAA (T)	Steel	**0.96**
BCAA (L)	Steel	**1.89**
BCAC (T)	Industrial Minerals	**0.81**
BCAC (L)	Industrial Minerals	**1.62**
BCAC (T)	Steel	**0.97**
BCAC (L)	Steel	**1.88**
BDAR (T)	Coal ESI	**0.86**
BDAR (L)	Coal ESI	**1.50**
BDAR (T)	Enterprise	**0.91**
BDAR (L)	Enterprise	**1.44**
BDAR (T)	Industrial Minerals	**0.75**
BDAR (L)	Industrial Minerals	**1.08**
BDAR (T)	Other	**0.88**
BDAR (L)	Other	**1.39**
BDAR (T)	Steel	**0.88**
BDAR (L)	Steel	**1.27**
BEAA (T)	Enterprise	**0.91**
BEAA (L)	Enterprise	**1.49**
BEAA (T)	Industrial Minerals	**0.75**
BEAA (L)	Industrial Minerals	**1.10**
BEAA (T)	Other	**0.88**
BEAA (L)	Other	**1.48**
BEAA (T)	Steel	**0.88**
BEAA (L)	Steel	**1.29**
BFAP (T)	Enterprise	**0.92**
BFAP (L)	Enterprise	**1.33**
BFAP (T)	Other	**0.88**
BFAP (T)	Steel	**0.88**
BFAP (L)	Steel	**1.24**
BFAS (L)	Enterprise	**1.31**
BFAS (T)	Industrial Minerals	**0.75**
BFAS (T)	Steel	**0.88**
BFAS (L)	Steel	**1.20**

BFAT (T)	Steel	**0.88**
BFAT (L)	Steel	**1.20**
BIAH (T)	Steel	**1.03**
BIAH (L)	Steel	**2.15**
BLAA (T)	Enterprise	**1.01**
BLAA (L)	Enterprise	**2.17**
BLAA (T)	Industrial Minerals	**0.82**
BLAA (L)	Industrial Minerals	**1.50**
BLAA (T)	Other	**0.97**
BLAA (T)	Steel	**0.97**
BLAA (L)	Steel	**1.94**
BLAP (T)	Enterprise	**1.02**
BLAP (T)	Industrial Minerals	**0.82**
BLAP (L)	Industrial Minerals	**1.35**
BLAP (T)	Steel	**0.98**
BLAP (L)	Steel	**1.95**
BMAA (T)	Industrial Minerals	**0.76**
BMAA (L)	Other	**1.55**
BMAA (T)	Steel	**0.88**
BMAA (L)	Steel	**1.46**
BMAB (T)	Steel	**0.88**
BMAB (L)	Steel	**1.48**
BNAA (T)	Industrial Minerals	**0.77**
BNAA (L)	Other	**1.51**
BNAA (T)	Steel	**0.90**
BNAA (L)	Steel	**1.49**
BPAR (L)	Other	**1.32**
BPAR (T)	Steel	**0.89**
BPAR (L)	Steel	**1.31**
BQAA (T)	Industrial Minerals	**0.76**
BQAA (L)	Industrial Minerals	**1.15**
BQAA (T)	Steel	**0.89**
BQAA (L)	Steel	**1.45**
BRAB (T)	Enterprise	**1.19**
BRAB (T)	Other	**1.14**
BSAE (T)	Steel	**0.92**
BSAE (L)	Steel	**1.67**
BTAA (T)	Enterprise	**0.91**
BTAA (L)	Enterprise	**1.33**
BTAA (T)	Other	**0.88**
BTAA (T)	Steel	**0.88**
BTAA (L)	Steel	**1.27**
BTAR (T)	Enterprise	**0.91**
BTAR (L)	Enterprise	**1.32**
BTAR (T)	Steel	**0.87**

BTAR (L)	Steel	**1.26**
BVAA (T)	Steel	**1.13**
BVAA (L)	Steel	**2.44**
BXAA (T)	Steel	**1.01**
BXAA (L)	Steel	**2.16**
BYAA (T)	Enterprise	**1.19**
BYAA (T)	Industrial Minerals	**0.99**
BYAA (L)	Industrial Minerals	**2.22**
BYAA (T)	Other	**1.14**
BYAA (L)	Other	**2.57**
BYAA (T)	Steel	**1.14**
BYAA (L)	Steel	**2.72**
BYAB (T)	Enterprise	**1.18**
BYAB (T)	Industrial Minerals	**0.99**
BYAB (L)	Industrial Minerals	**2.24**
BYAB (T)	Other	**1.14**
BYAB (T)	Steel	**1.14**
BYAB (L)	Steel	**2.77**
BZAA (L)	Enterprise	**2.08**
BZAA (T)	Industrial Minerals	**0.81**
BZAA (L)	Industrial Minerals	**1.37**
BZAA (T)	Other	**0.97**
BZAA (T)	Steel	**0.97**
BZAA (L)	Steel	**1.93**
CDAR (T)	Industrial Minerals	**0.98**
CDAR (L)	Industrial Minerals	**1.87**
DCEY (T)	Other	**1.09**
DHEY (T)	Other	**0.94**
DOEY (T)	Other	**0.98**
DPEX (T)	Other	**1.30**
DPEY (T)	Other	**1.18**
DREY (T)	Other	**1.16**
DXEY (T)	Other	**1.02**
EAEY (T)	Mail and Premium Logistics	**1.79**
EAEY (T)	Other	**1.02**
ECAY (T)	Other	**1.20**
ECAY (T)	Royal Mail	**2.29**
ECAY (L)	Royal Mail	**2.83**
ECEY (T)	Other	**0.96**
ECEY (T)	Royal Mail	**1.87**
EDEY (T)	Other	**1.12**
EEAY (T)	Other	**0.96**
EEAY (T)	Royal Mail	**1.66**
EEAY (L)	Royal Mail	**2.05**
EEEY (T)	Other	**0.97**

EEEY (T)	Royal Mail	**1.88**
EHAY (T)	Other	**0.98**
EHAY (T)	Royal Mail	**1.70**
EHAY (L)	Royal Mail	**2.10**
EHEY (T)	Other	**0.92**
EHEY (T)	Royal Mail	**1.79**
EIEY (T)	Other	**0.94**
EJEY (T)	Other	**0.89**
EKEY (T)	European Conventional	**1.15**
EKEY (T)	Mail and Premium Logistics	**1.75**
EKEY (T)	Other	**0.93**
ELEY (T)	Other	**1.06**
EMEY (T)	Other	**1.03**
EQEY (T)	European Conventional	**1.20**
EZAY (T)	Other	**1.00**
EZAY (T)	Other	**1.00**
FAAA (L)	Domestic Intermodal	**1.49**
FAAA (T)	Enterprise	**0.98**
FAAA (L)	Enterprise	**1.20**
FAAA (T)	Other	**0.94**
FAAA (L)	Other	**1.17**
FAAU (T)	Domestic Automotive	**0.94**
FAAU (T)	Domestic Intermodal	**1.10**
FAAU (L)	Domestic Intermodal	**1.38**
FAAU (T)	Enterprise	**0.98**
FAAU (L)	Enterprise	**1.24**
FAAU (L)	European Automotive	**1.24**
FAAU (T)	European Intermodal	**1.19**
FAAU (L)	European Intermodal	**1.44**
FAAU (T)	Other	**0.94**
FAAU (L)	Other	**1.17**
FCAA (T)	Coal Other	**1.12**
FCAA (L)	Coal Other	**2.46**
FCAA (T)	Construction Materials	**1.20**
FCAA (L)	Construction Materials	**2.61**
FCAA (T)	Domestic Automotive	**1.12**
FCAA (L)	Domestic Automotive	**2.58**
FCAA (T)	Domestic Intermodal	**1.27**
FCAA (L)	Domestic Intermodal	**2.82**
FCAA (T)	Domestic Waste	**1.10**
FCAA (L)	Domestic Waste	**2.49**
FCAA (T)	Enterprise	**1.16**
FCAA (L)	Enterprise	**2.54**
FCAA (T)	European Automotive	**1.23**
FCAA (L)	European Automotive	**2.77**

FCAA (T)	European Conventional	**1.23**
FCAA (L)	European Conventional	**2.67**
FCAA (T)	European Intermodal	**1.35**
FCAA (L)	European Intermodal	**3.10**
FCAA (T)	Industrial Minerals	**0.98**
FCAA (L)	Industrial Minerals	**2.21**
FCAA (T)	Other	**1.12**
FCAA (L)	Other	**2.54**
FCAA (T)	Steel	**1.12**
FCAA (L)	Steel	**2.48**
FDAA (T)	Construction Materials	**1.28**
FDAA (L)	Construction Materials	**2.60**
FDAA (L)	Domestic Intermodal	**2.66**
FDAA (T)	Enterprise	**1.24**
FDAA (T)	Other	**1.21**
FDAA (L)	Steel	**2.41**
FEAA (T)	Construction Materials	**0.94**
FEAA (L)	Construction Materials	**1.40**
FEAA (T)	Domestic Intermodal	**1.00**
FEAA (L)	Domestic Intermodal	**1.49**
FEAB (T)	Construction Materials	**0.92**
FEAB (L)	Construction Materials	**1.36**
FEAB (T)	Domestic Automotive	**0.86**
FEAB (T)	Domestic Intermodal	**0.98**
FEAB (L)	Domestic Intermodal	**1.40**
FEAB (T)	Domestic Waste	**0.84**
FEAB (T)	Enterprise	**0.89**
FEAB (T)	European Automotive	**0.95**
FEAB (L)	European Automotive	**1.21**
FEAB (L)	European Intermodal	**1.55**
FEAB (T)	Industrial Minerals	**0.75**
FEAB (T)	Other	**0.86**
FEAC (T)	Construction Materials	**0.94**
FEAC (L)	Construction Materials	**1.40**
FEAC (T)	Domestic Intermodal	**1.00**
FEAC (L)	Domestic Intermodal	**1.49**
FEAD (T)	Construction Materials	**0.94**
FEAD (L)	Construction Materials	**1.88**
FEAD (L)	Domestic Intermodal	**1.31**
FEAE (T)	Construction Materials	**0.94**
FEAE (L)	Construction Materials	**1.35**
FEAE (T)	Domestic Intermodal	**1.00**
FEAE (L)	Domestic Intermodal	**1.45**
FEAE (T)	Domestic Waste	**0.86**
FEAE (L)	Domestic Waste	**1.22**

FEAF (L)	European Conventional	**1.48**
FEAF (L)	Industrial Minerals	**1.14**
FEAF (L)	Other	**1.44**
FEAF (L)	Steel	**1.30**
FEAS (T)	Construction Materials	**0.95**
FEAS (L)	Construction Materials	**1.40**
FEAS (T)	Domestic Intermodal	**1.00**
FEAS (L)	Domestic Intermodal	**1.44**
FHAA (T)	Domestic Intermodal	**0.95**
FHAA (T)	Other	**0.81**
FHAB (T)	Domestic Automotive	**0.79**
FHAB (T)	Domestic Intermodal	**0.92**
FHAB (L)	Domestic Intermodal	**1.13**
FHAB (T)	Other	**0.79**
FIAB (T)	Domestic Automotive	**0.72**
FIAB (T)	Domestic Intermodal	**0.83**
FIAB (L)	Domestic Intermodal	**1.09**
FIAB (T)	Enterprise	**0.75**
FIAB (L)	Enterprise	**0.91**
FIAB (T)	European Conventional	**0.81**
FIAB (L)	European Conventional	**0.96**
FIAB (T)	European Intermodal	**0.90**
FIAB (L)	European Intermodal	**1.33**
FIAB (T)	Industrial Minerals	**0.61**
FIAB (T)	Other	**0.72**
FIAB (L)	Other	**0.87**
FIAB (T)	Steel	**0.72**
FIAB (L)	Steel	**0.87**
FIAD (L)	Domestic Automotive	**1.16**
FIAD (L)	Enterprise	**1.20**
FIAD (T)	European Conventional	**0.95**
FIAD (L)	European Conventional	**1.29**
FIAD (L)	European Intermodal	**1.45**
FIAD (L)	Other	**1.16**
FJAS (T)	Domestic Intermodal	**1.03**
FKAA (T)	Domestic Automotive	**0.75**
FKAA (T)	Domestic Intermodal	**0.88**
FKAA (L)	Domestic Intermodal	**1.12**
FKAA (T)	Enterprise	**0.78**
FKAA (L)	Enterprise	**1.03**
FKAA (L)	European Automotive	**1.27**
FKAA (L)	European Conventional	**1.16**
FKAA (T)	European Intermodal	**0.95**
FKAA (L)	European Intermodal	**1.21**
FKAA (T)	Industrial Minerals	**0.63**

FKAA (L)	Industrial Minerals	**0.81**
FKAA (T)	Other	**0.75**
FKAA (L)	Other	**0.97**
FLAB (T)	Domestic Intermodal	**0.90**
FLAB (L)	Domestic Intermodal	**1.16**
FLAI (T)	Domestic Intermodal	**0.89**
FLAI (L)	Domestic Intermodal	**1.15**
FLAJ (T)	Domestic Intermodal	**0.89**
FLAJ (L)	Domestic Intermodal	**1.14**
FLAO (T)	Domestic Intermodal	**0.89**
FLAO (L)	Domestic Intermodal	**1.15**
FLAP (T)	Domestic Intermodal	**0.89**
FLAP (L)	Domestic Intermodal	**1.15**
FNAB (T)	Other	**0.92**
FNAB (L)	Other	**1.62**
FNAC (T)	Other	**0.92**
FNAC (L)	Other	**1.62**
FPAB (L)	Steel	**1.66**
FRAA (L)	Domestic Waste	**1.26**
FRAA (T)	Domestic Waste	**0.88**
FSAO (T)	Domestic Intermodal	**1.01**
FSAO (L)	Domestic Intermodal	**1.39**
FTAI (T)	Domestic Intermodal	**1.01**
FTAI (L)	Domestic Intermodal	**1.35**
FWAA (L)	Domestic Intermodal	**1.25**
FWAA (T)	Domestic Intermodal	**0.94**
FYAB (T)	Domestic Automotive	**1.12**
FYAB (T)	Domestic Intermodal	**1.27**
FYAB (L)	Domestic Intermodal	**2.89**
FYAB (T)	Domestic Waste	**1.10**
FYAB (L)	Domestic Waste	**2.56**
FYAB (T)	Enterprise	**1.16**
FYAB (L)	Enterprise	**2.53**
FYAB (T)	European Intermodal	**1.35**
FYAB (L)	European Intermodal	**3.16**
FYAB (T)	Industrial Minerals	**0.98**
FYAB (L)	Industrial Minerals	**2.36**
FYAB (T)	Other	**1.12**
FYAB (L)	Other	**2.58**
FZAA (T)	Other	**0.94**
HAAV (T)	Coal ESI	**1.11**
HHAA (T)	Coal ESI	**0.86**
HHAA (L)	Coal ESI	**1.90**
HHAA (T)	Coal Other	**0.87**
HHAA (L)	Coal Other	**1.97**

HHAA (T)	Construction Materials	**0.94**
HHAA (L)	Construction Materials	**2.25**
HHAA (T)	Other	**0.87**
HHAA (L)	Other	**2.00**
HHAB (T)	Coal ESI	**0.86**
HHAB (L)	Coal ESI	**1.90**
HHAB (T)	Coal Other	**0.87**
HHAB (L)	Coal Other	**1.51**
HHAB (T)	Construction Materials	**0.94**
HHAB (L)	Construction Materials	**2.25**
HHAB (T)	Other	**0.87**
HHAB (L)	Other	**2.01**
HHAC (T)	Coal ESI	**0.86**
HHAC (L)	Coal ESI	**1.85**
HIAA (T)	Coal ESI	**0.88**
HIAA (L)	Coal ESI	**1.69**
HIAA (T)	Coal Other	**0.89**
HIAA (L)	Coal Other	**1.82**
HIAA (T)	Construction Materials	**0.96**
HIAA (L)	Construction Materials	**2.01**
HIAA (T)	Domestic Intermodal	**1.02**
HIAA (T)	Other	**0.89**
HJAI (T)	Construction Materials	**0.91**
HJAI (T)	Construction Materials	**0.91**
HJAI (L)	Construction Materials	**2.24**
HJAI (L)	Construction Materials	**2.24**
HJAI (T)	Enterprise	**0.88**
HJAI (T)	Enterprise	**0.88**
HJAO (T)	Construction Materials	**0.91**
HJAO (T)	Construction Materials	**0.91**
HJAO (L)	Construction Materials	**2.18**
HJAO (L)	Construction Materials	**2.18**
HJAO (T)	Enterprise	**0.88**
HJAO (T)	Enterprise	**0.88**
HKAI (T)	Coal ESI	**0.85**
HKAI (L)	Coal ESI	**1.95**
HKAI (T)	Construction Materials	**0.94**
HKAI (L)	Construction Materials	**2.28**
HKAI (T)	Domestic Intermodal	**1.00**
HKAI (T)	Industrial Minerals	**0.74**
HKAI (L)	Industrial Minerals	**1.50**
HKAO (T)	Coal ESI	**0.85**
HKAO (L)	Coal ESI	**1.95**
HKAO (T)	Construction Materials	**0.94**
HKAO (L)	Construction Materials	**2.27**

HKAO (T)	Domestic Intermodal	**1.00**
HKAO (T)	Industrial Minerals	**0.74**
HKAO (L)	Industrial Minerals	**1.50**
HKAO (T)	Other	**0.87**
HLAA (T)	Construction Materials	**1.31**
HLAA (L)	Construction Materials	**3.09**
HLAB (T)	Construction Materials	**0.90**
HLAB (L)	Construction Materials	**2.15**
HOAA (T)	Construction Materials	**0.95**
HOAA (L)	Construction Materials	**2.28**
HOAA (T)	Enterprise	**0.92**
HOAA (L)	Enterprise	**2.02**
HOAA (T)	Industrial Minerals	**0.76**
HOAA (L)	Industrial Minerals	**1.52**
HOAA (T)	Other	**0.89**
HQAD (T)	Construction Materials	**1.00**
HQAD (L)	Construction Materials	**2.08**
HQAD (L)	Domestic Intermodal	**2.35**
HQAD (T)	Industrial Minerals	**0.79**
HQAD (L)	Other	**1.88**
HQAE (T)	Construction Materials	**1.00**
HQAE (L)	Construction Materials	**2.10**
HQAE (L)	Domestic Intermodal	**2.35**
HQAE (T)	Industrial Minerals	**0.79**
HQAE (L)	Other	**1.70**
HQAF (T)	Construction Materials	**1.02**
HQAF (L)	Construction Materials	**2.06**
HQAF (T)	Industrial Minerals	**0.80**
HQAF (L)	Other	**1.81**
HQAG (T)	Construction Materials	**1.00**
HQAG (L)	Construction Materials	**1.99**
HQAG (T)	Domestic Automotive	**0.93**
HQAG (L)	Domestic Automotive	**1.88**
HQAG (L)	Other	**1.88**
HQAG (L)	Steel	**1.88**
HQAH (T)	Construction Materials	**1.00**
HQAH (L)	Construction Materials	**1.98**
HQAH (L)	Other	**1.88**
HQAJ (T)	Construction Materials	**1.01**
HQAJ (L)	Construction Materials	**1.99**
HQAJ (L)	Other	**1.84**
HQAK (T)	Construction Materials	**1.02**
HQAK (L)	Construction Materials	**2.04**
HQAL (T)	Construction Materials	**1.00**
HQAL (L)	Construction Materials	**2.06**

HQAM (T)	Construction Materials	**1.00**
HQAM (L)	Construction Materials	**2.06**
HTAA (T)	Enterprise	**1.18**
HTAB (T)	Coal ESI	**1.12**
HTAB (L)	Coal ESI	**2.76**
HTAB (T)	Coal Other	**1.14**
HTAB (L)	Coal Other	**2.80**
HTAB (T)	Construction Materials	**1.22**
HTAB (L)	Construction Materials	**3.09**
HTAB (T)	Enterprise	**1.18**
HTAB (T)	Industrial Minerals	**0.99**
HTAB (L)	Industrial Minerals	**2.20**
HTAB (T)	Other	**1.14**
HTAB (T)	Steel	**1.14**
HTAB (L)	Steel	**2.49**
HTAD (T)	Coal ESI	**1.12**
HTAD (L)	Coal ESI	**2.77**
HTAD (T)	Coal Other	**1.14**
HTAD (L)	Coal Other	**2.81**
HTAD (L)	Construction Materials	**3.12**
HTAD (T)	Enterprise	**1.18**
HTAD (T)	Other	**1.14**
HTAD (T)	Steel	**1.14**
HTAD (L)	Steel	**2.49**
HXAA (T)	Coal ESI	**0.86**
HXAA (L)	Coal ESI	**1.88**
HXAA (T)	Coal Other	**0.88**
HXAA (L)	Coal Other	**1.95**
HXAA (T)	Construction Materials	**0.95**
HXAA (T)	Other	**0.88**
HXAB (T)	Coal ESI	**0.86**
HXAB (L)	Coal ESI	**1.88**
HXAB (T)	Coal Other	**0.88**
HXAB (L)	Coal Other	**1.95**
HXAB (T)	Construction Materials	**0.95**
HXAB (T)	Domestic Intermodal	**1.01**
HXAB (T)	Other	**0.88**
HYAA (T)	Biomass	**1.05**
HYAA (L)	Biomass	**2.52**
HYAA (T)	Coal ESI	**0.88**
HYAA (L)	Coal ESI	**1.99**
HYAA (T)	Construction Materials	**0.97**
HYAA (L)	Construction Materials	**2.39**
HYAA (T)	Other	**0.90**
HYAA (T)	Steel	**0.90**

HYAA (L)	Steel	**2.09**
ICAD (L)	Chemicals	**1.25**
ICAD (T)	Construction Materials	**0.87**
ICAD (T)	Enterprise	**0.85**
ICAD (L)	Enterprise	**1.54**
ICAD (T)	European Conventional	**0.90**
ICAD (L)	European Conventional	**2.03**
ICAD (T)	Other	**0.82**
ICAD (L)	Other	**1.17**
ICAG (T)	Enterprise	**0.88**
ICAG (L)	Other	**1.06**
ICAG (T)	Petroleum	**0.81**
ICAG (L)	Petroleum	**1.23**
ICAH (L)	Enterprise	**1.43**
ICAH (L)	Enterprise	**1.43**
ICAH (L)	European Conventional	**1.57**
ICAH (L)	European Conventional	**1.57**
IFAB (L)	Domestic Automotive	**1.62**
IFAB (L)	European Automotive	**1.83**
IFAB (L)	European Conventional	**1.86**
IFAB (L)	European Intermodal	**2.07**
IFAE (L)	Construction Materials	**1.14**
IFAE (T)	Domestic Intermodal	**0.83**
IFAE (L)	Domestic Intermodal	**1.24**
IFAE (T)	Enterprise	**0.75**
IFAE (L)	Enterprise	**0.92**
IFAE (T)	European Conventional	**0.81**
IFAE (L)	European Conventional	**1.01**
IFAE (T)	Steel	**0.72**
IFAE (L)	Steel	**1.25**
IFAG (T)	Domestic Automotive	**1.19**
IFAG (L)	Domestic Automotive	**2.40**
IFAG (T)	Enterprise	**1.24**
IFAG (L)	Enterprise	**2.47**
IFAG (T)	European Automotive	**1.34**
IFAG (T)	European Conventional	**1.34**
IFAG (T)	Other	**1.19**
IFAG (L)	Other	**2.41**
IFAG (L)	Steel	**2.41**
IFAP (T)	Domestic Intermodal	**1.00**
IFAP (L)	Domestic Intermodal	**1.44**
IFAP (L)	European Intermodal	**1.66**
IFAR (T)	Construction Materials	**1.10**
IFAR (T)	Construction Materials	**1.10**
IFAR (T)	Domestic Intermodal	**1.19**

IFAR (T)	Domestic Intermodal	**1.19**
IFAS (T)	Domestic Intermodal	**1.17**
IFAS (T)	Domestic Intermodal	**1.17**
IFBB (L)	Domestic Automotive	**1.75**
IFBB (L)	European Automotive	**1.93**
IFBB (L)	European Conventional	**1.99**
IFBB (T)	European Intermodal	**1.53**
IFBB (L)	European Intermodal	**2.20**
IFBB (T)	Other	**1.23**
IGAD (L)	Construction Materials	**2.53**
IGAD (T)	European Intermodal	**1.28**
IGAD (L)	European Intermodal	**2.87**
IGAD (T)	Industrial Minerals	**0.94**
IGAD (T)	Other	**1.07**
IGAD (T)	Steel	**1.07**
IGAD (L)	Steel	**2.36**
IHAE (L)	European Intermodal	**3.33**
IHAE (T)	Steel	**1.06**
IHAE (L)	Steel	**2.55**
IHAF (T)	Construction Materials	**0.95**
IHAF (L)	Construction Materials	**1.84**
IHAF (T)	Domestic Automotive	**0.88**
IHAF (T)	Domestic Intermodal	**1.00**
IHAF (T)	Enterprise	**0.91**
IHAF (L)	Enterprise	**1.86**
IHAF (T)	European Conventional	**0.98**
IHAF (T)	European Intermodal	**1.08**
IHAF (L)	European Intermodal	**2.30**
IHAF (T)	Industrial Minerals	**0.75**
IHAF (L)	Industrial Minerals	**1.23**
IHAF (T)	Other	**0.88**
IHAF (L)	Other	**1.48**
IHAF (T)	Steel	**0.88**
IHAF (L)	Steel	**1.64**
IHAG (T)	Steel	**0.87**
IHAG (L)	Steel	**1.59**
IIAA (T)	Biomass	**1.05**
IIAA (L)	Biomass	**2.61**
IIAA (T)	Coal ESI	**0.88**
IIAA (L)	Coal ESI	**2.04**
IIAA (T)	Construction Materials	**0.97**
IIAA (L)	Construction Materials	**2.45**
IIAA (T)	Other	**0.90**
IIAA (L)	Other	**2.04**
IIAB (T)	Coal ESI	**0.90**

IIAB (T)	Construction Materials	**0.95**
IIAB (L)	Construction Materials	**2.24**
IIAB (T)	Enterprise	**0.91**
IIAB (L)	Enterprise	**2.02**
IIAB (T)	Other	**0.88**
IIAC (T)	Biomass	**1.05**
IIAC (T)	Biomass	**1.05**
IIAC (L)	Biomass	**2.00**
IIAC (L)	Biomass	**2.00**
IIAC (T)	Coal ESI	**0.88**
IIAC (T)	Coal ESI	**0.88**
IIAC (L)	Coal ESI	**1.53**
IIAC (L)	Coal ESI	**1.53**
IIAC (T)	Construction Materials	**0.97**
IIAC (T)	Construction Materials	**0.97**
IKAF (T)	Construction Materials	**0.77**
IKAF (L)	Construction Materials	**0.93**
IKAF (T)	Domestic Intermodal	**0.83**
IKAF (L)	Domestic Intermodal	**1.13**
IKAF (T)	Enterprise	**0.75**
IKAF (L)	Enterprise	**0.90**
IKAF (L)	European Conventional	**1.08**
IKAF (T)	European Intermodal	**0.90**
IKAF (L)	European Intermodal	**1.30**
IKAF (T)	Other	**0.72**
IKAF (L)	Other	**0.86**
IKAH (T)	Domestic Intermodal	**0.82**
IKAH (L)	Domestic Intermodal	**1.11**
IKAH (T)	Enterprise	**0.74**
IKAH (L)	Enterprise	**0.89**
IKAH (L)	European Automotive	**0.99**
IKAH (T)	European Conventional	**0.79**
IKAH (L)	European Conventional	**1.00**
IKAH (T)	European Intermodal	**0.89**
IKAH (L)	European Intermodal	**1.17**
IKAH (T)	Other	**0.71**
IKAH (L)	Other	**0.86**
IKAH (T)	Steel	**0.71**
IKAJ (T)	Domestic Automotive	**0.71**
IKAJ (T)	Domestic Intermodal	**0.82**
IKAJ (L)	Domestic Intermodal	**1.11**
IKAJ (T)	Enterprise	**0.74**
IKAJ (L)	Enterprise	**0.91**
IKAJ (T)	European Automotive	**0.79**
IKAJ (L)	European Automotive	**1.02**

IKAJ (T)	European Conventional	**0.79**
IKAJ (L)	European Conventional	**1.09**
IKAJ (T)	European Intermodal	**0.89**
IKAJ (L)	European Intermodal	**1.20**
IKAJ (T)	Other	**0.71**
IKAJ (L)	Other	**0.86**
IKAJ (T)	Steel	**0.71**
IKAK (T)	Domestic Intermodal	**0.82**
IKAK (L)	Domestic Intermodal	**1.10**
IKAK (T)	Other	**0.71**
IKAK (L)	Other	**0.86**
INAA (L)	European Automotive	**1.24**
INAA (L)	European Intermodal	**1.50**
IOAE (L)	Construction Materials	**2.25**
IOAE (T)	Enterprise	**0.88**
IPAA (T)	Domestic Automotive	**1.07**
IPAA (L)	Domestic Automotive	**3.19**
IPAA (T)	Enterprise	**1.10**
IPAA (L)	Enterprise	**3.25**
IPAA (T)	European Automotive	**1.17**
IPAA (T)	European Conventional	**1.17**
IPAA (T)	Other	**1.07**
IPAA (L)	Other	**3.21**
IPAA (L)	Steel	**3.27**
IPAB (T)	Domestic Automotive	**0.91**
IPAB (L)	Domestic Automotive	**1.82**
IPAB (T)	Domestic Intermodal	**1.06**
IPAB (L)	Domestic Intermodal	**2.00**
IPAB (T)	Enterprise	**0.95**
IPAB (L)	Enterprise	**1.87**
IPAB (T)	European Conventional	**1.03**
IPAB (T)	European Intermodal	**1.15**
IPAB (T)	Other	**0.91**
IPAB (L)	Other	**1.86**
IPAV (T)	Domestic Automotive	**0.90**
IPAV (L)	Domestic Automotive	**1.80**
IPAV (T)	Enterprise	**0.94**
IPAV (L)	Enterprise	**1.84**
IPAV (T)	European Conventional	**1.01**
IPAV (T)	European Intermodal	**1.13**
IPAV (T)	Other	**0.90**
IPAV (L)	Other	**1.80**
IPAX (T)	Domestic Automotive	**1.06**
IPAX (L)	Domestic Automotive	**2.73**
IPAX (T)	Enterprise	**1.10**

IPAX (L)	Enterprise	**2.74**
IPAX (T)	European Automotive	**1.18**
IPAX (T)	European Conventional	**1.17**
IPAX (T)	European Intermodal	**1.29**
IPAX (T)	Other	**1.06**
IPAX (L)	Other	**2.74**
IPAX (L)	Steel	**2.73**
IQAD (T)	Other	**0.81**
IRBH (L)	Domestic Automotive	**1.61**
IRBH (T)	Enterprise	**0.92**
IRBH (L)	Enterprise	**1.70**
IRBH (T)	European Conventional	**0.98**
IRBH (L)	European Conventional	**1.89**
IRBH (L)	Other	**1.61**
IRBH (T)	Steel	**0.89**
IRBH (L)	Steel	**1.61**
IVAL (T)	Domestic Automotive	**1.12**
IVAL (L)	Domestic Automotive	**1.66**
IVAL (T)	Domestic Intermodal	**1.29**
IVAL (L)	Domestic Intermodal	**1.95**
IVAL (T)	Enterprise	**1.16**
IVAL (L)	Enterprise	**1.73**
IVAL (L)	European Automotive	**1.85**
IVAL (T)	Other	**1.12**
IVAL (L)	Other	**1.65**
IVAL (T)	Steel	**1.12**
IWAB (T)	Domestic Intermodal	**1.21**
IWAB (T)	Enterprise	**1.10**
IWAB (L)	Enterprise	**2.43**
IWAB (L)	European Conventional	**2.63**
IWAB (L)	European Intermodal	**2.81**
IWAB (T)	Industrial Minerals	**0.93**
IWAB (L)	Industrial Minerals	**2.11**
IWAB (T)	Other	**1.06**
IWAB (L)	Other	**2.38**
IWAB (T)	Steel	**1.06**
IWAB (L)	Steel	**2.49**
IWBB (L)	Enterprise	**2.53**
IWBB (L)	European Conventional	**2.64**
IWBB (T)	European Intermodal	**1.29**
IWBB (L)	European Intermodal	**2.82**
IWBB (T)	Industrial Minerals	**0.93**
IWBB (T)	Other	**1.06**
IWBB (L)	Other	**2.47**
IZAL (T)	Enterprise	**0.97**

IZAL (L)	Enterprise	**1.88**
IZAL (T)	European Automotive	**1.05**
IZAL (L)	European Automotive	**2.08**
IZAL (T)	European Conventional	**1.05**
IZAL (L)	European Conventional	**1.94**
IZAL (T)	European Intermodal	**1.17**
IZAL (L)	European Intermodal	**2.23**
IZAL (L)	Industrial Minerals	**1.42**
IZAL (T)	Other	**0.93**
IZAL (L)	Other	**1.37**
IZAL (L)	Steel	**1.76**
IZAN (T)	Domestic Intermodal	**1.08**
IZAN (L)	Domestic Intermodal	**2.13**
IZAN (T)	Enterprise	**0.97**
IZAN (L)	Enterprise	**1.92**
IZAN (T)	European Automotive	**1.05**
IZAN (L)	European Automotive	**2.03**
IZAN (T)	European Conventional	**1.05**
IZAN (L)	European Conventional	**1.94**
IZAN (T)	European Intermodal	**1.17**
IZAN (L)	European Intermodal	**2.12**
IZAN (L)	Industrial Minerals	**1.43**
IZAN (T)	Other	**0.93**
IZAN (T)	Royal Mail	**1.78**
IZAN (L)	Steel	**1.75**
JAAK (T)	Enterprise	**0.90**
JAAK (L)	Enterprise	**1.78**
JAAK (L)	Other	**1.68**
JEAI (T)	Industrial Minerals	**0.99**
JEAI (L)	Industrial Minerals	**2.36**
JEAO (T)	Industrial Minerals	**0.99**
JEAO (L)	Industrial Minerals	**2.36**
JFAB (T)	Construction Materials	**0.90**
JFAB (L)	Construction Materials	**2.25**
JGAK (T)	Coal ESI	**0.86**
JGAK (L)	Coal ESI	**1.70**
JGAK (T)	Construction Materials	**0.94**
JGAK (L)	Construction Materials	**1.98**
JGAK (T)	Domestic Waste	**0.86**
JGAK (L)	Domestic Waste	**1.61**
JGAK (T)	Enterprise	**0.91**
JGAK (L)	Enterprise	**1.39**
JGAK (T)	Industrial Minerals	**0.75**
JGAK (L)	Industrial Minerals	**1.37**
JGAK (T)	Other	**0.87**

JGAK (L)	Other	**1.21**
JGAK (T)	Steel	**0.87**
JGAK (L)	Steel	**1.82**
JGAL (T)	Industrial Minerals	**0.77**
JGAL (L)	Industrial Minerals	**1.31**
JGAM (T)	Construction Materials	**0.92**
JGAM (L)	Construction Materials	**1.92**
JGAM (T)	Industrial Minerals	**0.73**
JGAM (L)	Industrial Minerals	**1.31**
JGAN (T)	Construction Materials	**0.92**
JGAN (L)	Construction Materials	**2.28**
JHAI (T)	Construction Materials	**0.91**
JHAI (L)	Construction Materials	**2.25**
JHAL (T)	Construction Materials	**1.32**
JHAL (L)	Construction Materials	**3.18**
JHAO (T)	Construction Materials	**0.91**
JHAO (L)	Construction Materials	**2.25**
JHAO (L)	Enterprise	**2.13**
JIAA (T)	Enterprise	**0.93**
JIAA (L)	Enterprise	**1.92**
JIAA (T)	Industrial Minerals	**0.76**
JIAA (L)	Industrial Minerals	**1.39**
JIAA (L)	Other	**1.82**
JIAB (T)	Industrial Minerals	**0.76**
JIAB (L)	Industrial Minerals	**1.31**
JIAY (L)	Domestic Automotive	**1.52**
JIAY (T)	Enterprise	**0.91**
JIAY (L)	Enterprise	**1.61**
JIAY (L)	Other	**1.52**
JJAB (T)	Construction Materials	**0.98**
JJAB (L)	Construction Materials	**2.00**
JMAI (T)	Construction Materials	**0.93**
JMAO (T)	Construction Materials	**0.93**
JNAA (T)	Biomass	**0.99**
JNAA (L)	Biomass	**2.79**
JNAA (T)	Coal ESI	**0.84**
JNAA (L)	Coal ESI	**2.01**
JNAA (T)	Coal Other	**0.85**
JNAA (L)	Coal Other	**1.69**
JNAA (T)	Construction Materials	**0.91**
JNAA (L)	Construction Materials	**2.16**
JNAA (T)	Domestic Intermodal	**0.98**
JNAA (T)	Enterprise	**0.89**
JNAA (T)	Industrial Minerals	**0.73**
JNAA (L)	Industrial Minerals	**1.47**

JNAA (T)	Other	**0.85**
JNAA (L)	Other	**1.54**
JNAA (T)	Steel	**0.85**
JNAA (L)	Steel	**1.87**
JNAB (T)	Coal Other	**0.91**
JNAB (L)	Coal Other	**1.61**
JNAB (T)	Construction Materials	**0.98**
JNAB (L)	Construction Materials	**1.96**
JNAB (T)	Enterprise	**0.94**
JNAB (L)	Enterprise	**1.49**
JNAB (T)	Industrial Minerals	**0.77**
JNAB (L)	Industrial Minerals	**1.26**
JNAB (T)	Other	**0.91**
JNAB (L)	Other	**1.77**
JNAB (T)	Steel	**0.91**
JNAB (L)	Steel	**1.41**
JNAC (T)	Construction Materials	**1.30**
JNAC (L)	Construction Materials	**2.69**
JNAC (T)	Enterprise	**1.26**
JNAC (T)	Steel	**1.22**
JNAC (L)	Steel	**2.59**
JNAD (T)	Construction Materials	**0.91**
JNAD (L)	Construction Materials	**2.23**
JNAG (T)	Coal Other	**1.22**
JNAG (L)	Coal Other	**2.46**
JNAG (T)	Construction Materials	**1.30**
JNAG (L)	Construction Materials	**3.03**
JNAG (T)	Domestic Waste	**1.20**
JNAG (L)	Domestic Waste	**2.41**
JNAG (T)	Enterprise	**1.26**
JNAG (T)	Industrial Minerals	**1.06**
JNAG (L)	Industrial Minerals	**2.26**
JNAG (T)	Iron Ore	**1.22**
JNAG (L)	Iron Ore	**2.46**
JNAG (T)	Other	**1.22**
JNAG (T)	Steel	**1.22**
JNAG (L)	Steel	**2.64**
JNAN (T)	Coal Other	**1.22**
JNAN (L)	Coal Other	**2.46**
JNAN (T)	Construction Materials	**1.30**
JNAN (L)	Construction Materials	**3.03**
JNAN (T)	Industrial Minerals	**1.06**
JNAN (L)	Industrial Minerals	**2.29**
JNAN (T)	Iron Ore	**1.22**
JNAN (L)	Iron Ore	**2.44**

JNAN (T)	Other	**1.22**
JNAN (L)	Other	**2.44**
JNAN (T)	Steel	**1.22**
JNAN (L)	Steel	**2.60**
JNAS (T)	Coal Other	**1.24**
JNAS (L)	Coal Other	**2.65**
JNAS (T)	Construction Materials	**1.33**
JNAS (L)	Construction Materials	**3.11**
JNAS (T)	Enterprise	**1.28**
JNAS (T)	Industrial Minerals	**1.06**
JNAS (L)	Industrial Minerals	**2.31**
JNAS (T)	Other	**1.24**
JNAS (L)	Other	**2.87**
JPAA (T)	Construction Materials	**0.90**
JPAA (L)	Construction Materials	**2.27**
JRAH (L)	Coal Other	**1.79**
JRAH (T)	Construction Materials	**0.94**
JRAH (L)	Construction Materials	**2.01**
JRAH (T)	Enterprise	**0.91**
JRAH (L)	Enterprise	**1.87**
JRAH (T)	Industrial Minerals	**0.75**
JRAH (L)	Industrial Minerals	**1.32**
JRAH (T)	Other	**0.87**
JRAH (L)	Other	**1.23**
JSAA (T)	Construction Materials	**1.29**
JSAA (T)	Enterprise	**1.25**
JSAA (T)	Industrial Minerals	**1.04**
JSAA (L)	Industrial Minerals	**2.17**
JSAA (T)	Other	**1.20**
JSAA (L)	Other	**2.75**
JSAA (T)	Steel	**1.20**
JSAA (L)	Steel	**2.68**
JTAE (T)	Construction Materials	**1.27**
JTAE (L)	Construction Materials	**3.03**
JTAE (T)	Iron Ore	**1.20**
JTAE (L)	Iron Ore	**2.68**
JTAE (T)	Steel	**1.20**
JTAE (L)	Steel	**2.38**
JTAF (T)	Construction Materials	**1.27**
JTAF (L)	Construction Materials	**3.00**
JTAF (T)	Iron Ore	**1.20**
JTAF (L)	Iron Ore	**2.68**
JTAF (T)	Steel	**1.20**
JTAF (L)	Steel	**2.38**
JUAD (T)	Construction Materials	**1.27**

JUAD (L)	Construction Materials	**3.03**
JUAD (T)	Iron Ore	**1.20**
JUAD (L)	Iron Ore	**2.68**
JUAD (T)	Steel	**1.20**
JUAD (L)	Steel	**2.38**
JXAT (T)	Coal Other	**0.92**
JXAT (L)	Coal Other	**1.56**
JXAT (T)	Construction Materials	**0.99**
JXAT (L)	Construction Materials	**2.24**
JXAT (T)	Domestic Intermodal	**1.10**
JXAT (T)	Domestic Waste	**0.92**
JXAT (L)	Domestic Waste	**1.52**
JXAT (T)	Industrial Minerals	**0.78**
JXAT (L)	Industrial Minerals	**1.56**
JXAT (T)	Iron Ore	**0.94**
JXAT (L)	Iron Ore	**1.58**
JXAT (T)	Other	**0.95**
JXAT (T)	Steel	**0.95**
JXAT (L)	Steel	**1.66**
JYAT (T)	Construction Materials	**1.00**
JYAT (L)	Construction Materials	**2.39**
JZAA (T)	Enterprise	**1.04**
JZAA (L)	Enterprise	**1.26**
JZAA (T)	Steel	**1.00**
JZAA (L)	Steel	**1.53**
JZAB (T)	Enterprise	**0.96**
JZAB (L)	Enterprise	**1.18**
JZAB (T)	Steel	**0.93**
JZAB (L)	Steel	**1.38**
JZAD (T)	Enterprise	**0.93**
JZAD (T)	Steel	**0.90**
KEAZ (T)	Coal ESI	**1.17**
KEAZ (L)	Coal ESI	**2.51**
KEAZ (T)	Coal Other	**1.19**
KEAZ (L)	Coal Other	**2.50**
KEAZ (T)	Construction Materials	**1.28**
KEAZ (L)	Construction Materials	**3.00**
KEAZ (T)	Domestic Waste	**1.17**
KEAZ (L)	Domestic Waste	**2.37**
KEAZ (T)	Enterprise	**1.24**
KEAZ (T)	Industrial Minerals	**1.04**
KEAZ (L)	Industrial Minerals	**2.25**
KEAZ (T)	Iron Ore	**1.20**
KEAZ (L)	Iron Ore	**2.41**
KEAZ (T)	Other	**1.20**

KEAZ (L)	Other	**2.39**
KEAZ (T)	Steel	**1.19**
KEAZ (L)	Steel	**2.56**
KFAA (T)	Construction Materials	**0.96**
KFAA (L)	Construction Materials	**1.17**
KFAA (T)	Domestic Intermodal	**1.03**
KFAF (T)	Construction Materials	**0.93**
KFAF (L)	Construction Materials	**1.38**
KFAF (T)	Domestic Automotive	**0.87**
KFAF (T)	Domestic Intermodal	**0.99**
KFAF (L)	Domestic Intermodal	**1.37**
KFAF (T)	Domestic Waste	**0.85**
KFAF (L)	Domestic Waste	**1.21**
KFAF (T)	Enterprise	**0.90**
KFAF (T)	European Automotive	**0.96**
KFAF (T)	European Conventional	**0.96**
KFAF (T)	European Intermodal	**1.05**
KFAF (L)	European Intermodal	**1.43**
KFAF (T)	Other	**0.87**
KFAF (T)	Steel	**0.87**
KFAG (T)	Enterprise	**0.93**
KFAG (L)	Enterprise	**1.17**
KFAG (T)	European Automotive	**0.99**
KFAG (T)	Other	**0.90**
KFAG (L)	Other	**1.13**
KFAR (T)	Construction Materials	**1.23**
KFAR (L)	Construction Materials	**2.46**
KFAR (T)	Domestic Intermodal	**1.29**
KFAR (L)	Domestic Intermodal	**2.65**
KFAR (T)	Domestic Waste	**1.15**
KFAR (L)	Domestic Waste	**2.33**
KFAR (T)	Enterprise	**1.19**
KFAR (T)	European Intermodal	**1.36**
KFAR (L)	European Intermodal	**3.20**
KFAR (T)	Industrial Minerals	**1.04**
KFAR (T)	Other	**1.16**
KFAR (T)	Steel	**1.16**
KFAT (T)	Construction Materials	**0.96**
KFAT (L)	Construction Materials	**1.40**
KJAS (T)	Construction Materials	**1.13**
KJAS (L)	Construction Materials	**1.26**
KPAX (T)	Construction Materials	**0.94**
KPAX (L)	Construction Materials	**1.91**
KPAX (T)	Domestic Waste	**0.86**
KPAX (L)	Domestic Waste	**1.49**

KPAX (T)	Enterprise	**0.92**
KPAX (L)	Enterprise	**1.93**
KPAX (T)	Other	**0.88**
KSAA (T)	Construction Materials	**1.00**
KSAA (L)	Construction Materials	**1.52**
KSAA (T)	Other	**0.93**
KTAA (T)	Domestic Intermodal	**1.00**
KTAA (L)	Domestic Intermodal	**1.36**
KUAA (T)	Construction Materials	**0.94**
KUAA (T)	Other	**0.86**
KUAA (L)	Other	**1.37**
KVAB (T)	Construction Materials	**1.14**
KVAB (L)	Construction Materials	**2.64**
KVAB (T)	Enterprise	**1.10**
KVAB (L)	Enterprise	**2.58**
KVAB (T)	Other	**1.06**
KVAB (L)	Other	**2.48**
KVAB (T)	Steel	**1.06**
KVAB (L)	Steel	**2.49**
KWAW (T)	Enterprise	**1.19**
KWAW (L)	Enterprise	**2.88**
KWAW (T)	European Automotive	**1.26**
KWAW (T)	Other	**1.15**
KWAW (L)	Other	**2.71**
KWBW (T)	Domestic Intermodal	**1.30**
KWBW (T)	Enterprise	**1.19**
KWBW (L)	Enterprise	**2.37**
KWBW (T)	European Automotive	**1.26**
KWBW (T)	European Conventional	**1.26**
KWBW (T)	Other	**1.15**
KWBW (L)	Other	**2.63**
KXAC (T)	Other	**0.81**
KXAC (L)	Other	**1.45**
MBAB (T)	Coal ESI	**1.13**
MBAB (L)	Coal ESI	**2.63**
MBAB (T)	Coal Other	**1.15**
MBAB (L)	Coal Other	**2.63**
MBAB (T)	Construction Materials	**1.24**
MBAB (L)	Construction Materials	**2.88**
MBAB (T)	Enterprise	**1.19**
MBAB (T)	Industrial Minerals	**0.99**
MBAB (L)	Industrial Minerals	**2.22**
MBAB (T)	Other	**1.15**
MBAB (T)	Steel	**1.15**
MBAB (L)	Steel	**2.59**

MBAC (T)	Coal ESI	**1.13**
MBAC (L)	Coal ESI	**2.63**
MBAC (T)	Coal Other	**1.15**
MBAC (L)	Coal Other	**2.64**
MBAC (T)	Construction Materials	**1.24**
MBAC (L)	Construction Materials	**2.88**
MBAC (T)	Enterprise	**1.19**
MBAC (T)	Industrial Minerals	**0.99**
MBAC (L)	Industrial Minerals	**2.19**
MBAC (T)	Other	**1.15**
MBAC (T)	Steel	**1.15**
MBAC (L)	Steel	**2.58**
MCAA (T)	Construction Materials	**1.23**
MCAA (L)	Construction Materials	**2.95**
MCAA (T)	Enterprise	**1.19**
MCAA (T)	Other	**1.15**
MDAA (T)	Construction Materials	**1.23**
MDAA (L)	Construction Materials	**2.93**
MDAA (T)	Enterprise	**1.19**
MDAA (T)	Other	**1.14**
MEAA (T)	Coal ESI	**1.12**
MEAA (L)	Coal ESI	**2.07**
MEAA (T)	Coal Other	**1.14**
MEAA (L)	Coal Other	**2.16**
MEAA (T)	Construction Materials	**1.23**
MEAA (L)	Construction Materials	**2.52**
MEAA (T)	Enterprise	**1.19**
MEAA (T)	Industrial Minerals	**0.98**
MEAA (L)	Industrial Minerals	**1.64**
MEAA (T)	Other	**1.14**
MEAA (T)	Steel	**1.14**
MEAA (L)	Steel	**1.89**
MFAA (T)	Construction Materials	**1.22**
MFAA (L)	Construction Materials	**2.30**
MFAA (T)	Domestic Automotive	**1.13**
MFAA (T)	Enterprise	**1.17**
MFAA (L)	Enterprise	**1.79**
MFAA (T)	Other	**1.13**
MFAA (L)	Other	**1.81**
MHAA (T)	Coal ESI	**1.12**
MHAA (T)	Construction Materials	**1.22**
MHAA (L)	Construction Materials	**2.30**
MHAA (T)	Domestic Automotive	**1.14**
MHAA (L)	Domestic Automotive	**1.73**
MHAA (T)	Enterprise	**1.18**

MHAA (L)	Enterprise	**1.87**
MHAA (L)	Industrial Minerals	**1.87**
MHAA (T)	Other	**1.14**
MHAA (L)	Other	**1.84**
MHAA (L)	Steel	**1.95**
MJAA (T)	Construction Materials	**0.91**
MJAA (L)	Construction Materials	**1.89**
MLAA (T)	Coal ESI	**1.02**
MLAA (L)	Coal ESI	**2.39**
MLAA (T)	Construction Materials	**1.10**
MLAA (L)	Construction Materials	**2.61**
MLAA (T)	Other	**1.04**
MLAA (L)	Other	**2.50**
MLAA (T)	Steel	**1.04**
MLAA (L)	Steel	**2.50**
MLAB (T)	Construction Materials	**0.94**
MLAB (L)	Construction Materials	**1.54**
MLAB (L)	Enterprise	**1.69**
MOAA (T)	Construction Materials	**1.23**
MOAA (L)	Construction Materials	**3.02**
MOAA (T)	Enterprise	**1.19**
MOAA (T)	Other	**1.14**
MRAA (T)	Construction Materials	**1.20**
MRAA (L)	Construction Materials	**2.73**
MRAA (T)	Steel	**1.12**
MRAA (L)	Steel	**2.61**
MRAB (T)	Construction Materials	**1.20**
MRAB (L)	Construction Materials	**2.75**
MRAB (T)	Steel	**1.11**
MRAB (L)	Steel	**2.61**
MRAC (T)	Construction Materials	**1.20**
MRAC (L)	Construction Materials	**2.76**
MRAC (T)	Steel	**1.11**
MRAC (L)	Steel	**2.44**
MRAD (L)	Coal ESI	**2.55**
MRAD (T)	Construction Materials	**1.22**
MRAD (L)	Construction Materials	**2.64**
MRAD (L)	Domestic Intermodal	**3.07**
MRAE (L)	Coal ESI	**2.55**
MRAE (T)	Construction Materials	**1.20**
MRAE (L)	Construction Materials	**2.75**
MRAF (L)	Coal ESI	**2.55**
MRAF (T)	Construction Materials	**1.20**
MRAF (L)	Construction Materials	**2.68**
MTAA (T)	Coal ESI	**1.08**

MTAA (L)	Coal ESI	**1.73**
MTAA (T)	Construction Materials	**1.18**
MTAA (L)	Construction Materials	**2.20**
MTAA (T)	Enterprise	**1.14**
MTAA (L)	Enterprise	**1.74**
MTAA (L)	Industrial Minerals	**1.80**
MTAA (T)	Other	**1.10**
MTAA (L)	Other	**1.76**
MTAA (L)	Steel	**2.10**
MTAB (T)	Coal ESI	**1.11**
MTAB (L)	Coal ESI	**1.50**
MTAB (T)	Construction Materials	**1.21**
MTAB (L)	Construction Materials	**2.05**
MTAB (T)	Enterprise	**1.17**
MTAB (L)	Enterprise	**1.42**
MTAB (T)	Other	**1.13**
NOA0 (T)	Other	**0.88**
NZ5/H (T)	Other	**0.99**
NZAH (T)	Enterprise	**1.03**
NZAH (T)	Other	**0.99**
NZAJ (T)	Other	**0.99**
OAAC (T)	Construction Materials	**1.22**
OAAC (L)	Construction Materials	**2.38**
OAAF (T)	Construction Materials	**1.22**
OAAF (L)	Construction Materials	**2.38**
OAAF (T)	Enterprise	**1.18**
OAAF (L)	Enterprise	**2.49**
OAAF (T)	Other	**1.14**
OBAM (T)	Construction Materials	**1.23**
OBAM (L)	Construction Materials	**2.36**
OBAM (T)	Domestic Intermodal	**1.31**
OBAM (L)	Domestic Intermodal	**2.44**
OBAM (T)	Enterprise	**1.19**
OBAM (L)	Enterprise	**2.49**
OBAM (T)	Other	**1.14**
OBAM (T)	Steel	**1.14**
OBAM (L)	Steel	**1.71**
OCAN (T)	Construction Materials	**1.22**
OCAN (L)	Construction Materials	**2.25**
OCAN (T)	Domestic Intermodal	**1.31**
OCAN (L)	Domestic Intermodal	**2.43**
OCAN (T)	Enterprise	**1.18**
OCAN (L)	Enterprise	**2.02**
OCAN (T)	European Intermodal	**1.40**
OCAN (T)	Other	**1.14**

OCAN (L)	Other	**1.65**
OCAN (T)	Steel	**1.14**
OCAR (T)	Construction Materials	**1.24**
OCAR (L)	Domestic Intermodal	**1.92**
PAAS (T)	Construction Materials	**1.23**
PAAS (L)	Construction Materials	**2.83**
PCAC (T)	Construction Materials	**1.25**
PCAC (L)	Construction Materials	**2.92**
PCAC (T)	Enterprise	**1.21**
PCAC (L)	Enterprise	**2.30**
PCAC (T)	Other	**1.16**
PCAC (T)	Steel	**1.16**
PCAC (L)	Steel	**2.23**
PCAE (T)	Steel	**1.18**
PCAE (L)	Steel	**2.30**
PFAC (L)	Construction Materials	**1.80**
PFAC (T)	Other	**1.13**
PFAC (L)	Other	**1.68**
PGAC (T)	Construction Materials	**1.23**
PGAC (L)	Construction Materials	**2.73**
PGAC (T)	Domestic Waste	**1.12**
PGAC (L)	Domestic Waste	**2.48**
PGAC (T)	Enterprise	**1.19**
PGAC (T)	Other	**1.14**
PHAP (T)	Construction Materials	**1.23**
PHAP (L)	Construction Materials	**2.70**
PHAQ (T)	Construction Materials	**1.27**
PHAQ (L)	Construction Materials	**2.70**
PHAR (T)	Construction Materials	**1.27**
PHAR (L)	Construction Materials	**2.68**
PHAS (T)	Construction Materials	**1.27**
PHAS (L)	Construction Materials	**2.69**
PJAK (T)	Domestic Automotive	**1.52**
PJAK (L)	Domestic Automotive	**1.47**
PJAK (T)	Enterprise	**1.57**
PJAK (L)	Enterprise	**1.52**
PJAK (T)	Other	**1.52**
PJAK (L)	Other	**1.46**
PJAL (T)	Domestic Automotive	**1.55**
PJAL (L)	Domestic Automotive	**1.45**
PJAL (T)	Enterprise	**1.60**
PJAL (L)	Enterprise	**1.50**
PJAL (T)	Other	**1.55**
PJAL (L)	Other	**1.45**
PJAM (T)	Domestic Automotive	**1.55**

PJAM (L)	Domestic Automotive	**1.45**
PJAM (T)	Enterprise	**1.60**
PJAM (L)	Enterprise	**1.50**
PJAM (T)	Other	**1.55**
PJAM (L)	Other	**1.45**
PNAA (T)	Construction Materials	**1.26**
PNAA (L)	Construction Materials	**2.63**
PNAE (T)	Construction Materials	**1.27**
PNAE (L)	Construction Materials	**2.63**
QPAC (T)	Other	**0.99**
QQAA (T)	Other	**0.97**
QQAC (T)	Other	**1.05**
QSAB (T)	Other	**0.98**
QSAH (T)	Other	**1.01**
QSAH (L)	Other	**1.15**
QXAJ (T)	Other	**1.01**
RRAO (T)	Construction Materials	**1.20**
RRAO (T)	Other	**1.12**
RRAO (T)	Steel	**1.12**
RRAO (L)	Steel	**1.83**
RRAS (T)	Construction Materials	**1.22**
RRAS (T)	Steel	**1.14**
RRAS (L)	Steel	**1.74**
RRAV (T)	Construction Materials	**1.22**
RRAV (T)	Other	**1.13**
RRAV (T)	Steel	**1.13**
RRAV (L)	Steel	**1.66**
RRAX (T)	Steel	**1.13**
RRAX (L)	Steel	**1.40**
RRBS (T)	Steel	**1.12**
RRBS (L)	Steel	**1.72**
SEAB (T)	Industrial Minerals	**0.99**
SEAB (T)	Steel	**1.16**
SEAB (L)	Steel	**2.16**
SPAE (T)	Chemicals	**0.93**
SPAE (T)	Construction Materials	**1.24**
SPAE (L)	Construction Materials	**2.54**
SPAE (T)	Industrial Minerals	**0.98**
SPAE (T)	Other	**1.15**
SPAE (T)	Steel	**1.15**
SPAE (L)	Steel	**2.23**
SPAL (T)	Industrial Minerals	**0.99**
SPAL (T)	Other	**1.16**
SPAL (T)	Steel	**1.16**
SPAL (L)	Steel	**2.12**

SSAA (T)	Coal Other	**1.20**
SSAA (L)	Coal Other	**2.34**
SSAA (T)	Domestic Intermodal	**1.37**
SSAA (T)	Industrial Minerals	**1.02**
SSAA (L)	Industrial Minerals	**1.81**
SSAA (T)	Steel	**1.20**
SSAA (L)	Steel	**2.31**
TDAD (L)	Chemicals	**0.92**
TDAD (T)	Enterprise	**0.92**
TDAD (L)	Enterprise	**1.13**
TDAD (T)	Other	**0.89**
TDAD (L)	Other	**1.10**
TDAD (T)	Petroleum	**0.85**
TDAD (L)	Petroleum	**1.22**
TEAK (L)	Chemicals	**2.01**
TEAK (T)	Enterprise	**1.24**
TEAK (L)	Enterprise	**2.47**
TEAK (L)	Other	**3.15**
TEAK (T)	Petroleum	**1.15**
TEAK (L)	Petroleum	**2.30**
TEAL (L)	Chemicals	**0.97**
TEAL (L)	Enterprise	**2.21**
TEAL (T)	Other	**0.86**
TEAL (L)	Other	**1.07**
TEAL (L)	Petroleum	**1.23**
TEAM (L)	Other	**1.07**
TEAM (L)	Petroleum	**1.22**
TEAP (L)	Chemicals	**0.90**
TEAP (L)	Other	**1.07**
TEAP (L)	Petroleum	**1.22**
TEAS (T)	Enterprise	**1.24**
TEAS (L)	Enterprise	**2.74**
TEAS (T)	European Conventional	**1.31**
TEAS (T)	Other	**1.20**
TEAS (T)	Petroleum	**1.17**
TEAS (L)	Petroleum	**2.49**
TEBK (L)	Enterprise	**2.55**
TEBK (L)	Other	**3.30**
TEBK (T)	Petroleum	**1.19**
TEBK (L)	Petroleum	**2.36**
TIAY (T)	Chemicals	**0.72**
TIAY (L)	Chemicals	**1.20**
TIAY (L)	Enterprise	**1.29**
TIAY (L)	European Conventional	**1.20**
TIAY (T)	Other	**0.90**

TIAY (L)	Other	**1.15**
TIAY (T)	Petroleum	**0.85**
TIAY (L)	Petroleum	**1.18**
TTAA (L)	Enterprise	**1.81**
TTAA (L)	European Conventional	**1.90**
TTAA (L)	Other	**1.70**
TTAA (L)	Petroleum	**1.64**
TUAC (L)	Chemicals	**1.42**
TUAC (T)	Other	**1.19**
TUAC (L)	Other	**1.71**
VAAN (T)	Other	**1.16**
VBAF (T)	Construction Materials	**1.26**
VDAE (T)	Other	**1.13**
VDAF (T)	Construction Materials	**1.26**
VGAF (T)	Domestic Automotive	**1.19**
VGAF (L)	Domestic Automotive	**1.65**
VGAF (T)	Domestic Intermodal	**1.39**
VGAF (T)	Enterprise	**1.24**
VGAF (L)	Enterprise	**1.80**
VGAF (T)	European Automotive	**1.34**
VGAF (T)	European Conventional	**1.34**
VGAF (L)	European Conventional	**1.83**
VGAF (T)	Industrial Minerals	**1.01**
VGAF (L)	Industrial Minerals	**1.45**
VGAF (T)	Other	**1.19**
VGAF (L)	Other	**1.76**
VKAA (T)	Enterprise	**1.24**
VKAA (L)	Enterprise	**1.81**
VKAA (T)	Industrial Minerals	**1.01**
VKAA (L)	Industrial Minerals	**1.45**
VKAA (T)	Other	**1.19**
VKAA (L)	Other	**1.78**
VXAD (T)	Other	**1.33**
WIAA (T)	Domestic Automotive	**0.82**
WIAA (L)	Domestic Automotive	**1.00**
WIAA (T)	Domestic Intermodal	**0.98**
WIAA (L)	Domestic Intermodal	**1.18**
WIAA (T)	Enterprise	**0.86**
WIAA (L)	Enterprise	**1.04**
WIAA (T)	European Conventional	**0.94**
WIAA (T)	European Intermodal	**1.06**
WIAA (L)	European Intermodal	**1.25**
WIAA (T)	Industrial Minerals	**0.67**
WIAA (T)	Other	**0.82**
YDAC (T)	Other	**0.89**

YDAE (T)	Domestic Intermodal	**1.13**
YDAE (T)	Steel	**0.97**
YDAE (L)	Steel	**1.67**
YDAF (T)	Domestic Intermodal	**1.13**
YDAF (L)	Domestic Intermodal	**1.56**
YDAF (T)	Steel	**0.97**
YDAF (L)	Steel	**1.67**
YDAG (T)	Construction Materials	**1.06**
YDAG (T)	Domestic Intermodal	**1.13**
YDAG (L)	Domestic Intermodal	**1.30**
YEAA (T)	Construction Materials	**1.00**
YEAA (L)	Construction Materials	**1.52**
YEAA (T)	Other	**0.92**
YEAD (T)	Construction Materials	**1.09**
YEAD (T)	Domestic Intermodal	**1.17**
YEAD (T)	Enterprise	**1.04**
YEAD (T)	Steel	**1.00**
YGAA (T)	Construction Materials	**0.97**
YGAA (L)	Construction Materials	**1.42**
YGAA (T)	Enterprise	**0.94**
YGAA (L)	Enterprise	**1.45**
YGAA (T)	Other	**0.90**
YGAA (L)	Other	**1.27**
YGBA (T)	Construction Materials	**0.97**
YGBA (L)	Construction Materials	**1.43**
YGBA (T)	Enterprise	**0.94**
YGBA (L)	Enterprise	**1.38**
YGBA (T)	Other	**0.90**
YGBA (L)	Other	**1.30**
YGBD (T)	Construction Materials	**0.97**
YGBD (L)	Construction Materials	**1.44**
YGBD (T)	Enterprise	**0.94**
YGBD (T)	Other	**0.90**
YGBE (T)	Construction Materials	**1.28**
YGBE (L)	Construction Materials	**2.52**
YGBE (T)	Enterprise	**1.24**
YGBE (L)	Enterprise	**2.45**
YGBE (T)	Other	**1.21**
YGBE (L)	Other	**2.60**
YGHB (T)	Construction Materials	**0.97**
YGHB (L)	Construction Materials	**1.48**
YGHB (T)	Other	**0.91**
YGHB (L)	Other	**1.28**
YGHF (T)	Construction Materials	**1.28**
YGHF (L)	Construction Materials	**2.53**

YGHF (T)	Domestic Intermodal	**1.34**
YJAF (T)	Construction Materials	**1.51**
YKAB (T)	Construction Materials	**1.00**
YKAB (L)	Construction Materials	**1.56**
YKAB (T)	Domestic Intermodal	**1.07**
YKAB (T)	Enterprise	**0.96**
YLAB (T)	Construction Materials	**1.02**
YLAB (L)	Construction Materials	**1.82**
YLAB (T)	Steel	**0.94**
YLAB (L)	Steel	**1.27**
YOAL (T)	Steel	**1.51**
YQAA (T)	Construction Materials	**1.02**
YQAB (L)	Construction Materials	**1.30**
YRAL (L)	Construction Materials	**1.26**
YSAA (T)	Construction Materials	**1.33**
YSAB (T)	Steel	**1.10**
YWAA (T)	Construction Materials	**1.27**
YWAA (L)	Construction Materials	**2.71**
YWAA (T)	Steel	**1.19**
YWAB (T)	Construction Materials	**1.27**
YWAB (L)	Construction Materials	**2.58**
YWAB (T)	Enterprise	**1.23**
YWAB (T)	Other	**1.19**
YWAB (L)	Other	**2.45**
YWAB (T)	Steel	**1.19**
YWAB (L)	Steel	**2.40**
YXAB (T)	Other	**1.06**
YXAM (T)	Construction Materials	**1.08**
ZCAB (T)	Construction Materials	**1.27**
ZCAB (L)	Construction Materials	**2.39**
ZCAB (T)	Enterprise	**1.23**
ZCAB (L)	Enterprise	**2.04**
ZCAB (T)	Other	**1.18**
ZCAB (T)	Steel	**1.18**
ZCAB (L)	Steel	**2.10**
ZCAC (T)	Construction Materials	**1.27**
ZCAC (L)	Construction Materials	**2.60**
ZCAC (T)	Enterprise	**1.23**
ZCAC (L)	Enterprise	**2.19**
ZCAC (T)	Other	**1.18**
ZCAC (T)	Steel	**1.18**
ZCAC (L)	Steel	**1.73**
ZCAD (T)	Construction Materials	**1.22**
ZCAD (L)	Construction Materials	**2.10**
ZCAD (T)	Enterprise	**1.18**

ZCAD (L)	Enterprise	**1.98**
ZCAD (T)	Other	**1.14**
ZCAD (T)	Steel	**1.14**
ZCAD (L)	Steel	**2.03**
ZCAO (T)	Construction Materials	**1.27**
ZCAO (L)	Construction Materials	**2.70**
ZCAO (T)	Enterprise	**1.23**
ZCAO (L)	Enterprise	**2.24**
ZCAO (T)	Other	**1.18**
ZCAP (T)	Coal ESI	**1.16**
ZCAP (T)	Construction Materials	**1.27**
ZCAP (L)	Construction Materials	**2.33**
ZCAP (T)	Enterprise	**1.23**
ZCAP (L)	Enterprise	**2.25**
ZCAP (T)	Other	**1.18**
ZCAP (T)	Steel	**1.18**
ZCAP (L)	Steel	**2.25**
ZCAQ (T)	Construction Materials	**1.27**
ZCAQ (L)	Construction Materials	**2.28**
ZCAQ (T)	Enterprise	**1.23**
ZCAQ (L)	Enterprise	**2.20**
ZCAQ (T)	Other	**1.18**
ZCAQ (T)	Steel	**1.18**
ZCAQ (L)	Steel	**2.22**
ZIBC (T)	Other	**1.21**
ZOAK (T)	Construction Materials	**1.25**
ZOAK (T)	Engineering Haulage	**0.93**
ZOAK (T)	Other	**1.13**
ZWAB (T)	Construction Materials	**1.84**
ZWAE (T)	Construction Materials	**1.21**
ZWAZ (T)	Steel	**0.81**
ZZAB (T)	Enterprise	**1.01**
ZZAB (T)	Enterprise	**1.01**