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Aurizon submission on the Arc Infrastructure proposed DORC valuation

11 August 2025

Dear Jeremy,

Aurizon welcomes the opportunity to provide a submission to the Economic Regulation Authority (ERA) in response to Arc Infrastructure's (Arc) proposed Depreciated Optimised Replacement Cost (DORC) valuation.

Aurizon is Australia's largest rail operator, with its operations extending across both Arc's rail network in WA and more generally across Australia, including the large-scale bulk haulage of iron ore and coal, integrated supply chain services for other bulk products and the recent introduction of interstate containerised freight services. Aurizon has strong ambitions to grow its containerised freight and bulk supply chains, which can only be achieved by driving new freight volumes to rail. Accordingly, the ability to efficiently access Arc's rail network is crucial to Aurizon's ability to offer attractive rail haulage services to its customers.

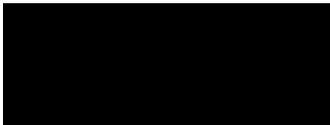
The pricing reforms established in the 2023 amendments to the Railways (Access) Code followed an extensive evaluation by the WA Government on how to improve the quality of price guidance established in the Code given the unique issues presented by the WA rail networks. The Code Amendments are intended to ensure that the floor and ceiling price limits best reflect the permissible range of economically efficient prices, given the age and condition of the existing assets. The DORC valuation will establish the key foundation for this assessment for decades to come.

However, Aurizon considers that Arc's valuation, as set out in the report by its consultant GHD, is highly inflated having regard to regulatory precedent and our expectations of reasonable input assumptions. The DORC value presented by Arc and GHD completely fails to achieve

the objectives of the Code Amendments, as the effect of the unreasonable input assumptions and variations from regulatory precedent mean that the estimated DORC value materially exceeds the previous estimates of GRV (in current \$ terms). From Aurizon's analysis, it is clear that a reasonable DORC value for Arc's network will be a small fraction of that proposed by Arc and GHD.

Aurizon's submission contains no confidential information and is in a form suitable for publication by the ERA. Should you have any questions or require further information, please do not hesitate to contact me on [REDACTED]

Kind regards,



David Steele
Head of Customer & Growth
Aurizon

Arc Infrastructure Proposed Depreciated Optimised Replacement Cost

Submission to ERA

11 August 2025

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Executive Summary

Aurizon welcomes the opportunity to provide a submission to the ERA in response to Arc's proposed Depreciated Optimised Replacement Cost valuation, which is intended to form the basis for its initial Regulatory Asset Base.

As an overarching comment, Aurizon considers that Arc's valuation, as set out in the report by its consultant GHD, is highly inflated having regard to regulatory precedent and our expectations of reasonable input assumptions. This is not the result of a small number of readily identifiable concerns, but instead is the outcome of GHD adopting unreasonable, and in some cases technically incorrect, positions on a wide array of assumptions, many of which have a compounding effect for the resulting valuation proposal.

The pricing reforms established in the Code Amendments followed an extensive evaluation by the WA Government on how to improve the quality of price guidance established in the Code given the unique issues presented by the WA rail networks. The Code Amendments are intended to ensure that the floor and ceiling price limits best reflect the permissible range of economically efficient prices, given the age and condition of the existing assets. The IRAB will establish the key foundation for this assessment for decades to come.

The DORC value presented by Arc and GHD completely fails to achieve the objectives of the Code Amendments, as the effect of the unreasonable input assumptions and variations from regulatory precedent mean that the estimated DORC value materially exceeds the previous estimates of GRV (in current \$ terms).

Given the extent of concerns with the DORC Report, both in terms of the range of interrelated problems identified in the report as well as the resulting highly inflated value, Aurizon does not consider the DORC Report to provide an appropriate starting basis for the ERA's assessment of Arc's IRAB. There is a high risk that any attempt to 'fix' the problems with this assessment will either miss issues, or miss their compounding impact on other aspects of the valuation.

Instead, Aurizon considers that the ERA needs to undertake its own comprehensive assessment of a reasonable DORC value, and present this as its draft decision on the DORC valuation. This will provide all stakeholders, including Arc, an opportunity to review and comment on the valuation before the ERA forms a final decision. This process will provide a stronger basis for developing a reasonable and appropriate IRAB, while ensuring the principles of natural justice are maintained for all stakeholders, including Arc.

While Aurizon believes that a reasonable IRAB requires the ERA to undertake its own assessment of DORC value, we have reviewed the DORC Report in detail, and have provided a comprehensive submission setting out those concerns that we have been able to identify given the information provided. Where there is sufficient information available, Aurizon has provided an estimate of the impact of these issues on GHD's DORC valuation. These estimates have been developed considering each issue in isolation, and the combined impact of these issues will be less than a simple summation. However, even allowing for this, it is clear that a reasonable DORC value for Arc's network will be a small fraction of that proposed by Arc and GHD.

Our key issues are summarised in the following table.

Element	Issue	Materiality
General Approach		
Disregard to prior ERA determinations	GHD has given no consideration to ERA's established regulatory precedent developed through previous assessments of Arc's network replacement value, and has only selectively adopted Costing Principles requirements.	High
Superficial assessment	Notwithstanding the substantial amount of time allowed to Arc for this valuation, GHD has undertaken only a high level desktop assessment, with little reference to the actual assets, or their age and condition. Indicates Arc's lack of commitment to assessing a reasonable DORC value.	Very High
Aggregation	Route section aggregation means that it is difficult to assess the proposed DORC valuation on a route section basis and, in some cases, for meaningful groupings of route sections.	Medium
Calculation errors	Numerous calculation errors throughout the DORC Report, effect on valuation is unknown, but undermines confidence in the quality of the report.	High
Replacement Cost		
MEA specification	GHD has inappropriately specified MEA as like for like rebuild of existing assets using modern materials and construction methods, rather than the modern asset design appropriate to meet required service standards. Clear examples are formation and signalling/communication/control systems. The implications vary depending on the specific asset, but include excessive replacement cost estimates, insufficient application of depreciation and insufficient valuation adjustments for non-MEA assets.	High
Treatment of excluded assets	The Code defines rail infrastructure assets to be valued as excluding land and earthworks (including cuttings and embankments) except those acquired/constructed since 2000. This means that the valuation should assume the corridor is in place, and consider the costs for replacing the network from that point. However, GHD has narrowly excluded the cost of pre-2000 land and earthworks, but has otherwise fully reflected the cost and time required to assemble the corridor and prepare it for track construction.	Very High
Location adjustments	The use of location adjustments is an accepted approach when valuing assets in regional and remote areas. However, GHD has applied substantially higher location factors than previously accepted by ERA, with no evidence to support its adjustments.	Medium
Asset identification	In some cases, GHD values assets that are assumed to be in place, with no evidence as to whether the assets are actually installed as assumed. Examples include access roads and walkways.	Uncertain
Direct replacement costs	GHD's assessed asset replacement costs are, in many cases, far higher than we consider reasonable given construction comparators, ERA precedent and GHD's own assessment undertaken for the ARTC Interstate Network. Track replacement costs are a clear example, with GHD's value more than double its own assessed replacement cost for ARTC. Reducing track replacement costs to previous benchmarked rates would reduce the track construction cost by around \$6 billion, and would, in isolation, reduce GHD's DORC value by around \$4.2 billion.	Very High
Indirect replacement costs	GHD's ~49.5% allowance for contractor indirect costs is excessive given previous benchmarks and reasonable expectations, particularly having regard to 1-2% margin previously accepted by the ERA. Further, GHD has double counted contractor margins for signalling and communications assets, using the argument that the principal contractor would appoint a specialist contractor for this work. Where subcontractors are appointed, it should be assumed that the contractor margin will be shared amongst the various contractors, depending on the scope and scale of their assigned work and responsibility. Reducing indirect contractor margins to previously	Very High

	used benchmarks would cut indirect contractor costs by around \$4.3 billion, and would, in isolation, reduce GHD's DORC value by around \$3.5 billion.	
Optimised Replacement Cost		
Non-operational assets	The optimisation step is intended to remove assets from the valuation where they are not required to meet actual and reasonably projected demand. However, GHD has retained non-operational routes in the valuation, notwithstanding that it accepts that these are not required to meet future demand. While GHD has depreciated many of the assets on these routes to zero, its approach inflates its estimated construction time (and funding cost) and presents a misleading view of the extent of depreciation applied to the operating network. Removing non-operational assets would, in isolation, reduce the estimated ORC by \$2.8 billion and, even after accounting for GHD's high depreciation on these routes, is estimated to reduce the DORC by around \$170 million.	Very High
Application of optimisation	GHD's implementation of optimisation is very unclear, particularly in terms of the factors that have resulted in optimisation of the track assets and their relationship, if any, with other asset types.	Uncertain
Railway owner project costs	GHD's allowance for railway owner project design costs is excessive given prior benchmarks and GHD's own assessment of reasonable costs for ARTC. Preliminary planning and development approval costs should be disregarded, given that the valuation is being conducted on the assumption that the corridor is already assembled and earthworks complete. Removing preliminary planning and approval costs and reducing railway owner costs to previously benchmarked margins would, in isolation, cut the railway owner margin by around \$720 million and reduce GHD's DORC value by around \$550 million.	High
Railway owner funding costs	GHD's assessment of railway owner funding cost is highly inflated, driven by a 11.8 year construction duration which is excessive in asset scope (by including the time required to construct assets that either are excluded from the valuation or should be optimised at the outset), and adopts an unrealistically slow construction program. This is inconsistent not only with previous ERA determinations, which have required the adoption of a pragmatic approach to considering construction timeframes given the hypothetical nature of the exercise, but also with actual evidence of construction timeframes, with the 200km Carmichael Rail Network (including all civil works) constructed in 19 months. Reducing the construction duration to 19 months and applying a real post tax WACC would, in isolation, reducing railway owner funding costs by around \$7.6 billion, and reduce GHD's DORC value by around \$4 billion.	Very High
Depreciated Optimised Replacement Cost		
Assumption when condition and age unknown	Arc's limited data on the actual condition and age of its assets means that GHD has adopted assumed ages for a substantial proportion of the asset base. However, GHD's assumed ages for these assets are inconsistent with available data on Arc's past capex. GHD has assumed that all formation assets are in an 'as new' condition, with no attempt to assess their actual condition. Depreciating formation assets from their estimated construction date over their standard design life would, in isolation, reduce GHD's DORC value by around \$1.9 billion.	Very High
Standard design life adopted	GHD has taken a selective approach to adopting the standard design lives specified in Arc's approved Costing Principles. The most extreme example is ballast, where GHD has assumed a standard design life of 878 years based solely on Arc's current ballast renewal rate, notwithstanding that the Costing Principles specify ballast life at 50 years. The use of excessive standard design lives results in inappropriately low depreciation applied at the valuation date. Depreciation ballast assets from their estimated	Very High

	construction date over their standard design life would, in isolation, reduce GHD's DORC value by around \$1 billion.	
Life adjustment for non-MEA assets	For each asset type, GHD has expressed the life of existing assets as a % of their standard useful life remaining and has then applied this same % to the Optimised Replacement Cost of the MEA in order to calculate the depreciated value of the asset. This approach understates depreciation where the standard design life of the existing asset is shorter than the standard design life of the MEA. Sleepers providing the clearest example, with a 50% life expired timber sleeper due to be replaced in 7.5 years, requiring the MEA concrete sleeper (with a design life of 50 years) to be 85% depreciated to achieve the same asset renewal date. Applying an MEA adjustment to sleeper life expired would, in isolation, reduce GHD's DORC value by around \$590 million.	High
Valuation Adjustments		
Contributed assets	Aurizon does not accept GHD's statement, confirmed by Arc, that none of the assets in the DORC are contributed assets. There is substantial public evidence around the existence of large amounts of third party contributed capital over the last 20 years.	Very High
Operating cost adjustments	GHD has made insufficient valuation adjustments to reflect the Arc's additional maintenance cost resulting from its actual assets being constructed to less than MEA standard, with GHD recognising only limited instances of higher costs. In addition, the valuation should be adjusted to reflect the operating cost penalty imposed on rail operators, where they are unable to operate train services in the way that would be permitted, if the asset were constructed to MEA standard.	Very High

1. Introduction and Overview

1.1 Introduction

Arc Infrastructure (**Arc**) has submitted its proposed Depreciated Optimised Replacement Cost (**DORC**) valuation to the Economic Regulatory Authority (**ERA**), as required in accordance with the December 2023 amendments to the Railways (Access) Code 2000 (**Code** and **Code Amendments**). Aurizon welcomes the opportunity to provide a submission to the ERA in response to Arc's proposals, as set out in the following documents:

- > Depreciated Optimised Replacement Cost (**DORC**) report, prepared by GHD Advisory (**DORC Report**);
- > Depreciation Schedule;
- > Level of Service Statement; and
- > Additional information provided by Arc in response to an ERA request for further information.

Aurizon is Australia's largest rail operator, with its operations extending across Australia, including the large scale bulk haulage of iron ore and coal, integrated supply chain services for other bulk products and the recent introduction of national inter-city containerised freight services. Aurizon operates extensively across Arc's rail network, and the ability to efficiently negotiate 'fit-for-purpose' access to this network is critical to Aurizon's ability to offer attractive rail haulage services to its customers.

The pricing reforms established in the Code Amendments followed an extensive evaluation by the WA Government on how to improve the quality of price guidance established in the Code given a number of unique issues presented by the WA rail networks. Specifically, for many of Arc's routes, the rail infrastructure standard is substantially less than a modern engineering equivalent, and the demand and willingness to pay of users is often insufficient to fund full replacement of the assets. In this context, the Code Amendments are intended to ensure that the floor and ceiling price limits best reflect the permissible range of economically efficient prices, given the age and condition of the existing assets.

The DORC valuation will form the basis of Arc's Initial Regulatory Asset Base (**IRAB**), for the purposes of the pricing framework established in the Code Amendments. Accordingly, the IRAB will establish the key foundation for the assessment of floor and ceiling price limits for decades to come. The longstanding implications from the IRAB emphasise the importance of ensuring that the initial DORC valuation is reasonable and reflects the economic outcomes sought through the Code Amendments.

1.2 Submission Overview

As an overarching comment, Aurizon considers that Arc's DORC valuation, as set out in GHD's DORC Report, is highly inflated having regard to regulatory precedent and our expectations of reasonable input assumptions, given Aurizon's experience as a railway owner. This is not the result of a small number of readily identifiable problems, but instead is the outcome of GHD adopting unreasonable, and in some cases technically incorrect, positions on a wide array of assumptions, many of which have a compounding effect for the resulting valuation proposal. In addition, while the report appears comprehensive, there is limited detail around many of the inputs and assumptions, and how these have been applied, meaning it is difficult to properly evaluate their effect.

Given the extent of concerns with the DORC Report, both in terms of the range of interrelated problems identified in the report as well as the resulting highly inflated value, Aurizon does not consider that the DORC Report provides an appropriate starting basis for the ERA's assessment of Arc's IRAB. There is a high risk that any attempt to 'fix' the problems with this assessment will either miss issues, or miss their compounding impact on other aspects of the valuation.

Instead, Aurizon considers that the ERA needs to undertake its own comprehensive assessment of a reasonable DORC value, and present this as its draft decision on the DORC valuation. This will provide all stakeholders, including Arc, an opportunity to review and comment on the valuation before the ERA forms a final decision. This process will provide a stronger basis for developing a reasonable and appropriate IRAB, while ensuring the principles of natural justice are maintained for all stakeholders, including Arc.

While Aurizon believes that a reasonable IRAB requires the ERA to undertake its own assessment of DORC value, we have reviewed the DORC Report in detail, and have provided a comprehensive submission setting out those concerns that we have been able to identify given the information provided. In section 2, we discuss our overarching problems with the approach taken to the valuation by Arc and GHD. The remainder of the submission then follows the structure of the DORC Report.

Aurizon has not specifically commented on Arc's proposed Depreciation Schedule or Level of Service Statement. In relation to the Depreciation Schedule, Aurizon notes this will need to be reviewed by the ERA to align with the final DORC valuation, as the Depreciation Schedule should provide for the assets to be depreciated from the valuation date over their remaining standard design life as used in the assessment of accumulated depreciation for the DORC valuation.

2. Overall Approach

2.1 Purpose of the DORC Valuation Methodology

A major element of the Code Amendments has been to change the basis for assessing costs for the purpose of assessing ceiling price from the previous cost annuity approach using a GRV valuation, which essentially assessed capital and operating costs assuming a new replacement asset, to a more conventional building blocks cost assessment. Key elements of this approach include:

- > Assets to be valued using the DORC valuation methodology, and incorporated into a RAB;
- > The RAB to be annually rolled forward to reflect economic depreciation as well as efficient capital additions; and
- > Operating costs to be assessed having regard to the actual age and condition of the assets.

The DORC valuation methodology is the most commonly used method for regulatory valuations of natural monopoly assets in these circumstances, as it reflects the costs that a hypothetical new entrant would pay to develop a replacement asset with equivalent service potential, and hence represents the maximum value that would be placed on that asset if it were able to be traded in a hypothetically competitive market for used assets. A DORC valuation will yield the highest tariff that may be consistent with the objectives of achieving allocative, productive and dynamic efficiency, as a tariff above this level would support inefficient bypass of the existing asset.

However, the context of the DORC valuation for Arc's rail network is a little different to most regulated assets. In most regulatory settings, a DORC valuation is undertaken for assets that are broadly consistent with MEA, and where willingness to pay and demand generates revenue sufficient to fund full recovery of the asset value. In this context, the primary purpose of the asset valuation is to determine the maximum allowable revenue and services as a binding revenue constraint.

In contrast, for many of Arc's routes, the rail infrastructure standard is substantially less than the MEA, and the demand and willingness to pay of users is often insufficient to fund full replacement of the assets.

In this context, in determining to adopt the DORC valuation methodology, a key benefit identified by WA Treasury was to more accurately represent the permissible range of economically efficient prices.¹ This is because the floor price will have regard to the actual incremental cost of providing access and the ceiling price will more closely reflect the actual service potential and costs incurred by the railway owner given the condition of the asset, and therefore provides more realistic guidance around the maximum price. This emphasises the need for the asset valuation to reflect a reasonable representation of the service potential of the asset in order to support prices, demand and revenue commensurate with the sustainable provision of rail services on those corridors.

In conducting a DORC valuation of Arc's existing infrastructure, it is critical that any decisions on the methodology and approach for that valuation are grounded by reference to this purpose.

¹ WA Treasury (2020); Review of the Western Australian Rail Access Regime – Final Decision Paper; February 2020; p.7-15.

2.2 Relevance of ERA Regulatory Precedents

While this is the first time that a regulatory DORC valuation has been undertaken for Arc's network, there is already a well established body of precedent for the ERA's consideration of significant elements of the valuation.

Since 2000, the Code has established a methodology for assessing floor and ceiling costs (including capital costs) relevant to an access proposal. Prior to the Code Amendments, the Code provided for capital costs (used in the determination of ceiling prices) to be assessed using a capital annuity method, which was based on the Gross Replacement Value (**GRV**) asset valuation methodology. The GRV is essentially the same as the Replacement Cost step of a DORC valuation.

The Code provides for the ERA to assess floor and ceiling costs for access to the Arc network, either because the ERA considered an access proposal to be likely, or in response to a specific access proposal. Prior to the 2023 Code amendments, such an assessment required the ERA to review and approve the assessed GRV of the relevant part of the network. As a result, the ERA has determined replacement values for substantial parts of Arc's network on multiple occasions, including:

- > Assessment of floor and ceiling costs for the Mainlines, Worsley Line, Terminal Ends and Grain Lines in 2007² and 2009³;
- > Assessment of floor and ceiling costs for the Grain Lines together with portions of the Mainlines for Co-operative Bulk Handling's (**CBH**) 2013 access proposal⁴; and
- > Assessment of floor and ceiling costs on the Eastern Goldfields Route (**EGR**) for Australian Western Railroad's (**AWR**) 2021 access proposal⁵.

Through these processes, the ERA has established, and continually built upon, a set of precedents around how it considers rail network replacement costs should be assessed.

There is value to all stakeholders in maintaining a stable regulatory framework, with changes to established methods and precedents made only where there is a clear case for change. Not only does this create more efficient regulatory review processes, without the need for stakeholders to repeatedly make 'first principles' based submissions on issues, it also avoids the potential for windfall gains and losses between stakeholders due to changing regulatory treatment of issues.

As noted above, the Code change to assess capital charges using a DORC valuation methodology was intended by WA Treasury as a refinement to the Code, aimed at more accurately representing the permissible range of access charges. Aurizon considers that there is no reason why this should disrupt the established ERA precedents on establishing network replacement costs.

Unfortunately, the DORC Report appears to have ignored all established ERA precedent, with unexplained changes in methodology and valuation benchmarks contributing to a network replacement cost that is far in excess of the previously approved GRV value (in current \$ terms).

² ERA (2007); WestNet Rail's Floor and Ceiling Costs Review – Final Determination on the Proposed Floor and Ceiling Costs; 26 June 2007

³ ERA (2009); WestNet Rail's Floor and Ceiling Costs Review – Final Determination on the Proposed 2009-10 Floor and Ceiling Costs; 26 June 2009

⁴ ERA (2014); Brookfield Rail – Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013; 30 June 2014 (reprinted 16 April 2015 to incorporate corrigenda notice dated 16 April 2015)

⁵ ERA's website notes that it made a determination of the costs to apply for this access proposal on 22 March 2021, however this determination was not published.

Aurizon considers that the ERA should require Arc to continue to apply established regulatory precedent, with changes to accepted methodologies and approaches only considered where Arc has demonstrated how circumstances have changed since the ERA's previous consideration of the issue to justify a change in approach.

2.3 Compliance with Arc's Costing Principles

In designing the Code Amendments, the WA Government adopted a progressive approach, whereby the Costing Principles were designed to establish the foundations upon which the DORC valuation would be conducted and IRAB established, as well as principles for the ongoing assessment of network costs including the roll-forward of the RAB. Arc's Costing Principles were reviewed and approved by the ERA in June 2024.

However, in undertaking the DORC valuation, GHD has applied the Costing Principles requirements in a piecemeal manner. In particular, while Appendix 2 of the Costing Principles sets out the ERA endorsed Standard Design Life for each of Arc's asset classes, when calculating accumulated depreciation, GHD has selectively applied these standard design lives. While for some asset classes, GHD has relied on the Costing Principles' standard design lives to support its calculation of accumulated depreciation, in other cases, GHD has ignored the Costing Principles' requirements (and the ERA's considerations in approving these), and formed an entirely inconsistent view of standard design life.

A key purpose of the Costing Principles was to provide upfront consideration and determination of key elements of the DORC valuation methodology to be applied. Accordingly, in undertaking the DORC valuation, the requirements of the Costing Principles should be adopted in their entirety. There should be no discretion for Arc or GHD to pick and choose which parts of the Costing Principles to adopt.

2.4 Nature of Assessment

The Code Amendments provided Arc with 12 months following finalisation of the Costing Principles to submit its proposed DORC valuation. This timing had regard to Arc's extensive network (with shorter periods permitted for railway owners with smaller networks), and was intended to ensure that Arc had sufficient time to properly evaluate not only the reasonable replacement cost of its network, but also the reasonable level of accumulated depreciation, given the actual age and condition of its infrastructure.

However, GHD's DORC Report appears to be based on a fairly superficial desktop assessment of both the assets to be valued, and the depreciation of those assets. There is no evidence of any stocktake confirmation of the assets held by Arc, and in some cases the valuation appears to 'assume' the extent to which assets exist in practice (access roads providing a clear example of this). There appear to have been no condition assessments undertaken for any assets, and little interrogation of Arc's asset management systems which presumably would be able to provide further insight into the condition of Arc's network. As a result, accumulated depreciation is heavily dependent on unverified assumptions of asset condition and age.

The absence of a robust, evidence based approach to the DORC valuation is disappointing and indicates a lack of commitment by Arc to ensuring that the Code process arrives at reasonable DORC valuation for its network.

2.5 Other Issues

2.5.1 Aggregation of Information

In presenting the DORC valuation, notwithstanding that the Code requires the DORC value to be developed for each identified route section, GHD has aggregated route sections into a smaller number of 'network groups' for the purpose of much of the information presented. The network groups appear to have been selected based on historic utilisation patterns, and they do not necessarily align well with current boundaries of network standards and utilisation.

A clear example is in the Midwest – the rail infrastructure between Geraldton and Tilley Junction was substantially upgraded for Karara Mining Limited (**KML**), and KML is the major user of this route. This infrastructure has very different characteristics to the adjoining lightly trafficked grain routes, in terms of infrastructure standard, age and usage patterns. However, this is not treated as a single identifiable network group, with the Midwest network group commencing at Narngulu, and extending 100km beyond Tilley Junction to Maya. Narngulu to Geraldton is contained within the MR network group.

Following an ERA information request, Arc has provided some further disaggregated information, but it remains difficult to assess the DORC proposal on a route section basis, and in some cases, for meaningful groupings of route sections.

ERA should require Arc to:

- > Provide further disaggregation of information to route sections so that stakeholders can properly assess the DORC valuation at a route section level as well as at a network group level; and
- > Review the categorisation of route sections into network groups to ensure that they contain infrastructure of a similar standard, age and usage. In particular, in the Midwest, there should be a single network group incorporating (and limited to) the route segments from Narngulu to Tilley Junction, which have been upgraded to 21 tonne axle load (**TAL**) and which are now used predominantly for iron ore.

2.5.2 Calculation Errors

Throughout our review of the DORC Report, we have noticed numerous apparent calculation errors throughout the report, e.g. unit numbers x unit rate does not equal value, or unit rate variations do not align with explanations). The existence of so many apparent calculation errors undermines confidence in the quality of the analysis and the resulting valuation. The extent of calculation errors further confirms our concerns with trying to 'fix' the GHD valuation by requiring GHD to amend the valuation to correct identified concerns, as we are not confident that this would flow through to the calculated value in the way intended.

3. Replacement Cost

3.1 Construction Replacement Cost Approach

3.1.1 Identification of Modern Equivalent Asset Standard

Aurizon considers that the issue of appropriate Modern Equivalent Asset (**MEA**) selection has not been adequately addressed in the DORC Report. The MEA is intended to reflect the asset/s that will deliver the same service potential as existing asset/s, but using current technology and design standards. Key characteristics of the MEA are that it is:

- > Functionally equivalent – the MEA asset will perform the same role or deliver the same utility as the original asset;
- > Technologically current – the MEA asset will reflect the latest materials, construction methods, and efficiency standards;
- > Optimised design – it will avoid over-engineering or outdated features that may exist in the original asset; and
- > Not a replica – the MEA is not a like-for-like rebuild but a practical, cost-effective substitute for the existing asset.

Arc's Costing Principles reflect this approach,⁶ providing that the MEA will be defined on the basis that it meets the closest comparable service standard to the existing asset, and further identifying the key capital cost drivers that the Railway Owner will adopt to specify the MEA will be:

- > The operating standards (axle load, maximum speed, maximum train length);
- > Population of supporting infrastructure (bridges, culverts); and
- > Topography of route (gradient and track curvature).

Specifying the MEA by defining the asset specification required to meet the required service standard is consistent with previous ERA assessments of Total and Incremental Costs for Arc's network,⁷ and this approach has been consistently applied in subsequent applications of costs relevant to individual access proposals.⁸

However, in the DORC Report, GHD has consistently scoped the MEA with reference to the existing *asset standard* rather than the required *service standard*. That is, GHD has sought to value a like-for-like rebuild, but using modern materials and construction methods.

A particularly clear example of this is the treatment of formation, where GHD has sought to define a different MEA for sections of track with the same required service standard, but with a different original design. Where the existing track has no engineered formation, GHD has defined the MEA as an asset constructed using rolled compaction of the subgrade rather than with engineered formation, even though they have provided no evidence that this is a modern accepted construction technique used as an alternative to formation for track with the nominated required service standard. The perverse outcome of this approach is that not only is the non-existent formation valued at around \$570 million in GHD's

⁶ Arc Infrastructure Costing Principles (2025), Section 2.3, p.10

⁷ ERA (2009); WestNet Rail's Floor and Ceiling Costs Review – Final Determination on the Proposed 2009-10 Floor and Ceiling Costs; 30 June 2009; p.42-43

⁸ Including 2013 Access Proposal by Co-operative Bulk Handling and 2021 Access Proposal by Australian Western Railroad

proposed DORC value (being the replacement cost of rolled compaction along the corridor plus all GHD's applied margins), but there is then no requirement to make any adjustment to this valuation to reflect the standard or condition of the actual asset differing from MEA.

In this particular example, Aurizon fundamentally considers that where formation does not exist, there should ultimately be no value attributed to formation in the DORC value, and an appropriate application of the DORC methodology, starting with MEA definition, must achieve this result. Aurizon considers that the approach most consistent with the theoretical principles underpinning the DORC methodology, and with ERA precedent on replacement value, would be to value the asset based on its MEA (which in this case would include formation) and then to depreciate the asset components to reflect the actual condition of the asset, and adjust that value for any operating cost penalty associated with the condition of the actual asset compared to the valued asset. Where there is no actual formation in place, such a condition based assessment of depreciation would result in this asset component being depreciated to zero. However, Aurizon notes that there may be alternative ways in which the DORC methodology could acceptably be applied which would also result in a zero value for formation that does not exist.

The ERA should require Arc to provide a clear summary of how it has defined the MEA, having regard to the required *service standards* for each route. This should be similar to the MEA definition tables presented in previous ERA determinations.

Aurizon's specific concerns about the reasonableness of the proposed MEA specification are addressed below under each asset category.

3.1.2 Treatment of Excluded Assets (Land, Cuttings, Embankments)

The Code includes a definition of railway infrastructure which is to be subject to the DORC valuation. The definition of railway infrastructure excludes the railway corridor itself,⁹ but goes on to provide that the costs of any land, cutting or embankment made since the initial commencement of the Code in 2000 will be recognised in the assessed capital costs.¹⁰

In Aurizon's view, the most reasonable way to interpret this is that the valuation should assume that the corridor (including land, cuttings and embankments) is in place, and that the valuation of railway infrastructure (as defined in the Code) should recognise the costs that would be incurred to construct the network from this point.

This means that costs associated assembling the corridor, such as feasibility assessments, EIS studies, native title issues and development permits should not be recognised in the valuation, as all corridor approvals would need to be in place in order for the corridor to be assembled and earthworks to be constructed. Similarly, the construction program used for assessing financing costs should not incorporate these tasks, as the valuation should assume that they are already complete.

This is consistent with the approach that the ERA has previously required when assessing capital costs for the Arc network:¹¹

The Authority has not included a period for planning and approvals before the construction of the routes, or financing charges associated with such a period. The 'hypothetical' replacement of infrastructure which already exists is on the basis that all

⁹ Railways (Access) Code 2000 (Western Australia); Part 1, Clause 3

¹⁰ Railways (Access) Code 2000 (Western Australia); Schedule 4, Clause 2

¹¹ ERA (2014); Brookfield Rail – Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013; 30 June 2014; Paragraph 324, p.53

routes are fully designed and optimised. As the costs associated with all land corridors in place at the commencement of the Code are not included in the infrastructure capital cost, as detailed in clause 2(5) Schedule 4 to the Code, it is assumed that all necessary approvals are already in place.

In contrast, GHD has taken a very limited approach to this issue, excluding only the cost of pre-2000 land, cuttings and embankments, but otherwise fully reflecting the cost and time that would be required to assemble the corridor and construct the required earthworks. Aurizon considers that this approach inflates the DORC value in a way inconsistent with the intent of the Code.

3.1.3 Relevant Comparator Rates

The DORC Report refers to the intent for the replacement cost estimates to be the least-cost to reconstruct the network with MEAs at the valuation date, with rates benchmarked to a range of recent projects. However, in many cases, the resulting replacement cost estimates are far higher than expected given previously established regulatory valuation benchmarks, including both previous ERA accepted benchmarks, and GHD's own valuation benchmarks used in its 2021 DORC assessment for the ARTC Interstate network.¹² While GHD's valuation of the ARTC Interstate network was not ultimately incorporated into a RAB, the ACCC noted that the valuation that GHD prepared satisfies the ACCC's terms of reference.¹³

As noted in section 2.2, Aurizon considers it essential that Arc explain any material differences in approach and/or valuation benchmarks compared to previous ERA assessments of GRV, and demonstrate how circumstances have changed since the ERA's previous consideration of the issue to justify the proposed change in approach.

In addition, when considering benchmark replacement costs, we urge the ERA to consider:

- > the body of precedent established in other regulatory DORC assessments of rail networks, where whole of network replacement costs have been considered, with GHD's valuation of the ARTC Interstate network being the most relevant and most recent example;
- > in relation to specific project comparators, the need to ensure comparisons are reasonable, in terms of project scale, scope and complexity, noting that while location factors may be lower for metropolitan rail projects, these projects are often far more costly and complex due to the density of infrastructure and traffic, and the requirement to maintain ongoing access to the network;
- > a broader range of specific project comparators including projects undertaken outside of Western Australia. In this regard, Aurizon considers that the privately built ~200km Carmichael Rail Network (which connects to Aurizon Network's central Queensland coal network), completed in 2021-22, is a relevant comparator given its recency, its similar construction standard, its greenfield construction methodology and its remote location¹⁴;
- > the need for Arc, or its consultant, to present evidence to support its view on comparator rates, particularly where it is seeking to adopt rates that vary substantially from expected benchmarks.

¹² GHD Advisory (2021); Developing a Regulatory Asset Base value for the Australian Rail Track Corporation Interstate Network, using the Depreciated Optimised Replacement Cost Method – Concluding Public Report; 7 October 2021.

¹³ ACCC (2021); DORC valuation of ARTC's Interstate Network – ACCC consultation paper; 15 June 2021; p.2.

¹⁴ See [Carmichael Rail Network | Bowen Rail Company](#) [viewed 4 August 2025]

3.1.4 Contractor's Direct and Indirect Costs

Aurizon agrees that a replacement cost estimate must include a reasonable allowance for the construction contractor's indirect costs. However, we consider that the allowance proposed by GHD, at 49.5%¹⁵, is far higher than expected given previous benchmarks and reasonable expectations. While GHD has nominated a lower indirect cost markup to railway owner direct procurement of ballast, sleepers, rail and turnouts, it has still applied a margin of 5% for direct supply management,¹⁶ again far higher than expected given previous benchmarks and reasonable expectations of material procurement costs.

In previous assessments of rail infrastructure replacement cost, the ERA has accepted contractor indirect costs of 1-2%. This was the indirect cost margin proposed by Arc (then known as Brookfield Rail), and confirmed as being reasonable by the ERA's consultant Engenium.¹⁷ Applying the ERA's previously accepted contractor indirect margin in lieu of GHD's proposal would alone reduce the applied contractor indirect costs by approximately \$4.3 billion and is estimated to reduce GHD's DORC value by around \$3.5 billion.

To the extent that Arc now considers a higher indirect cost margin to be appropriate, it should be required to demonstrate how circumstances have changed since the ERA's previous consideration of the issue to justify the proposed change in approach.

To the extent that ERA reconsiders this issue, we note that in addition to the contractor's overheads, profits and preliminaries (a reasonable benchmark for which should be able to be provided by the ERA's valuation advisor), GHD has included an across the board 5% contractor risk allowance,¹⁸ which reflects a change in the methodology used to assess contractor indirect costs compared to that previously accepted by the ERA. In doing so, GHD has cited regulatory precedent from the ACCC's arbitration of an access dispute between Glencore and Port of Newcastle.

Aurizon notes that, in this determination, the ACCC required a 5% risk allowance specifically for the construction of breakwaters, given debate around the cost of construction using the determined MEA design which Port of Newcastle argued involved a higher degree of risk than its preferred design, given limited instances of its use in Australian ports.¹⁹ The ACCC did not require the application of this 5% risk allowance as an across-the-board markup to all construction costs.

When considered more broadly, there is little regulatory precedent to support the inclusion of a general construction risk allowance in a replacement cost valuation. This reflects the view that a firm that is tendering to construct a new asset may well include an allowance for contingencies that could increase the cost of construction, however, this does not mean that those contingencies will occur or that those costs will be incurred. It is equally likely that the project may cost less than was forecast. A DORC valuation seeks to estimate the actual cost of replacing the existing asset. To include in such a valuation an allowance for contingencies assumes that the replacement project would always suffer from the

¹⁵ Calculated on the basis of each margin being applied cumulatively, as applied by GHD.

¹⁶ DORC Report, p.97.

¹⁷ ERA (2014); Brookfield Rail – Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013; 30 June 2014; Paragraph 153, p.27.

¹⁸ DORC Report, p.24

¹⁹ ACCC (2018); Final Determination Statement of Reasons – Access dispute between Glencore Coal Assets Australia Pty Ltd and Port of Newcastle Operations Pty Ltd; 18 September 2018; p.93.

planned contingencies and would cost more than was forecast. Regulators have previously taken the view that this assumption is not justified.²⁰

As a result, Aurizon is of the view that there is insufficient evidence of a change in circumstances since the ERA's previous consideration of this issue to warrant Arc's proposed inclusion of an across-the-board construction risk contingency.

3.1.5 Location Adjustment Factor

The use of location adjustment factors is an accepted approach for adjusting replacement costs to reflect any additional costs that can be expected from constructing assets in regional and remote areas.

GHD has nominated location adjustment factors to be applied to each network group, but has given no evidence to support these nominated adjustments. In general, GHD's location adjustments appear to be substantially higher than those previously accepted by the ERA in assessments of Arc's replacement cost,²¹ but with no explanation given to support this.

Aurizon considers that the approach that GHD adopted in preparing the ARTC Interstate network DORC provides a robust and verifiable approach to location adjustment factors. In that case, GHD:²²

- > Adopted regional uplift factors from the Rawlinson's Australia Construction Handbook, which is well accepted industry estimating referencing material;
- > Plotted the regional uplift factors in a Geographical Information system (**GIS**);
- > Used the GIS to assess the length of ARTC track relating to each regional uplift factor; and
- > Then determined a weighted average location factor for each route grouping.

A similar structured approach could be applied to assessing location adjustment factors across the Arc network.

3.2 Right of Way

3.2.1 Clearing and Grubbing; Cuttings and Embankments

Construction Cost Estimate

GHD has stated that, as clearing and grubbing is an earthworks activity, only clearing and grubbing for earthworks since 2000 has been included.²³ Aurizon agrees that this is the appropriate treatment of clearing and grubbing.

Consistent with this approach, GHD has only included clearing and grubbing in the Midwest network group, where earthworks were undertaken as part of a 2011-12 upgrade of the Mullewa to Tilley line from 16TAL to 21TAL – a distance of about 100km.²⁴ Given this work involved an upgrade of an existing track

²⁰ ACCC (2003); East Australian Pipeline Limited – Access arrangement for the Moomba to Sydney Pipeline System; 2 October 2003; p.41-42

²¹ ERA (2014); Brookfield Rail – Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013; 30 June 2014; Paragraph 203, p.34-35.

²² GHD Advisory (2021); Developing a Regulatory Asset Base value for the Australian Rail Track Corporation Interstate Network, using the Depreciated Optimised Replacement Cost Method – Concluding Public Report; 7 October 2021; p.38.

²³ DORC Report, p.26.

²⁴ DORC Report, p.26.

for which an existing established corridor was in place, Aurizon expects that there would only have been a need for a limited amount of clearing and grubbing within this length of corridor, sufficient to clear any areas where new or extended cuttings and embankments were required.

However, the area of clearing and grubbing nominated in Table 4-1 appears to be far greater than would be required for this task, with 8,636,530m² consistent with fully clearing an 86m wide corridor over the full 100km upgrade length. While, in response to the ERA's information request, Arc has subsequently explained that the unit rate of \$4.5m/km is incorrect, it has not made any correction to the area cleared.²⁵

The ERA should examine whether there is an error in the nominated area to be cleared and grubbed, as well as the reasonableness of the unit rates applied.

3.2.2 Formation

Modern Equivalent Asset

As discussed above in section 3.1.1, Aurizon considers that GHD has inappropriately defined the formation specification in the MEA, by referencing this to the existing asset rather than the required service standard.

GHD states that it has assumed that formation is to be assumed constructed where it currently exists on Arc's network as well as where high levels of reliability are required or high axle loads operated. For other sections of track, GHD assumes that no formation would be constructed, and that the track would be directly laid on compacted subgrade.

GHD has not provided any evidence that laying track directly on compacted subgrade is a modern accepted construction technique used as a functionally equivalent and technologically current alternative to formation given the nominated required service standard (defined in terms of maximum axle load, train length and speed). Instead, GHD has sought to value a like-for-like replica of the current asset, using modern materials and construction methods.

GHD has acknowledged that, if the network were to be replaced today, it would need to comply with current construction standards which require a formation layer,²⁶ indicating an acceptance that compacted subgrade is not a functionally equivalent and technologically current alternative to engineered formation. Accordingly, the use of compacted subgrade in lieu of engineered formation should not be accepted as the MEA. The inclusion of an engineered formation for all routes is consistent with the way that MEA has been defined for previous ERA determinations of total cost.²⁷

All routes should then have replacement cost assessed based on the MEA. To the extent that the existing route does not have formation installed, this should be treated as a difference between the existing route and the MEA, with the valuation adjusted accordingly in the optimisation and/or depreciation steps.

Aurizon also questions GHD's apparent assumption that there is a single MEA standard applicable to formation across the entirety of the Arc network. In Aurizon's experience, different formation construction standards would be applied to routes with materially different service standards and volume expectations. The same formation standard would not be expected for a mainline which requires the operation of high

²⁵ Arc Infrastructure Clarifications Register as at 1 July 2025, item 1

²⁶ DORC Report, p.28.

²⁷ ERA (2009); WestNet Rail's Floor and Ceiling Costs Review – Final Determination on the Proposed 2009-10 Floor and Ceiling Costs; 30 June 2009; p.42-43

axle loads (up to 23TAL), with high reliability, as compared to lightly trafficked branch lines with a maximum axle load of 16TAL. These differences in required service standard were reflected in different MEA formation specifications in the ERA's 2007 and 2009 floor and ceiling price determinations.

Construction Cost Estimate

GHD has stated that, as clearing and grubbing is an earthworks activity, only clearing and grubbing for earthworks since 2000 has been included.²⁸ Aurizon agrees that this is the appropriate treatment of clearing and grubbing. The ERA should ensure that this approach is consistently adopted for the entirety of all corridors, noting that GHD appears to have included an amount for clearing, grubbing and stripping when valuing its compacted subgrade alternate to formation.

Otherwise, it is difficult to directly compare the formation construction unit rates used by GHD with those previously accepted by the ERA in previous replacement cost valuations or with relevant benchmarks from other regulatory DORC valuations, given differences in construction methodology and the unit specification. However, a high level review indicates that GHD's assessed formation replacement costs are broadly similar to that used in the ERA's previous valuations.

3.2.3 Access Roads

Modern Equivalent Asset

In specifying the MEA, GHD has assumed that access roads are constructed on one side of the full length of the track. However, it is unclear whether, in practice, access roads exist to this extent. The actual decision on whether access roads are permanently maintained along the full length of the track will depend on whether this provides an efficient total cost outcome having regard to factors such as:

- > Alternate access opportunities – for example, if there are other maintained roadways outside the corridor boundary that can be used to provide road access to the railway, there may be no need to construct private access roads;
- > Regularity of required road access – where road access is required on a regular basis for track maintenance, then it will likely be efficient to have a permanent road access capability. However, for some parts of the network, road access may only be required on an irregular or occasional basis; and
- > Required network reliability – where routes are highly utilised and require high reliability, then the need to be able to quickly respond to network issues means that it will likely be efficient to have a permanent road access capability. However, for lightly trafficked routes, and particularly where the regularity of required access is low, it may be more efficient to create road access capability on an as required basis.

Access roads have a design life of around ten years,²⁹ and permanently maintained access roads will require regular refurbishment or reconstruction. Given this, Aurizon considers that it is reasonable to assume that Arc will have actually constructed and/or refurbished access roads where it has been efficient to do so over the last ten years, given the factors described above. The best available information on the extent to which it is efficient to install access roads across the Arc network is whether they are currently in place. Therefore, access roads should only be valued where they currently exist.

ERA should request that Arc identify the extent to which access roads currently exist on its network, and only include the replacement cost for access roads on these sections of track.

²⁸ DORC Report, p.26.

²⁹ Arc Infrastructure Costing Principles (2025); Appendix 2; p.26 and DORC Report; p.126.

Construction Cost Estimate

The access road construction unit rates used by GHD for this valuation far exceed the rates adopted in the ERA's 2013 cost assessment for the CBH access proposal, as shown in the table below. Reducing the construction cost rate of access roads to the ERA's previous benchmark would, on its own, decrease the construction replacement cost by around \$540 million, and is estimated to reduce GHD's DORC valuation by around \$465 million.

Table 1 Access Road unit cost comparison

Rate pre location adjustment	2013 \$/km	2024 \$/km
ERA 2013 determination ^{a,b}	7,623	9,833
GHD 2025 valuation (no location adj)		90,000

a Source: ERA (2014); Brookfield Rail – Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013; 30 June 2014; Paragraph 304, p.51.

b Escalated from 2013 to 2024 using PPI Index – road and bridge construction Western Australia

Accordingly, the ERA should carefully evaluate the appropriateness of the identified access road construction rates, having regard to reasonable comparators.

3.3 Civil Structures

3.3.1 Bridges

Modern Equivalent Asset and Construction Cost Estimate

It is difficult to directly compare the bridge construction MEAs and unit rates used by GHD with those previously accepted by the ERA in previous replacement cost valuations or with relevant benchmarks from other regulatory DORC valuations. However, a high level review indicates that GHD's assessed bridge replacement cost is substantially higher than the replacement cost adopted (expressed in current \$ terms) in the ERA's previous valuations. Accordingly, the ERA should carefully evaluate the appropriateness of the identified bridge MEAs and construction rates, having regard to lowest cost bridge design and reasonable construction cost comparators.

In addition, there are number of inconsistencies in the valuation tables 4-8 to 4-10, which indicate that there may be calculation errors in GHD's estimated replacement cost. For example:

- > Table 4-9 Total Bridge Deck area (m²) for EGR bridge types 2b and 3 appear incorrect, as Table 4-8 identifies 2 of each type of bridge, but the total deck area for the smaller bridge type 2b almost three times the total deck area for the larger bridge type 3;
- > In relation to Table 4-10 Bridge Construction Replacement Cost Rate \$ per m² deck area, GHD explains the variation in construction rates between locations as being due to level of remoteness, however this does not explain the very large variation between locations for bridge type 1 and 3; and
- > For Table 4-11 Bridge Construction Replacement Cost \$million, in a number of cases the identified replacement cost does not with the deck area m² and unit cost per m² in the previous tables (note in particular Metro and Midwest network groups).

3.3.2 Culverts

Modern Equivalent Asset and Construction Cost Estimate

Aurizon notes that GHD has, in all cases, selected reinforced concrete pipes as the MEA culvert design on the basis that these are the least cost option that is readily available and provides the same level of

service as the existing assets. However, for the DORC valuation of the ARTC Interstate network, GHD considered the lower cost corrugated metal pipes to be a reasonable MEA in many cases. Further, in previous valuations of the Arc network, the MEA has been specified with different culvert designs.

It is difficult to directly compare the culvert construction unit rates used by GHD with those previously accepted by the ERA in previous replacement cost valuations or with relevant benchmarks from other regulatory DORC valuations. However, a high level review indicates that GHD's assessed culvert replacement cost is around double the replacement cost adopted (expressed in current \$ terms) in the ERA's previous valuations. This may in part be due to the differences in the MEA specification discussed above.

Accordingly, the ERA should carefully evaluate the appropriateness of the identified culvert MEAs and construction rates, having regard to lowest cost culvert design and reasonable construction cost comparators.

In terms of the construction cost for culverts, we would expect there to be a clear and consistent relationship between the unit rate/m and culvert diameter, and would also expect culvert replacement costs to vary between locations largely according to the location adjustment factor. However, these relationships are not evident in the culvert construction replacement cost rates shown in table 4-16. The reason for differences in unit rates, across culvert types and locations, requires further examination.

3.4 Track

3.4.1 Modern Equivalent Asset

Aurizon's concerns regarding GHD's misapplication of the MEA standard also applies to rail, sleepers and ballast. In the MEA, matters such as rail weight, sleeper type and spacing and ballast depth should be specified according to the required service standard (being maximum axle load, speed and length). This is the approach that has been accepted by the ERA in previous determinations of total cost, with previous MEA specifications identifying that:³⁰

- > A 16TAL service requirement aligned with an MEA specification of 31kg rail, 1:4 steel/timber "A" type sleepers at 1320/km, and 100-150mm depth ballast;
- > A 19TAL service requirement aligned with an MEA specification of 41kg rail, 1:4 steel/timber "B" type sleepers at 1320/km and 150mm depth ballast;
- > A 21TAL service requirement aligned with an MEA specification of 50kg rail, with varying specifications of sleepers and ballast; and
- > On the EGR, where up to 23TAL can operate (at lower speeds), the MEA specified 60kg rail, concrete sleepers at 1500/km and 250mm ballast depth.

In contrast, GHD has sought to define the MEA as the closest specification to the existing track:

- > Rail has been specified as the available rail weight closest to the existing rail weight (rounded up);
- > Sleepers have been specified as concrete sleepers using existing sleeper spacing; and
- > Ballast has been specified based on current ballast depth.

³⁰ ERA (2009); ; WestNet Rail's Floor and Ceiling Costs Review – Final Determination on the Proposed 2009-10 Floor and Ceiling Costs; 30 June 2009; p.42-43

This has resulted in track standards that don't clearly align with the required service specification. For example:

- > GHD has specified varying rail weights on routes with the same service standard, and this approach has resulted in the vast majority of Arc's network being assumed to be reconstructed with 50kg rail, notwithstanding that this rail weight is not necessary for most lightly trafficked routes;
- > The definition of sleeper type and sleeper spacing has not been aligned to the required service level for the relevant route. If concrete sleepers are to be adopted as the MEA due to availability issues, then it is necessary to consider the concrete sleeper weight and spacing required to achieve the desired service standard. This may differ from the spacing currently adopted for lighter weight timber/steel sleepers.

A further outcome of GHD's approach is that there appears to be very little differentiation between the MEA specification for different routes with different required service standards, however the lack of detailed information on the MEA specification by route means that this is difficult to evaluate with confidence.

The ERA should review the MEA specification for rail, sleepers and ballast for each route, to ensure that it is aligned with the required service standard.

3.4.2 Supply Cost Estimates

The supply unit rates used by GHD for rail, sleepers and ballast far exceed reasonable benchmark rates, including those adopted in the ERA's 2013 cost assessment for the CBH access proposal. For example the comparative rail supply cost (excluding location adjustment) for rail is shown in the table below.

Table 2 Rail supply cost

Rate pre location adjustment	2013 \$	2024 \$/km
ERA 2013 determination ^{a,b}	50kg rail - \$/tonne	1,250
	50kg rail – tonne/rail km	50
	50kg rail - \$/rail km	62,500
	\$/factory weld	464
	Factory welds/rail km	27
	Factory weld - \$/km	12,528
	Rail supply - \$/km	75,028
GHD 2025 valuation (no location adj)		340,000

^a Source: ERA (2014); Brookfield Rail – Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013; 30 June 2014; Paragraph 304, p.51.

^b Escalated from 2013 to 2024 using PPI Index – road and bridge construction Western Australia

Ignoring transportation costs (which are assumed to be reflected in the location adjustment, discussed below), GHD's rail supply costs are more than triple the previous benchmark. The supply costs for sleepers and ballast are similarly up to double those used in the ERA's previous assessments.

Further, GHD has applied the full location adjustment to material supply costs, without properly considering the nature of these additional supply costs. For rail and sleepers, the additional costs for remote location will be the transportation costs (by rail). Aurizon expects a reasonable estimate of transport costs to be far less than the applied location adjustment for non-metropolitan network groups.

For ballast, the ERA has previously received specific cost estimates for ballast supply in different regions, with regional costs not aligning particularly well with standard location adjustments. For example, in its 2013 cost assessment for the CBH access proposal, the quoted ballast supply costs at Kalgoorlie were

4% higher than Perth metro, whereas in the DORC Report GHD has applied a 50% location adjustment to Kalgoorlie.

This demonstrates the need for the ERA to undertake its own assessment of a reasonable allowance for rail, sleeper and ballast supply costs, both in terms of the cost of procuring the materials as well as a realistic estimate of the costs of transporting those materials to the required location.

3.4.3 Installation Cost Estimates

Aurizon questions the track installation methodology adopted by GHD. While GHD has not described the installation methodology assumed, it appears from its description of both installation costs and project schedule that GHD is assuming separate and sequential installation of ballast, sleepers and track. This is inconsistent with typical track installation methods, as Arc described for the ERA's 2013 cost determination:³¹

BR has advised that for concrete sleepers track it is assumed that the track would be laid using a track laying machine which is now the standard method across Australia. This method consists of laying sleepers and rail onto the formation with the machine and then using a ballast train to lay the first layer of ballast between and to the shoulders of the sleepers. The track is then lifted through the ballast with a resurfacing machine. A second 'drop' of ballast is added and the resurfacing machine levels and aligns the track. For 300mm ballast used under concrete sleepers on both SG and NG track, this process is repeated three times. Other machines profile and consolidate the ballast.

GHD's combined installation cost for rail, sleepers and ballast is around 50% higher than the cost of installation using the above integrated method³² (escalated to current dollar terms).

3.4.4 Summary

The aggregate impact of the issues of inappropriate MEA definition, inflated supply costs and unreasonable installation methodology and costs means that GHD has derived an assumed track replacement rate/km of \$2.3m. This assessed average construction rate/km is over double reasonable expectations of track replacement unit rates (in equivalent \$ terms), based on previous ERA determinations and more recently GHD's own assessment for the ARTC Interstate Network DORC valuation. If the track construction cost estimate were reduced by 50% to more closely align with these benchmarks, this alone would reduce track construction replacement costs by around \$6.1 billion, and would reduce GHD's DORC valuation by around \$4.2 billion.

3.5 Signalling, Communications and Control Systems

3.5.1 Modern Equivalent Asset

Aurizon considers that GHD's approach to signalling and communications assets further demonstrates its inappropriate approach to defining MEA with reference to current asset specification rather than the required service standard. Aurizon considers that the MEA must be defined with reference to the lowest cost approach to create the functionality required to meet the required service standard. GHD's

³¹ ERA (2014); Brookfield Rail – Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013; 30 June 2014; Paragraph 226, p.40.

³² ERA (2014); Brookfield Rail – Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013; 30 June 2014; Paragraph 234, p.41.

assessment in section 5.5 clearly demonstrates that the use of radio based train control will provide for the same (and in some locations improved) service standard as the existing assets, at a lower cost.

Accordingly, the signalling and communications system MEA should be defined as a radio based train control system (GHD's "Alternative B"), with GHD's "Alternative A" (based on replacement of Arc's current system using MEA equipment) disregarded for the purposes of this valuation. This is consistent with the approach taken by GHD in its DORC valuation of ARTC's interstate network, where the signalling and communications assets were valued in accordance with a radio based train control system, rather than with reference to the installed signalling and communications systems.³³

Given the MEA asset is of a completely different design as the existing signalling and communications systems, the specification of the MEA design is necessarily theoretical. However, Aurizon considers that the ERA should closely review the asset specification adopted by GHD to ensure that it is not over-specified or over-designed. Specific issues that the ERA should examine include:

- > Extent of fibre optic cabling required. The routes which GHD has assumed require fibre optic cable appear to align with the routes that currently have a communications backbone network in place. However, it is not clear that the service demand on all of these routes supports an assumption of full installation of a fibre optic cable;
- > The extent of radio communication assets required on other parts of the network. GHD has assumed a radio mast, router, signalling location case and base station every 30km, to communicate with the train and the national telecoms network. However, this differs substantially to GHD's assumptions for the ARTC Interstate Network where, across the 4,825km of network not laid with fibre optic cable, GHD required:³⁴
 - 1,154 routers (every 4.2km)
 - 90 radio towers (every 55km)
 - 90 radio base stations (every 55km)

With radio towers being by far the highest cost of these items, the alternate asset scope adopted for ARTC will be materially lower cost than the one specified for the Arc network.

3.5.2 Construction Cost Estimate

Direct Construction Costs

As with other asset types, GHD's assumed replacement costs appear, in some cases, to be very high when compared to other relevant benchmarks, for example for the Arc valuation, GHD has assessed the replacement cost for 1,428km of fibre optic cable to be \$1,565m, whereas for the ARTC valuation, GHD assessed the replacement cost of 1,476km of fibre optic cable as \$503m (\$608m in equivalent \$ terms). This indicates that the ERA should closely examine reasonable replacement cost assumptions for these assets.

GHD's treatment of control centre assets is unclear. GHD note that there are two control centres on Arc's network which contain signals assets, with the cost for these assets distributed across the network where signalling assets exist. It appears that GHD is assuming a direct construction cost per control centre of \$55m, however, when allocating these costs across the network, it then applies the location factor

³³ GHD Advisory (2021); Developing a Regulatory Asset Base value for the Australian Rail Track Corporation Interstate Network, using the Depreciated Optimised Replacement Cost Method – Concluding Public Report; 7 October 2021; p.48-51.

³⁴ GHD Advisory (2021); Developing a Regulatory Asset Base value for the Australian Rail Track Corporation Interstate Network, using the Depreciated Optimised Replacement Cost Method – Concluding Public Report; 7 October 2021; p.52

relevant to each network group.³⁵ Apart from the question of whether \$55m is a reasonable cost assumption for each control centre, Aurizon does not consider the application of the location factor to be reasonable – the location factor is intended to reflect the additional cost of constructing assets in remote locations. If a location factor is to be added to the cost of control centre assets, it should relate to the location where the control centre itself is located (as this is where the construction costs will be incurred). No location factor adjustments should then be applied to the allocation of these costs to network groups.

Indirect Costs

GHD notes that signalling and communications infrastructure are often proprietary products, supplied and installed by specialist contractors. On this basis, GHD has:

- > Assumed that a specialist signalling and communications contractor would be engaged and managed by the principal contractor; and
- > On this basis, applied its contractor indirect costs margin both for the specialist contractor and again for the principal contractor. While not disclosed in the report, information provided by Arc in response to the ERA's information request shows that the indirect cost margin assumed for the specialist contractor is 62% - materially higher than the already excessive assumption applied for the principal contractor.³⁶ When combined with the principal contractor margin, GHD has applied total contractor indirect costs of 142% of the direct construction cost.

Aurizon considers this to be an inappropriate treatment of contractor indirect costs, and serves to massively overstate the reasonable allowance for these costs. It will be the case that many specific construction tasks for an assumed network replacement would be undertaken by sub contractors working under the principal contractor. In such cases, the assumed contractor indirect costs will be shared amongst the various contractors depending on the scope and scale of the assigned work and responsibility. To the extent that a specialist contractor is appointed with responsibility for constructing signalling and communications assets, this principle will similarly apply.

3.6 Other Assets

3.6.1 Buildings

Aurizon notes that, similar to control centre signal assets, buildings and facilities have been allocated to each network group based on their usage scope. However, any location adjustment factor should be assessed based on where the buildings are located, not on the allocated value to the various network groups.

3.6.2 Walkways

GHD has assumed that walkways are present along the length of all embankments and cuttings. However, it is unclear whether:

- > Walkways actually exist to the extent assumed. Similar to access roads, it should be assumed that to the extent that it is efficient or necessary from a safety perspective to construct such walkways, Arc will have done so; and

³⁵ DORC Report, Table 4-29 p.51 and Table 5-11 p.88.

³⁶ Arc Infrastructure clarifications as at 1 July, Unit Rates tab

- > Where walkways do exist as part of cuttings and embankments, the extent to which these simply form part of that cutting or embankment (and should therefore be excluded from the valuation consistent with the Code's required treatment of cuttings and embankments).

The ERA should examine Arc's actual walkway assets in order to determine to what extent walkways should be included in the DORC valuation.

4. Optimised Replacement Cost

4.1 Optimised Replacement Cost Approach

4.1.1 Treatment of Non-Operational Assets

The Costing Principles define the optimised asset configuration as that which has the capacity to meet the actual and reasonably projected demand, within the physical constraints of the existing railway corridor, that can be constructed at least cost. The Costing Principles go on to state that the level of service associated with the actual and reasonably projected demand will be defined in terms of:

- > Maximum axle loads;
- > Maximum train speeds; and
- > Maximum train lengths.³⁷

This optimised asset configuration is to be based on a ten year demand forecast developed from ten years of historic demand data.

It is clear from the description of the optimisation process, that it is intended to ensure that only those assets for which there is continued demand are intended to be assigned a value.

However, in applying the optimisation process, GHD states that, railway infrastructure that is either disposed of or stranded is not included in the definition of optimisation. On this basis, GHD has continued to include a value for 814km of non-operational routes in the ORC value. GHD bases this approach on a reference to the Costing Principles description of the process of the Annual RAB Update, where the Costing Principles provide that:³⁸

Where Railway Infrastructure is disposed of or becomes redundant or stranded **during a Relevant Period** [emphasis added], the Railway Owner will remove the value of that Railway Infrastructure which has been disposed of, made redundant or stranded from the Updated RAB in respect of the relevant Route Section.

Aurizon considers GHD's approach to be a misapplication of the Costing Principles requirements. Section 3.6 is clearly intended to apply in relation to assets that become stranded during the relevant period for the annual RAB update. Assets that are stranded prior to the DORC value being undertaken should simply not be included in the RAB at its initial valuation date. The fact that there is no demand for an asset such that it's been taken out of service means that it is not required to deliver the level of service associated with actual and reasonably projected demand – this is the definition of optimisation.

Aurizon acknowledges that GHD has depreciated most assets on the non-operational routes to zero. This does not create the same outcome as the correct approach of excluding non-operational assets from the valuation date for two reasons:

- > First, GHD has not depreciated formation assets on non-operational routes to zero. The reason for this is unexplained, but when considered in tandem with its approach of applying no depreciation to

³⁷ Arc Infrastructure (2025); Costing Principles; Section 2.4, p.11.

³⁸ Arc Infrastructure (2025); Costing Principles; Section 3.6, p.15.

- formation assets (discussed in section 5.2.3) means that the value of formation is maintained in the DORC value at its reconstruction cost, regardless of there being no future demand for that route;
- > the time associated with building these unwanted assets is embedded in the in GHD's calculation of financing costs and so inappropriately increases the overall ORC value, regardless of the approach then taken to depreciation.

The treatment of these routes as fully depreciated, rather than optimised, also provides a misleading indication of the overall extent to which the network has been depreciated, by creating a higher average rate of depreciation than has actually been applied to operational assets.

Removing non-operational assets will, in isolation, reduce the Optimised Replacement Cost of the infrastructure by around \$2.8 billion, and even after accounting for the high depreciation of these assets, will reduce GHD's DORC valuation by around \$170 million. The ERA should require that all non-operational assets be optimised as at the valuation date, consistent with the philosophy underpinning the DORC valuation methodology.

4.1.2 Consistent Application of Optimisation to Asset Types

GHD's implementation of optimisation is very unclear, particularly in terms of the factors that have resulted in optimisation of the track assets and their relationship, if any, with other asset types.

While the discussion around optimised asset configuration indicates redundant route sections and loop lengths totalling 36.3km, the optimisation of track assets has reduced the total replacement cost by 23%. There is no explanation of the reason for this optimisation, nor if it has implications for other asset types (eg right of way and structures assets).

The ERA should ensure that optimisation adjustments are consistently applied to all relevant asset types.

4.2 Railway Owner Project Costs

4.2.1 Project Procurement Models

GHD's discussion around consideration of alternate project procurement models appears unnecessary, as the DORC methodology requires the use of the least cost asset replacement methodology, including project procurement model. However, Tables 5-19 and 5-20 create uncertainty around the approach actually used by GHD, given numerous unexplained differences in GHD's estimate of the OCC cost for conventional and alternative procurement models. The ERA should closely examine the application of contractor and project management markups to ensure that the allowances for these activities are not excessive given regulatory benchmarks and reasonable expectations of cost.

4.2.2 Project Design and Development Costs

GHD has included project design and development costs of \$237m upfront planning and development approval cost as well as 4% of the capital cost of the assets to allow for design.³⁹ These allowances are excessive compared to reasonable expectations and having regard to regulatory precedent.

As discussed in section 3.1.2, the valuation should be based on the existence of a corridor, inclusive of completed earthworks, and only reflect the costs that would be incurred in replacing the network from that

³⁹ While not disclosed in the report, Arc's 1 July 2025 clarifications register states that GHD has applied this design % to a higher estimate of construction cost than that used in the valuation, the reasons for which are not clear.

point. On this basis, the preliminary planning and development approval costs as described by GHD should not be included in the valuation. This is consistent with the approach that the ERA has previously required when assessing capital costs for the Arc network.⁴⁰

Beyond this, GHD's estimated design costs (within the range of 4-6% of the capital costs and with selected allowance of 4%) are well above the range that GHD considered reasonable for the ARTC Interstate Network valuation.⁴¹ At that time, GHD estimated efficient design costs for a railway of 2-3% (with selected allowance of 2.5%) and this was inclusive of the development planning approval activities which are not applicable for this valuation. GHD further estimated the upfront planning costs at 0.6% of capital costs, indicating that the subsequent design cost allowance would have been no greater than 2%.

4.2.3 Project management and Corporate Costs

GHD's proposed 15% allowance for project management, construction supervision and corporate costs is within reasonable expectations, provided that other cost markups (both contractor indirect costs and Arc's design costs) are reduced, as discussed earlier in this submission.

4.2.4 Summary of Railway Owner Project Costs

GHD has stated that it has applied railway owner cost margins totalling 19% (including 4% design, 5% project and contract management, 7% construction and supervision and 3% corporate and other costs). However, the allowance for these items shown in Table 5-22 adds to over 21% of the optimised construction replacement cost. This may partly be due to the undisclosed application of the margins to a higher replacement cost estimate than that used in the valuation itself. Adjusting railway owner margins by removing planning and development approval costs, reducing design costs to GHD's prior estimate and applying these to the construction replacement costs actually used in the valuation would, in isolation, reduce the railway owner margin applied by around \$720m and is estimated to reduce GHD's DORC value by around \$550m.

The ERA should closely examine the reasonableness of the way in which GHD has applied railway owner project cost margins.

4.3 Railway Owner Funding Costs

GHD has applied a 44% markup to the construction cost of assets to account for funding costs, a markup far in excess of that adopted in comparable regulatory valuations. This is largely driven by the approach that GHD has taken in the assessment of a construction timeframe and schedule, where GHD has assumed a 4.8 year pre-construction phase including planning, design and approvals, followed by a 13.3 year construction phase.

The issue of the appropriate calculation of the railway owner's funding costs, including the matters to consider in relation to the assumed construction period, has been considered by the ERA on a number of previous occasions. As discussed in section 2.2, Aurizon considers that the ERA should, wherever possible, align its assessment of Arc's DORC valuation with its own regulatory precedent, with variations only adopted where there are changes in actual asset construction methodologies and costs, not because of a varied calculation methodology.

⁴⁰ ERA (2014); Brookfield Rail – Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013; 30 June 2014; Paragraph 324, p.53

⁴¹ GHD Advisory (2021); Developing a Regulatory Asset Base value for the Australian Rail Track Corporation Interstate Network, using the Depreciated Optimised Replacement Cost Method – Concluding Public Report; 7 October 2021; p.35-37.

4.3.1 Scope of Network Construction

The purpose of the funding cost allowance is to recognise that there is a period of time over which capital must be expended before revenue is able to be generated from a completed asset. Unlike a port asset, which must be constructed in a particular sequence (with dredging required to create reclaimed land prior to constructing loading facilities), a railway is a linear asset, which can feasibly be constructed in multiple stages, each of which can potentially generate revenue while other stages are being completed. This leads to the question of what scope of network construction should be assumed to be required for the purpose of calculating funding costs. The Code requires the DORC value to be assessed for each nominated route section, with Arc's Costing Principles specifying 48 separate route sections.⁴² At one extreme, funding costs could be assessed based on the time required to construct each of these individual route sections. However, GHD has adopted an assumption at the other extreme, assessing the time required to construct the total network for the purpose of assessing funding costs (albeit with construction occurring over 10 concurrent work fronts).

The appropriate network scope for assessing construction time is, in practice, somewhere between these two extremes, recognising not only the opportunity for concurrent work fronts, but also that elements of the network can be independently used and as such there is no requirement for the network to be constructed in full in order to commence generating revenue. The ERA has previously considered this issue, and taken a pragmatic assumption that construction would apply concurrently across 18 'Schedule 1' routes.⁴³ It considered that this was a practical compromise, particularly given the 'hypothetical' nature of the exercise (i.e. these are the notional financing costs that would be incurred by a hypothetical new entrant, and have not actually been incurred by Arc or any other railway owner).

4.3.2 Scope of Construction Activities

As discussed in section 3.1.2, recognising that the Code requires that corridor assets be excluded from the valuation (unless constructed since 2000), the valuation should assume that the corridor (including land and earthworks) is in place, and that the valuation of railway infrastructure (as defined in the Code) should include the costs that would be incurred to construct the network from this point.

This means that the construction program should not incorporate activities such as feasibility assessments and development permits, nor the time for constructing earthworks, as the valuation should assume that these are already in place. This is consistent with the approach that the ERA has previously required when assessing funding costs for the Arc network.⁴⁴

In contrast, GHD has unreasonably extended the construction timeframe, not only by including the time required for tasks that should be excluded from the assessment as per the Code provisions, but also by including time for constructing non-operational routes for which there is no demand. These routes should simply not form part of the optimised network, and including these simply serves to extend GHD's assessed construction schedule and embed higher funding costs across the whole network. Excluding non-operational routes will reduce the network size from 5,560km to around 4,500km.

⁴² Arc Infrastructure (2025); Costing Principles; Appendix 1, p.20-25.

⁴³ ERA (2014); Brookfield Rail – Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013; 30 June 2014; p.52-53

⁴⁴ ERA (2014); Brookfield Rail – Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013; 30 June 2014; Paragraph 324, p.53

4.3.3 Construction Timeframes

The construction timeframes adopted by GHD are excessive compared to other valuation benchmarks, including GHD's own assessment of a reasonable construction schedule for the ARTC interstate network, in particular:

- > An 11.8 year construction duration for Arc's right of way assets is substantially slower than GHD considered reasonable for the ARTC Interstate Network, where it estimated that right of way assets for the 6,300km interstate network, including cuttings and embankments, could be constructed within 6 years. However, the assumed construction timeframe for the Arc network should be significantly faster than for the ARTC network given:
 - earthworks are assumed to already be in place for the Arc network, significantly reducing the required reasonable construction time; and
 - the ARTC Interstate network involves a small number of very long interstate routes, meaning that larger portions of the network need to be constructed before revenue generation can be assumed;
- > GHD's assumption of a sequential installation of ballast, sleepers and rail does not reflect contemporary practice;
- > GHD's required timeframes between completion of construction for different asset types is unnecessary, and simply inflates the overall construction time (eg tracklaying to complete 6 months after completion of formation, or signalling to complete 6 months after completion of tracklaying); and
- > An allowance for a 12 month commissioning period post completion of all network construction is inappropriate and is not reflective of good practice. Note for the ARTC valuation, GHD assumed that commissioning would occur progressively, and would be completed within 3 months of the final completion of tracklaying.

A practical example of the time required for the construction of a greenfields railway in a complex and remote location is the Carmichael Rail Network, a ~200km railway connecting to Aurizon Network's central Queensland coal network. Construction of this railway commenced in February 2020, with the rail infrastructure completed by September 2021⁴⁵. Rail operations commenced in early 2022, at which point all mine and rail infrastructure was complete. The circumstances of this project indicate that this should be treated as an upper estimate of a relevant construction time for the Arc DORC valuation given:

- > The civil construction works included all necessary earthworks, which as discussed above should be assumed to be complete prior to the commencement of the relevant rail assets; and
- > The Carmichael Rail Network is located in a subtropical environment, with difficult geotechnical conditions and within flood prone areas. The ~200km route included the construction of 25 bridges and 460 culverts,⁴⁶ far more extensive than the structures requirement in any of Arc's network groups, and likely to materially add to the required construction time.

In the ERA's previous assessments of construction timeframes, it had again adopted a pragmatic approach to the assumption of construction rates, particularly citing the hypothetical nature of the assessment. In this context, in its assessment of total costs for the CBH access application, it had taken a high level approach to the issue, assuming construction could occur at a rate of 2.5km/day across each of the assumed 18 construction packages.⁴⁷

⁴⁵ See [Carmichael Rail Network | Martinus Rail](#) [viewed 4 August 2025]

⁴⁶ See [Carmichael Rail Network | Bowen Rail Company](#) [viewed 4 August 2025]

⁴⁷ ERA (2014); Brookfield Rail – Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013; 30 June 2014; p.52-53

4.3.4 Applied WACC

In the ERA's previous assessments of railway owner funding costs, it has calculated the funding costs by applying the (then) current ERA determined real pre-tax ("Officer") formulation of WACC. GHD has used the same form of WACC in calculating railway owner funding costs, with the rate applicable at the valuation date being 7.46%.

With the transition to a more typical building block based assessment of total costs, with a DORC based valuation of the initial capital base, Aurizon considers it appropriate to re-consider the formulation of WACC applied in the calculation of railway owner funding costs.

Aurizon agrees that it is necessary to use a real formulation of WACC. This reflects that the valuation is being consistently undertaken using real \$ terms as at the valuation date. Therefore, the valuation is already compensating the owner for the inflation effect on costs over the construction period. Using a nominal WACC would result in these inflation effects being double counted.

However, Aurizon considers that the calculation of railway owner funding costs should be based on a post-tax (vanilla) WACC formulation, rather than using a pre-tax WACC. The railway owner will be compensated for tax in the assessment of allowable revenue through the building block calculation. Also capitalising a tax allowance into the RAB (by calculating funding costs on a pre-tax WACC) will result in tax costs being double counted.

The issue of the appropriate WACC formulation for calculating funding costs for inclusion in a DORC valuation was explicitly considered by the QCA in relation to Dalrymple Bay Coal Terminal, with the QCA concluding that the correct approach was to apply a real, after tax WACC to each month's construction cost.⁴⁸ Similarly, Aurizon confirms that when interest during construction is calculated for the purpose of capitalising projects into Aurizon Network's RAB, a post tax formulation of WACC is applied.

Adopting a post tax (vanilla) WACC formulation means that the rate applied for the calculation of funding costs, as at the valuation date, should be reduced to 6.22%.

4.3.5 Summary impact

Adjusting the construction period to a length consistent with the actual construction period achieved for the Carmichael Rail Network and using a post-tax WACC would, in isolation, reduce the railway owner funding costs from around \$8.6 billion to around \$905 million, with an estimated reduction in GHD's DORC value of around \$4.0 billion.

⁴⁸ Queensland Competition Authority (2004); Draft Decision – Dalrymple Bay Coal Terminal Draft Access Undertaking; October 2004; p.165

5. Depreciated Optimised Replacement Cost

5.1 Approach to Depreciation

5.1.1 Life Assessment Hierarchy

Aurizon acknowledges that the Costing Principles specify a clear methodology for assessing accumulated depreciation based, where possible, on a condition based assessment of the remaining life of assets.⁴⁹

In Table 6-1, GHD has set out a 3 step approach for assessing the physical condition of assets, having regard to available information on asset condition data and/or asset commissioning date.

As an overarching comment, Aurizon is concerned about the extent to which Arc apparently has no available information, and has made no effort to assess, the condition of its assets. This is compounded, in many cases, by limited information on construction date of assets. As a result, a large proportion of Arc's assets have been depreciated based on broad assumptions on the condition or age of the assets. This can be seen from the following table, which has been drawn from the information provided by GHD on depreciation approach by asset type.

Table 3 Basis for depreciation by asset type

Asset type	Basis for depreciation					Optimised Replacement Cost (\$M)
	Non-operational	Actual condition	Actual age	Assumed age or condition	Life expired	
Right of Way	4%	0%	0%	96%	0%	3,966
Civil						
Bridges	22%	0%	21%	58%	0%	849
Tunnels	0%	0%	0%	100%	0%	111
Culverts	1%	0%	92%	4%	3%	506
Track						
Rail	20%	76%	0%	4%	0%	10,301
Sleepers*	14%	0%	40%	46%	0%	3,741
Ballast*	15%	0%	13%	72%	0%	1,838
Turnouts	12%	0%	26%	59%	3%	757
Signal and control	0%	0%	81%	14%	5%	5,236
Buildings	0%	0%	6%	94%	0%	253
Track structures	0%	0%	0%	100%	0%	62
Miscellaneous	0%	0%	0%	100%	0%	237
TOTAL						27,925

* GHD did not identify that it had depreciated sleepers and ballast to zero on non-operational routes, however this has been inferred from summary tables. The % applicable for other categories has been adjusted accordingly.

Aurizon considers the limited information on actual asset condition is both surprising and disappointing. Surprising, as an experienced large scale infrastructure manager such as Arc would be expected to have a robust asset management framework in place, including regular assessment and reporting of asset condition in order to inform maintenance and asset renewal decisions. To the extent that this information is not available from Arc's asset management systems, it is disappointing that Arc has not sought to assemble information on the condition of its assets, as the extended timeframe provided to railway owners for submitting their DORC valuation was predicated at least in part on the expectation that they

⁴⁹ Arc Infrastructure (2025); Costing Principles; section 2.7

would need to assemble robust data on actual asset condition, including through site visits and asset sampling techniques.

Having said that, the very limited proportion of assets depreciated according to their actual physical condition means that the fallback depreciation methodologies applied by GHD become increasingly important. Aurizon's views on these fallback mechanisms are discussed below.

Where condition data does not exist but commissioning date is known

Aurizon agrees that, where condition data does not exist but commissioning date is known, it is reasonable to depreciate an asset from time of commissioning over its standard design life. However, in doing so, the standard design life adopted for each asset type should in all cases be consistent with the life defined in the Costing Principles.⁵⁰ While Arc's approved Costing Principles include details on the standard design life of each asset type (which in most cases were approved directly as proposed by Arc), GHD has not consistently used these standard design lives and, in some cases, has substantially departed from the accepted standard design life in order to assess accumulated depreciation.

GHD then propose to adjust the remaining life assessed from commission date, in order to reflect any deviation from industry normal deterioration rates evident from those assets where condition data is available. Aurizon does not consider this to be appropriate. Asset deterioration will vary depending on the maintenance regime applied and on whether any life extending capex has occurred. Such work will not necessarily apply uniformly across a route section or across a network group. In the absence of detailed records on asset maintenance and renewal, it is not possible to know whether a consistent maintenance and investment regime has applied for an asset if no condition data is available.

In any case, from Table 3, there does not appear to be any asset types where some assets have been depreciated from their commissioning date, but for which condition based data is available for other assets within that type. Accordingly, Aurizon considers that there are no circumstances where the deterioration rate evident for other assets is likely to provide sufficient evidence to justify any adjustment to a commissioning date based estimate of remaining life of an asset.

Aurizon agrees that, where assets remain in service beyond their standard design life, it is reasonable to apply a minimum of 10% of standard design life for as the remaining life of those assets.

GHD has identified that, for most assets not in service, 0% of useful life has been applied on the basis that these assets are not currently able to deliver a service because of their condition. As addressed in section 4.1.1, where assets are not in service, they should be removed from the valuation as part of the optimisation stage.

If neither condition nor commissioning date is known

GHD state that, where neither condition nor commission date is known, there is no evidence to suggest a level of maintenance any different to the remainder of the route section, therefore a route section weighted average depreciation rate will be applied to these assets, based on operating sections where condition data is known.

Contrary to GHD's suggestion, the level of maintenance applied to an asset is not a good determinant of its remaining asset life, as an asset's standard design life is based on the expectation that it will be adequately maintained over that period. In any case, as noted above, the only asset type for which condition data is available is rail. There is no reason to believe that the condition of the rail asset is a

⁵⁰ Arc Infrastructure (2025); Costing Principles; Appendix 2; p.26-27.

good indicator of the remaining useful life of assets that have different standard design lives and different maintenance and renewal profiles.

Instead, in these circumstances, available data sources should be examined in order to provide the best estimate of likely asset age. For example:

- > where Arc has detailed data on past expenditure for an asset type (eg sleeper replacement), then where there is no record of such expenditure on a route section over that same timeframe, it should be assumed that that no expenditure occurred on that asset type over that route section within that timeframe. The date at which those detailed records commenced would then be minimum age for remaining assets of that type;
- > Arc should have available data on its capital expenditure on the network since Brookfield took over responsibility for the network in 2010. This data should be able to be used to identify (even if in general terms) where Arc has undertaken asset renewal works over its network. Where there is no evidence that Arc has undertaken asset renewal since 2010, then it should be assumed that no such renewal occurred, again informing the minimum age for assets;
- > it may be similarly possible to source information on material asset investments undertaken by Westnet Rail when owned by Brookfield's predecessors.

The approach, and relevant information sources, for estimating likely asset age should be considered for each asset type on a case by case basis.

5.1.2 Depreciation Calculation Methodology

For each asset type, GHD has expressed the life of existing assets as a % of their standard useful life remaining. GHD has then applied this same % to the Optimised Replacement Cost of the MEA in order to calculate the depreciated value of the asset.

This approach is reasonable where the actual asset construction is consistent with the MEA. However, this approach will not be appropriate where the standard useful life of the existing asset differs materially from the standard useful life of the MEA. The best example of this is sleepers, where in all instances the MEA is assumed to be constructed with concrete sleepers, which have a standard useful life of 50 years. However, for many routes, the actual sleepers are a mix of timber (with a 15 year standard useful life), steel (with a 40 year standard useful life). Using GHD's methodology, if timber sleepers have a remaining life of 50%, GHD will apply the same % remaining life assumption to the MEA, which would result in it being depreciated by 50%. However, a timber sleeper that is 50% life expired will need to be replaced in 7.5 years. The MEA concrete sleeper should be depreciated to have an equivalent remaining life of 7.5 years, which would require that it be depreciated by 85%.

The same issues will apply, to some extent, to all other assets.

To address this, if there are differences between the standard useful life of existing assets and the MEA, the % life remaining should be converted to a remaining life in years, with this then being used to calculate the applicable % life remaining of the MEA.

5.2 Right of Way Assets

5.2.1 Clearing and Grubbing

Clearing and grubbing is an activity involved in the development of the associated earthworks assets, and does not create an asset in and of itself. These costs should be amalgamated with the cost of constructing the relevant asset, and depreciation applied to the relevant asset as per the required depreciation method.

5.2.2 Earthworks and Formation

GHD has taken the view that earthworks (including formation) does not physically deteriorate with time, provided adequate maintenance (e.g. drain clearance) is undertaken. On this basis, GHD has assumed that Arc's actual earthworks and formation is in an 'as new' condition, with no accumulated depreciation applied. For the purpose of assessing future depreciation, GHD has assumed that the remaining life of all earthworks and formation assets are equal to the standard design life of 100 years.

As a starting point, Aurizon does not agree that earthworks should be valued for the DORC as if they are non-depreciating (perpetual) assets. In regulatory DORC valuations of railway assets, earthworks are typically assigned a finite life, with accumulated depreciation recognised in the valuation.⁵¹ The ERA consistently required that Arc adopt a standard useful life of 100 years for earthworks and formation assets in the Costing Principles.⁵²

Adopting an appropriate allowance for accumulated depreciation is required to achieve a reasonable economic outcome for the following reasons:

- > The price limits set for Arc's past access charges include recovery of earthworks assets, with ceiling price determinations previously made under the Code reflecting a 100 year life for earthworks assets. This ceiling price has been used in the assessment of over-payments for Code based access agreements, and has also influenced access seekers' decisions as to whether to pursue a Code based access agreement (which would in turn give access to over-payment entitlements). To now exclude accumulated depreciation on earthworks would be akin to allowing Arc to earn a return on previously depreciated assets, and would therefore be inconsistent with the principle established in the Code that asset be depreciated only once (i.e. current customers would be required to pay for the economic benefit which has accrued to prior users of the railway); and
- > The initial investment in rail corridors was undertaken under public ownership, and this investment was:
 - unlikely to have been made on the expectation of a perpetual asset life; and
 - made for the purpose of broader economic and public interest criteria that achieved the recovery of the original capital investment through economic returns to the state. The treatment of earthworks as a perpetual asset where this was not the basis for the original investment decision will therefore likely deliver windfall or speculative gain to the railway owner.⁵³

Moreover, regardless of these economic concerns, in reaching its view that formation should not be depreciated for the DORC valuation, GHD has provided no evidence that it has actually assessed the condition of any formation assets – rather it has assumed that they have been well maintained and are in 'as new' condition as per the MEA.

In Aurizon's experience, formation deteriorates with ongoing use of a railway (at times requiring intensive maintenance and/or renewals), particularly when it was originally built to a standard that is less than would be used for a MEA. In many cases, Arc's network has been constructed with a lesser formation standard than the MEA. While this is most evident across substantial sections of the narrow gauge network where there is no engineered formation in place, it is also the case that where formation has been installed, in many cases this was built to a lesser standard than would be adopted today. Routes with a substandard formation create significant issues for both the railway owner and rail operators, both due to its impact on track maintenance costs (requiring higher maintenance to maintain track geometry

⁵¹ Aurizon (2024); Arc Infrastructure Proposed Costing Principles – Submission to ERA; 19 April 2024; p.15-16.

⁵² Economic Regulation Authority (2024); Arc Infrastructure Costing Principles – Approval Decision; 16 May 2024; p.80

⁵³ Professor Flavio Menezes (2015); A preliminary view: Regulatory economics assessment of the proposed Western System asset valuation approaches; 8 April 2015; p.24-25

and track stress within acceptable limits) and service quality (requiring greater speed restrictions e.g. due to heat).

Accordingly, Arc's formation assets should be subject to an appropriate level of depreciation that reflects the age, standard and condition of the formation. Given the gradually increasing requirements for formation standard, it is likely that there will be reasonable correlation between the age of the formation (since its last substantial upgrade) and its standard and condition. Accordingly, Aurizon considers that a reasonable approach will be to depreciate the formation assets over their standard design life from the date of their construction or major upgrade. Construction and major upgrade dates for each route have been estimated by GHD in the context of its assessment of the remaining life of ballast,⁵⁴ and these dates are considered reasonable to apply as a construction/upgrade dates for formation.

In the event that Arc were to seek to methodically assess the actual condition of its formation assets for the purpose of assessing condition based depreciation, then it is critical that, the actual formation standard and condition be considered for each route relative to the MEA assumption, with a condition based adjustment to the formation value where the actual formation standard is less than the MEA standard:

- > where there is no formation installed, the condition assessment should result in the formation asset being depreciated to zero; and
- > where formation is installed but to a lower standard than the MEA, a condition adjustment to the formation asset value should be made to reflect the relative standard of the actual formation asset.

Aurizon also questions GHD's application of depreciation to non-operational routes. Notwithstanding Aurizon's view that these routes should be excluded from the valuation in the optimisation stage, GHD has stated that it instead taken the approach of depreciating these non-operational routes to zero. However, Table 6-4 shows that GHD has not applied any depreciation to clearing and grubbing or formation assets on non-operational routes. No explanation is provided for this omission.

Aurizon estimates that applying depreciation from the assumed construction date of formation will, in isolation, reduce GHD's DORC valuation by around \$1.9 billion.

5.2.4 Access Roads

GHD has stated that there is no condition data available on access roads, and instead GHD has assumed that there is a reasonable correlation between the weighted average economic life of the route sections and that of the access roads within them, and also that route sections with reasonably long remaining lives will have been accessed relatively recently or frequently (which would have required maintenance or upgrade of the access roads).

It is evident from GHD's explanation that there is no factual evidence or data to support the depreciation assumptions for access roads. Aurizon considers that it is unacceptable to make such generalised assumptions around the appropriate level of depreciation for such a substantial asset class (with GHD's estimate of the ORC for access roads being in excess of \$1bn).

An examination of the depreciation applied by network group shows that, excluding non-operational routes which have been depreciated to zero, GHD has applied 44% depreciation to access roads across the network. With a 10 year standard life, this indicates that all access roads are on average 4.4 years old (or in an equivalent condition).

⁵⁴ DORC Report, p.141.

An assumption on access road age needs to be substantiated based on information that is directly relevant to those access roads. This should at minimum include a review of actual expenditure on access road renewals during Arc's 15 year tenure as railway owner. Unless Arc can demonstrate that access road capital expenditure occurred on a route, it should be assumed that the access road has not been renewed over this period (and for access roads that actually exist, would simply have the 10% remaining useful life assumption applied).

Alternately, Arc may choose to undertake a methodical assessment of the actual condition of its access roads, as a basis for a condition based assessment of access road depreciation.

5.3 Civil Structures

5.3.1 Bridges

In Aurizon's experience as a railway manager, bridges are a safety critical asset, with asset condition monitoring undertaken regularly. As such, it is surprising that Arc has so little information available on the actual construction form or condition of its bridges.

Nevertheless, bridges are long lived assets, and generally only replaced when a route is being upgraded or otherwise in unusual circumstances. Therefore, it can be expected that Arc will have clear records of bridge installation dates in only limited circumstances, generally where they have been replaced subsequent to the original construction or upgrade of the route (note, 21% of bridge assets have known installation dates).

Aurizon does not consider it to be reasonable to assume that other bridges were constructed or replaced at the same time as the known installations, but with no records being maintained. Instead, Aurizon considers a more realistic assumption to be that, where the date of bridge installation is not known, that the bridge was constructed at the time that the route was originally installed or subject to a major upgrade, with these dates estimated in the same way as for formation (discussed above).

To the extent that this would result in bridges exceeding their standard design life, then the 10% remaining life assumption should be adopted.

5.3.2 Tunnels

GHD has made the assumption that tunnels will have been subject to similar life extending maintenance effort as bridges. There appears to be no factual evidence or data to support this assumption. Tunnels are very unique assets, and are likely to be subject to maintenance and life extending works based on their specific circumstances. There is no basis for assuming that replacement dates for bridges will have any correlation to the requirement for life extending works on tunnels.

Instead, Aurizon considers a more realistic assumption to be that, where the date of tunnel installation is not known, that the tunnel was constructed at the time that the route was originally installed or subject to a major upgrade, with these dates estimated in the same way as for formation (discussed above).

To the extent that this would result in tunnels exceeding their standard design life, then the 10% remaining life assumption should be adopted.

5.3.3 Culverts

Aurizon notes that, for the vast majority of culverts, the installation date is known and has been used as the basis for depreciation, which is considered reasonable. However, given that there appears to be very detailed information maintained on culvert replacement dates, Aurizon does not consider it reasonable to assume that the remaining culverts have been replaced in the same timeframes, where no such evidence

exists. Aurizon considers a more realistic assumption to be that, where the date of culvert installation is not known, that the culvert was constructed at the time that the route was originally installed or subject to a major upgrade, with these dates estimated in the same way as for formation (discussed above).

To the extent that this would result in culverts exceeding their standard design life, then the 10% remaining life assumption should be adopted.

In addition, as discussed in section 5.1.2, adjustment will need to be made where the design (and standard design life) of an actual culvert differs from the MEA. The MEA asset has been specified, in all cases, as concrete pipe. If actual culverts are designed using materials other than concrete (such as steel pipes), then they are likely to have a shorter design life. Accordingly, it is necessary to assess the remaining life of actual assets in years, in order to convert this to the appropriate % of remaining life to apply to the MEA asset.

5.4 Track

5.4.1 Rail

Aurizon notes that, for the vast majority of rail assets, condition based data is available and has been used as the basis for depreciation, which is considered reasonable. When considering whether it is reasonable to apply this same remaining life to rail within a route section without condition data, the ERA should have regard to:

- > the reason why condition data has not been collected on that rail; and
- > whether an assumption of similar usage and similar maintenance is reasonable for that rail. For example, if it is rail on a seldom used siding, such an assumption is unlikely to be valid.

Further, Aurizon notes that there are significant areas of Arc's network constructed with rail weights significantly lighter than the specified MEA. As discussed in section 5.1.2, adjustment will need to be made to reflect whether the standard design life of the actual asset is materially less than the standard design life of the MEA asset.

Finally, the calculation of the average weighted remaining life in Table 6-14 shows 59% average weighted remaining life across operational routes. This would appear to be in error, as it is inconsistent with the data provided in Table 6-13 which shows the vast majority of rail on operational routes has a remaining life of 37.5%. If this is in error it would, in isolation, result in rail depreciation on operational routes being understated by around \$1.5 billion. The ERA should closely examine the calculation of rail depreciation.

5.4.2 Sleepers

Consistent with our views on right of ways assets and structures, Aurizon does not consider it reasonable to assume the same remaining life for sleepers with no information on installation year as for those sleepers where the installation year is known.

Sleeper relay programs are undertaken on a periodic basis, typically as a major component of a network upgrade or renewal. Given the significance of these programs when they occur, it would be expected that Arc would have maintained detailed records on their scope and timing. Consistent with this expectation, GHD notes that Arc has a high level of granularity on sleeper installation information including year, length of track, sleeper type and sleeper pattern.

Given the nature of these programs and the detailed information that Arc maintains on sleeper replacements, it is inappropriate to assume the same replacement pattern will have occurred in areas where Arc has no information on actual replacements. Moreover, even within a route section with detailed available information on sleeper replacements, information on remaining % life of one sleeper

type (eg timber, steel or concrete) should not be extrapolated to a different sleeper type as, given the different standard design life of each sleeper type, this would have required very different installation programs for the different sleeper types.

Instead, it is more likely to be the case that where Arc has no information on actual sleeper replacements, none will have occurred since those detailed records commenced. Unless Arc can demonstrate sleeper renewal capital expenditure occurred on a route, it should be assumed that the sleepers have not been renewed over this period.

To the extent that Arc does not have its own information on the timing and extent of sleeper relay programs, it may be the case that an examination of public data will provide some information on timing of significant programs.

Alternately, Arc may choose to undertake a methodical assessment of the actual condition of its sleepers, as a basis for a condition based assessment of sleeper depreciation.

Further, as discussed in section 5.1.2, different sleeper types have very different standard design lives. With the MEA in all cases being defined as a concrete sleeper with a 50 year design life, it is critical that the remaining useful life of the MEA be properly aligned to the remaining useful life for existing assets, which in many cases are built with steel or timber sleepers. This is likely to result in a much greater depreciation being applied to MEA assets than has been calculated by GHD. Based on the data presented in Table 6-17 showing numbers and remaining lives of sleepers by type, Aurizon estimates that when adjusted for the standard design life of each sleeper type, the average remaining life of the MEA concrete sleeper (across operational routes) would be 33%. Applying this average remaining life is estimated to, in isolation, increase the depreciation applied to sleeper assets by nearly \$600m.

Finally, the ERA should closely examine the calculation of depreciation amounts, as there are a number of inconsistencies in GHD's calculation of depreciation given its assessed weighted remaining life, as shown in Table 6-18. For example, the sleeper population for the EGR has a weighted remaining life of 32%, however the reported DORC value of \$281.5m is 45% of the assessed ORC of \$619.8m. Similar inconsistencies apply for other network groups.

5.4.3 Ballast

In determining the accumulated depreciation for Arc's ballast assets, GHD has adopted an effective useful life of 878 years. This bears no resemblance to the endorsed standard design life of 50 years, as per Arc's Costing Principles.

In regulatory DORC valuations of railway assets, ballast is typically assigned a finite life of no greater than 50 years, with accumulated depreciation recognised in the valuation. Arc itself proposed a standard design life for ballast of 50 years in its Costing Principles,⁵⁵ and following an examination of this issue, the ERA's consultant Marsden Jacob concluded that this was reasonable.⁵⁶ In addition, the price limits set for Arc's past access charges consistently reflected a 50 year life for ballast.

However, GHD has adopted a far longer ballast life by extrapolating Arc's current ballast renewal rate (of around 6km per year) to conclude that the ballast across Arc's entire network (including non-operational routes) will be fully replaced over around 878 years.⁵⁷ Arc's limited ballast replacement program does not provide objective evidence of an extremely long useful life for ballast, as suggested by GHD. Asset

⁵⁵ Arc Infrastructure (2024); Costing Principles (Proposed); 19 March 2024; Appendix 2.

⁵⁶ Economic Regulation Authority (2024); Arc Infrastructure Costing Principles – Approval Decision; 16 May 2024; p.78

⁵⁷ DORC Report, p.141.

renewal rates will vary at different times for a range of reasons, and asset renewal requirements can be 'lumpy'. Limited asset renewals could efficiently occur during a period where the bulk of ballast assets are simply within their design life. It is also possible that a low asset renewal rate could indicate a declining asset quality, if assets are not being replaced when they reach their end of life.

Where ballast is to be depreciated based on construction date, the Costing Principles standard design life assumption of 50 years should be adopted. To the extent that this would result in ballast exceeding its standard design life, then the 10% remaining life assumption should be adopted.

In terms of GHD's assumed ballast installation dates, Aurizon accepts that it is likely that ballast will have been upgraded or replaced where concrete sleeper installation has occurred (GHD's 'Method 1'). However, where rail/sleeper replacement has otherwise occurred ('Method 2'), it is less clear that ballast upgrade or replacement will also have occurred. For example, a programmed timber sleeper renewal would not typically also involve ballast replacement, given that timber sleepers have a much shorter life than ballast. The ERA should examine the specific projects identified by Arc to ensure that it is reasonable to expect that ballast renewal will have occurred as part of those projects.

Aurizon estimates that, if assessed in isolation, applying depreciation from the estimated ballast installation date using the standard design life of ballast would reduce GHD's DORC value by around \$1 billion.

As an alternate to depreciation based on estimated ballast installation date, Arc could methodically assess the actual condition of its ballast assets for the purpose of assessing condition based depreciation. However, in this event, it would be critical that the actual ballast standard and condition be considered for each route relative to the MEA assumption, with a condition based adjustment to the ballast value where the actual ballast standard is less than the MEA standard.

5.4.4 Turnouts

Aurizon's concerns with GHD's application of depreciation to turnouts are consistent with our comments on sleepers in section 5.4.2, in particular:

- > Aurizon does not consider it reasonable to assume that, where there is no information on turnout installation date (as is the case for 59% of turnouts), installation dates should be assumed to be the same on average as where there is information on installation date – the absence of information instead indicates that installation of those turnouts will not have occurred within this same timeframe. The ERA should consider what other sources of information are available in order to better inform an estimated installation date for these turnouts;
- > As an alternate to depreciation based on estimated turnout installation date, Arc could methodically assess the actual condition of its turnout assets for the purpose of assessing condition based depreciation; and
- > Adjustment will need to be made to reflect the difference between the standard design life of the actual turnout assets compared to the standard design life of the MEA asset.

5.5 Signalling, Communications and Control Systems

GHD has depreciated signalling and control systems assets from their known or estimated installation date, over their standard design life. In doing so, in Table 6-27, GHD notes that:

- > for 81% of signalling and control system assets, the date of installation is known and linear depreciation has been applied; and
- > a further 14% of assets do not have a known installation date but have been depreciated over the average remaining life for other signalling assets across the network.

GHD does not specify the standard design life assumption applied to signalling and control system assets. But applying this approach, GHD has concluded a remaining life of signalling assets across the network of around 33% (see Table 6-28) – ranging from 18% remaining life (in the Metro network group) to 48% remaining life (in the Midwest network group).

As stated earlier, where GHD is depreciating assets from their commissioning date based on their standard design lives, it should be applying the lives established in the Costing Principles, as endorsed by the ERA. Arc's Costing Principles identifies that the standard design life for signalling assets is 20 years, and for communications assets is 15 years. On this basis, an average remaining life for network groups of 18% to 48% would imply that Arc has largely replaced all of its signalling and communications assets over the period from around 2009 to 2015. However we are unaware of such a major wholesale renewal program having occurred, except in the Midwest network group, where signalling assets were upgraded in around 2011. Even for the Midwest network group, given this timing, the 48% remaining life indicates that GHD may be applying a 30 year life to these assets.

Accordingly, the ERA needs to closely examine whether the standard design lives applied by GHD for signalling and communications assets is consistent with the lives specified in the Costing Principles.

Consistent with our comments on other asset classes, Aurizon does not consider it reasonable to assume, for assets with no available information on installation date, that the assets have been replaced within the same average timeframe as for assets with known installation dates. If this were the case, it would be expected that information on installation date would be available. The ERA should examine other information sources to identify information that would provide a better guide to likely installation date for these assets. Alternately, Arc could methodically assess the actual condition of these assets for the purpose of assessing condition based depreciation.

5.6 Other Assets

Aurizon notes that there appears to be limited factual data to support the assumed construction date adopted for buildings, track structures and miscellaneous assets. The ERA should closely examine available information to ensure that it is satisfied that the assumptions are reasonable.

6. Valuation Adjustments

6.1 Contributed Capital

The Code requires that the value of contributed capital must not be included in the DORC valuation, where contributed capital means⁵⁸ 'railway infrastructure that has been funded wholly or in part by an entity other than the railway owner or an associate of the railway owner, including by the entity doing any of the following

- > providing cash or in-kind contributions to the railway owner or an associate of the railway owner;
- > undertaking work, or paying for work to be undertaken, for the railway owner or an associate of the railway owner;
 - making payments to the railway owner or an associate of the railway owner that —
 - fund the recovery of capital in relation to the railway infrastructure; and
 - are not payments of prices and charges for access.'

Aurizon is surprised that Arc has confirmed to GHD that none of the assets in the DORC are contributed capital, according to this definition. There is substantial public evidence around the existence of large amounts of contributed capital over the last 15-20 years for Arc's network, including:

- > Government (both Western Australian and Federal), funding for resleeper programs, passing loops and other track works;.
- > Karara Mining Limited funding of infrastructure upgrades between Geraldton and Tilley Junction;
- > Cliffs Natural Resources funding of infrastructure upgrades to the Koolyanobbing to Esperance line.

Aurizon expects that the ERA will closely examine these investments to understand the source of the capital and whether these should be treated as contributed capital.

Further, Aurizon highlights the requirement in the Costing Principles that contributed capital be measure not by the current value of the contribution, but by the current value of the *assets funded by the contribution*. This is important to ensure that the full current impact of the contribution is recognised, and Arc does not bear any windfall gains or losses due to differences between the current value of the contribution, and the current value of the assets funded by the contribution.

6.2 Operating Costs

One of the main benefits of moving to the DORC valuation methodology is to properly reflect the actual age and condition of the asset in both the assessment of the asset value, and in the assessment of future maintenance and asset renewal costs, hence providing more accurate information on the permissible range of economically efficient prices. One of the ongoing concerns with the previous GRV methodology is that it relied upon assessment of operating expenditure under hypothetical conditions, with the result that the assessed efficient operating cost bore no real relevance to the actual operating costs incurred. This was a key contributor to the floor price assessed under the GRV methodology being less than Arc's incremental cost of continuing to provide the infrastructure.

⁵⁸ Railways (Access) Code 2000 (Western Australia); Part 1, Section 47B.

In order to ensure internal consistency between the assessment of future operating and maintenance costs and the initial asset valuation, it is therefore necessary to adjust the asset value to reflect differences between Arc's operating and maintenance cost profiles given the existing asset standard and condition, and those that would be expected from the assumed MEA standard asset. Such an adjustment is required under Arc's Costing Principles.

However, when implementing this operating cost adjustment, Aurizon considers that GHD has taken a very limited and piecemeal approach to assessing the operating cost differences between Arc's actual assets compared to MEA.

6.2.1 Network Operating Costs

Operating Cost Differences

In Table 7-1, GHD has identified only limited cost differences due to the need for ad-hoc replacement of timber sleepers (in both track and turnouts), recoating requirements for steel bridges and operating cost impacts of an optimised signalling and communications system.

For some parts of the Arc Network, there are major differences between the quality of the actual track, structures and right of way assets and the assumed MEA. This is particularly the case for lightly trafficked areas of the network such as the narrow gauge grain lines, where most aspects of the actual track, structures and right of way assets differ from the MEA. However, it is also the case across the broader rail network which, in most cases, was originally constructed or upgraded more than 50 years ago.

The operating cost implications of these differing construction standards are significant and will be embedded throughout Arc's maintenance practices. The types of additional costs will include:

- > different inspection requirements, including:
 - different track inspection intervals, particularly where the actual track is constructed to a far lighter standard than for the MEA track, and where the actual track is more significantly affected by weather conditions, such as heat, than would be expected for the MEA;
 - additional structures inspections, including more frequent inspection intervals for timber and steel bridges;
- > additional corrective maintenance requirements beyond the need for spot timber sleeper repair, including additional track geometry correction/resurfacing, rail repair, rail joint maintenance, additional culvert clearing⁵⁹, and so on; and
- > additional cyclic maintenance, including additional track resurfacing.

Given the broad range of additional maintenance requirements, some of which may be attributable to the combination of differences from MEA (rather than directly from a difference for an individual asset type), Aurizon consider the best approach to assessing the operating cost impacts of different track, structures and right of way standards is to:

- > Assess the holistic maintenance regime that would be required for mature track, structures and right of way assets, where these are constructed to MEA standard. The ERA has previously undertaken this assessment for much of the Arc network, with previous ceiling price evaluations including assessment

⁵⁹ Note, on p 37 of the DORC Report, GHD cited the additional maintenance commitment required for smaller culverts, which influenced its view that 600mm diameter culverts should be adopted as the MEA culvert size throughout the network

of the efficient maintenance cost for the MEA asset, both in its early life cycle, and as mature assets, and assuming light, medium and heavy duty demand;

- > Compare this against Arc's current annual maintenance costs. This will provide a more comprehensive identification of the maintenance impacts from Arc's existing assets compared to MEA.

For signalling and communication assets, a similar approach should be taken. While Aurizon is surprised that that Arc's signalling and communications maintenance cost data is not available with reasonable granularity, we do not consider that this should prevent this assessment from being undertaken. The calculation of an appropriate operating cost adjustment will require:

- > Assessing the maintenance regime that would be required for the MEA signalling and communications system. Note, for the ARTC interstate network DORC valuation, GHD made an assessment of the likely maintenance activity required for the MEA signalling and communications system.⁶⁰ Aurizon considers that it should be similarly possible to make a more informed estimate of likely costs for maintaining the MEA signalling and communication system than simply assuming 3% of signalling replacement costs + an additional 1% for remote support, as proposed by GHD in this instance;
- > Compare the estimated costs of maintaining the MEA signalling and communications system against Arc's current costs. If the granularity able to be provided by Arc does not allow this to be compared at an activity level, then it can still be compared at a higher total cost level, for which data should be available.

Assessment Period

The approach normally used for assessing an appropriate DORC adjustment for operating costs differences is to calculate the difference in cost (between actual and MEA asset) on an NPV basis over the remaining life of the asset, on the expectation that upon renewal, the asset will be replaced with a MEA asset. However, Aurizon considers that this is unlikely to result in an appropriate adjustment for operating cost differences in this case.

While many of Arc's non-MEA standard assets are older and may be close to their life expiry, Aurizon considers it likely that these will often continue to be operated through minor life extending capex and a higher maintenance cost regime, rather than being replaced with the MEA standard assets. Even where assets are replaced, non-MEA assets may continue to be installed on an as required basis, if the cost of upgrading the route to MEA standard are not justified.

Accordingly, unless there is a reasonable expectation that the assets on a route will be replaced with the MEA asset when they reach the end of their physical life, the operating cost deduction should be applied over a nominal twenty year period, reflecting a conservative view of the likely period of time for which this operating model will be maintained.

If actual asset renewal occurs within this timeframe that means this deduction was overstated, the relevant portion of the adjustment can be reversed at that time.

6.2.2 Rail Operator Cost Implications

Operating Cost Differences

In some cases, the differences between the actual asset and the MEA standard asset have implications not only for the ongoing costs of operating and maintaining the infrastructure, but also for the ongoing costs for rail operators to run services on that infrastructure. On Arc's network, these above rail cost

⁶⁰ GHD Advisory (2021); Developing a Regulatory Asset Base value for the Australian Rail Track Corporation Interstate Network, using the Depreciated Optimised Replacement Cost Method – Concluding Public Report; 7 October 2021; p.94.

implications are most acute on the narrow gauge grain lines where the actual lines are heavily speed restricted compared to MEA standard (particularly during summer months) and often require the imposition of additional restrictive operating practices. Further, TAL limits on these lines require the operation of lightweight locomotives and lightly loaded wagons, which imposes a requirement to run more train services than would be required if the railway were actually constructed to MEA standard.

If the additional cost consequences for rail operators from the actual infrastructure being less than MEA standard are not reflected in adjustments to the DORC value of that infrastructure, then the resulting total supply chain cost for end customers (assuming prices are set at the ceiling price) would exceed the costs if a hypothetical new entrant were to replace the assets. This outcome would not be consistent with the objectives of achieving allocative, productive and dynamic efficiency.

As Aurizon explained in its submission to the ERA on Arc's Costing Principles, there are two options for how the supply chain cost implications can be reflected in the asset valuation:⁶¹

- > The remaining lives for existing assets could be assessed based on the assumption that trains will operate at the MEA standard.
- > Alternately, the NPV of rail operator operating expenditure savings anticipated due to the assumption of MEA standard assets could be deducted from the DORC valuation. This is consistent with the approach used to adjust for network maintenance cost implications.

The first approach is the most reasonable approach to adopt in circumstances where the differences between actual and MEA standard are modest, and it is in fact possible to run a MEA standard train service on the actual asset.⁶²

However, it is conceptually difficult to apply this approach if the actual standard of the infrastructure means that it is not possible to run a MEA standard service, as we consider likely to be the case on much of Arc's narrow gauge grain network. For example, would this mean that there is no remaining life for existing assets unable to be used for the MEA standard service and that they should therefore be valued at zero?

Accordingly, Aurizon considers that the second approach may be better suited to application on Arc's network, given the extent of differences between the actual infrastructure and the MEA standard.

⁶¹ Aurizon (2024); Arc Infrastructure Proposed Costing Principles – Submission to ERA; 19 April 2024; p.13.

⁶² ACCC (2013); Position Paper – Australian Rail Track Corporation's proposed variation of the Hunter Valley Access Undertaking to include the Gap to Turravan Segments; 12 December 2013; p.24-25