

In relation to the
Infraco Contract
between
tie Limited
and
Bilfinger Berger (UK) Limited
and Siemens plc

Report
regarding
Forensic Planning Exercise
in relation to
The Edinburgh Tram Project

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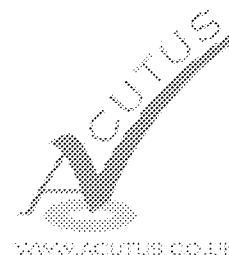
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Section 1 Executive Summary

1.1 Introduction

1.1.1 **tie** engaged Acutus to undertake forensic planning work on the Edinburgh Tram Project during the period April to December 2009. That work was primarily focused upon the delays to the Infraco contract. Prior to and during this period the Infraco contractor (the Infraco) made several applications for extensions of time (EoT). **tie** sought from Acutus assistance, advice and independent analysis in respect of some of those applications. A number of reports, papers, presentations and assessment materials were prepared and presented by Acutus, some of which included assistance and input from **tie**'s own planning staff, other consultants and lawyers. Acutus also participated in meetings and mediation sessions involving **tie**; its consultants and advisors; and representatives of the Infraco. This report summarises the work undertaken.

1.2 Structure and contents of this report

1.2.1 This executive summary provides an overview of Acutus' findings, opinions and recommendations in relation to the extension of time claims submitted by the Infraco. It summarises the extension of time analysis undertaken by Acutus (assisted by **tie**) and updates the measure of that analysis based on the latest information on actual progress and MUDFA delays communicated to Acutus by **tie**.

1.2.2 The subsequent sections of this report summarise each of the individual forensic planning exercises undertaken during the relevant period and the implementation of Acutus' recommendations to collate essential contemporaneous records to protect **tie**'s contractual position and secure its proper position in relation to time and associated costs.

1.2.3 The appendices to this report (in Section 8) contain the contemporaneous reports, productions and other documented materials produced as part of each of these forensic planning exercises.

1.3 Contract provisions in relation to time, mitigation and acceleration

1.3.1 Acutus was asked to review the sections of the Infraco contract that deal with matters of time, delay, mitigation, acceleration and their related costs and damages. The following obligations are considered to be of most pertinence to the claims for extension of time:



- a) Work in mutual co-operation and apply expertise (clause 6.3.1);
- b) Approach all Permitted Variations on a collaborative and Open Book basis (clause 6.3.1);
- c) Take reasonable steps to mitigate any foreseeable losses and liabilities (clause 6.3.5);
- d) Take all reasonable steps to manage, minimise and mitigate all costs (clauses 6.3.6 & 7.5.5);
- e) Progress the Infraco Works with due expedition and in a timely and efficient manner without delay, to achieve timeous delivery and completion (clause 60.1); and,
- f) The Infraco shall take all reasonable steps to mitigate the effects of any delay to the progress of the Infraco Works (clause 60.9).

1.3.2 The contract provisions for extension of time to the four Sectional Completion Dates prescribed in the contract are to be found in the following three clauses:

- a) Relief Events (clause 64);
- b) Compensation Events (clause 65);
- c) **tie** Change (clause 80).

1.3.3 Each of these clauses prescribes certain specific processes and mechanisms for notification, estimation, assessment and award for extensions of time. Further details of the pertinent aspects of these clauses are set out in the set of presentation slides enclosed at Appendix A.

1.4 Performance and behaviour of the Infraco

1.4.1 **tie** raised a number of concerns regarding the performance and behaviour of the Infraco in relation to the aforementioned contract provisions and asked Acutus to provide opinion on whether such criticisms were justified.

1.4.2 Acutus examined extracts from the project records (correspondence, reports, minutes of meetings, progress reports and the like) and the programme and extension of time submissions made by the Infraco. It observed that:



- a) Generally, the Infraco has complied with its obligations in relation to notification of delays it claims are attributable to **tie** (clauses 65.2.1 and Schedule Part 4, clause 3.5, albeit not all of these were served in time). However, it has universally failed in its obligation to notify **tie** of delays for which it carries liability (clause 65.10).
- b) These contract clauses, referred to at 1.3.2 require the Infraco to timeously follow-up notices of delay (or change) with substantiating details, estimates of cost and impact on the programme. For the most part, the Infraco has failed in this obligation. Prescribed times for providing details have been exceeded, in many instances by several months. The claims for extension of time contain no information on cost. They ignore any culpability for delay on the part of the Infraco. Requirements to mitigate delay and put forward proposals for acceleration have not been provided.
- c) The Infraco has repeatedly ignored **tie**'s specific instructions to commence readily available works in several parts of the site. It would appear that many elements of the Infraco Works have been delayed for reasons that are only known by the Infraco.
- d) The Infraco has refused to commence work on certain sections of the route where utilities diversions are incomplete. This has been despite the fact that the incomplete utilities in particular sections do not present a physical or contractual obstacle to the Infraco progressing work elements in accordance with the Programme. The Infraco presents justification for this action on the basis of clause 18 citing its entitlement to "exclusive licence". Acutus does not agree with the Infraco's apparent interpretation of this clause. (i.e. that the Infraco should not commence work in a particular section until each and every utility diversion within its limits is complete.) It would appear that many elements of the Infraco Works have been unnecessarily delayed by the Infraco's actions and inactions in this respect.

1.4.3 For these reasons it is apparent that the Infraco is not fulfilling its obligations under the terms of the contract. Such actions and inactions are frustrating the proper operation of the contractual mechanisms for the notification, assessment and award of extension of time. The Infraco's failure to notify, record and include in its claims delays for which it



carries liability are distorting the delay analyses it is presenting. It would appear that such actions and inactions give rise to overstated claims for entitlement to extension of time.

1.5 Review of Infraco EoT Submissions

1.5.1 During the period covered by this report the Infraco has presented three formal claims for extension of time. These are as follows:

- a) “EoT Entitlement Programme” – submitted 15 May 2009;
- b) “Programme (Revision 2) – 31 March 2009 – Sub-Revision 0”– submitted 20 May 2009; and,
- c) “MUDFA programme Revision 08 – Delay and Disruption Resulting from Incomplete Utility Works” - submitted 8 August 2009.

1.5.2 Commentaries, assessments and reports on each of these are enclosed in the subsequent sections of this report and its associated appendices.

1.5.3 Each of these claims is based on an impacted as-planned programme analysis. This is a recognised form of delay analysis. It has been much criticised in established case law, primarily for the following reasons:

- a) It does not take account of changed intentions or construction methods;
- b) It takes no account of actual progress;
- c) It takes no account of any re-sequencing;
- d) It ignores any duty to mitigate delay;
- e) It does not establish the actual effect of the delaying events;
- f) It gives only theoretical results which often conflict with known facts;
- g) It can be easily manipulated, particularly by focusing only on the delays attributable to one of the parties, such that concurrency and dominance always accrues to the benefit of that party.



1.5.4 It is Acutus' opinion that each and all of these criticisms can be legitimately levelled at the Infraco's EoT submissions. Coupled with the performance and behaviour of the Infraco, as summarised at 1.4 above, it is our opinion that these delay analyses are unreliable, do not accord with the contractual requirements for the assessment of delay and produce overstated results that appear to hold **tie** liable for more delay than it legitimately should be. A significant factor in Acutus' criticism of these analyses is the Infraco's complete disregard of delays and lack of progress that appears to be entirely attributable to its own actions, inactions, and/or risks it carries under the terms of the contract.

1.6 Analysis of Infraco entitlement to EoT

1.6.1 Acutus (assisted by **tie**) undertook a detailed examination of each of the delay analyses submitted by the Infraco.

1.6.2 Each of these involved:

- a) checking and, where appropriate, adjusting the factual information contained within the submitted programmes. (Some of the actual progress dates used by the Infraco were different from **tie**'s contemporaneous records.)
- b) examining the network logic contained in the impacted programmes to check that it was correct and justifiable, and to determine if it was physical logic (i.e. true interdependency) or preferential logic (e.g. logic added by the Infraco for its own preferences in relation sequencing and limiting demands on certain resources).
- c) tracing, through the programme network, the critical and near critical paths that were driving the Sectional Completion Dates to identify why the Infraco's analyses were projecting the magnitude of delay being claimed.

1.6.3 In each and every case it became apparent that the critical path was being driven by a number of preferential logic links and/or resource constraints that the Infraco had built into its original programme. There appears to be little justification for strict adherence to most of these. Much of the preferential logic was found to be superseded and required removal or revision. Preferential logic links included in the original programme to effect resource smoothing on track laying and overhead line work were driving a large proportion of the projected delay despite the fact that they were no longer serving their original



intended purpose. It was recognised that the Infraco had made some minor adjustments to the logic network (claiming such action to fulfil its obligation to mitigate delay) but these were relatively limited in nature and only partly reduced the projection of delay.

- 1.6.4 Having completed these examinations, Acutus then used the delay analyses presented by the Infraco as the starting points to establish its own analysis of entitlement to EoT. This took the form of reverse (back) analyses of the Infraco's impacted programmes. Following adjustments for errors in baseline factual data, the critical paths of all activity strings that were projecting delay beyond the current sectional completion dates were examined. They were each traced back from the link to the Sectional Completion Date milestones. Where criticality was found to be driven by what was considered to be unnecessary / superseded preferential logic, errors in the network, unjustified constraints, and the like, appropriate adjustment was made. This was an iterative process as each adjustment had the potential to, and often did, change the route of the critical path. Each adjustment reduced the measure of the EoT being "incurred" or "forecast". This exercise resulted in revised (and much reduced) projections of EoT requirement. (Further details can be found in following sections of this report and the documents contained in its appendices.)
- 1.6.5 Following this initial analysis and adjustment of the Infraco submissions, further consideration was given to the activity strings that continued to project completion beyond the current sectional completion dates. For each of these, consideration was given to what cost effective mitigation measures could be reasonably and readily applied. For the most part, the mitigation considered applicable was either increasing resources to overcome Infraco imposed limits and / or opportunities to reduce some activity durations where the allowance made by the Infraco appeared to be overly generous (i.e. there appears to be float hidden in the Programme through overly generous duration allowances and unnecessary start to finish interdependency links). Where considered practical and cost effective, such mitigation adjustments were made and recorded, further reducing the projected delay on some of the activity strings that were over-running the current sectional completion dates.
- 1.6.6 The conclusion of the exercises produced the overall assessments summarised in the table below.



It should be noted that for the “EoT Entitlement” and “Revision 2” submissions, analysis was carried out on only the four sections identified by the Infraco as critical plus a fifth section requested by **tie** as it had a bearing on the Section B Completion Date. Of these five sections, section 1C (City Centre on-street works) was considered to be the source of the dominant delay to overall completion. The “MUDFA Rev. 8” analysis was carried out across all sections of the project and it identified section 1B as the source of dominant delay. That delay was greater than the dominant delay identified in the analysis of the five sections of the “Programme (Revision 2)” submission.

Infraco EoT Claim	Delay to Completion of Infraco Works (without mitigation)	Delay to Completion of Infraco Works (with mitigation)
Entitlement Claim (to 31 March 2009)	14 weeks	n/a
Programme Revision 2 (to 31 March 2009)	14 weeks	n/a
MUDFA Rev. 8 (to 31 March 2009)	21 weeks	3 weeks

1.6.7 More detailed commentary on each of these is included in the subsequent sections of this report and in its appendices.

1.6.8 Since the date of these analyses there have been further delays impacting on the programme and in particular increasing delay arising from later completion of the MUDFA works. This information has recently been communicated to Acutus by **tie** (Ref. email dated 21 December 2009. Copy enclosed at Appendix B). Time has not permitted the carrying out of a detailed analysis of this most recent MUDFA delays information. However, **tie** has asked Acutus to provide its opinion on the impact these revised completion dates may have on the overall estimate of extension of time entitlement.

1.6.9 The MUDFA Rev. 8 analysis referred to at paragraph 4.3 of this report identified that Section 1B (Leith Walk to MacDonald Road) was critical and driving completion. Updating



the MUDFA completion dates for this section increases that assessment by a further 31 weeks.

1.6.10 Increased MUDFA delays on other sections of the route also adversely impact on their projected completion dates, but by initial inspection, it would appear that Section 1B continues to be the dominant cause of delay that will drive overall completion. On that basis our opinion on the current estimate of entitlement to extension of time is:

- a) 52 weeks without mitigation; and,
- b) 34 weeks with mitigation.

1.6.11 It should be noted that these assessments are based on the information made available and may be subject to revision when further information on actual delay, cause and effect is known. The assessment of mitigation is considered to be a reasonable estimate based on practical, cost effective¹ measures that should be readily deliverable. For Section 1B the mitigation is based on reducing individual activity durations through reduction of overly generous durations, increased productivity and/or increased working hours. Consideration was given to revised traffic management arrangements to permit further mitigation through revised sequencing of the works. However, **tie** advised that this proposal had been rejected by the local businesses in the area and therefore it could not be delivered.

1.7 Acutus Opinion and Advice

1.7.1 In our opinion the Infraco submissions (claims) for and in support of EoT have not be made in accordance with the strict terms of the contract. It is therefore correct that they should be rejected for the following reasons:

- a) They have been submitted under reference to contract clauses that do not make provision for the assessment and award of extension of time.
- b) They do not properly consider the impact of delays in relation to the events and activities that are the Infraco's responsibility under the terms of the contract.
- c) They do not include sufficient and appropriate supporting information as is required by the contract.

¹ Cost effective does not necessarily mean cost neutral. i.e. there may be additional cost incurred by Infraco which would be reimbursable.



- d) They do not properly and clearly link cause with effect.
- e) They do not appear to consider or apply readily available and applicable cost effective mitigation measures.

1.7.2 Notwithstanding the criticism made at 1.7.1 above, it is clear that there have been a considerable number of delays for which **tie** carries liability under the terms of the contract and that these should be assessed in relation to consideration of extension of time awards to which the Infraco is fairly entitled. Whilst the Infraco's submissions to date are considered to lack clarity, proper analysis and due contractual process, it is Acutus' opinion that a significant entitlement to extension of time does exist. From the analyses and assessments undertaken it would appear that the dominant cause of delay is likely to be completion of the MUDFA works, particularly in section 1B. Notwithstanding that there may be some concurrency issues with other delays that may be attributable to the Infraco, it may prove difficult to successfully use these to reduce the direct impact of the dominant MUDFA delays. In the identified critical areas some of the MUDFA delays have physically prevented commencement of the works on the dates specified in the contract. On that basis, the estimates of EoT entitlement stated at 1.6.9 above are, in Acutus' opinion, a fair and reasonable estimate of the Infraco's entitlement as at the end of 2009.

1.7.3 Acutus considers it important to note that while the issues of concurrency and Infraco delay mentioned above may be subsumed by many of the MUDFA delays, they should not be ignored in the commercial assessment of events and **tie** Change. Extension of time grants relief to the imposition of liquidated damages. It does not automatically give rise to an equivalent amount of time related costs. Where additional time related costs would have been incurred anyway because of delays for which the Infraco carries liability, then such costs should, in our opinion, be excluded from any commercial assessment. It is Acutus' opinion that there could be considerable sums associated with this principle and if **tie** is to protect its commercial position it should compile and maintain comprehensive contemporaneous records of actual progress and reasons for delay. Analysis of these should be used to inform **tie**'s commercial team in its work to properly and fairly value adjustments to sums due to the Infraco.



- 1.7.4 The importance of good quality records cannot be over stated. As recommended in Acutus' initial reports these need to be carefully prepared and compiled in a manner that can be readily interrogated and analysed. It is acknowledged that steps have been taken to implement this advice. A delay attribution database has been set-up to bring together all relevant data in a readily searchable form. Daily conference calls involving all **tie** Project Managers, chaired by **tie**'s Planning Manager, seek to identify and record all relevant issues as soon as they occur. A high degree of diligence is required across the entire **tie** project management team to establish a robust and reliable database of evidence. If this can be achieved it will prove to be an important source of information to help ensure that **tie** secures its correct contractual entitlement through whatever means may prove to be necessary (negotiation, mediation, adjudication, arbitration and/or litigation). It is acknowledged that this action has increased the quality and quantity of **tie**'s records but there is still room for improvement (Ref. paragraph 7.1.4).
- 1.7.5 The ongoing delay attribution work described in Section 7 is considered to be of particular importance in informing **tie** staff in their discussions and negotiations relating to time and money. It is recommended that the compilation of this base data and its collation in the delay attribution charts becomes a routine process for the remainder of the project period.
- 1.7.6 In protecting **tie**'s ability to secure its contractual entitlement it is recommended that the contract provisions in relation to the serving of **tie** notices and calls for revised programmes etc. be diligently applied. If the Infraco is to be properly held to account for delays and associated costs for which it carries liability, **tie** should seek to have appropriate and sufficiently particularised contemporaneous correspondence in place. With particular reference to delay and extension of time, the requirements and provisions of clauses 6, 60, 64, 65 and 80 requiring or entitling **tie** to serve notice of Infraco delay and/or requests for revised programmes / proposals should not be overlooked. Legitimate and specific criticisms of the Infraco should be raised and formally recorded at the time they occur to deny the Infraco future defences of lack of adequate notification and/or lack of awareness.



Section 2 Introduction

2.1 Synopsis

2.1.1 On 8 May 2008 **tie** Limited (“**tie**”) contracted with Bilfinger Berger UK Limited and Siemens PLC (together “the Infraco”) to carry out the Infraco Works on the Edinburgh Tram Project.

2.1.2 From the outset, delivery of the Infraco Works has been subjected to delay. As a consequence of these delays the Infraco is projecting significant over-runs on the four Sectional Completion Dates contained in the contract and is claiming entitlement to extension of time. **tie** acknowledges that there have been a number of delays for which it is liable but also that there are other delays that are the contractual responsibility of the Infraco. The Infraco has presenting its claims for entitlement based on its current projected completion dates. These projections appear to make no attempt to allocate responsibility for delay nor do they implement mitigation measures. As such **tie** considered it lacked sufficient information on which to fulfil its contractual obligations in relation to assessing such claims and making fair and reasonable adjustments to the Sectional Completion Dates.

2.2 Appointment

2.3 On 8th April 2009 Acutus was appointed by **tie** to support and challenge the delay assessment work already undertaken by its own planning team and to provide independent forensic planning analyses to inform and advise **tie** in its administration of the Infraco contract. A copy of Acutus’ initial brief is enclosed at Appendix C.

2.4 This brief has been developed and extended during the period of Acutus’ engagement to cover:

- a) the analysis of subsequent programme submissions and claims by the Infraco;
- b) the preparation of a position paper in relation to a dispute being pursued through the contract’s dispute resolution procedure (DRP);
- c) technical and contractual support and advice in relation to disputes being progressed through the DRP, in particular preparations for two separate mediations including participation in one of them;



- d) advice in relation to the collection and collation of information to support and protect **tie**'s contractual position and entitlements;
- e) strategic advice in relation to dispute resolution, mitigation of delay and re-programming of the Infraco Works.

2.5 Report

2.5.1 In accordance with the developed brief and **tie**'s subsequent directions, this report:

- a) summarises the work undertaken by Acutus during 2009;
- b) provides Acutus' view on the Infraco's contractual obligations in relation to programme, delay mitigation and the extent to which it has fulfilled these;
- c) discusses the relative strengths and weaknesses of the arguments being presented by both parties in respect for the other's liability for delay; and,
- d) provides Acutus' estimate of **tie**'s potential liability for delay and the impact that has on the Sectional Completion Dates.

2.5.2 The appendices to this report contain copies of the key papers, reports, presentation materials and analysis documentation prepared and presented by Acutus during the period of its appointment.

2.5.3 The following members of Acutus staff have undertaken and/or contributed to this appointment and the contents of this report:

- i) Iain McAlister, Associate Director;
- ii) Robert Burt, Director;
- iii) John Hughes, Consultant.

2.5.4 They were assisted, advised and informed by the following members of **tie**'s staff:

- i) Tom Hickman, Planning Manager;
- ii) Susan Clark, Deputy Project Director;
- iii) Dennis Murray, Commercial Director;



- iv) Steven Bell, Project Director;
- v) Fiona Dunn, Commercial Manager Strategic;
- vi) Damian Sharp, Design Manager;
- vii) Frank McFadden, Infraco Director;
- viii) Andrew Scott, Project Manager;
- ix) Tom Cotter, Project Manager;
- x) Malcolm Butchert , Project Manager;
- xi) Michael Jesuarul, Project Planner;
- xii) Clare Norman, Project Planner; and,
- xiii) Kirsty Wilson, Assistant Project Manager.

2.5.5 Acutus personnel also consulted with and presented to the following **tie** consultants and advisers in relation to contractual interpretation and the inter-relationship of delays with other commercial matters and events:

- i) Keith Kilburn, Solicitor, DLA Piper;
- ii) Stuart Jordan, Partner, DLA Piper;
- iii) Andrew Fitchie, Partner, DLA Piper;
- iv) John Nicolson, Consultant; and,
- v) Brandon Nolan, Partner, McGrigors.

2.6 Opinions Expressed in Relation to Law / Legal Matters

2.6.1 Opinions expressed in this report that touch upon the interpretation of the contract, or of the law, are given in Acutus' staff capacity as construction contracts and construction planning experts with formal education in construction law. Those views are given only where it is necessary for them to explain the basis upon which they have come to their opinions. Acutus staff are not qualified to provide legal advice.



2.7 Disclosure of Interests

2.7.1 Acutus is unaware of any conflict of interest that would prejudice it in relation to providing independent and objective opinion in relation to this contract.

2.8 Curriculum Vitae

2.8.1 Curriculum vitae detailing the experience, qualifications and specialist fields of the Acutus directors involved in the preparation of this report are included at Appendix D of this report.



Section 3 Initial Forensic Planning Exercise

3.1 Scope of Exercise

3.1.1 In its brief dated 8th April 2009 (ref. Appendix C), **tie** set out its requirements for the initial forensic planning exercise. It required Acutus to:

- a) review the contract in relation to programme and revision to the Sectional Completion Dates;
- b) examine the programmes, progress reports and forecasts to completion;
- c) review the history of programme analysis and relevant contractual correspondence;
- d) analyse delay, disruption and prolongation, including responsibility for addressing same;
- e) challenge **tie**'s programme and commercial approach to-date;
- f) provide a view on opportunities for improving confidence in **tie**'s ability to negotiate a successful conclusion to programme delay and mitigation costs; and,
- g) identify / recommend opportunities for recovery or acceleration.

3.2 Reports Produced

3.2.1 In accordance with **tie**'s directions, Acutus produced routine progress reports on the work it was undertaking and concluded these with an Initial Summary report. The documents produced are as follows and copies have been included at Appendix E.

- a) Acutus Progress Report No. 1 – 24th April 2009
- b) Acutus Progress Report No. 2 – 1st May 2009
- c) Acutus Progress Report No. 3 – 8th May 2009
- d) Acutus Progress Report No. 4 incorporating Initial Summary – 27th May 2009

3.3 Conclusions

3.3.1 The conclusions contained in these reports are summarised as follows.



- a) There would appear to be a consensus between the parties that the Infraco Works have been subjected to a great many delays that adversely impact on the Programme. Under the terms and conditions of the contract, it is clear that **tie** carries liability for many of these delays. The contract requires **tie** to assess the impact of these delays on the Programme and, if appropriate, revise the Sectional Completion Dates.
- b) The programmes that the Infraco has presented to substantiate the quantum of its requests for extension of time (i.e. revision of the Sectional Completion Dates) appear to take no cognisance of any delays for which the Infraco carries liability.
- c) These programmes appear to contain virtually no effective measures to mitigate delay, despite this being a contractual obligation on the Infraco.
- d) The method of delay analysis used in the preparation of these programmes is “as-planned impacted”, a method generally discredited in established case law, particularly where used in complex projects subjected to many delays.
- e) The Infraco’s method of seeking extension of time does not accord with the contract and is frustrating **tie**’s ability to properly and correctly operate the change mechanisms contained therein.
- f) The actions and inactions of the Infraco in relation to the operation of the change mechanism in the contract appear to be unnecessarily delaying the delivery of the Infraco Works; missing opportunities to take effective mitigation measures; and, denying **tie** the opportunity to make informed judgements and issue instructions that would be in the best interests of the Project.

3.4 Recommendations

3.4.1 Acutus’ recommendations to **tie** included;

- a) challenging the Infraco’s approach to claiming entitlement to extension of time and, in this respect, direct it to the specific requirements of the contract.
- b) putting on record **tie**’s specific criticisms of the Infraco’s contribution to general delay through its own lack of progress and/or its disputed interpretation of



particular contractual provisions and mechanisms. Such criticism to make clear that **tie** considers the Infraco to be liable for the consequences of such general delay and that it requires to be taken into account in any assessment of awards of extension of time.

- c) the preparation of evidence files to capture detailed contemporaneous records of all matters affecting progress and delay, including information on where opportunities were not being taken to progress readily available works and mitigate delay.
- d) analysis of delay based on the information and knowledge currently available to **tie** and the operation of the contract's change mechanisms in accordance with the advice of its legal and technical advisors.
- e) formally notifying the Infraco each time **tie** identifies an opportunity to mitigate or avoid delay which is not pursued.

3.4.2 **tie** has accepted these recommendations and taken measures to implement them as it considered appropriate and practical.

3.4.3 Acutus was directed to support and assist **tie** in the implementation of some of these recommendations, as noted in subsequent sections of this report.



Section 4 Infraco “MUDFA Rev. 8 EoT Claim”

4.1 Background

4.1.1 The diversion of utilities to facilitate the construction of the tram infrastructure was commissioned by **tie** via. the MUDFA contract. This contract pre-dates the Infraco contract by approximately one year. The Infraco contract programme is predicated on a set of 10 completion dates for the MUDFA Works. The documentation incorporated into the Infraco contract (Pricing Assumptions and Programming Assumptions) states that variations from these dates give rise to a Notified Departure. By definition this is Mandatory **tie** Change which commences the contractual mechanism for assessing same. Part of that assessment includes consideration of the requirement to adjust the Sectional Completion Dates.

4.1.2 It is a matter of record that the MUDFA Works were subjected to numerous and various delays. From commencement of the Infraco contract, the Infraco served numerous notices of **tie** Change in relation to what it consider to be MUDFA delays that were adversely impacting on the Infraco works programme.

4.1.3 The contractual mechanism for dealing with such changes requires the Infraco to submit estimates detailing the effect on the sums due and any requirement to revise any of the Sectional Completion Dates. The Infraco did not submit such estimates for each notified **tie** Change relating to late completion of MUDFA Works. It did not comply with the timescales for operation of the various stages in the change assessment mechanism and thereby denied **tie** the opportunity and information to deal with these matters contemporaneously.

4.2 MUDFA Rev. 8 Estimate

4.2.1 The Infraco’s first formal submission of an Estimate for **tie** Change associated with MUDFA delays was made on 6th August 2009, some 14 months into the Infraco contract period and a similar duration from the dates of the Infraco’s first notices of MUDFA delays. This estimate addressed only the issue of time, seeking revision of the four Sectional Completion Dates (A, B, C & D) by 187, 185, 251 and 257 days respectively.



4.3 Assessment of MUDFA Rev. 8 Estimate

4.3.1 **tie** directed Acutus, assisted by **tie**'s Planning Manager Tom Hickman, to examine this claim and undertake an assessment of it both in terms of contractual entitlement and the measure of extension of time sought. A report on this work was produced on 31st August 2009. It was left in final draft form on the understanding that it would be discussed further with senior **tie** management and their advisers, particularly in relation to some of contractual interpretations on which it was based. Subsequently, **tie** requested an “alternative” version of that report based on Acutus’ suggestion that, in respect of the Gogar Depot, the degree of mitigation considered achievable could be greater than that incorporated into the original version of the report, albeit that such mitigation could be considered beyond that which **tie** should reasonably account for in its assessment of the claim. The “alternative” version was produced on 8th September 2009. It was also left in final draft form for the same reason as the original version. Copies of both reports are included at Appendix F.

4.3.2 The conclusions from these reports are summarised below. The only difference between the two versions is in respect of the assessment of extension of time relating to Sectional Completion Dates A & B.

- a) The Estimate submitted by the Infraco does not fulfil the requirements of the contract and, in particular, does not comply with the specific provisions of Clause 80.
 - i) It does not provide information in relation to any increase or decrease in any sums due to be paid to the Infraco under the contract.
 - ii) It does not appear to propose the implementation of the **tie** Change in the most cost effective manner.
 - iii) It contains no meaningful and effective delay mitigation measures.
 - iv) It contains none of the evidence required by clause 80.7.
- b) The Estimate over-states the impact of the MUDFA delays on the Sectional Completion Dates and thereby seeks extensions of time much greater than is justified by the factual background and the evidence presented.



4.3.3 The initial assessment of extension of time, undertaken by Acutus with assistance from **tie**, is summarised in the following table. It should be noted that this assessment is based on the Infraco’s estimate submission which used the forecast MUDFA completion dates as presented by **tie** in April 2009.



“Original” Report Assessment Summary

Sectional Completion Date	Client Programme (Rev.01)	MUDFA 8 Estimate / Claim	Unmitigated assessment	Mitigated assessment	Comment
A	1 June 2010	13 Dec. 2010	153 days delay 1 Nov. 2010	63 days delay 3 Aug 2010	Mitigation of 60 days saving on building works plus 30 days overlap of equipment installation
B	1 July 2010	10 Jan. 2011	153 days delay	63 days delay 2 Sept. 2010	Section B date is 28 days after the Section A date, assuming sufficient track is laid away from the Depot.
C	10 Mar. 2011	22 Nov. 2011	151 days delay 3 Aug. 2011	19 days delay 29 Mar. 2011	Infraco claim appears to over-estimate MUDFA completion date by 23 days. Leith Walk is the primary driver of delay. Opportunities identified to reduce overall duration by approximately 109 days.
D	6 Sept. 2011	20 May 2012	151 days delay	19 days delay 29 Sept. 2011	Section D date is 6 months after the Section C date.



4.3.4 The “alternative” report assessment of extension of time, undertaken by Acutus with assistance from **tie**, is summarised in the following table and is again based on the MUDFA completion dates as reported in April 2009.

“Alternative” Report Assessment Summary

Sectional Completion Date	Current Programme (Rev.01)	MUDFA 5 Estimate / Claim	No mitigated assessment	tie mitigated assessment	Comment
A	1 June 2010	13 Dec. 2010	153 days delay 1 Nov. 2010	0 days delay 1 Jun 2010	Mitigation of 21 weeks saving on building works plus 14 weeks on equipment installation
B	1 July 2010	10 Jan. 2011	153 days delay	0 days delay 1 Jul. 2010	Section B date is 28 days after the Section A date, assuming sufficient track is laid away from the Depot.
C	10 Mar. 2011	22 Nov. 2011	151 days delay 3 Aug.2011	19 days delay 29 Mar. 2011	Infraco claim appears to over-estimate MUDFA completion date by 23 days. Leith Walk is the primary driver of delay. Opportunities identified to reduce overall duration by approximately 109 days.
D	6 Sept. 2011	20 May 2012	151 days delay	19 days delay 29 Sept. 2011	Section D date is 6 months after the Section C date.

4.3.5 It should be noted that there have been further delays to completion on the MUDFA contract. These are explained at paragraph 1.6.8 and an initial estimate of their impact on the assessment above is included at paragraph 1.6.10.

4.4 Referral of MUDFA Rev. 8 Dispute

4.4.1 Clause 80.9 requires the parties to discuss and agree the issues set out in the Estimate. Two days after the first meeting between the parties to discuss the MUDFA Rev. 8 Estimate



the Infraco served notice of a dispute and referred the matter to the dispute resolution procedure (DRP) contained within the contract.

- 4.4.2 **tie** directed Acutus to prepare its position paper for the DRP, in consultation with its senior managers and legal advisors. A copy of that paper is included at Appendix G.
- 4.4.3 Following the exchange of position papers the Infraco exercised its option to stall the DRP to attempt a mediated settlement. **tie** directed Acutus to prepare various materials for use in that mediation. These were discussed with, and challenged by, **tie** senior management and its legal advisors. A copy of these materials is included at Appendix H.
- 4.4.4 At a meeting between the parties' executive officers, several days prior to the start of the mediation, agreement was reached to stall the mediation and the pursuit of the MUDFA Rev. 8 Estimate through the DRP pending the outcome of further discussions. Acutus was requested to put on-hold any further work on this matter until directed otherwise.
- 4.4.5 At the date of this report no further work on the MUDFA Rev. 8 estimate and dispute had been undertaken by Acutus.



Section 5 Infraco “EoT Entitlement Programme”

5.1 Background

- 5.1.1 On 15 May 2009 the Infraco submitted a programme for acceptance by **tie** under reference to clause 60.3. It was entitled “EoT Entitlement Programme”.
- 5.1.2 On 20 May 2009 the Infraco submitted another programme for acceptance. It was entitled “Programme (Revision 2) – 31 March 2009 – Sub-Revision 0”. It was based on the same data as the “EoT Entitlement Programme” submission but included what the Infraco claimed to be mitigation measures. These were, primarily, the removal of some superseded preferential logic links that were giving rise to an overstated projected completion date.

5.2 Assessment of Claim

- 5.2.1 Acutus’ assessment of the “EoT Entitlement Programme” extended only to the examination of the adjustments to the network logic that brought the “EoT Entitlement” submission in line with the “Revision 2” programme. Thereafter, Acutus’ analysis focused solely on the “Programme Revision 2” submission. That analysis is summarised in Section 6 of this report.
- 5.2.2 Acutus did not produce a report on this “EoT Entitlement Programme” submission because its findings and conclusions would be the same as those produced for the “Programme (Revision 2)” submission.

5.3 Recommendations

- 5.3.1 Acutus recommendation to **tie** was that it formally reject this programme submission with reference to clause 60.4.2, explaining that it:
- a) did not meet the requirements of the contract with regard to completion on time;
 - b) ignored the Infraco’s obligations to mitigate delay;
 - c) did not consider the effect of delays for which the Infraco carried liability and/or was partly or wholly culpable; and,



- d) had not been made in accordance with the contractual mechanisms for seeking assessment of extension of time. In particular it did not include the essential factual information in relation to cause, effect, mitigation and cost specified as requirement by these contractual mechanisms.



Section 6 Infraco “Programme (Revision 2)” (EoT2)

6.1 Background

6.1.1 As noted at paragraph 5.1.2, on 20th May 2009 the Infraco submitted a programme entitled “Programme (Revision 2) – 31 March 2009 – Sub-Revision 0” for acceptance by **tie**. It was presented under reference to Clause 60.3 of the contract and was accompanied by a seven page narrative. That narrative explains that this programme is based on the “EoT Entitlement Programme – 31 March 2009” referred to at 5.1.1 above but incorporated mitigation measures.

6.1.2 Clause 60 of the contract provides for **tie** to accept or reject programmes submitted by the Infraco. It does not, however, contain the contractual mechanisms for assessing and awarding extensions of time and adjusting the Sectional Completion Dates. However, the Infraco did make it clear that it considered these submissions to be in support of its claims for entitlement to extension of time. **tie** considered that the “Programme (Revision 2)” did form a basis from which it could consider its liability for granting extension of time and directed Acutus to undertake an analysis of it. The parties agreed to refer to this submission and assessment as “EoT 2”.

6.2 Initial Recommendations

6.2.1 Acutus’ recommendation to **tie** was that it formally reject this programme submission with reference to clause 60.4, explaining that it:

- a) did not meet the requirements of the contract with regard to completion on time;
- b) ignored the Infraco’s obligations to mitigate delay;
- c) did not considers the effect of delays for which the Infraco carried liability and/or was partly or wholly culpable; and,
- d) had not been made in accordance with the contractual mechanisms for seeking assessment of extension of time. In particular it did not include the essential factual information in relation to cause, effect, mitigation and cost specified as requirement by these contractual mechanisms.

6.2.2 Acutus also recommended that **tie** should put on record, at this time:



- a) its concerns regarding the lack of progress on elements of the works for no apparent reason;
- b) delays to elements of the works for reasons that are the Infraco’s responsibility under the terms of the contract;
- c) that where elements of the works were being deliberately delayed by the Infraco on points of contractual interpretation, **tie** intended to hold the Infraco liable for the consequences arising therefrom. In particular, recognising that a significant part of the Infraco’s EoT claim is driven by resource constraints, it would appear that delaying new works that could readily be progressed increases the likelihood of greater resource driven delay in the later stages of the project period.
- d) it’s belief that the Infraco was not fulfilling its contractual obligations to progress the works with due expedition, to mitigate delay, to minimise cost and to co-operate with **tie** to achieve the project vision. Should that prove to be true, **tie** considered that the Infraco would be held liable for any costs unnecessarily incurred and would be subjected to claims for liquidated and ascertained damages for readily avoidable late completion of the Infraco Works.

6.3 Mediation on “EoT2”

- 6.3.1 During week commencing 29 June 2009, **tie** and the Infraco participated in a series of mediation sessions to discuss and, hopefully, resolve several evolving disputes on the contract. This included the Infraco’s claims for extension of time. Acutus was directed to advise and support **tie** in this mediation.
- 6.3.2 The mediation sessions did not prove fruitful. Both parties held disparate views on contractual interpretation, due processes and what could, realistically, be achieved given the current situation of numerous, complex and inter-related delays requiring presentation and assessment in accordance with the contract. It became clear that the Infraco considered the contractual mechanisms to have become unworkable and therefore it was not prepared to play its part in them. Acutus and **tie** were of the opinion that the Infraco was deliberately frustrating the contractual process to achieve that end.



6.3.3 The mediation sessions in relation to EoT 2 concluded with agreement that the parties needed to undertake further work and hold meetings so that they could each better understand the other’s position.

6.4 Inter-party discussions on “EoT2”

6.4.1 Following the initial mediation, **tie** held several meetings with the Infraco to discuss the “EoT2” submission. As part of these it was agreed that **tie** would deliver a presentation to the Infraco to explain its criticisms of the Infraco submission and how **tie** was going about its own assessment of same. **tie** asked Acutus to deliver this presentation and participate in the discussions that it provoked. This was done on 28 July 2009. **tie** was represented by Susan Clark, Frank McFadden and Iain McAlister (Acutus). Enclosed at Appendix I is a copy of the presentation slides used for that presentation. Discussion focused, in particular, on the principles of concurrency, Infraco culpability, dominant cause and mitigation opportunities surrounding the assessment of the delays to the Gogar Depot.

6.5 EoT challenge sessions

6.5.1 **tie** asked Acutus to lead two in-house challenge sessions on the EoT assessments. These included examination of the pertinent contract clauses. A copy of the presentation slides used in the session held on 26 August 2009 is enclosed at Appendix A. This session covered both “EoT 2” and the “MUDFA Rev. 8” submissions.

6.5.2 Further discussion sessions involving **tie**’s legal advisors took place on 21 August 2009, 21 September 2009 and 19 October 2009.

6.6 Assessment of “Programme (Revision 2)”

6.6.1 **tie** directed Acutus, assisted by **tie**’s Planning Manager Tom Hickman, to examine this submission and provide it with an initial assessment of it. Given the volume of data involved and the timeframe in which **tie** sought this initial assessment Acutus was directed to focus its examination on five particular sections of the programme. Four of these sections had been identified by the Infraco as the critical ones that were driving the principal completion dates. The fifth was added by **tie** as it singularly determined the Section B Completion Date.

6.6.2 A report on this work was produced on 7th September 2009. It was left in final draft form on the understanding that it would be discussed further with senior **tie** management and



their advisers, particularly in relation to some of contractual interpretations on which it was based. It was also felt that the assessment may require review and possible adjustment when decisions were obtained on certain disputes that were, at that time, being progressed through the DRP. A copy of that report is included at Appendix J.

6.6.3 The conclusions from this report are summarised as follows.

- a) Based on the premise that the Infraco has overarching obligations to take all reasonable measures to mitigate delay and implement change in the most cost effective manner, there would appear to be;
 - i) no requirement to revise the Section A & B completion dates;
 - ii) a requirement to extend the Section C & D completion dates by 14 weeks;assessed on the basis of the information presented in the programme submissions by the Infraco.
- b) It is apparent that there may be other sections of the programme, not assessed in detail as part of this exercise, where critical delay may exceed the 14 weeks noted at a)ii) above.



Section 7 Delay Attribution Exercise

7.1 Introduction

- 7.1.1 It is a matter of record that the Infraco works have been subjected to an extremely large number of individual delays. The causes of these delays are many and varied. Under the terms of the contract **tie** carries liability for some of them. Others would appear to be the responsibility of the Infraco. There are also delays where liability is either unclear or is a matter of dispute between the Parties.
- 7.1.2 The Infraco's submissions in relation to analysis of delay and its claims for entitlement to extension of time do not particularise the individual delays nor do they link cause with effect. As such they do not represent a properly prepared and appropriately detailed delay analysis. They ignore any culpability of the part of Infraco and seek to hold **tie** liable for all critical delay to date.
- 7.1.3 Acutus' recommendations from the initial planning exercise, referred to at Section 3 above, included that **tie** systematically compile contemporaneous records of actual progress, causes of delay and opportunities to advance available work. One of the objectives of this exercise is to provide **tie** with sufficiently detailed records from which reliable delay attribution and delay analysis exercises can be undertaken. The outputs from such exercises will provide **tie** with the information required to properly assess Infraco culpability in respect of delay and its entitlement to extension of time.
- 7.1.4 In the summer of 2009 **tie** instigated processes and systems to record and collate the data required to undertake this work. It is understood they continue to be used. Feedback from **tie's** management advises that the project record, as a whole, has shown a marked improvement over that previously being compiled. Much of this information is provided by, or under the direction of, **tie's** Project Managers. The quality and quantity of the records varies depending on the individual involved. This has been drawn to the attention of the **tie** senior management who have taken an action to address this issue.

7.2 Attribution of Delay

- 7.2.1 Throughout 2009 the Infraco pursued various claims for extension of time through formal submissions, discussions/negotiations and the DRP. In all of these, no recognition was



given, or account taken, of delays caused by and attributable to the Infraco itself. To ignore such culpability is contrary to the terms of the contract and serves as an attempt to hold **tie** liable for all delay.

- 7.2.2 In September 2009 **tie** directed Acutus to assist its project team in the execution of a delay attribution exercise, the objective of which was to provide **tie** senior management with reliable information for use in the proper and fair assessment of the Infraco's extension of time and commercial claims. Such information was also considered important to inform **tie's** ongoing negotiations with the Infraco regarding potential solutions to the slow rate of progress currently being experienced on the project as a whole and the Infraco contract in particular.
- 7.2.3 Acutus proposed and agreed with **tie** the format of this exercise. It involved collating all relevant information and evidence from **tie's** various systems and records and grouping it in an orderly manner set against a time-line. A Gantt chart schedule was created for each principal element of the Infraco Works. Each time-line was "topped" with the current "As-planned" program for that element and "tailed" with the current "As-built / forecast". Colour coding was used to attribute liability of each individual entry within the listing of the delays and contributory factors. Enclosed at Appendix K is an example of one of these time-line Gantt charts.
- 7.2.4 There are currently 80 of these charts to cover the scope of the Infraco infrastructure works. Acutus prepared the first draft of each of these and then passed them to **tie** for the addition of more detailed information, allocation of liability, and sense checking. (This is an ongoing process requiring a sustained and concerted effort from **tie's** Project Managers, planning staff, design managers and their supporting staff.)
- 7.2.5 When each schedule has been fully populated and sense checked, it will be possible to examine the full data set for that particular element and; filter out the minutia; isolate delaying factors that have been subsumed by other matters; and identify where dominant cause and criticality actually lie. The output of this examination and assessment can then be presented as a summary chart and bulleted list of the pertinent facts. (Enclosed at Appendix L is an example of such a summary chart.)



7.2.6 At the end of 2009 Acutus had produced all 80 chart templates and passed these to **tie**. **tie** staff, assisted by Acutus, had developed these further and populated them with available data. Enclosed at Appendix M is **tie**'s schedule of progress on the preparation of these Concurrency Charts, as at 23 December 2009.

7.2.7 It is **tie**'s intention that it takes over responsibility for this work from January 2010.

7.3 Assessment of entitlement to extension of time and additional monies

7.3.1 The information arising from this delay attribution exercise provides reliable, evidence based data from which a structured delay analysis can be undertaken to determine the Infraco's entitlement to extension of time in accordance with the terms of the contract.

7.3.2 Importantly, it will also provide **tie**'s commercial managers with reliable information on culpability for delay, within individual elements or sections of the project, to inform its assessment of, and negotiations on, Infraco claims for additional monies.



Section 8 Appendices

- A. Presentation slide compiled to inform and facilitate discussion on assessment of extension of time on both MUDFA 8 and EoT2.
- B. Email dated 21 December 2009 from Tom Hickman to Iain McAlister – Subject: FW: Utility Diversions programme.
- C. Initial brief – 8th April 2009
- D. C.V.'s of Acutus Staff
 - i) Iain McAlister
 - ii) Robert Burt
- E. Initial Forensic Planning Exercise Reports
 - i) Acutus Progress Report No. 1 – 24th April 2009
 - ii) Acutus Progress Report No. 2 – 1st May 2009
 - iii) Acutus Progress Report No. 3 – 8th May 2009
 - iv) Acutus Progress Report No. 4 incorporating Initial Summary – 27th May 2009
- F. MUDFA Rev. 8
 - i) Acutus Report - Initial assessment of EoT requirement – 31 August 2009
 - ii) Acutus Report - Alternative assessment of EoT requirement – 8 September 2009
- G. Position Paper INTC No. 429 – Delays arising from MUDFA Programme Revision 8
- H. Presentation notes and slides compiled for use in preparation for the MUDFA 8 mediation.
- I. Assessment of EoT2 – Slides from presentation to Infraco – 28 July 2009.



- J. Proposed “Programme (Revision 2)” EoT2
 - i) Acutus Report - Initial assessment of EoT 2 requirement – 7 September 2009
- K. Delay Attribution - Sample of a detailed delay attribution timeline chart – (Section 2A – Haymarket Viaduct)
- L. Delay Attribution - Sample of a delay attribution summary chart and narrative – (Section 2A – Haymarket Viaduct)
- M. Concurrency Chart schedule (as at 23 December 2009).



Appendix A

Presentation slide compiled to inform and facilitate discussion on assessment of extension of time on both MUDFA 8 and EoT2.



Appendix B

Email dated 21 December 2009 from Tom Hickman to Iain McAlister – Subject: FW:
Utility Diversions programme.



Appendix C

Initial brief – 8th April 2009



Appendix D

C.V.'s of Acutus Staff

- i) Iain McAlister
- ii) Robert Burt



Appendix E

Initial Forensic Planning Exercise Reports

- i) Acutus Progress Report No. 1 – 24th April 2009
- ii) Acutus Progress Report No. 2 – 1st May 2009
- iii) Acutus Progress Report No. 3 – 8th May 2009
- iv) Acutus Progress Report No. 4 incorporating Initial Summary – 27th May 2009



Appendix F

MUDFA Rev. 8

- i) Acutus Report - Initial assessment of EoT requirement – 31 August 2009
- ii) Acutus Report - Alternative assessment of EoT requirement – 8 September 2009



Appendix G

Position Paper INTC No. 429 – Delays arising from MUDFA Programme Revision 8



Appendix H

Presentation notes and slides compiled for use in preparation for the MUDFA 8 mediation.



Appendix I

Assessment of EoT2 – Slides from presentation to Infraco – 28 July 2009.



Appendix J

Proposed “Programme (Revision 2)” EoT2

- i) Acutus Report - Initial assessment of EoT 2 requirement – 7 September 2009



Appendix K

Delay Attribution – Sample of a detailed delay attribution time-line chart – (Section 2A – Haymarket Viaduct)



Appendix L

Delay Attribution – Sample of a delay attribution summary chart and narrative
(Section 2A – Haymarket Viaduct)



Appendix M

Concurrency Chart schedule (as at 23 December 2009)