


Independent Reporter

Edinburgh to Glasgow Improvements Programme
Cost Of Work Done Review
(CH/024)

Network Rail and ORR

August 2013

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Document history

Independent Reporter Review –Edinburgh to Glasgow Improvement Programme

Cost of Work Done Review (CH/024)

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1.0	16 Aug 13	Final Report following NR/ORR Comments	BP	DS	DS
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1 Executive Summary

1.1 Background

1.1.1 The Edinburgh to Glasgow Improvements Programme (EGIP) is a key component of the Scottish Government's future transport strategy. Network Rail (NR) has been delivering work packages during Control Period 4 (CP4) to develop the scope, complete advance works and begin some implementation projects.

1.1.2 On 4 July 2012 the Scottish Transport Minister announced the re-phasing of the EGIP programme. Following this announcement Network Rail has been working with Transport Scotland (TS), First ScotRail and Jacobs to agree the requirements, outputs and scope for the next phase of EGIP. This development work is now reaching completion and the draft of a new client requirements document has been made available.

1.1.3 Haymarket North Lines Electrification and EGIP GRIP 4 development was not funded through the Periodic Review (PR08) and as a consequence the eligibility to add the costs to the Regulatory Asset Base (RAB) must be assessed by the Office of Rail Regulation (ORR) in accordance with its Investment Framework Consolidated Policy & Guidelines.

To assist ORR in determining if the costs incurred were efficient for Haymarket North Lines and EGIP GRIP 4 development work, the Independent Reporter (IR) was required in Reporter Mandate CH/024 to review the validity of costs incurred to date (excluding costs associated with works directly funded by Transport Scotland).

1.2 Analyses Undertaken by the Independent Reporter

1.2.1 The IR has undertaken analyses of the EGIP programme costs for the Haymarket North Lines GRIP 5 to 8 and for the EGIP GRIP 4 Development of both Infrastructure and Electrification works, under the following topics:

- Allocation of EGIP programme costs to the new Initial Phase and otherwise
- A disaggregation of EGIP programme costs using the standard investment estimating template at Network Rail to divide the GRIP4 costs into recognised categories
- Commentary on whether services from 3rd parties were procured and delivered efficiently
- Commentary on whether costs were at an appropriate level for the work completed

1.3 General Conclusions

1.3.1 The IR concludes that the programme has delivered a considerable amount of work using efficient market rates but that changes to requirements and methods has created additional cost. The additional cost is, however, part of a contribution to refine the scheme, and the development of a reduced scope solution for GRIP 5-8 is expected to reduce future construction costs.

1.3.2 The IR has found that the methods of procurement used on the projects were appropriate for the requirements and included contemporary contract scope documents and valid evaluation criteria. The procurement actions were

undertaken in line with the approved contracting strategies and have secured competitive market rates and satisfactory tender prices.

- 1.3.3 However, following contract award on all projects, the scope of the works and the costs increased significantly. The IR has found little evidence of additional cost being derived from dispute or poor project controls and note a variety of events including unforeseen conditions, additional quantities of assets and changes in delivery methods.
- 1.3.4 The IR considers that a saving may have been possible on the projects had a fixed scope, based on a full knowledge of the asset and site conditions, been procured in the first instance. The IR considers this saving to be between 5% and 10%.
- 1.3.5 The change control and contract management were undertaken to a good standard with clear records demonstrating appropriate challenge of contractor or supplier prices and an auditable record of the commercial activities have been upheld.

1.4 Specific Conclusions

- 1.4.1 **EGIP Infrastructure project development** - The outputs specified by Transport Scotland for the EGIP Infrastructure project development were delivered by Network Rail at an efficient cost of £27,972,992.
- 1.4.2 The total cost of development that contributes to the initial phase is £16,873,651.
- 1.4.3 The total cost of development that contributes to later phases of EGIP is £11,099,342.
- 1.4.4 **EGIP Electrification project development** - The outputs specified by Transport Scotland for the EGIP Electrification project development were delivered by Network Rail at an efficient cost of £7,739,020.
- 1.4.5 The total cost of development that contributes to the initial phase is £4,025,444.
- 1.4.6 The total cost of development that contributes to later phases of EGIP is £3,713,576.
- 1.4.7 **Haymarket North Lines Electrification** – The outputs specified by Transport Scotland for the Haymarket North Lines Electrification were delivered by Network Rail at an efficient cost of £10,960,372.

David Simmons
Independent Reporter
Halcrow Group Limited
August 2013.

2 Introduction

2.1 Background to Project

2.1.1 The Edinburgh to Glasgow Improvements Programme (EGIP) is a key component of the Scottish Government's future transport strategy. Network Rail has been delivering work packages during CP4 to develop the scope, complete advance works and begin some implementation projects.

2.1.2 Until July 2012, Network Rail was developing EGIP on the basis of the following objectives, to increase service levels across all routes between Edinburgh and Glasgow:

- an increase in service frequency, from a baseline of 6-7 tph to 13 tph; and
- a decrease in the fastest journey time from 50 minutes to 37 minutes

The scope being developed by Network Rail included electrification, station works and various infrastructure works.

2.1.3 On 4 July 2012 the Scottish Transport Minister announced the re-phasing of the EGIP programme¹. Following this announcement Network Rail has been working with Transport Scotland, First ScotRail and Jacobs to agree the requirements, outputs and scope for the next phase of EGIP. This development work is now reaching completion and the draft of a new client requirements document has been made available.

2.2 Remit for Independent Reporter

2.2.1 Haymarket North Lines Electrification and EGIP GRIP 4 development was not funded through the Periodic Review (PR08) and as a consequence the eligibility to add the costs to the Regulatory Asset Base (RAB) must be assessed by ORR in accordance with its Investment Framework Consolidated Policy & Guidelines.

2.2.2 To assist the ORR in determining if the costs incurred were efficient for Haymarket North Lines and EGIP GRIP 4 development work, the Independent Reporter was required in Reporter Mandate CH/024² to assess if:

- The works delivered the outputs (specified in the original client requirements) in the most economical way i.e. the best value option considering the requirements agreed with the client; including life cycle cost considerations
- Cost reports were appropriately detailed, substantiated and efficiently incurred
- The engineering access strategy was fit for purpose to achieve an efficient outcome
- Assumptions & interdependencies were adequately defined

¹ Scottish Transport Minister announcement: <http://www.transportscotland.gov.uk/news/Edinburgh-Glasgow-Rail-Improvement-Programme>

² Cost of Work Done Review: Haymarket North Lines Electrification and GRIP 4 Development v1.2 dated 7 May 2013

- Procurement arrangements were appropriate to produce an efficient outcome
- Governance arrangements were clearly specified and appropriate
- Risk management processes were appropriate
- Acceptance requirements were adequately defined upfront and included in the assurance plan

This involved the IR reviewing costs incurred to date (excluding costs associated with works directly funded by Transport Scotland).

2.2.3 Network Rail was requested by ORR to provide information to the Independent Reporter in the following categories:

1. The client requirements specified at the start of the works and the most recent version of client requirements for EGIP initial phase (currently being agreed between Network Rail and Transport Scotland).
2. Confirmation and evidence of the deliverables realised for Haymarket North Lines electrification and GRIP 4 development works.
3. Summary of cost incurred up to a defined point which is intended to be added to the RAB, highlighting main activities and associated cost.
4. The summary should be disaggregated in terms of GRIP stage, Network Rail direct costs, Network Rail indirect costs, procured services, main work items including description, quantities and rates applicable etc.
5. Demonstration that costs were at an appropriate level for work completed (resources / allocation / rates / based on reasonable level of detail, etc)
6. Demonstration that any services from 3rd parties were procured and delivered efficiently
7. Highlight cost associated with validating any work handed over to Network Rail
8. Highlight any inefficiencies, abortive costs, rework etc. and reasons for such inefficiencies
9. Highlight any costs for works undertaken that other programmes have benefited from (e.g. development work done by this programme means other programmes don't need to repeat)
10. Highlight any costs covered by funding from other sources.

2.2.4 This report is presented as a series of structured findings summarised as follows:

For **Haymarket North Lines Electrification**: the Network Rail reported cost incurred, and the IR's assessment of the efficient costs.

For **EGIP GRIP 4 Development Works**, these costs are broken into:

- costs incurred to develop scope that will be used in EGIP Initial Phase;

- costs incurred to develop scope that is now not expected to be used for EGIP Initial Phase, but may be used in future phases of the programme or for Transport Scotland's planned rolling electrification programme.

2.3 Previous Independent Reporter Reviews

2.3.1 The EGIP programme has been subject to a number of previous reviews by the IR:

- Part 1: Commercial Strategy - 26.08.11
- Electrification Review – 27.01.12
- Cumbernauld Electrification Project – 12.12.12

2.4 Other EGIP Projects Currently Progressing

2.4.1 There are other EGIP projects currently progressing. These are listed below but are not included in the scope of this review:

- Edinburgh Gateway Station
- Haymarket Station Capacity Improvement
- Electrification – advance route clearance works
- Cumbernauld Electrification

2.5 Acknowledgements

2.5.1 The IR would to thank the EGIP programme team for their collective assistance in compiling this report, and Geoff Cook in particular.

3 The Reconfiguration of the EGIP Programme

3.1 The Original Scope of EGIP

3.1.1 Until July 2012, Network Rail was developing EGIP on the basis of the following Transport Scotland programme objectives, articulated in their Client Requirements, to increase service levels across all routes between Edinburgh and Glasgow:

- an increase in combined route service frequency, from a baseline of 6-7 tph to 13 tph; and
- a decrease in the fastest journey time from 50 minutes to 37 minutes

The programme scope being developed to GRIP 4 Stage by Network Rail, in response to the TS Client Requirements, included infrastructure works, electrification works and station works.

3.1.2 The original scope of the **Infrastructure Works** being developed to GRIP 4 Stage was as follows:

1. Glasgow Queen Street Station High Level – Infrastructure Capacity
2. Haymarket to Inverkeithing Signalling Headways
3. Edinburgh Waverley Station Infrastructure Capacity
4. East of Edinburgh EMU Depot/Stabling
5. Croy Station Turnback
6. Greenhill Upper Junction Enhancement
7. Winchburgh Junction Enhancement
8. Winchburgh Junction to Dalmeny Junction Upgrade
9. Almond Chord
10. Stirling Area Stabling Facilities

3.1.3 The original scope of the **Electrification Works** being developed to GRIP 4 Stage was as follows:

11. Newbridge Junction to Glasgow Queen Street High Level
12. Cumbernauld to Greenhill Lower Junction (Diversionary Route 3)
13. Greenhill Upper Junction to Polmont Junction (Diversionary Route 2)
14. North Lines at Haymarket Central Junction to Winchburgh via the new Almond Chord (Diversionary Route 4)
15. Carmuir West & Carmuir East Junction/Larbert Junction/Stirling/Dunblane
16. Stirling to Alloa
17. Grangemouth Junction to Fouldubs
18. Cowlairs West & Cowlairs East Junctions to Anniesland and Westerton Junction

3.1.4 The original scope of the **Station Works** being developed to GRIP 4 Stage was as follows:

19. Haymarket Station Capacity
20. Edinburgh Gateway Station

3.2 The Amended Scope of EGIP

- 3.2.1 On 4 July 2012 the Scottish Transport Minister announced the re-phasing of the EGIP programme. The proposed Initial Phase of EGIP would not deliver all of the outputs specified for the full EGIP programme and as a consequence the scope of the NR work required to support that would be reduced.
- 3.2.2 Following this announcement Network Rail has been working with Transport Scotland, First ScotRail and Jacobs to agree the detailed requirements, outputs and scope for the Initial Phase of EGIP. This development work is now reaching completion and the draft of a new Transport Scotland Client Requirements document dated 27 March 2013 has been made available to the IR, together with a draft of NR's response.
- 3.2.3 Essentially, the original Transport Scotland proposal for an increased service frequency of service on the Glasgow Queen Street High Level to Edinburgh Waverley route with six-car set Electric Multiple Unit (EMU) trains on accelerated journey times, has been changed in the Initial Phase of implementation to maintaining the existing 4 trains per hour (tph) service frequency but with longer eight-car set EMUs on progressively improved journey times.
- 3.2.4 Transport Scotland has specified the four key outputs it requires from the Initial Phase of EGIP:
- Key Output 1 (December 2016) – Start of EMU-operated passenger services on the Edinburgh Waverley to Glasgow Queen Street High Level (E&G) route on existing 4 tph pattern, existing timings and a maximum of seven car sets
 - Key Output 2 (December 2017) – All passenger services operated by EMUs on existing 4 tph pattern, accelerated timings and a maximum of seven car sets
 - Key Output 3 (December 2018) - All passenger services operated by EMUs on existing 4 tph pattern, accelerated timings and a maximum of eight car sets
 - Key Output 4 (March 2019) - All passenger services operated by EMUs on existing 4 tph pattern, 42-minute timings and a maximum of eight car sets
- 3.2.5 Network Rail and Transport Scotland are currently agreeing the detailed requirements, with NR finalising the scope to deliver these outputs. The present indications are however as follows. The scope listed below as intact is likely to form the Initial Phase of EGIP. The scope listed below as “struck through” is likely to be delivered at a later date, either as a subsequent phase of EGIP or as part of Transport Scotland's proposed rolling programme of electrification.
- 3.2.6 **Infrastructure Works**
11. Glasgow Queen Street Station High Level – Infrastructure Capacity
 12. Haymarket to Inverkeithing Signalling Headways
 13. Edinburgh Waverley Station Infrastructure Capacity
 14. East of Edinburgh EMU Depot/Stabling
 - ~~15. Croy Station Turnback~~
 - ~~16. Greenhill Upper Junction Enhancement~~
 - ~~17. Winchburgh Junction Enhancement~~
 - ~~18. Winchburgh Junction to Dalmeny Junction Upgrade~~
 - ~~19. Almond Chord~~

~~20. Stirling Area Stabling Facilities~~

3.2.7 Electrification Works:

- 21. Newbridge Junction to Glasgow Queen Street High Level
- 22. Cumbernauld to Greenhill Lower Junction (Diversionary Route 3)
- ~~23. Greenhill Upper Junction to Polmont Junction (Diversionary Route 2)~~
- ~~24. North Lines at Haymarket Central Junction to Winchburgh via the new Almond Chord (Diversionary Route 4)~~
- 25. Carmuir West & Carmuir East Junction/Larbert Junction/Stirling/Dunblane
- ~~26. Stirling to Alloa~~
- ~~27. Grangemouth Junction to Fouldubs~~
- ~~28. Cowlares West & Cowlares East Junctions to Anniesland and Westerton Junction~~

3.2.8 Station Works:

- 29. Haymarket Station Capacity
- 30. Edinburgh Gateway Station

3.2.9 In addition, the following items have been introduced into scope for the Initial Phase of EGIP

- 31. Croy, Falkirk High, Polmont and Linlithgow Stations Platform Lengthening
- 32. Glasgow Queen Street High Level Station Concourse Works

3.3 The Transport & Works Order (Scotland) Process

3.3.1 Whilst the several workstreams of the original EGIP programme have reached GRIP 4 conclusion, the issue remains of the incomplete Transport & Works Order (Scotland) ("TAWS") process.

3.3.2 Network Rail had been progressing the statutory processes, necessary to support delivery of EGIP, on two fronts: firstly, Advance Route Clearance using NR's own Permitted Development rights, and secondly a TAWS Order application; using specialist subcontract suppliers familiar with these processes. Following the Minister's announcement NR has taken steps to bring the workstreams to a close after bringing the latest iteration of the draft Order, Maps and Sections to completion, although some work is continuing on the Environmental Statement in order to bring it to a suitable break point.

3.3.3 The powers associated with a TAWS Order are not required for the Initial Phase Infrastructure Works, but powers may or may not be required for certain bridge clearance works necessary for the Initial Phase Electrification Works dependant on how Transport Scotland wish to deal with potential planning risk and blight risk on land associated with works which are now deferred. These issues have not yet been resolved between Transport Scotland and Network Rail.

4 Determining Efficient Cost of Work Done

4.1 Introduction

4.1.1 Independent Reporter was required to assess whether costs incurred by Network Rail for the Haymarket North Lines Electrification and EGIP Grip 4 Development work were efficient in order to assist ORR in determining that aspect of NR compliance with the ORR Investment Policy Framework. This comprised determining whether:

- The works delivered the outputs (specified in the original client requirements) in the most economical way i.e. the best value option considering the requirements agreed with the client; including life cycle cost considerations
- Cost reports were appropriately detailed, substantiated and efficiently incurred
- The engineering access strategy was fit for purpose to achieve an efficient outcome
- Assumptions & interdependencies were adequately defined
- Procurement arrangements were appropriate to produce an efficient outcome
- Governance arrangements were clearly specified and appropriate
- Risk management processes were appropriate
- Acceptance requirements were adequately defined upfront and included in the assurance plan

This involved the IR reviewing costs incurred to date (excluding costs associated with works directly funded by Transport Scotland).

4.1.2 The COWD review provides a project by project review of Procurement, Change Control and Contract Management of the following EGIP projects/stages

- OP No 102090 EGIP Electrification (GRIP4)
- OP No 106982 EGIP Infrastructure (GRIP4)
- OP No 112163 Haymarket North Lines Electrification (GRIP 5 to 8)

4.1.3 The IR received a comprehensive series of documents to review ahead of review meetings with the project teams for the above schemes at Network Rail, Buchanan House, Glasgow, on Monday 10th and Tuesday 11th June 2013.

4.2 Reporter Methodology

4.2.1 The IR has focused the review on the achievements of the procurement, the efficiency within the change control and the level of challenge to costs on the scheme.

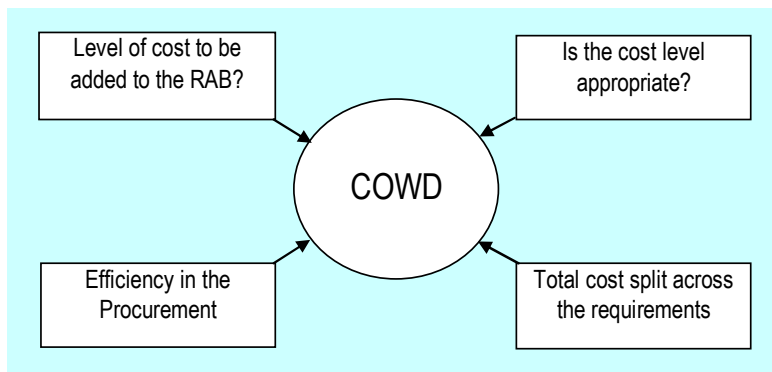
4.2.2 This report provides a breakdown of cost for each of the three projects showing internal, external direct and indirect costs, costs which are to be RAB funded, confirmation of the procurement actions and an analysis of the cost control phase

4.2.3 The IR has reviewed the methods and working practices used by the commercial and project management staff and has been provided with documentation, presentations, emails, attachments and correspondence to validate the activities using the Network Rail (NR) document control system (CCMS). This included evidence of the existence of the relevant GRIP deliverables.

- 4.2.4 The review seeks to establish that rates paid for works were appropriate, costs were challenged during the delivery of the works and the scale of cost in relation to deliverables is at acceptable levels.

4.3 Considerations in Determining Efficient Cost of Work Done

- 4.3.1 The COWD review considers the following key aspects of project cost;



5 GRIP 4 Development Costs - Allocation to EGIP Initial Phase

- 5.1.1 The IR has undertaken an assessment of GRIP 4 costs for the Infrastructure and Electrification projects against the Network Rail response to the draft Transport Scotland Client Requirements dated April 2013. The IR has separated the cost for development of the Initial Phase scope and that for other scope, re-phased to potentially be delivered in future phases of EGIP.
- 5.1.2 The methods used to calculate the apportionment of GRIP 4 cost calculate a split of the tendered design cost across the projects in Infrastructure and a split of tendered design cost against route mileages for Electrification. The resulting percentages applicable to each project have been applied to the total cost.
- 5.1.3 The AMEY and ATKINS tenders for GRIP 4 provide a total tender sum for design. The individual costs per project are also contained within the tenders. The IR has taken these individual costs per project and compared them to the total cost of design to achieve a conversion into a percentage per project. The percentage per project has then been applied to the whole of the GRIP4 cost including all PM and TAWS costs. This provided a scale cost per project.
- 5.1.4 For the Electrification projects, the IR has taken the total GRIP 4 cost including all PM and TAWS COWD and divided this by the total route kilometres to achieve a unit rate per kilometre. This unit rate has then been calculated against the exact route mileage for each Electrification project to give the appropriate scale per project.
- 5.1.5 The IR confirms that the following tables demonstrate a relevant view of the cost attribution across the schemes;

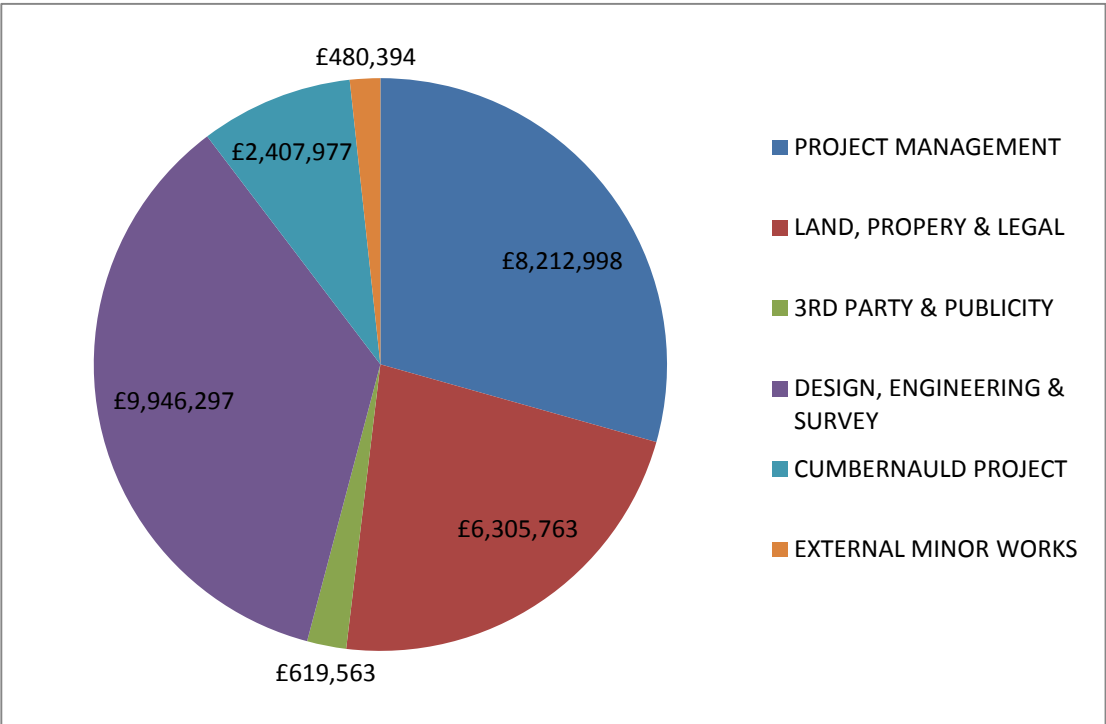
Electrification Projects	Km	Initial Phase	£
Core E G Route	135.7	Y	3,556,333
Diversionary route 3	17.9	Y	469,111
Diversionary route 2	28.1	N	736,426
Diversionary route 4	34.4	N	901,532
Carmuir West East	47.5	N	1,244,847
Stirling Alloa	10.5	N	275,177
Grangemouth to Fouldubs	6.4	N	167,727
Cowlairs West East	14.8	N	387,868
Included in initial phase			4,025,444
Not included in initial phase			3,713,576

Infrastructure Projects	Initial Phase	£
Core E G Route (Glasgow Queen St IC, Haymarket to Inverkeithing, Edinburgh Waverley)	Y	16,873,651
Croy Station Turnback	N	1,322,166
Greenhill Upper Junction	N	2,938,336
Winchburgh Junction Enhancement	N	1,830,020
Winchburgh Junction to Dalmeny Jcn	N	1,731,925
Almond Chord	N	2,288,674
Stirling Area Stabling Facilities	N	988,221
Included in initial phase		16,873,651
Not included in initial phase		11,099,342

6 Summary of cost incurred to be added to the RAB

6.1 GRIP 4 Infrastructure Works

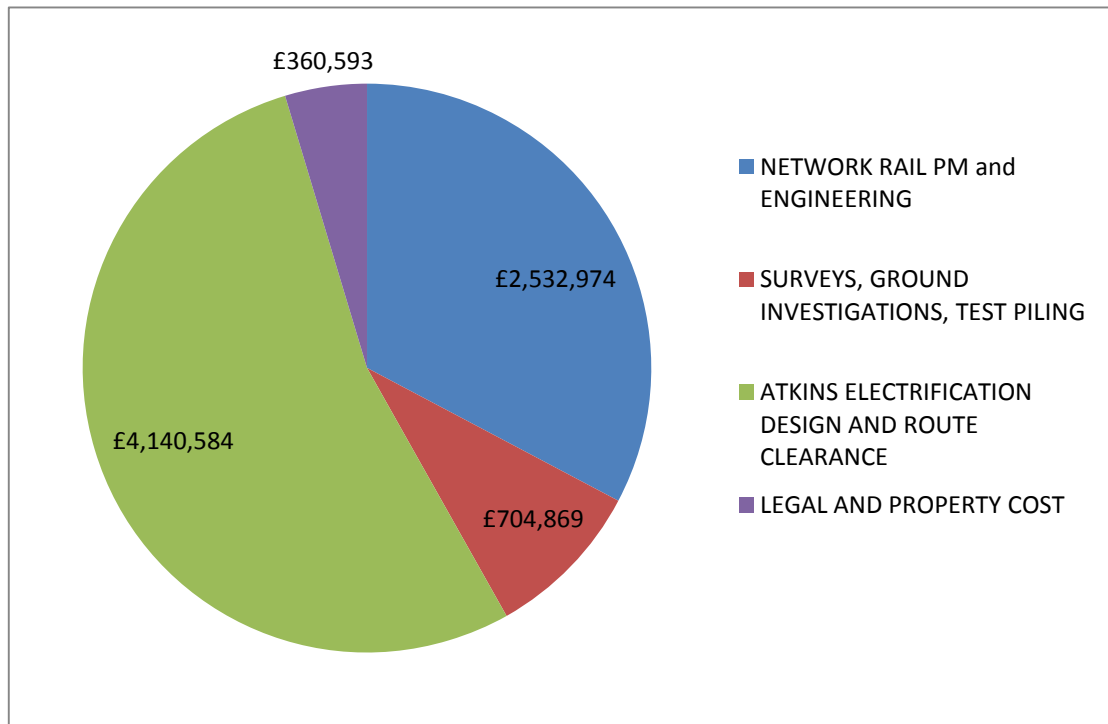
- 6.1.1 The IR confirms that the outputs specified by Transport Scotland for the GRIP 4 EGIP Infrastructure Works (OP No 106982) are eligible to be added to the RAB at an efficient cost of £27,972,992.
- 6.1.2 The graph below demonstrates the split of the total cost into six main categories.



6.2 GRIP 4 Electrification Works

6.2.1 The IR confirms that the outputs specified by Transport Scotland for the GRIP 4 EGIP Electrification Works (OP No 102090) are eligible to be added to the RAB at an efficient cost of **£7,739,020**.

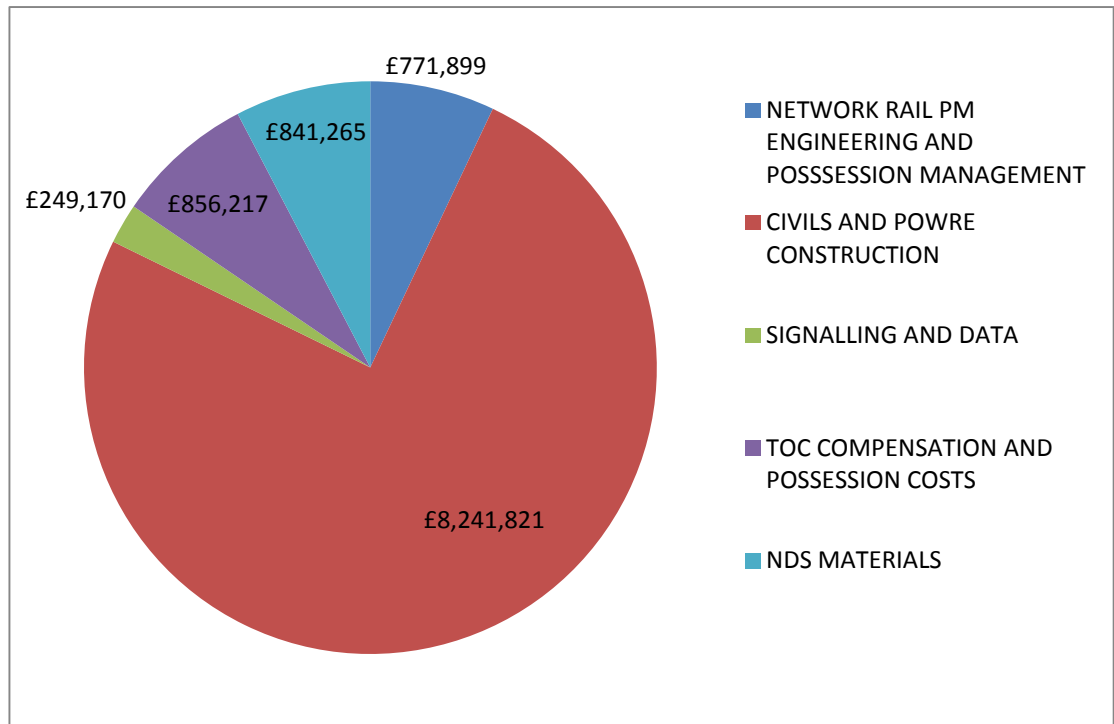
6.2.2 The graph below demonstrates the split of the total cost into four main categories.



6.3 Haymarket North Lines Electrification (GRIP 5 to 8)

6.3.1 The IR confirms that the outputs specified by Transport Scotland for the GRIP 5 to 8 Haymarket North Lines Electrification (OP No 112163) are eligible to be added to the RAB at an efficient cost of **£10,960,372**.

6.3.2 The graph below demonstrates the split of the total cost into the five main categories.



7 Disaggregation of Cost Incurred

7.1 GRIP 4 Infrastructure Works

7.1.1 The following breakdown employs the standard investment estimating template at Network Rail to divide the GRIP4 costs into recognised categories.

WBS	Estimate Breakdown	Value
	Contractor's direct costs -	
10	Infrastructure Design, Engineering & Surveys	9,946,297
20	Minor Works	480,394
30	Cumbernauld Project Works	2,407,977
	Contractor's Base Construction Cost inc OH&P: Sub-Total A	12,834,668
	Network Rail's "direct costs"	
tbc	NDS - Materials	
tbc	NDS - Fleet	
tbc	- Engineering trains	
tbc	- Tampers	
tbc	NDS - Possession / Isolation Management	156,262
	Sub - Total B	156,262
	Total Construction Cost C (A+B)	12,990,930
	Network Rail's indirect & other costs	
tbc	Network Rail Project Management	8,212,998
tbc	Compensation charges (TOC & FOC), (costs from NDS)	
tbc	Land / Property Costs & compensation / TAWS	6,149,501
tbc	Escalation	
tbc	Other (3rd Party and Publicity)	619,563
	Sub - Total D	14,982,062
	Point Estimate - Sub - Total E (C+D)	27,972,992

7.2 GRIP 4 Electrification Works

7.2.1 The following breakdown employs the standard investment estimating template at Network Rail to divide the GRIP4 costs into recognised categories.

WBS	Estimate Breakdown	Value
	Contractor's direct costs -	
10	Electrification Design and Surveys NR3	1,527,573
20	Route Clearance Design and Surveys NR3	1,148,899
30	Route Clearance Instructive and Minor Works NR4	1,464,112
40	Telcoms Surveys	169,872
50	Pilot Piling Programme	534,997
	Contractor's Base Construction Cost inc OH&P: Sub-Total A	4,845,453
	Network Rail's "direct costs"	
tbc	NDS - Materials	
tbc	NDS - Fleet	
tbc	- Engineering trains	
tbc	- Tampers	
tbc	NDS - Possession / Isolation Management	180,223
	Sub - Total B	180,223
	Total Base Construction Cost inc OH&P: Sub-Total C (A+B)	5,025,676
	Contractor's indirect costs	
tbc	Preliminaries	
tbc	Design	
tbc	Testing & Commissioning	
tbc	Training	
tbc	Spares	
tbc	Other - Possession Management	
	Sub - Total D	-
	Total Construction Cost E (C+D)	5,025,676
	Network Rail's indirect & other costs	
tbc	Network Rail Project Management	2,352,751
tbc	Compensation charges (TOC & FOC), (costs from NDS)	
tbc	TWA Charges	
tbc	Land / Property Costs & compensation	360,593
tbc	Escalation	
tbc	Other	
	Sub - Total F	2,713,344
	Point Estimate - Sub - Total G (E+F)	7,739,020

7.3 Haymarket North Lines Electrification (GRIP 5 to 8)

7.3.1 The following breakdown employs the standard investment estimating template at Network Rail to divide the GRIP5-8 costs into recognised categories.

WBS	Estimate Breakdown				Value
	Contractor's direct costs -				
10	Electrification & Civils Construction				8,241,821
20	Signalling & Data				249,170
30	Route Clearance Instructive and Minor Works NR4				
40	Telcoms Surveys				
50	Pilot Piling Programme				
	Contractor's Base Construction Cost inc OH&P: Sub-Total A				8,490,991
	Network Rail's "direct costs"				
tbc	NDS - Materials				841,265.00
tbc	NDS - Fleet				
tbc	- Engineering trains				
tbc	- Tampers				
tbc	NDS - Possession / Isolation Management				
	Sub - Total B				841,265
	Total Base Construction Cost inc OH&P: Sub-Total C (A+B)				9,332,256
	Contractor's indirect costs				
tbc	Preliminaries				
tbc	Design				
tbc	Testing & Commissioning				
tbc	Training				
tbc	Spares				
tbc	Other - Possession Management				
	Sub - Total D				-
	Total Construction Cost E (C+D)				9,332,256
	Network Rail's indirect & other costs				
tbc	Network Rail Project Management				771,899
tbc	Compensation charges (TOC & FOC), (costs from NDS)				856,217
tbc	TWA Charges				
tbc	Land / Property Costs & compensation				
tbc	Escalation				
tbc	Other				
	Sub - Total F				1,628,116
	Point Estimate - Sub - Total G (E+F)				10,960,372

8 Demonstration that services from 3rd parties were procured and delivered efficiently

8.1 GRIP 4 Infrastructure Works

- 8.1.1 The GRIP 4 design and surveys were awarded to two separate design engineers due to the scale of the project and the multiple disciplinary works involved. The requirement across multiple route section areas involved Permanent Way, Signalling, Electrification and Plant, Structures, Geotechnical and Telecoms.
- 8.1.2 The action was to establish a full infrastructure design to a standard which would provide a value for money solution and benefit the installation and subsequent maintenance of the route. The procurement requirement was competitively tendered to seven suppliers on a fixed price lump sum.
- 8.1.3 A value management workshop was conducted to develop the right approach for the procurement of professional services including the design. The tendered works were divided into 12 route sections and grouped into 3 main packages to separate suppliers in order to spread the delivery risk.
- 8.1.4 The IR has evidenced the procurement records relating to this action. The suite of scope documents used in the procurement action is appropriate for the services required and is sufficiently detailed to achieve a valid cost from the supply chain. The IR can confirm that required governance has been maintained.

8.2 GRIP 4 Electrification Works

- 8.2.1 The procurement activity employed a competitive tender process which involved four bidders. An award was made based on the most economically advantageous tender.
- 8.2.2 The original Contract Requirements Technical (CRT) reference design dated 20th October 2009 provided clear Scope, Survey & Mapping Requirements and Engineering Deliverables for the following;
 - (a) Overhead Line Structure Layout diagrams
 - (b) Major Power Feeding diagrams and
 - (c) Engineering Deliverables Schedules linked to the GRIP stage gate
- 8.2.3 The requirements of this procurement were for the consultant to deliver 47 separate non-intrusive design and survey products, 15 intrusive surveys and contribute to a further 15 Network Rail design deliverables.
- 8.2.4 The contract was awarded to Atkins Limited on a lump sum basis with the recommendation to employ Atkins referring to a 17% saving on the Network Rail Professional Services (PSERV) rates. The choice of one designer for all electrification design and survey work was also taken to ensure consistency, standardisation and to avoid repetition.
- 8.2.5 Evidence of this procurement has been provided to the IR. The suite of scope documents used in the procurement action is appropriate for the services required and is sufficiently detailed to achieve a valid cost from the supply chain. The IR can confirm that governance has been maintained.

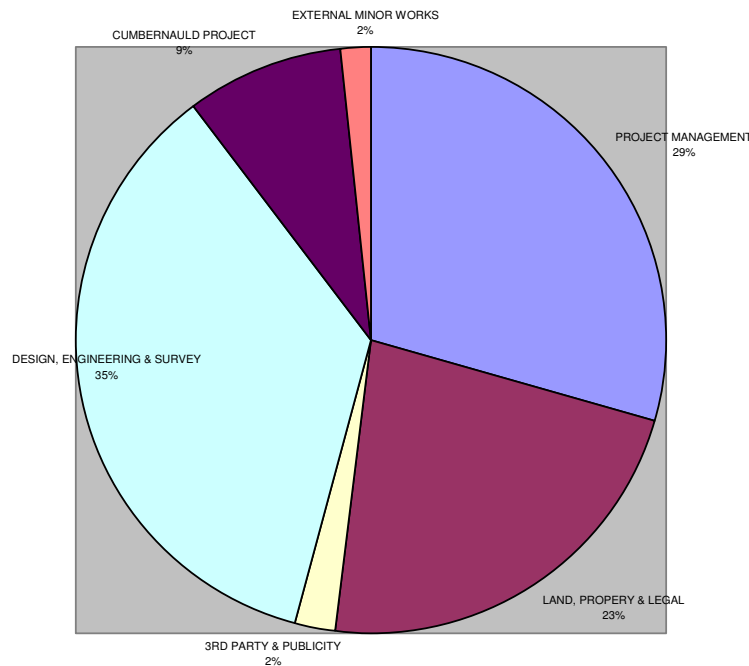
8.3 Haymarket North Lines Electrification (GRIP 5 to 8)

- 8.3.1** The IR has been provided and has reviewed the original Gateway 3 Strategic Sourcing procurement paper for GRIP 5 to 8.
- 8.3.2** It shows that the procurement was part of an approved contracting strategy using a competitive tender process with four bidders under an NR9 fixed price lump sum contract. An award was made based on the most economically advantageous tender with a 50/50 split between the Commercial and Technical submissions providing the scoring. The paper confirms that the procurement achieved a saving against the pre-tender estimate levels.
- 8.3.3** The recommendation was for Carillion Civil Engineering to be awarded a contract for the works. The Carillion tender price ranged from 17% to 37% of the other three bidders price levels.
- 8.3.4** With the Carillion bid representing a much lower price level, a full validation of the bid was undertaken to confirm integrity. This confirmed a competent and well considered bid approach and a level of understanding of the works equal to others. Some additional items suggested for alternative approaches such as access planning and drilling rig options enhanced their bid.
- 8.3.5** The IR considers the procurement action to be sufficiently robust to have achieved a value adding result and has reviewed the procurement documentation relating to this exercise.

9 Demonstration that costs were at an appropriate level for work completed

9.1 GRIP 4 Infrastructure Works

9.1.1 The IR notes that 87% of the COWD on the EGIP Infrastructure project in GRIP 4 is derived from three main items of Project Management, Design and Land, Legal and Property. The balance of the cost comes from a contribution of works done for the Cumbernauld Project, and minor works and contracts as represented in the following diagram.



9.1.2 Internal Costs

9.1.3 As with the other schemes the rates paid and positions filled on the project are in line with template organisations approved by Network Rail programme managers. The control of staff numbers and the approval and acceptance of costs in this area have been witnessed by the IR and is confirmed as appropriate for the size of the scheme. The IR has found no evidence of staff being utilised inefficiently or procured outside of required governance and arrangements.

9.1.4 External Works and Change Control

9.1.5 The IR has focused on the main external design contracts to form a view of value and efficiency in the Infrastructure. These contracts are the highest single value items procured and contain the 'top five' contract changes in terms of cost.

9.1.6 The key question is why the quantity of design work has increased so significantly.

9.1.7 The largest account and variance relates to the AMEY design works. However, this account is also representative of the changes throughout other design providers.

The combined AMEY accounts for NR3 Design and NR4 Minor Works have moved from a procured level of £2.5m to a current contract value of £5.7m.

9.1.8 The IR can conclude the following;

- 48% of changes (£1.38m) are additional scope including signalling and structures
- 23% of changes (£662k) relate to TAWS requirements
- 14% of changes (£403k) relate to additional project design staff and preliminaries
- 15% of changes (£432k) relate to the addition of the Eastfield and Millerhill Depots

9.1.9 The scale of the design works is evidenced in the split between Signalling and the 12 asset locations, having been divided over 4 large design works packages. The IR can confirm the scale of cost is actually aligned to the design outputs.

9.1.10 As with the Haymarket and the Electrification scheme there is a change process undertaken to the required standard and the IR can confirm that appropriate prices and contract documentation are being prepared on the project.

9.1.11 **Conclusion**

9.1.12 The IR has found no evidence to suggest that the increases represent inefficiency or are derived from dispute or scope creep. However, the scale of additional requirements procured under change control highlight an insufficient knowledge of the scheme requirements at the time of the originally procured works.

9.2 GRIP 4 Electrification Works

9.2.1 The original scope requirements for Electrification included the works necessary in the period prior to the establishment of the Alliance procurement arrangements. The remainder of the Electrification was planned to be procured later under the Alliance arrangement, which approach had been selected to align with the wider NR aspiration of a joint management structure with collective responsibility for performance, and an equitable sharing of risk, responsibility and opportunity.

9.2.2 As works progressed and the Alliance arrangement remained in development, additional structures were brought out of future procurement and added to the existing scheme. The impact of this was to increase the scope of the scheme, with staff and suppliers having additional work to deliver.

- Tranche 1 of the scheme involved 15 structures (bridges) and 6 track lowers.
- Additional tranches 2 & 3 added 14 additional structures.

9.2.3 The IR review of cost has focused on the following Oracle Projects task lines from GRIP4 as these packages represent the largest external and internal cost elements of the scheme in GRIP4.

4.1.1 Internal Costs - NR Project Management

4.2.1 External Costs - Electrification - Surveys

4.4.1 External Costs - Route Clearance – Surveys

4.5.1 External Costs - Route Clearance - Design

9.2.4 Internal Costs

9.2.5 The IR has reviewed the project team size which includes external and internal staff positions. There is an organisational structure appropriate to the development of a major scheme during GRIP4. The rates for external staff are competitive market tested and were procured through the Network Rail professional services framework (PSERV).

9.2.6 The management of internal cost is undertaken using Oracle Projects (OP) which imposes operational constraints and approvals on line managers and is designed to ensure that charges received are a valid representation of the work undertaken.

9.2.7 The IR can confirm that this process has taken place routinely. The project management and commercial staff review the charges received into OP by permanent staff and approve the hours or where question permits, transfer out to the correct budget areas or projects.

9.2.8 The IR has been shown the Oracle Time and Labour (OTL) downloads and communication by email of these assessment taking place in a routine way each period. External project staff or consultants are required to compile timesheets and these are signed off locally by NR staff online management before being accepted into COWD and paid.

9.2.9 Other internal departments booking to the project include Network Rail operational property and legal services that operate under a regulated framework of external suppliers. The IR considers the template project team size and cost and to be appropriate and can confirm it to be the right level for the requirement.

9.2.10 External Works and Change Control

9.2.11 As reported, the procurement action was undertaken within governance to achieve a value based outcome. However, between contract award and completion of GRIP 4, the works on these task lines incurred the highest level of change between original contract and close out value as represented in the following table;

Item	Cost £m
Atkins Design and Surveys Total value of the contracts at time of award	£2.87m
The total value of these contracts at completion	£4.14m
Level of Change	£1.27m (up 44%)

9.2.12 The change represents the additional 14 structures added to the scheme post contract award and requirements in relation to Ground Investigations, Area

Layout Plans, Contractor Constructability Reviews, Track Lowering Reviews, Route Alignments and OLE Structures.

- 9.2.13 The changes have been calculated using the rates in the contract and represented market rate levels accordingly.
- 9.2.14 The IR has reviewed the methods used under change control and can confirm that the Change Request Form (CRF) and Change Assessment Form (CAF) process has been utilised correctly.
- 9.2.15 Example CRF and CAF documentation has been provided with change registers and associated communications. The challenge to submitted fee levels is evident within the registers and associated communications.
- 9.2.16 The table below represents a range of outcomes through the change process including negotiating downward the fee submissions from the supplier, increase to fees where the supplier has overlooked requirements in order to fix the correct scope and items cancelled as an efficiency and removed from the account.

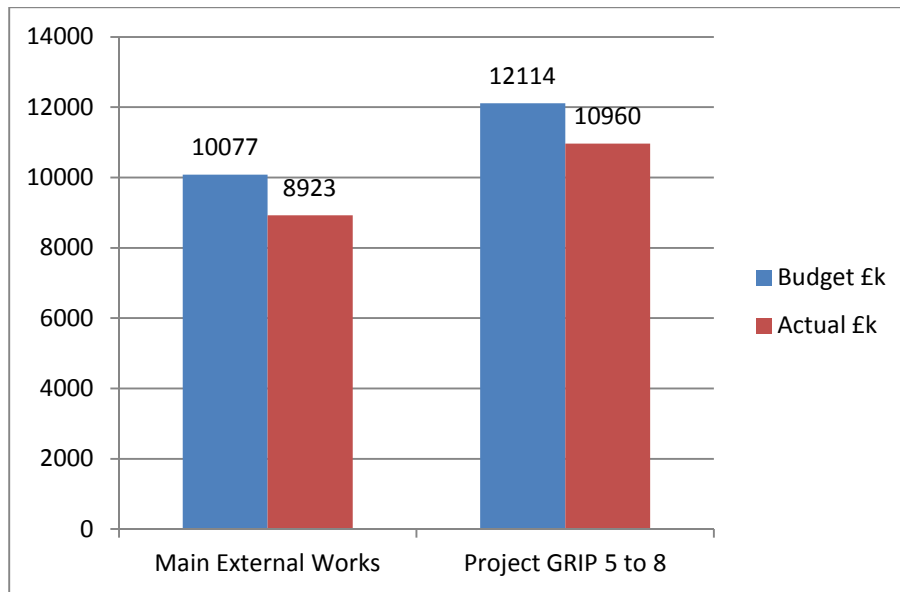
Additional Topo		102090/002	£156,945.38	£156,945.38
Carrying out Site Surveys Associated with the CR 002 Working in place of Prohibited Red Zone Working		102090/010	£87,846.00	£40,132.00
Track Lowering GI		102090/026	£76,030.69	£60,221.24
Provision of Constructability Report		102090/011	£77,323.00	£81,401.29
Additional Track Design for Special Reduced Clearance		102090/028	£53,689.83	£53,689.83
Removal from NR 3 Track lowering Additional GI (Probing)		102090/030	-£60,221.24	-£60,221.24

9.2.17 Conclusion

- 9.2.18 The conclusion of the IR is that the works have been delivered to a satisfactory level of efficiency, including the management of additional scope. Market tested rates have been achieved through competitive procurement and efficient change control. Staff rates are appropriate for internal and external staff and the amount of design and survey delivered is in line with the requirements and budget.

9.3 Haymarket North Lines Electrification (GRIP 5 to 8)

- 9.3.1 The GRIP 5 to 8 phase of the project was delivered under the anticipated budget due to the procurement efficiency against pre-tender estimate budget levels despite variations to the works.
- 9.3.2 The main external works contract delivered at £8.92m against a budget provision of £10.77m.
- 9.3.3 If the project reserve and contingency is stripped out of the overall budget, the project delivered at £10.96m against budget of £12.11m.



- 9.3.4** The scope of works was detailed in an approved CRT which covered the requirement sufficiently for endorsement by all senior disciplines. This document was used in the pre tender estimate to ensure tenders were returned like for like.
- 9.3.5 Internal Costs**
- 9.3.6** Internal costs, which show a lower than typical level for the amount of construction cost delivered, have been managed well and employed the governance required under Oracle projects.
- 9.3.7** As with the Electrification project, the controls on individual's time and labour bookings, the appropriation of team size and the external consultant charges can all be confirmed by the IR as satisfactory. Rates used for staff are within bands prescribed and external consultants were used only where required and at rates published under existing framework arrangements.
- 9.3.8** Documentation and internal communications have been witnessed through presentation by the project commercial staff by the IR for this project.
- 9.3.9** The main works contract delivered by Carillion represents the delivery of the scope detailed in the CRT plus additional requirements identified during the works. This contract covers 97.1% of the external contracted works in the GRIP 5 to 8 Phase and is examined under Change Control below.
- 9.3.10 External Works and Change Control**
- 9.3.11** The main works cost has increased by or £2.80m to £8.92m as a result of additional works.
- 9.3.12** In order to clarify the reasons for the change, the IR has undertaken a review with the project team of the change register and in highlight the 'top 5' cost changes in the following table;

Item	Scale of Change	Cost of Change	Reason for Change
Tunnel Structure	Major	£601,894	Scope change following structural weakness in tunnel uncovered – additional Track works, Civil works and Signalling works.
Tunnel Structure	Major	£550,443	Civil works to restructure a tunnel wall due to 'bulge'
Overhead Line Works	Major	£317,114	Additional power supply structure requested by NR during Xmas blockade works
Overhead Line Works	Moderate	£161,563	Return conductor from Waverley to Haymarket – additional requirement from NR
Overhead Line Works	Moderate	£104,000	Change to the tendered method for building OLE bases due to rock formation conditions

- 9.3.13** Almost all changes in the register relate to additional scope often required by the client whether due to unforeseen conditions or where it can be demonstrated that additional award to the existing contractor is cheaper than bringing new suppliers into the project without prior knowledge of the works.
- 9.3.14** The rates used in the changes are either contract rates from the existing contract or current at the time market rates and the IR has evidenced this by sub-contractor quotes and invoices. As scope changes and not protracted debates over costs, the IR can confirm a collaborative approach existed between NR and the contractor to get the additional works incorporated into the programme efficiently.
- 9.3.15** Example CRF and CAF documentation has been provided with change registers and associated communications. In each event the submission of the CRF and CAF is sufficiently detailed and includes back up to all cost elements that are being provided by the contractor in response to the additional requirements.
- 9.3.16** The IR has copies of negotiated settlements showing commercial staff at NR engaging with the contractor to bring about a reduction in the cost price for changes wherever this is appropriate or achievable.
- 9.3.17** **Conclusion**
- 9.3.18** The IR considers the cost of the design contracts to be a satisfactory level for the scale of design, surveys, investigations and management required and Network Rail internal project team cost are considered low.

10 General Conclusions on Cost of Work Done

- 10.1.1 The IR concludes that the programme has delivered a considerable amount of work using efficient market rates but that changes to requirements and methods has created additional cost.
- 10.1.2 The IR has found that the methods of procurement used on the projects were appropriate for the requirements and included contemporary contract scope documents and valid evaluation criteria. The procurement actions were undertaken in line with the approved contracting strategies and have secured competitive market rates and satisfactory tender prices.
- 10.1.3 However, following contract award on all projects, the scope of the works and the costs increased significantly. The IR has found little evidence of additional cost being derived from dispute or poor project controls and note a variety of events including unforeseen conditions, additional quantities of assets, changes in delivery methods and the moving of scope between phases and projects as part of the developing reconfiguration of EGIP.
- 10.1.4 The IR considers that a saving may have been possible on the projects had a fixed scope, based on a full knowledge of the asset and site conditions, been procured in the first instance; and if decisions about the configuration of EGIP and quantity of works in the phases had remained fixed. The IR considers this saving to be between 5% and 10%.
- 10.1.5 The change control and contract management were undertaken to a good standard with clear records demonstrating appropriate challenge of contractor or supplier prices and an auditable record of the commercial activities have been upheld.

David Simmons
Independent Reporter
Halcrow Group Limited
August 2013.



Appendix A

ORR Investment Policy Framework Criteria

A.1.1.1 The criteria to achieve ‘in-principle’ approval is set out in the ORR’s ‘Investment Framework consolidated policy & guidelines’ dated October 2010:

the expenditure must be incurred as a result of a reasonable requirement of Government (or another funder directly supported by Government), and Government must therefore be content to support the financial commitment arising from the associated RAB addition

the expenditure must add to the economic value of the rail network

Network Rail can afford to finance the planned expenditure, and has the capability to deliver; and

the expenditure must be incurred efficiently

A.1.1.2 In assessing whether a scheme is efficient, ORR consider whether:

the proposed risk allocation is appropriate

the procurement and governance arrangements, including management and cost control arrangements, are clearly specified and provide appropriate incentives on all parties.

design and implementation services should usually be procured through a transparent, competitive process to ensure market-tested prices are obtained;

outputs and acceptance requirements are clearly specified, so that it is clear when the scheme is complete and under what terms Network Rail will be paid; and

cost estimates put forward by Network Rail or the scheme promoter represents efficient prices.

A.1.1.3 In assessing cost estimates ORR looks for market-tested values for each element of cost included in the estimate. Where appropriate, ORR also takes into account the potential for cost efficiency improvements during the project life.

A.1.1.4 The detail of cost estimates provided should be commensurate with the size and complexity of the scheme. In general the estimates provided should be disaggregated by:

development costs (showing any sunk costs);

estimated construction costs, including contractors’ preliminary costs, showing unit costs and quantities assumed, any insurance costs due to the construction phase and any Schedule 4 or Schedule 8 costs expected to be incurred;

management costs incurred by Network Rail;

the allowance for identified, quantified risk usually estimated through a Quantified Cost Risk Analysis (QCRA) or similar process;

the contingency or allowance assumed for unidentified risks; and

other delivery costs, for example land purchase or legal fees



Appendix B

Evidence Received

Ref	Document Name
1	Revised Scope Map
2	TS Client Requirements Oct 2010
3	TS Client Requirements Aug 2011
4	TS Client Requirements March 2013
5	EGIP Historic Timeline
6	Delivery Plan & Authority Summary
7	Haymarket Tunnel ORR Cost Report
8	Haymarket Tunnel Delivery Plan
9	GRIP4 Electrification Delivery Plan
10	GRIP4 Infrastructure Works Delivery Plan Nov 2010
11	GRIP4 Infrastructure Works Delivery Plan May 2011
12	GRIP4 Infrastructure Works Delivery Plan Nov 2011
13	GRIP4 Infrastructure Works Delivery Plan Jan 2013
14	Haymarket Tunnel WIP Abstract
15	GRIP4 Electrification WIP Abstract
16	GRIP4 Infrastructure WIP Abstract
17	Haymarket Tunnel Procurement
18	GRIP4 Electrification Procurement
19	GRIP4 Infrastructure Procurement
20	IP Update Nov 2012
21	IP Update March 2013
22	Draft NR Response to TS Client Requirements
23	TAWS Close Out Report

Ref	Document Name
24	SG4 Review Checklist
25	QCRA Report
26	Newton GRIP 5 to 8 CRT
27	Implementation Strategy S&T
28	Infrastructure Procurement VM2 Report
29	Infrastructure Gateway 1b Paper
30	Infrastructure Resource Schedule
31	Electrification PDD
32	Electrification Gateway 3 Paper



Appendix C

Glossary of Terms

Term	Term Meaning / Definition
ARM	Active Risk Manager - Proprietary Risk Management Software
COWD	Cost of Work Done
D&B	Design & Build
EGIP	Edinburgh-Glasgow Improvement Programme
E&P	Electrical & Power
HLOS	High Level Output Specification
MAFA	Multi Asset Framework Agreement
NR	Network Rail
OLE	Overhead Line Equipment
QCRA	Quantified Cost Risk Analysis
QSRA	Quantified Schedule Risk Analysis
RAB	Regulatory Asset Base
SoFA	Statement of Funds Available
STA	Single Tender Action
TS	Transport Scotland
WLC	Whole Life Cost

