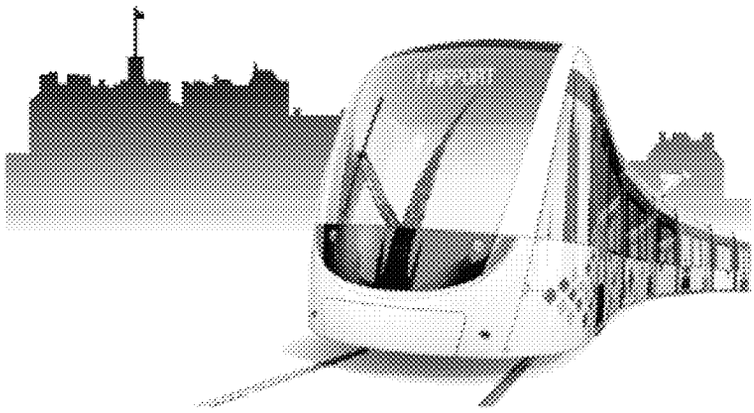
TRAM PROJECT ASSURANCE REVIEW

JUNE 2010

DRAFT – TUES 18:00



Contents

1. Introduction

In April 2010, the Director of City Development and the Chief Executive of **tie Ltd.** requested that I, as the Council's Head of Transport, undertake a project assurance review of the technical and engineering elements of the Tram project programme.

For the past two months I have based myself primarily at the Tram team's Citypoint offices. I have observed the work undertaken by both **tie** and the Tram team, and consulted officers on their professional opinion of the respective specialist areas in which they were involved.

This observation and consultation, combined with my own engineering knowledge and experience, forms the basis of the following assurance review. The programming section also draws on the findings of Acutus in its forensic planning exercise report.

The review outlines **tie** Ltd's project management approach, and its Operating Agreement with the Council, before examining in greater depth the programming and quality elements of the technical engineering work. I will touch briefly on the Health and Safety record and practices before presenting my key findings from the review, and a prioritised list of recommendations.

The review has been written as an internal report for senior Council management, in the understanding that **tie** Ltd. will have a different perception of some if not several elements and will wish in turn to present a response to this document.

This document is not intended to be a complete audit of the project delivery to date, in terms of programming and technical and engineering quality; but is intended to indicate the areas of concern to be addressed; and recommendations on how to do so.

Marshall Poulton
Head of Transport

18 June 2010

2. Executive summary

The role of tram project director is crucial to the successful achievement of project goals, and it is vital that the remit and responsibilities of this role are clearly defined. The tram PD's expertise in the rail industry has been very useful, and since October 2008 there has been a rapid learning journey with regard to roads and traffic regulation issues. The appointment of a new Director of Communications, and the end of the bonus culture which prevailed up until 2008, have brought significant improvements to the project.

The Tram Monitoring Officer's assurance role for the Council on Programme and Project management related issues continues. One of the areas under examination is TEL/tie ltd/CEC compliance with the operating agreement. CEC has worked with **tie** ltd to devise a framework for compliance with each of the obligations under the operating agreement.

CEC Transport welcomes the engagement of specialist programme and claims advisors by **tie** Ltd. Acutus's work seems to be comprehensive and well-evidenced, but their estimated completion dates should be taken as best-case scenarios. It is Transport's opinion that if all works were to resume immediately; as far as possible in parallel; and without further embargo or delay, it is theoretically feasible that the project could be completed by January 2013.

This completion date, however, is predicated upon having a proactive and willing contractor on board; and, given past experience, this is highly unlikely.

The Council in its capacity as Roads Authority does not have a defined or prescribed process which covers the tram Technical Approvals requirement, unlike the Structural Design Approvals and Planning Approvals processes, so the procedures currently in place have evolved as the project has progressed, and there will be lessons to be drawn from this.

The responses by System Design Services, the design consortium, to CEC's comments on the designs of sections and sub- have often been incomplete, flawed, or even contradictory. Indeed it was because of incomplete design submissions that CEC created an "informatives" process to allow the approvals process to progress, pending submission of outstanding information.

SDS's Interdisciplinary Design Process, or apparent lack of one, has been the crux of many of the problems experienced: with design issues remaining unresolved over long periods, and unco-ordinated or even contradictory contract documents being submitted.

These problems are not peculiar to the Technical Approvals process, but also apply to the Planning Prior Approvals and to the Structures Approvals.

tie's apparent lack of understanding of the design process and the approvals procedure has put a heavy burden on CEC staff, who have had to become closely involved in the design process, instead of monitoring it.

From ground test information made available, the contractor should have been aware of the likelihood of soft spots on Princes Street. The assumption that 70% of Princes Street would require full reconstruction was revised to 30% once work began, and it has not yet been made clear on what evidence BSC concluded that all eastbound and westbound lanes Princes Street needed to be completely re-constructed. An audit of BSC's records has been requested for July to attempt to gather information about this, and several other technical / engineering quality concerns.

During the final weeks of work on Princes Street, and the weeks following the re-opening, several issues arose which raised concerns about the quality of the finished wearing course; manhole surrounds; setted sections; underground track support slabs, rail sealant etc. CEC has not yet been provided with answers which can satisfactorily explain or alleviate these concerns.

Another concern is that BSC has not provided **tie** or CEC with any As Built information as to the presence and positioning of the infrastructure and apparatus on Princes Street; and the contractor is not contractually obliged to provide this information until the substantial completion of the full project. To obtain this information CEC have instructed **tie** to request an audit of BSC under Clause 105 Health & Safety and Environmental Management System. Both CEC's amd **tie**'s comments on INFRACO, MUDFA and MUD off- and on-street works are included at the end of section 6. Areas of concern include Carillion's record keeping with regard to MUDFA works, and the poor co-ordination between the structural and on-street elements of the design.

Transport is satisfied that there are good practices and record-keeping procedures in place with regard to the health and safety aspect of the tram project.

CEC used a bespoke contract for X?X?X, largely based on the Institution of Civil Engineer Conditions of Contract (5th edition), and taking into account tram delivery experiences elsewhere in the UK.

Summarise key findings and recommendations **here: ……. v v v v v**

3. tie **Ltd. project management approach**

Project Director Roles & Responsibilities

The tram project director role is critical to achieving the project goals, and it is important that the Project Director (PD) has clear roles and responsibilities.
Noted below are key roles and responsibilities which are essential to success. In general, all these issues and competences are demonstrated by the current tram PD, although it has been a steep learning curve on some issues and a very difficult and demanding project.

- Defines high level resource requirement for programme
- Gains programme Project Definition Report sign-off from sponsor (although this wasn't done very well for with the Employers Requirements)
- Provides support and commitment to the project managers and project team members
- Prioritises sub-projects
- Briefs the project managers about the overall programme
- Produces the programme schedule & budgets (with project managers input)
- Communicates priorities
- Monitors both programme and individual project progress
- Provides programme direction
- Keeps sponsor and stakeholders informed of programme progress
- Resolves conflict at the programme level
- Communicates programme changes to sponsor and project managers
- Ensures the programme evaluation happens, using project evaluations as appropriate
- Closes down individual projects with project managers and signs them off
- Stakeholder understanding
- Recognises and rewards the contributors
- Gives feedback to sponsor and project manager and team members
- Learns from experience

The tram PD has expertise in the rail industry and whilst this is very useful, it has led to a steep learning curve with regard to roads related matters.

An understanding of Stakeholder needs is also essential and whilst this can be demonstrated, it has significantly improved when a new Director of Communications was appointed and the one-team approach was adopted by tie ltd and the Council.

It is also important to recognise that there was a different culture within tie ltd in 2008, with a significant focus being placed on financial close. That, along with the bonus culture for specific milestones (which led to silo working) may have led to financial close being undertaken prematurely when some issues were unresolved, and a lessons learnt exercise should be focused around that (cross reference to conclusions etc).

Up until October 2008, the project management had been bullish, high-handed and uncommunicative; and concerned only with the delivery of a rail system without taking full account of the road network involved.

Since that time, there have been learning experiences that have progressively improved the project management approach. These can be thought of as milestones, and are as follows:

October 2008 – the Mound debacle brought it home very clearly that major traffic management cannot be conducted in isolation, and without due regard to wider stakeholders. Within five working days, a Peer Review Group was established, and this Group has led to significant benefits in the working relationships between all agencies and key stakeholders.

January 2009 - The Chief Executive of CEC and the Chairman of **tie** adopted and began to develop a 'one family approach'. This further strengthened some key working relationships.

May 2009 – The appointment of a new Chief Executive to **tie** led to a more open, transparent and constructive approach to communications, which has helped greatly, with regular briefings to all political parties and senior council officers taking place on a regular basis. This coupled with the appointment of a new Director of Communications has led to a marked improvement with regard to the dissemination of information and communication with key stakeholders in the business and retail sectors.

4. tie **Ltd / CEC operating agreement**

The Tram Monitoring Officer's assurance role for the Council on Programme and Project management related issues continues. One of the areas under examination is TEL/**tie** Ltd/CEC compliance **with** the operating agreement. CEC has worked with **tie** Ltd to devise a framework for compliance with each of the obligations under the operating agreement. The framework sets out owners for each of the obligations and when and what needs to be provided. The draft compliance documents are highlighted in the Appendices below.

5. Programming

CEC Transport has undertaken a very high level review of the Edinburgh Tram Programme, primarily focusing on the work undertaken by Acutus in an attempt to validate a theoretically feasible completion date for the Project from Newhaven to Edinburgh Airport. The review does not attempt to quantify the costs associated with meeting this completion date.

Available Information

All of the findings contained in this report are based upon the programme information made available, to date, by **tie** Ltd. to CEC as outlined below. It should be noted that the release of this information has been limited, contradictory and ever changing. However, this is understandable given the delicate contractual situation, with mediations ongoing with the contractor, on extension of time claims.

- Acutus Report regarding Forensic Planning Exercise in relation to the Edinburgh Tram Project – Dated 24th December 2009.
- Email regarding On-street Works containing analysis of On-street Programme from Anthony Rush to Susan Clark and Tom Hickman dated 1st March 2010.
- Email regarding Assessment of Rev3 Step 4 Ver 01 Programme for mitigation potential from Iain McAllister to Susan Clark and Tom Hickman dated 4th March 2010.
- Bilfinger Berger UK Limited and Siemens PLC (BSC) Revised Programme Rev 3a submitted 13th May 2010.
- Bilfinger Berger UK Limited and Siemens PLC (BSC) Revised Programme Rev 3b submitted 13th May 2010.
- Meetings to discuss programme issues with Susan Clark and Tom Hickman on 19th and 26th May 2010 respectively.

History

On 14th May 2008 **tie** Ltd. limited contracted with Bilfinger Berger UK Limited and Siemens PLC (BSC) to carry out the Infraco works on the Edinburgh Tram Project. At contract award BSC programme Rev 0 projected a completion date of 16th July 2011.

From the outset, delivery of the Infraco Works has been subject to delay and as a consequence of these delays BSC is projecting significant over-runs on the four Sectional Completion dates contained in the contract.

The first delay to the programme occurred almost on day one of the contract due to the "SDS" design only being part complete at contract award and changing from that originally priced at time of tender. Consequently, BSC submitted a revised programme Rev 1 with a 38 day extension based upon a 5day/week; this extended the completion date to September 2011. **tie** Ltd. has agreed to this extension.

As BSC's original programme had assumed exclusive access to sections of the route, the numerous delays to the advanced utility diversion "MUDFA" contract has therefore had a severe impact on the original programme. This, coupled with multiple design changes, additional works and contractual delays to date, has had a detrimental affect on the overall project programme.

Consequently, in May 2009 BSC submitted a revised Programme Rev 2, which was followed by a further revised Programme Rev 3 in late January 2010. The Rev 3 programme that took account of the MUDFA delays, design changes, additional works and contractual delays. This programme extended and projected the contract completion date to January 2014.

tie Ltd. never accepted nor agreed either of Programmes Rev 2 and Rev 3. In an attempt to resolve the situation a joint workshop was held between **tie** Ltd. and BSC to investigate possible mitigation measures and ways to "pull-in" the contract completion date.

Following the workshop, BSC submitted two further revised programmes; Rev 3A that incorporated further mitigation measures and projected a revised completion date of November 2013, and Rev 3B that included all of the mitigation measures within 3A along with identified acceleration. Programme Rev3B projects an overall contract completion date of July 2013.

To date **tie** Ltd. have not agreed to either of these revised programmes, however, they have offered a further 9 month extension to the contract that would result in a contract completion date of July 2012.

Acutus Report on Forensic Planning Exercise

With the numerous delays to the Infraco Works and associated Extension of Time (EoT) claims being submitted by BSC, **tie** Ltd. commissioned Acutus on 8th April 2009 to undertake forensic planning work on the Edinburgh Trams Project, to support and challenge the delay assessment work undertaken by its own planning team, and to inform and advise **tie** Ltd. on its administration of the Infraco contract. This work was carried out between April and December 2009. The work primarily focused upon the delays to the Infraco Contract and submitted extension of time EoT applications submitted by the BSC.

The work has been developed and extended during the period of engagement to cover:

- Analysis of subsequent programme submissions and claims by BSC.

- Technical and contractual support and advice in relation to disputes being progressed through the DRP, including preparation for and participation in mediations.

- Advice in the relation to the collection and collation of information to support and protect **tie** Ltd.'s contractual position.

- Strategic advice in relation to dispute resolution, mitigation of delay and reprogramming of the Infraco Works.

Acutus' Findings

The main Acutus' findings, opinions and recommendations were as follows:

Generally, BSC has complied with its obligations in relation to notification of delays that it claims are attributable to **tie** Ltd.; it has universally failed, however, in its obligation to notify **tie** Ltd. of delays for which it carries liability. Not all of the notifications of delays were served in time.

BSC's contractual requirements to mitigate delay and put forward proposals for acceleration have not been met.

BSC has refused to commence work on certain sections of the route where utility diversions were incomplete, including sections where they did not present a physical or contractual obstacle to BSC progressing work. It would appear that many elements of the Infraco Works have been unnecessarily delayed by BSC's actions and inactions.

BSC's failure to notify, record and include in its claims delays for which it carried liability was distorting the delay analyses they are presenting. It would appear that such actions and inactions give rise to overstated claims for entitlement to extension of time.

BSC had submitted three formal EoT submissions during the period, each claim being based on an impacted as-planned programme analysis. Although this is a recognised form of delay analysis it has been much criticised in established case law in the past.

Acutus Analyses of Extension of Time

Acutus Analyses of BSC's entitlement to EoT highlighted:

- That some of the actual progress dates used by BSC were different from **tie** Ltd.'s records.

- The critical path was being driven by a number of preferential logic links and/or resource constraints that BSC had built into their original programme. Preferential logic links included in the original programme to affect 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 – to optimise resource management. There was also hidden float within the original programme. BSC have made some minor adjustments to the logic network but these were relatively limited in nature and only partly reduced the projection of delay.

- Acutus' own reverse (back) analyses resulted in revised and much reduced projections of EoT requirements including what cost effective mitigation measures could be reasonably and readily applied, where considered practical and cost effective.

- Of the "EoT Entitlement" and "Revision 2" claim submissions, section 1C (City Centre on street works) was considered to be the dominant delay to overall completion. It is calculated that the delays to completion associated with these submissions are 14 weeks without mitigation and are 0 with mitigation. (Note EoT Entitlement and Revision 2 are effectively the same)

- Since the date of the analyses there have been further delays impacting on the programme, in particular increasing delay arising from later completion of the MUDFA works. Analyses of the additional delays were not included in the Acutus report.

- Of the "MUDFA Rev 8" claim submission, Section 1B (Foot of Leith Walk to MacDonald Road) was identified as critical and driving completion. Acutus have calculated delays for this submission as 31 weeks. Therefore Acutus' current estimate of entitlement to extension of time is 52 weeks without mitigation and 34 weeks with mitigation for the three submissions investigated.

Based on the above **tie** Ltd. has offered a 9 month extension of time to the contractor that takes the contract completion date to July 2012.

Acutus' Opinion

- The BSC submissions for and in support of EoT have not been made in accordance with the strict terms of the contract, therefore should be rejected.

- Notwithstanding the above it is clear that there has been a considerable number of delays for which **tie** Ltd. carries liability under the contract.

- That a significant entitlement to extension of time does exist, with the dominant cause the delay to the MUDFA works.

- If **tie** Ltd. is to protect its commercial position it should compile and maintain comprehensive contemporaneous records of actual progress and reasons for delay. The importance of good quality records cannot be overstated.

- Steps have been taken to implement this advice.

- It is recommended that the contract provisions in relation to the serving of notices and calls for revised programmes etc. be diligently applied by **tie** Ltd. **tie** Ltd. should seek to have appropriate and sufficient particularised contemporaneous correspondence in place. With particular reference to delay and EoT, the requirements and provisions of contract clauses 6, 60, 64, 65 and 80 requiring or entitling **tie** Ltd. to serve notice of BSC delay and/or requests for revised programmes/proposals should not be overlooked.

Further Programme Analyses by Acutus

Acutus have undertaken further analysis (March 2010) of the latest revised programme Rev 3 submitted by BSC in an attempt to mitigate delays and bring forward the overall contract completion date.

Their main findings are as follows;

On-street Works

Analysis of the on-street programme indicates that section 1A Newhaven to the foot of Leith Walk is currently the critical section, however, with changes to BSC's sequence of work, use of float and increase in shift working if started on 1 September 2010 it could be completed by 14 March 2012. The current completion date for this section within BSC's Rev 3 programme is 20 March 2013.

Section 1B Foot of Leith Walk to McDonald Road if started on 1 September 2010 could be completed on 30 January 2012, compared to a BSC's Rev 3 programme completion date of 20 March 2013.

Section 1C McDonald Road to Princes Street if started on 05 May 2010 could be completed by 16 November 2011, compared to a BSC Rev 3 programme completion date of 08 April 2013. However, this section is vulnerable to the completion of the BT diversion works. **It must be noted the start date has already passed and therefore the potential finish date is already slipping.**

Section 1D Princes Street to Haymarket if started on 30 May 2010 could be completed by 11 December 2011, compared to a BSC Rev 3 programme completion date of 26 March 2013. **It must be noted the start date has already passed and therefore the potential finish date is already slipping.**

Overall Contract

The assessment was been based on the IFC, MUDFA, and Form C Submission dates detailed in the programme. The most recent MUDFA schedule provided to Acutus by **tie** Ltd. showed that some of the on-street section dates may be approximately one to two months late and that the impact on the Section C On-street and Section D dates will be a direct correlation to increased MUDFA delay.

A summary of the Acutus's assessment of what they think could reasonably be achieved without resorting to exceptional measures and/or excessive additional cost is given below.

Section	Rev 3 Step 4 Ver 01 Programme	Mitigated Rev 3 Step 4 V Programme
Section A Completion	27 June 2011	December 2010
Section B Completion	15 February 2012	January 2011
Section C Off-street Completion	17 August 2012	January 2012
Section C On-street Completion	8 April 2013	July/August 2012
Section D Testing, Commissioning and Shadow Running	5 October 2013	January 2013

Overview of Sectional Assessments

Section A – Depot

In theory, the Depot building and associated road and track work could be completed by the end of 2010. The assessment was based on introducing negative lags to the finish to start relationships detailed in the contractor's programme. Time savings were also made on the road and track works by reducing what appear to be unnecessarily long durations for the civil engineering works. Finally, durations were reduced on the track and Electrical and Mechanical (E&M) works on the basis that there is scope to increase resource levels for part of the overall construction period. However, it is important to note that **tie** Ltd.'s Project Manager considers that the contractor has not sufficiently advanced the design work associated with integrating the SDS and E&M designs and therefore actually achieving this mitigated completion date appears, at this point in time, to be extremely unlikely.

Section B – Test Track

The programme logic models the requirement to have the track sections 5C and 7A complete to achieve the Section B completion date. On that basis, the late completion of the A8 Underpass and the groundworks at the Gogarburn Landfill Site project the Section B date to 15 February 2012. However, **tie** Ltd.'s E&M and operations staff; have advised that the actual requirement for the test track is approximately 1km of live track running from the Depot. Therefore, it would appear that a suitable length of track can be constructed by January 2011. The track section 5C running through the A8 underpass and to the south is not required for the test track. Providing the contractor makes a concerted effort to carry out the landfill site works in the Spring, Summer and Autumn of 2010, while at the same time progressing track construction in the adjacent sections of the route, there should be no impediment to having the test track ready within 28 days of the completion of the Depot.

Section C – Off-street

This section contains a great number of structural elements whose construction involves many programme interdependencies. Activity durations for the critical and near critical elements were reviewed and, where deemed appropriate, revised to reflect what was assessed to be achievable. In many instances there was a clear opportunity to commence the trackworks earlier and this was incorporated into the assessment. Generally, the durations and relationship of the E&M works were not adjusted from those detailed by the contractor. This was due to Acutus not presently possessing sufficient knowledge / data on which to base a meaningful review. Significant potential time savings were also identified on various structural elements and in particular on the reinforced earth retaining walls. Long periods for site clearance linked, finish to start, to completion of Form C approvals were reduced. The individual activity durations for the tram stops were similarly adjusted throughout.

Section C – On-street

The logic and sequencing of this section was predominantly driven by the traffic management arrangements. The assessment did not included consideration of radically different alternatives as, given the timescales available and the processes that would have to be gone through, it would appear these could not be promoted and implemented within a time frame that would improve the completion date.

The assessment focused, primarily, on the activity durations and fixed dates detailed in the contractor's programme. It concluded that there are many durations that could readily be reduced by increased productivity, increased resources and/or increased working hours. Where this was identified durations were reduced.

The contractor has included activities for track improvement, increased durations for excavation and capping and/or track improvement slabs in its Rev 3 programmes. As directed by **tie** Ltd., these were removed (zeroed out) in the assessment, albeit that some provision was left in place to provide a little contingency for unforeseen

ground conditions. As noted above under the Off-street section, the durations for tram stops were significantly reduced to address what appeared to be excessively long overall durations arising from lengthy individual activity durations linked in chains of finish to start relationships.

Section D – Testing, Commissioning and Shadow Running

This is the final phase on the critical path, and will be carried out when all other sections are complete. It forms part of the programme, but at present is not the cause of any programme extension.

CEC Transport's Recommendations and Conclusions

The engagement of specialist programme and claims advisors by **tie** Ltd. on the trams projects is seen as a positive action. The Acutus work has been comprehensive and the potential completion dates they have estimated based on the information available to them appear to be possible. However, these have been prepared to identify mitigation potential and to rebut extensions of time claims submitted by BSC at mediation hearings and therefore must be seen as best case scenarios.

Consequently, it is CEC Transport's opinion that if all site works were to recommence immediately it is theoretically feasible that the project could be completed by January 2013, however, this is predicated on a number of assumptions namely;

- That work on-street recommences on or before 1 September 2010.
- With the possibility of all of the on-street sections 1A-1D being undertaken in parallel, albeit in sub-divisions, that all of the on-street Traffic Management sequencing put forward by **tie** Ltd. are acceptable to the Council.
- There would be no work embargos during the summer festival and Christmas periods.
- Accelerated working and increased shift working must be used.
- That the outstanding BT utility diversion is completed on programme.
- That there are no more delays to the main Infraco works as a result of the MUDFA works.
- That the lack of design detail for York Place/ Picardy Place/ McDonald Road can be rectified without delaying that sub-section of the site works.
- For Section A, that BSC can sufficiently advance the design work associated with integrating the SDS and E&M designs to achieve the mitigation completion date of December 2010.

- That a 1 km length of track from the depot can be constructed by January 2011 to allow live test track running from the depot towards Edinburgh Airport.

- That BSC's proposed full depth track construction can be reduced and is approved by CEC as per the Specification for Highway Works Appendix 7/1. **Tie** Ltd. will have to demonstrate that the reduced pavement constructions will meet the requirements of the contract. It should be noted that a reduced depth of construction may decrease design life and increase maintenance resulting in more "down time" of the tram throughout its life.

- That the mitigation measures proposed by Acutus are only required from restart of construction work and are not required from the start of the project to meet their estimated January 2013 completion date.

- Finally, and maybe most importantly, that the January 2013 completion date is based upon having a proactive and willing contractor on board. It is CEC Transport's opinion that based upon all the evidence of past history this is highly unlikely.

Due to the limited, complex and conflicting information supplied to date by **tie** Ltd. on the programme, it is recommended that **tie** Ltd. and Acutus prepare and present a report on the programme to CEC senior officers, Director Level and above. This report/presentation should include what they estimate to be a realistic completion date for the project. It should outline the main mitigation and acceleration measures and any assumptions that have been made to come to this date, along with any future liabilities these may impose on the Council. It is important that the report/presentation be suitable for a non-technical audience, ie in "layman's terms".

6. Technical and engineering quality

Roads Design Approval Process

Background

The Tram Design Working Group was formed in January 2006 to consider the implications of the proposed Tram route from a Planning perspective. Tram workshops were held over the following months and design charettes, involving representatives from the groups involved with the implementation of the tram, took place in June and August 2006.

Between July and August 2006 a Preliminary Design of the Tram was supplied by SDS (Systems Design Services who were employed to design the Tram scheme). This design contained a low level of detail and in some instances it did not contain the required level of detail or it did not include all disciplines. For example, in some locations no drainage or street lighting design was supplied whereas in other locations street lighting was shown but not to an adoptable standard. The Tram Design Working Group commented on this design in August 2006, pointing out the shortfalls in design detail.

From spring 2006 to February 2008, the Road Design Working Group met to discuss issues emerging from the ongoing design. These meetings were chaired by SDS and tie, with CEC (both Technical and Planning) and Lothian Buses represented.

Stakeholder Design Review meetings took place between November 2007 and February 2008 and involved round the table reviews of specific packages or design issues. These meetings were chaired by tie, with CEC, Transdev and Lothian Buses represented. SDS was also present at these meetings so that they could respond to the issues discussed.

BSC Consortium

BSC were selected by tie to construct the Tram Scheme (the Infraco contract). SDS was novated into this consortium and BSC were paid to accept some of the risk involved with accepting future responsibility for the SDS design.

In November 2007 the Base Date Design Information (BDDI) was agreed and used by BSC to price the tram delivery. This base date design information which was used by the consortium did not include some of the design changes already agreed by SDS through the Tram Design and Roads Design Working Groups.

It should be noted that tie did not involve CEC in the compilation of the BDDI package and, that being the case, many of the details included in the package were not seen by the Council prior to the letting of the Infraco contract.

Roads Technical Approval

It is important to note that, unlike for Structural Design and Planning Approvals, the Roads Authority does not have a defined or prescribed process which covers the tram Technical Approvals requirement. So the procedures which are now in place have evolved as the project has progressed. These procedures should be reviewed at the "Lessons Learned" stage of the project.

The initial Technical Approvals process required tie to approve the design submission prior to CEC undertaking their review. This requirement was subsequently removed and replaced by the Design Assurance Process.

In February 2008 the first designs were submitted for Technical Approval. The designs were submitted in packages of 17 sub-sections, which included details of roads, signals, lighting and drainage designs. These initial packages were reviewed by officers from the Tram Co-ordination team, Street Lighting, Planning, Traffic Signals and Cycle Projects.

This process was to take 8 weeks from first submission, but as some of these initial packages were incomplete it was agreed that CEC required a further 3 weeks from date of last submission to complete review.

Where there was a fundamental flaw with a design package sub-section, it was placed on hold. An example of this was the package which contained Picardy Place. The junction layout proposed by SDS was not acceptable and it would have created unacceptable traffic congestion. CEC supplied an alternative design but SDS concluded that their design was better and the Technical Approval of this section was placed on hold until this matter could be resolved.

CEC wrote to SDS confirming approval in principle to each section with a list of comments to review. Comments on the road and drainage designs were discussed informally with Halcrow, who were acting on behalf of SDS as a designer, to agree a course of action. These discussions were held informally so that changes could be agreed before drawings were altered to prevent additional iterations.

Comment Closeout

The final stage in the approvals process involves reviewing packages to verify that previous comments have been resolved. This process also allows a review of the Road Safety Audit and the Technical Design Statement. Final comments are made on the design.

Where there was missing information, or individual issues which could not be resolved, approval was granted on the understanding that the missing information would need to be submitted, and approved, prior to commencement of construction. This outstanding information was designated "Informative", in line with the Planning process, and this action was taken to allow the rest of the package to proceed to the next review stage, i.e. the Informative process only came into existence because the designs and design submissions were incomplete or in some instances inadequate (see comments below about the Interdisciplinary Design Checks).

So an Informative is now a formal process where a further submission is required to be reviewed and approved before this Informative can be closed. For example CEC have not received any full drainage designs for the sections approved to date. An Informative was placed on these missing design details and a full drainage package needs to be supplied before this Informative can be closed.

Informatives

Through the Technical Approval process, 65 Informatives have been created which cover a range of issues varying from Tram stop furniture to the Traffic Regulation process.

A fortnightly meeting, involving tie, BSC, SDS and CEC is held to discuss these Informatives. Currently there are approximately 65 outstanding Informatives and SDS/BSC provide a "look-ahead" which gives draft dates when packages to close out Informatives will be supplied. CEC has 20 days to review these packages and the look-ahead programme started in October 2009. To date we have only received two submissions which covered a small number of Informatives, so this look-ahead programme has slipped by a number of months.

The Informative look-ahead programme is inaccurate and unreliable for resource-planning purposes. In addition, no accurate programme is issued by SDS/BSC when Technical Approval Packages will be submitted for review by CEC. On a weekly basis supplementary packages are supplied for review where the design has changed for a particular reason. For example where a value engineering exercise has taken place and part of the design has changed. There is no programme supplied for these supplementary reviews.

Problems with review process

Some of the packages supplied do not contain full details or no cognizance has been taken of previous comments.

There are problems with Interdisciplinary Design Checks (IDC). For example, the viaduct at Haymarket is being constructed using the structures drawing and a superseded Tram stop design, whilst a drawing updating the Tram stop was supplied for review after the construction process had started. This new Tram stop design requires ducting and drainage to be amended and it is not clear that this has been accounted for during the construction works. These issues have been identified by the Tram team and we have concerns that a proper IDC has not been carried out prior to construction.

Historically SDS gave an assurance that all such issues would be resolved by their IDC process. There has been no evidence that this is happening, hence the ongoing problems.

It became apparent from the construction of Princes Street that drawings have, perhaps erroneously, been marked as Issued for Construction (IFC), and that instructions issued through the design approval process have not been followed. On

Princes Street, for example, Overhead Line Equipment (OLE) poles and Traffic Signals poles have not been combined and the visibility of the traffic signal head is impaired.

SDS will only supply details for review if they consider that the Council has a need to review such detail in its capacity as statutory Roads Authority. This reflects the point made earlier, that the Roads Authority do not have a defined Technical Approval process (unlike Structures and Planning), so SDS will and do argue this point repeatedly. They will also only supply packages for approval to individual CEC teams within the Council. A package supplied to CEC Structures, for example, is not copied to the Tram team, even though there are critical interfaces such as drainage. This weak level of communication can be and often is problematic, particularly in light of the evidently poor IDC within SDS's system.

Another problem is that SDS has a tendency to contact different teams within the Council to gain approval for conflicting design details. At Roseburn Viaduct, for example, the design was changed for value engineering and SDS consulted Street Lighting to get approval for lighting columns to be erected against an area of landscaping. However, CEC Planning had requested that a wall was constructed around this area for personal safety reasons and that the lighting provision should be mounted on this wall. There is concern that if approval is granted by the lighting section then they would request a design change to implement Planning's requirements. Once CEC have approved a design if for any reasons we need to alter what has been approved then SDS can claim for a change and the cost of this change is agreed by tie or this goes to Dispute Resolution.

Resources

There are currently two full time members of staff who are responsible for Technical Approvals and Informatives, and who deal with any issues which emerge from the construction phase. The ongoing integration of cycle facilities with the Tram Route is also the responsibility of this team. Another full-time employee is being recruited at time of writing.

SDS was employed by tie to design the Tram Scheme. They design part of the scheme, but also use Halcrow to design certain disciplines. SDS are required to obtain "all necessary approvals". When BSC joined the project SDS were Novated into the consortium and they are now part of BSC.

CONCLUSION

The IDC process is the crux of many of the problems we are experiencing. Many of the still-unresolved issues were raised up to two years ago through the Tram Design Working Group and/or the Roads Design Working Group. SDS acknowledged at that time that there were problems but gave an assurance that their internal IDC processing would address all such issues.

As there are a number of different design teams working on the Tram there is obvious concern that different teams would end up changing the same part of a drawing. For example the drainage associated with a structure may connect into

road drainage. If this road drainage is amended then this connection can be lost. The IDC checks are meant to resolve any conflicting changes from different design teams but we have concerns that it either does not work or it does not happen. We have numerous examples of IDC-related conflicts, e.g. traffic signs and/or OLE poles obscuring traffic signals, as cited above.

More recently when it became clear that there were still conflicts in the contract documents — drawings and/or specifications at best not being "mutually explanatory" and at worst being contradictory — Halcrow offered a solution based on Design Advisory Notes (DANs). What they suggested was that where such inconsistencies existed they would issue clarification notes, DANs, to the contractor in lieu of revising and reissuing drawings and/or specifications. CEC accepted this proposal, by way of resolving what had become a seemingly intractable problem and recognising the need to keep to the construction programme. Two weeks later SDS rebutted this proposal and assured CEC that were such problems existed revised documents would be issued to the contractor.

As a footnote, the question must also be asked whether tie should have undertaken the approvals and should have submitted the design to CEC with their recommendation? CEC's role then would have been a lot simpler and a lot less onerous, i.e. checking the checker.

The key question remains; if CEC stepped back from the process now and didn't assume what is effectively the IDC role, what is **tie**'s current understanding of the state of the design and on what do **tie** base that understanding?

RECOMMENDATION

The is no quick fix, so in the short-term we should continue with the approvals processes as it stands; the Approvals Task Force and Informatives meetings are useful forums and should continue. The Tram Co-ordination team are in the process of appointing additional resources to help with the approvals process; that should be expedited, not least because SDS have indicated that they will be submitting a number of Informative packages in the near future.

In the mid-term CEC need to become more involved at the construction stage. The issues we have identified, most recently on the Haymarket Viaduct and previously on Princes Street, for example, are prompted not least by our good understanding of the design, particularly from the Roads Authority's perspective; this is an advantage tie's site-works project managers do not necessarily share.

Longer-term there needs to be a comprehensive review of the whole design process, from procurement through to Roads Technical Approvals, and lessons must be learned.

Technical and Engineering Quality

Inspection Test Plans (ITP)

As part of the quality management system a range of Inspection Test Plans (ITP's) has been set up for various elements of the tram project with a view to maintaining a high level of quality and consistency on the project. Prior to carrying out an inspection test plan, the contractor/subcontractor will issue a Request for Witness or Approval 24/48 hours prior to carrying out the testing to BSC and **tie.** This form will indicate which test is to be carried out, the location, time for inspection/approval and the time they intend to conduct the activity. Due to the nature of the self-cert contract governing **tie** the element can still be tested without being witnessed or approved.

The number of different tests to be completed was substantial and there is the concern whether all these tests were carried out and properly recorded. Examples of some of the tests to be done are: drainage testing, *mandrilling*, plate bearing, *concrete slumps*, longitudinal and transverse testing of the pavement, signals testing, rail weld ultrasonic testing, concrete cover checks etc.

There were two instances on Princes Street, for example, where concrete poured into the track improvement slab XX had to be removed the day after pouring, due to the lack of cement in the mix. If the Inspection Test Plan had been observed correctly, this concrete would never have been poured.

Infraco on Street Works

Areas of Concern/Lessons Learned from Princes Street

Record of Soft Spots

In the lead-up to the works commencing on the Tram project a number of companies produced site investigation information. There are reports available from Norwest Holst Soil Engineering, Mouchel, and Stanger. From this information the contractor was aware of the likelihood of soft spots and the need to remedy these areas. Based on the information provided in the Mouchel Pavement Evaluation Report on 8 September 2008, the conclusions for Princes Street were:

- Eastbound lane 1 requires resurfacing, which includes planning 50mm and laying a new hot rolled asphalt surface.
- Eastbound lane 2 - as lane 1.
- Westbound lane 1 requires deep inlay or full reconstruction.
- The majority of Westbound lane 2 requires surfacing as detailed above, however further investigation is required.

From the initial site investigation information provided with regards to Princes Street it was assumed that at least 70% of Princes Street would require full reconstruction due to soft spots. Once work commenced on site it was more like 30% that actually needed full reconstruction.

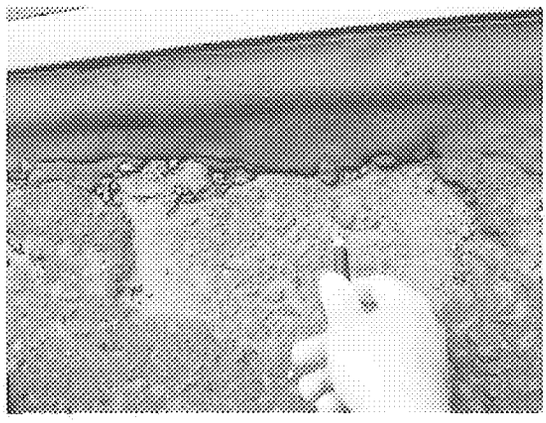
Based on this information, then, can BSC provide records that prove that the site investigation information was inaccurate which then resulted in the requirement for full reconstruction of Princes Street on both the Eastbound and Westbound lanes? Are there full records available of locations of soft spots and the volume and type of material removed and replaced in these areas?

Currently CEC have not been provided with evidence of the need for full reconstruction of the pavement on Princes Street based on the original site investigation information. An audit of BSC has been requested in July to try and gather information into this concern.

Road Pavement

During the final weeks of work on Princes Street and the weeks following the re-opening, several issues arose which raised questions about the quality of the finished wearing course (ie. the hot rolled asphalt surface). Since the road re-opened there has been evidence of plucking. Plucking occurs when there is too high a concentration of coarse aggregate i.e. chips which will result in failure of the bitumen bonding resulting in chip loss and premature failure of the asphalt, this is referred to as plucking. There cracking at the rail edges, and cracking around manhole covers, inconsistency of chip spread and evidence suggesting that the hot rolled asphalt is not entirely laid to 40mm as specified. Examples of some of the reasons which could explain these issues are below:-

- The use of too many different contractors leading to poor and uneven quality of the finished product;
- Surfacing laid in weather conditions too cold or wet;
- Material was too cold to lay due to waiting time in delivery vehicles,
- Rushed workmanship due to the tight timescale to reopen the road for the Christmas period. There should have been no need for work to be rushed, BSC were fully aware that Princes Street would be reopened for the Christmas period from the day the took site occupation,
- The finished wearing course trafficked too soon to allow adequate curing time of the material
- Is the design specification fit for purpose?



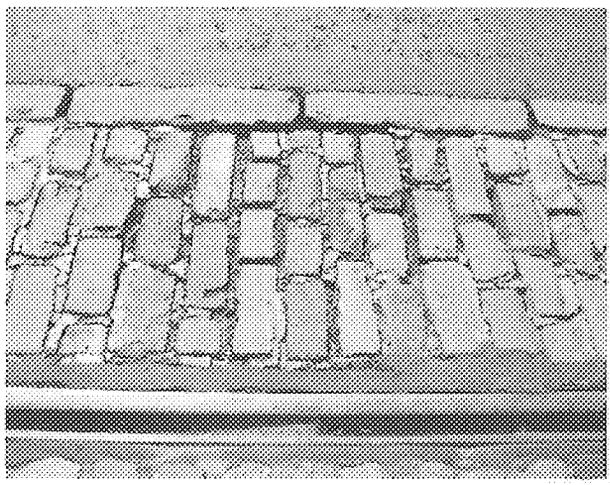
(This photo clearly indicates of thin the wearing course is at the location)

The approved Inspection Test Plan for pavements (refer to appendix…) requires testing of each pavement layer prior to the next layer being laid. Tests include:

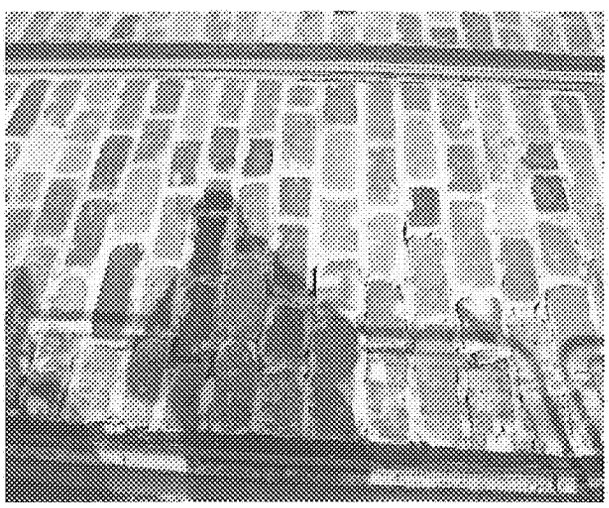
- visual inspection over cleanliness and dryness,
- level dips,
- chip spread on the wearing course,
- longitudinal testing and transverse testing.

All these tests are to be carried out in accordance with Test Appendix 1/5 Series 900.

In addition to flexible pavement on Princes Street there is also a trafficked tram only setted area at the tram stops. The recommended method of grouting provided by SIKA was not stringently adhered to. Setts were placed and grouted in weather conditions not in accordance with the SIKA method statement. This has lead to cracking and failure of the grouting system since Princes Street has reopened



Failure of the grouting system is evident here....



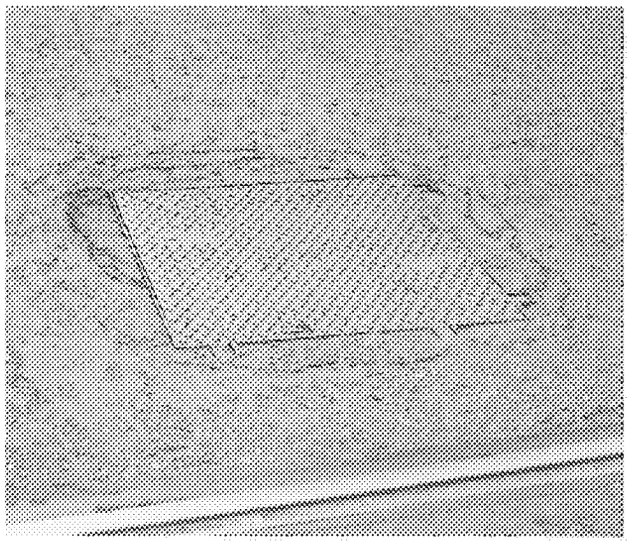
....And here. (Is this photo necessary?)

During the construction of the track improvement slab and the road pavement it was brought to BSC's attention by tie and CEC that there could be an issue of transitional cracking at the tie-in between the rigid track improvement slab and the flexible road surfacing. This issue had never been raised by the designers or BSC as a possible issue. In light of this concern Parsons Brinckerhoff came up with a design solution which involved a 1m wide strip of Tensar Glasstex Membrane being laid from the edge of the rail covering the joint between the track slab and the base course. TIE was informed that this solution would stop any transitional cracking before it reached the binder and wearing course. To date TIE and CEC have not seen any verification of the suitability of this design.

Manholes

Following the re-opening of Princes Street it became clear that there was an issue with some of the manholes in the carriageway. Some were beginning to sink into the wearing course and extensive cracking around the covers was beginning to develop. An extensive survey was therefore carried out of the manholes both externally and internally. The results of this survey indicated that the mortar within the manholes was failing, causing the manholes to sink. There is currently no inspection test plan in place for manholes, which are supposed to be built to the specification provided by CEC for a trafficked chamber. This information is then incorporated into the contractor method statement. Possible reasons which could explain these issues include:-

- Poor workmanship of brickwork, Lack of experience workforce, were the correct bricks used,
- Mortar failure within manholes and around lids, was the correct mortar used?
- Wearing Course laid poorly around manhole covers giving rise to cracking and sinking,
- Manhole lids not levelled properly allowing uneven vehicle weight distribution
- Is the design specification fit for purpose?



Poorly laid wearing course

Currently CEC have not been provided with evidence which can explain these concerns over the manholes on Princes Street. BSC are currently looking into the suitability of the design and specification of the Manholes.

Track Improvement Slab

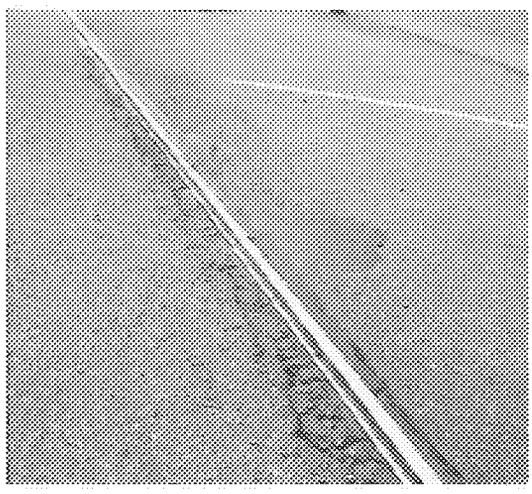
The track improvement slab is a structural strength 250mm deep concrete slab with steel reinforcement bars and mesh, this slab is constructed directly beneath the rail track slab. The principles behind the track improvement slab is to provide stability to the track. If the ground is tested and proven to be sound, however, would it not be better value engineering to either reduce the slab's depth or possibly eliminate it completely from the design? The overall time saving in constructing the improvement track slab could also be of great value to the project. ~~So bearing this in mind the main area of concern with the track improvement slab is whether it is necessary~~

An assessment of the suitability and necessity of this design could be requested form the designer.

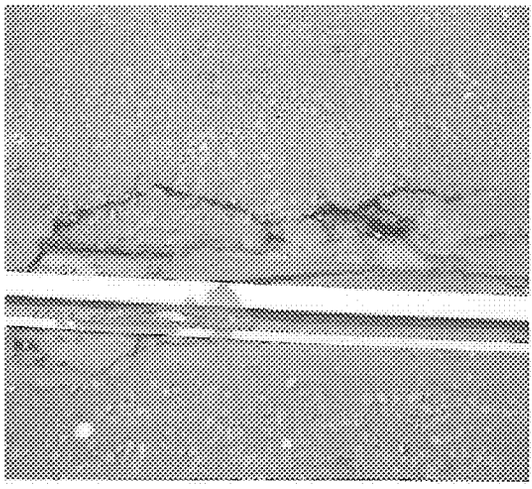
Rail Sealant

The rail sealant is a bitumus-based material that bonds the edge of the rails and the finished wearing course. Before this sealant is placed the wearing course is laid flush with the rails. The section that will contain the sealant is then cut away and sand blasted. Once this is done, this section is then heated with a lance to allow the correct temperature for the sealant to bind correctly with the rail and the surfacing. This is a lengthy and highly weather dependant operation. Since Princes Street has re-opened there have been several failures of this system and this may have occurred for the following reasons:-

-The method used to cut the groves for the sealant section could not give a consistently flush straight edge which made placing the sealant difficult and over-run was common,
-The sealant was placed in unsuitable weather conditions,
- The specification may not be fit for purpose, or the design may need to be modified.



Currently CEC have not been provided with evidence which can explain the failures in the sealant on Princes Street. BSC are currently looking into the suitability of the design and specification of the sealant.



As Built Information

To date **tie** Ltd. has not been provided with any as built information with regards to Princes Street. BSC are not contractually obliged to provide this information until the substantial completion of the full project, which could be anywhere between the years 2012-2014. **tie** was unable to provide the information requested by CEC on the 8 June 2010. To obtain this information CEC have instructed **tie** to request an audit of BSC under Clause 105 Health & Safety, Quality Assurance and Environmental Management System (refer to appendix for full clause). This specifies that **tie** must give in writing a notice of intention to audit and allow BSC 10 day notice to conducting the audit.

Unforeseen issues led to design changes in several of the elements of the original design for Princes Street. This could be a problem if an external organisation needed to come in to work in the area before BSC have provided the As Built Drawings, as **tie** would not be able to provide accurate information as to what is in the ground.

TIE Comments

INFRACO (BSC) – SUMMARY

We (tie**) have confidence in BSC's Quality System for the following reasons;**

- Formal review of deliverables detailed in Employers Requirements (Schedule 2)
- Formal issue and review of Inspection and test Plans for each element of the works
- Delivery of Construction Support reports (SDS internal clerk of works in line with novation agreement Section 14.1)
- Bi weekly Quality Inspections by BSC QA/QC Engineer
- Weekly DaST metrics inspections by tie and supported by BSC (and relevant contractors)
- Regular audits under clause 105
- Feedback from BSC design team at regular DaST meeting with **tie**
- SVS Audits
- PSCC meetings
- Period reporting from BSC, reviewed by **tie**
- Interim audits of ITP's
- Witness of information that will be used for as builts
- Monthly photographs provided as evidence of progress
- Interim completion certificate in place for Princes Street works
- Specific points of contact
- Audit Schedule provided yearly
- Copies of audits provided
- TQ register in place
- Non conformance Reports issued and addressed
- External BSI audits carried out ensuring compliance with registered system.
- Group Quality Manger; Consortium Quality Manger and onsite support.
- Contractor briefings Princes Street handover requirements
- Introduction of standard diary format

Areas for Improvement;

- **tie** introducing and trialling supervisors checklist
- Better communication between consortium members
- Prompt issue of documents
- Discussion on areas that many be handed over to CEC prior to actually contract completion
- BSC need to be more proactive role with contactors and tie regarding quality issues
- Regular quality forum in line with H&S forum would be advantageous
- Clarity regarding responsibility of each party during site handover

Infraco off Street Works

This section contains a great number of structural elements whose construction involves many programme interdependencies. The constructions of these off street elements are being constructed by different contractors in different areas of the city. The structures vary in size and complexity from bridges to viaducts and the tram depot building. Due to the complex and systematic nature of the off street works it is essential that the Health & Safety and Environmental Management System be adhered to. Evidence from audits conducted by **tie** has indicated that the various contractors are effectively using the system.

The main area of concern with respect to the off-street works is there seems to be little if any co-ordination of the structural elements of the design and the off-street (and on-street, in fact) elements. There is also a lack of integration between the new structures and the new or existing drainage network.

MUDFA and MUD

Areas of Concern

For the period from September 2007 to July 2008, there are no records for any of the MUDFA work carried out by Carillion. **tie** has repeatedly requested this information and has been informed each time that there is no information available. In July 2008, **tie** conducted a formal audit of the records Carillion were keeping. Carillion consequently starting to keep more complete and informative records. The MUDFA works do not use the same specification and appendixes that are used in the Infraco contracts. The MUDFA method of excavation and reinstatement for utilities diversions is in accordance with the Specification of Road Authorities and Utilities Committee RAUC(S). This specification sets out an agreed method of

reinstatement of openings in highways and the excavation of highways. This agreement has been made between local authorities, utilities companies and contractors.

In early 2009 Farrens and Clancy Dowcra took on the remainder of the utilities diversionary works. The level of record keeping from these contractors is of a much higher standard and **tie** will receive a comprehensive set of as built drawings and completed Inspection Test Plans.

TIE Comments

MUDFA RECORDS - SUMMARY

We (tie**) are confident in the MUDFA Quality System for the following reasons (relating to works June 2008 until completion);**

- AMIS acknowledged through the course of audit (June 2008), that records were deficient and would be actioned
- AMIS introduced (August 2008) a suit of record sheets to complement the Inspection and test plans already in place.
- AMIS HSQE manager presented a number of workshops to staff in order to improve record keeping.
- The new record sheet includes the option for **tie** to attend/witness inspections. On occasion tie attend these inspections.
- A number of meetings held with CUS and D Fraser (CEC) regarding reinstatement and **tie**
- Colin Goodsir (Quality Manager for CUS) appointed subsequent to June 2008 audit
- Quality Site Inspectors employed subsequent to June 2008 audit
- Conception and implementation of MUDFA Site Completion Certificate
- Monthly Quality update provided by CUS, information included within project period report.
- Joint audit carried out May 2009. No major issues identified. Evidence provided of new system in operation.
- Regular liaison meetings held to ensure relevant documentation for SUC supplied and red line information detailed.
- Concerns raised regarding using B0 material addressed and actioned during 2009, in conjunction with D Fraser (CEC)
- Completion Packs in place for all relevant diversions in line with the requirements of the SUC's.

We (tie**) have concerns (Works Prior to June 2008 audit) for the following reasons;**

- No visible inspection and test records were witnessed by **tie** during this period
- No Inspection and Test Records have been submitted by CUS on completion of works during this timescale.

MUD (Clancy Dowcra/Farrans) RECORDS – SUMMARY

We (tie**) have confidence in the MUD Contractors Quality System's for the following reasons;**

- They were made aware at tender stage of the need to produce ITP's and provided a full Quality Plan at tender.
- **tie** and the MUD Contractors developed Inspection and Test Plans upon award of contract.
- ITP's support by a suite of documents that include 'track' sheets detailing apparatus installed, pipe surround; reinstatement materials, certificates of conformity with reinstatement depths and levels i.e. Clegg Testing
- **tie** HSQE were introduced to Clancy Dowcra's and Farran's registered Quality System during initials audits.
- **tie** Site Supervision was afforded the opportunity to witness record taking during works
- Presentation to **tie** supervisors regarding required documentation
- Full Handover procedure and worksite release procedure developed in order to meet the requirements of the SUC's and take account of the lessons learnt during the MUDFA works
- Weekly progress meetings held include forum for quality issues
- As Built drawing scope and detail agreed between **tie** and MUD Contractors
- SUC buy in to ensure that requirements are being met i.e. sequential handover pack numbering
- Completion Packs are being issued in a standard manner in accordance with the tie procedure being centrally controlled for all tram works

Areas that may are being improved;

- During a review of Clancy Dowcra as built drawing **tie** identified that information did not fully identify the works carried out and would benefit from an internal review prior to formal submission to **tie**.
- Clancy Dowcra/Farrans also need to improve internal communications i.e. site staff/office staff.

In summary, CEC has not to date been provided with evidence that can explain or eradicate concerns about the above, namely:

- **confirmation that all the required ITP testing has been carried out and is in compliance with the design specifications;**
- **the issues surrounding the road pavement on Princes Street, and the quality of the finished wearing course;**
- **whether there was a need for full reconstruction of the pavement as based on the original site investigation information;**
- **the sinking or failing manholes in the carriageway;**
- **the failures of the rail sealant on Princes Street;**
- **the lack of 'as built' information about Princes Street;**

In light of the above, CEC has requested a formal audit of BSC's records to review the documents and records that could provide this information. This request is in accordance with the terms of the contract and will be carried out on 20 July 2010.

Supporting technical documentation available

Site supervisor role
Photo indicating documents required and ready for audit
Clause 105 Request for audit
Inspection Test Plan – Request for witness or approval form
Inspection Test Plan 005 – Drainage and service ducts
Inspection Test Plan 015- Structural concrete
Inspection Test Plan 024 – Trackworks
Inspection Test Plan 037 – Road pavement
Site inspection photos of Princes Street 21 May 2010
New supervisor quality checklists
Quality metrics meeting minutes
Deliver a safe tram Inspection - checklist

Edinburgh Tram: Comments on Princes Street Traffic Signal Installations

Below follow comments on the Princes Street Traffic Signals Installations divided into 4 general categories:- civil engineering, electrical installation, set-up / commissioning and UTC defects.

Civil Engineering Issues

Evidence of problems with the quality of civil engineering works associated with the signal installation was apparent some weeks before the signal installation commenced.These included shallow or poorly routed ducts, first witnessed at South St David's St and which can still be seen at the Scottish Water works on the Mound.

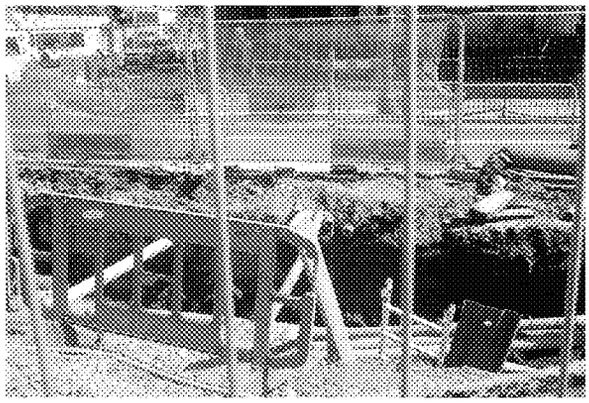
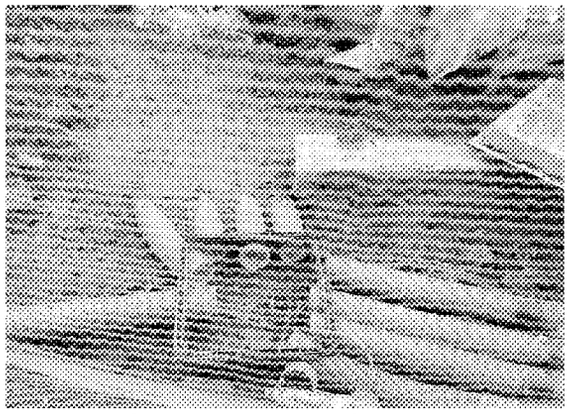


Photo showing shallow ducting

When tie and the contractor were challenged on these items the usual response was to either backfill the hole and remind us that the contractor was responsible for self-certifying the work and therefore did nothave to answer to the Council.

There are also locations where ducting boxes are incorrectly installed due to services including the west corner of Hanover Street at Princes Street where the box is only 150mm deep and rather that seek an alternative location simply installed sub-standard chambers (see pic, below).



Corner of Princes Street and Hanover Street

There are locations on Princes Street where signal poles are still located in NAL concrete blocks rather than permanent foundations either due to OLE pole shortages or because general civil engineering works are not complete. Many of the poles which have been installed permanently are either shallow, where the NAL unit projects up from the pavement and the pole is insufficiently planted or deep where the NAL unit has been covered over defeating the whole benefit of using them. In addition many traffic signal poles were installed off-vertical (George Street / Hanover Street).

Electrical Installation

The recurring theme on the electrical installations was mainly a lack of forward planning – not arranging for power supplies and ensuring equipment was ordered well in advance of it need-by date. Discussions with Siemens Traffic staff at the time suggested they knew very little of the programme and were struggling to meet the constraints placed on them by tie and BSC.

Siemens staff were observed on several occasions unable to access the work site safely due to the sheer volume of staff carrying out civil engineering works.

As a result of the above some locations were not equipped with permanent power supplies and had to be connected to temporary supplies, inductive loops and other detectors were missing and old controllers and street furniture weren't removed. At South St David's Street a signal cable was damaged by BSC footway works before the signals were even commissioned.

Virtually every site had wiring errors or equipment defective due to the speed they were installed in order to meet the opening deadline.

Another issue which has been raised may times firstly with SDS and then BSC is the dimensions of the islands used to house traffic signal poles. The dimensions specified by SDS have always been considered too small by CEC and this has been included in the design comments from the earliest stages.

Now that these islands have been installed in some locations it is obvious that our concerns are well founded where signal head arrangements have had to be altered in some locations to prevent then overhanging the carriageway and in others signal heads are being repeatedly struck by large vehicles.

Set-up / Commissioning

The commissioning of the new TS installations was a long drawn out process due to the number of defects present both in electrical and civils works at these locations – many of which have still not been rectified six months on from opening.

Again due to the proximity of the deadline to re-open Princes Street signals CEC staff had to agree the switching on of sites which would not have been commissioned in any other circumstances e.g. Princes Street / South St David's Street which had cables damaged prior to commissioning.

UTC Defects

The aspects of higher level UTC control of the Princes Street sites were completely overlooked until Siemens Traffic commenced work on site by which time it was too late to have the correct equipment and connections in place in time for the deadline. On re-opening Princes Street Council staff had to assist Siemens Traffic to re-install used outstation transmission units because the new equipment had not been ordered and install Mesh equipment left over from the diversion works.

There are still no UTC connections at Princes Street / Hanover Street or Princes Street / Frederick Street because these have never been ordered from BT by the contractor.

Conclusions

The conclusion reached by the Council traffic signals staff involved in these works has been that most of the above issues would have been avoidable if the work had been correctly planned, had involved the relevant CEC staff at an earlier stage in the process, and if the contractor had not greatly underestimated the work streams required to install so many traffic signals installations simultaneously.

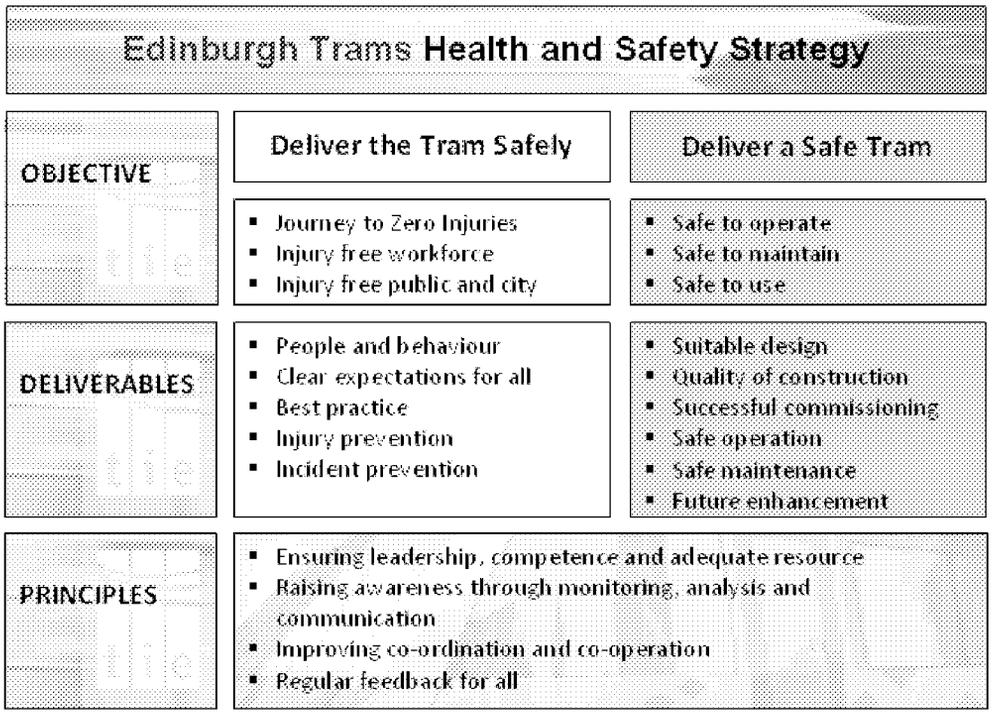
It was also obvious that though the traffic signals contractor was also Siemens they were not always informed as to what work and equipment was required at each site and had to resort to borrowing equipment from CEC or returning to the depot.

It can also be concluded that design issues commented on by CEC such as inadequate traffic islands have been supported by experience now that traffic is using Princes Street.

7. Health and safety

The main Health and Safety legislation that governs **tie**'s Project Management activities is the Construction Design and Management Regulations 2007. For the purposes of these regulations, **tie** Ltd is the Client, the Designer and may choose to be the CDM Co-ordinator. For more detailed information see CP7515. **tie** is not usually the contractor or designer. Contractors and designers are specifically selected by tie to design and construct the solution. Designers and contractors can be either one of the delivery partners from our approved list, or can be chosen through a tender process. For more information on designer and contractor selection, see Procedure CP 7516. **tie** has a legal responsibility to use only those contractors that have been approved.

Contractor performance is monitored by **tie** and action is taken where necessary if performance is below standard. When measuring **tie**'s own performance contractors' incidents are taken into account. **tie** considers itself to have a moral responsibility to help facilitate the improvement of contractors' health and safety performance, it is also recognised that good health and safety performance is also critical to the success of our projects. Information about contractor performance is reported to the project executive team and to the Board every month.



The Health & Safety strategy has two main objectives, to Deliver the Tram Safely focusing on Zero Injuries through an Injury free workforce and an Injury free public and city; and Deliver a Safe Tram, focusing on the principles; Safe to use, Safe to operate and Safe to maintain.

OBJECTIVE	Deliver the Tram Safely	Deliver a Safe Tram
	▪ Journey to Zero injuries ▪ Injury free workforce ▪ Injury free public and city	▪ Safe to operate ▪ Safe to maintain ▪ Safe to use
DELIVERABLE	▪ People and behaviour ▪ Clear expectations for all ▪ Best practice ▪ Injury prevention ▪ Incident prevention	▪ Suitable design ▪ Quality of construction ▪ Successful commissioning ▪ Safe operation ▪ Safe maintenance ▪ Future enhancement

More information regarding **tie**'s Healthy and Safety Strategy can be made available on request; however, all indications are that the Tram project has a very good Health and Safety record, with sound practices in place, and so, while recognising the vital importance of robust Health & Safety practices, this report will not devote more time to this subject.

8. Key findings

"We used a bespoke contract contract for what? as opposed to a standard one. The advice given was that the whole thing is pretty much based on ICE 5 except for the maintenance parts and the commercial arrangements agreed pre-Financial Close. It was apparently based on the Croydon and Nottingham experiences. He advised he was likely to be looking at this issue anyway, but that it was all examined in detail as part of the agreed procurement process"

[Please find below an additional comment that I want to insert in my report wrt to "Contract". I don't currently have a place for it and although it is short it is vitally important. Can you insert it somewhere in the report and I'll expand on it on Monday.]

9. Recommendations

From section 5
PROGRAMMING
It is recommended that **tie** Ltd. and Acutus prepare and present a report on the programme to CEC senior officers, Director Level and above. This report/presentation should include what they estimate to be a realistic completion date for the project. It should outline the main mitigation and acceleration measures and any assumptions that have been made to come to this date, along with any future liabilities these may impose on the Council. It is important that the report/presentation be suitable for a non-technical audience, ie in "layman's terms".
Recommended deadline: October 2005

From section 6
APPROVALS PROCESS
In the short-term CEC should continue with the approvals processes as it stands; the Approvals Task Force and Informatives meetings are useful fora and should continue. The Tram Co-ordination team are in the process of appointing additional resources to help with the approvals process; that should be expedited, not least because SDS have indicated that they will be submitting a number of Informative packages in the near future.
Timescale

In the mid-term CEC need to become more involved at the construction stage. The issues we have identified, most recently on the Haymarket Viaduct and previously on Princes Street, for example, are prompted not least by our good understanding of the design, particularly from the Roads Authority's perspective; this is an advantage tie's site-works project managers do not necessarily share.
Timescale

Longer-term there needs to be a comprehensive review of the whole design process, from procurement through to Roads Technical Approvals, and lessons must be learned.
Timescale:

ROADS AND STRUCTURES
In view of the quality concerns outline above, it is recommended that there be more supervision by CEC engineering staff of both on-street and off-street works. This would greatly help to ensure that work is carried out to a sufficient quality; and this added resource would be charged to **tie.**
Timescale: immediately for off-street works, and as soon as works resume for on-street works.

TRAFFIC SIGNALS INSTALLATION PROCESS
Given the problems experienced to date in the traffic installation processes, it s recommended that staff from CEC Traffic Systems be involved much more closely in the installation planning and supervision of future work sites. This has already been

suggested by tie and could take the form of a seconded technician or professional officer working on site with the tie project managers.
Recommended timescale: immediately

It is also recommended that the Tram team ensures that the Traffic Controls division of Siemens is kept informed during installation planning and construction works to ensure they can do their work in a planned, safe and efficient manner.
Recommended timescale: immediately

*

The following is based on a recent report given to the Chief Executive, and outlines the recommended components that need to be in place for the forward progress of the Edinburgh Tram project:

A fully committed partner
The programme of works is entirely predicated on a committed contractor undertaking the works. To date, this has not been demonstrated and it is recommended that should Project Carlisle be adopted as the best way forward for the project, close monitoring of the progress made should be undertaken. It is also recommended that if progress is not quickly evident then swift steps be taken to address this rather than continue with protracted negotiations and limited progress.

As stated in the Programming section above, a review of the programme information and Acutus reports demonstrates that it is possible to complete the tram works by December 2012, however this is based upon a fully committed contractor.

This judgment is based upon commencing on-street works in earnest by the end of July 2010. A delay beyond this date would extend the timescale.

Co-ordinated design
Initial findings suggest that the lack of a fully co-ordinated complete design is the significant factor that has caused many of the contractual difficulties. If the design had been completed on time, and managed better prior to financial close, then many of they issues would not have arisen. Moreover, there still remains a lack of a completed co-ordinated design, particularly between the individual design disciplines and system integration.

A detailed investigation on the status of the Interdisciplinary Design Checks should therefore be carried out as a matter of urgency. This should include obtaining the status of the Issue for Construction Drawings. It is also essential that the Council be provided with a programme of the planned outstanding Planning and Technical approvals and informatives to allow it to plan its resources and to minimise delays in any formal consents required.

Quality works and re-instatements
There are concerns about the quality of reinstatements, particularly in the city centre; and uneven quality of work is evident the main infrastructure works. At present limited records are available for utility reinstatements, particularly in the city centre.

With regard to the Princes Street works, initial investigation suggests that the substructure is of good quality, but the surfacing and track bonding requires major remedial work.

It is recommended that a review be carried out to compare the quality of the works undertaken against the design standards and the thresholds contained in the Contract. And lthough the Contract is based around 'self assurance, a review of the site supervision resources is recommended, including consideration of using Council resources, where appropriate.

Effective project management, strong communication

There has undoubtedly been a significant improvement in the management of the project since the new CEO and Director of Communications were appointed. The stakeholder involvement, openness and a one-team approach has dramatically improved, and this is despite the poor performance of the contractor.

However, notwithstanding these significant improvements in **tie** ltd's approach to project management, it is recommended that a "lessons learnt" exercise is undertaken to understand why the project is in its current position. This should particularly focus on Procurement, Financial Close and the design stage.

Transport Edinburgh Limited (TEL) and tie Limited
Checklist of compliance with Conditions of Operating Agreements w/ CEC - May 2010

OA Ref	*CONDITION*	*EXEC TEAM MONITOR*	*NOTES ON PROCESS & COMPLIANCE*
	TEL OA Dec 09 (Obligations of TEL are in practice often met by tie or ETL		
2.2	TEL shall ensure that all third party advisers and contractors engaged by it shall provide a direct duty of care to the Council in terms acceptable to the Council prior to carrying out any work in relation to the Project, failing which the appointment of any such third party will require the written approval of the Tram Monitoring Officer.	Steven Bell	Addressed as part of contract conditions fully since 2009. Proposal to regularize historical items submitted to TMO 20/1/10 (INF CORR 3198). Follow up information provided regarding Contract values and durations. TMO confirmed by email on 13/5/10 he is content this meets OA requirements and no further action required. Information including duration and value of contract will be updated and sent to TMO every May.
2.14	TEL shall at all times maintain in place appropriate policies of insurance in relation to all elements of its business and in particular the Project. TEL shall promptly inform the Tram Monitoring Officer in writing if any insurance ceases to be maintained and/or ceases to be available in the United Kingdom market at commercially reasonable rates and or commercially reasonable terms.	Susan Clark	All insurances maintained by a duly appointed Insurance Manager. No change or cessation of insurances has taken place.
2.15	TEL shall ensure that all contractors and consultants engaged or employed by it in any capacity shall have in place a policy of insurance providing TEL with appropriate indemnity for all risks relevant to their engagement. TEL shall promptly inform the Tram Monitoring Officer in writing if any insurance ceases to be maintained and/or ceases to be available in the United Kingdom market at commercially reasonable rates and or commercially reasonable terms.	Susan Clark	See answer to 2.2 above.
2.16	TEL will ensure that the Corporate Public & Products Liability and Professional Indemnity policies are to include an indemnity to principals clause protecting the interest of the Council as principal.	Susan Clark	Confirmed that both of these policies include an indemnity to principals clause.
2.17	TEL shall provide to the Tram Monitoring Officer upon request, and in any event not less than annually, a report providing full details of all its insurances, including inter alia details of (i) the contractors or consultants providing insurance cover to TEL and the Council and level of cover provided; and (ii) contractors or consultants not providing insurance cover and details of the authorisation obtained from the Tram Monitoring Officer in this regard.	Susan Clark	Annual statement of insurances provided to TMO and Principal Finance Officer on 18/5/10. Information will be updated and sent every May.
2.19	TEL shall continue to apply principles of good corporate governance and to adopt and adhere to the Council's Code on Corporate Governance (approved by the Council on 29 June 2006) as it may be amended from time to time.	Stewart McGarrity	Annual review of Corporate Governance reported to CEC Internal Audit on 14/5/10 including Ph1 reorganisation completed in Dec 09. Internal Audit of Governance completed by Deloitte in early 2009. Annual review of Corporate Governance will be updated and sent to CEC every May.
2.5	The TEL board shall establish such sub-Committees as it deems appropriate and necessary for the proper execution of its responsibilities and will seek to procure, with the approval of the Chief Executive of the Council, that the Board is composed of directors employing the requisite blend of skills, experience and aptitudes.	Stewart McGarrity	Committees now consist of TPB, Remuneration Committee, Audit Committee and H&S committee. TPB has 2 sub-comittees - Financial Commercial and Legal Committee and Business Realisation and Operational Readiness Committee. All committees operating under agreed remits. Board and board

			committee nominations/appointments are managed by the Chairman in consultation with CEC senior officers.
2.20	TEL will supply to the Tram Monitoring Officer copies of all relevant TEL and other board papers in connection with the governance arrangements set out in Schedule 2 [This reference is to Schedule 2 of the Operating Agreement, not repeated here, but which reflect the governance model presented separately to the TEL Board	Stewart McGarrity	TMO provided with all papers presented to the Board Sept and Dec 09 relevant to the Phase 1 changes in corporate structure.
2.22	TEL shall establish the Tram Project Board as a Committee of the TEL Board and shall define the responsibilities of the TPB and shall delegate appropriate authority to the TPB to enable the TPB to carry out its responsibilities in accordance with the terms of this Agreement.	Richard Jeffrey	TPB already in existence. TEL has effectively delegated it authority under the Operating agreement (up to the notified Baseline Cost and Baseline Date) to the TPB.
2.22	The following matters will be for the TEL Board to determine and report to the Council as appropriate in terms of the governance arrangements set out in Schedule 2: All matters affecting the programme, cost and scope of the Project except the following which are matters reserved to the Council: (i)any actual or reasonably expected delay beyond 3 months after the Baseline Date; or (ii) any actual or reasonably expected increase in capital cost which would mean that the Baseline Cost is exceeded by greater than £1,000,000; or (iii) any substantial change to the design, scope or service pattern set out in the Final Business Case. On the basis of information provided by TEL to the Council, the Baseline Date and the Baseline Cost will be determined by the Council's Chief Executive and notified to TEL from time to time. The Council Chief Executive will require Council approval to specify (i) a Baseline Date beyond October 2012; or (ii) a Baseline Cost exceeding £545 million. In assessing the source of actual or potential cost increases, the Board of TEL will use best endeavours to ensure that all financial claims are taken properly into account.	Richard Jeffrey	All operated in accordance with reserved CEC / TEL matters and in accordance with the Delegated Authority Rules which govern the tram delivery activities of all of TEL, tie and ETL. TEL has delegated authority within these limits to Tram Project Board. The Baseline Date and Baseline Cost as notified in writing by the Council Chief Executive to the Chairman of TEL on 23/12/09 as October 2012 and £545m respectively. Uncertainties over programme and resolution of disputes have made it impossible to determine any final cost – full breifings on range of possible outcomes provided as part of briefings to CEC senior officers (and to TS as funders) and in the Pitchfork report to the Board of March 2010. CEC Officers report to Council in June 2010 will conclude that it can be reasonable expected to exceed £545m to deliver the whole of Phase 1a but adequate certainty will not be achieved by then. Oct 2012 OFRS date cannot be discounted yet.
2.22	TEL may delegate responsibility for all the matters specified above (other than the matters reserved to the Council) to the TPB and the TPB may in turn delegate responsibility for all other matters to tie as appropriate, but only to the extent that such delegation is already within the remit of tie in the context of the tie Operating Agreement. TEL agrees that it shall retain ultimate responsibility for all matters it so delegates.	Stewart McGarrity	Delegations from TEL through the chain to the PM are all codified in the Edinburgh Tram Delegated Authority Rules (DARs) which govern the tram delivery activities of all of TEL, tie and ETL.
2.23	TEL shall liaise with the Tram Monitoring Officer, the Council, and any other bodies which the Council may specify, regularly and shall report to the Council on a four-weekly and annual basis with regard to financial matters and progress generally on the Project in a format acceptable to the Council. TEL will liaise with the Council and tie to ensure that duplication in reporting procedures is minimized.	Steven Bell	A weekly TMO report has been provided together with four weekly Tram Project report (TS Report). The Period 13 report includes the annual 2009/10 summary. This has been produced to the templates agreed with the TMO and / or Transport Scotland and CEC. tie Chief Executive also provides political Group Leaders briefings on a regular basis.
2.24	Immediately that TEL becomes aware of the likelihood of delay to, or overspend in, the Project it will ensure that notification is given to the Tram Monitoring Officer at the earliest opportunity, informing them of the reasons for the potential delay or overspend and detailing any measures (together with costs) which may mitigate such potential delay or overspend.	Steven Bell / Richard Jeffrey	Undertaken through briefings and reports to the Tram Project Board (eg Pitchfork) and on a regular basis directly with the TMO and other senior officers of CEC. AC – Concern over FCL role in this. Briefings work but are very informal. TPB Reports say nothing! CEC Officers do receive Financial Updates on a regular basis

			from tie FD.
2.25	Immediately TEL becomes aware that it requires a decision or information essential to the continuity of the Project from the Council to achieve key dates in the Project, TEL shall give notice of such requirement to the Tram Monitoring Officer with full supporting information to mitigate any delay to the Project to the fullest extent possible. All relevant tie remuneration matters will be monitored and controlled by the Remuneration Committee of the TEL Board.	Steven Bell	Undertaken via the TPB and/or directly with the TMO. All tie remuneration matters now fall within the remit of the TEL Audit Committee.
2.26	TEL shall procure that TEL and tie shall develop and have approved by the TEL board a remuneration policy setting out inter alia the benchmarks and procedures for proposed bonus achievement and the project milestone outcomes to which any such bonuses are linked. Such policy for both TEL and tie shall require to be approved by the TEL board, through its Remuneration Committee, in advance of each annual reporting period as it will apply in the succeeding annual reporting period. Notwithstanding that it has already commenced, the first such period will be Financial Year 09/10.	Richard Jeffrey	
2.26	TEL shall ensure that both TEL and tie's performance bonus incentive arrangements are aligned to appropriate Project milestones and reflect performance achievements beyond the level that might reasonably be expected of individual staff in fulfilling their assigned job roles	Richard Jeffrey	
2.26	The remuneration policy principles to be adopted by TEL's Remuneration Committee each year for both tie and TEL will also require to be approved by the Council's Chief Executive in advance of each annual reporting period. In addition to annual approval by the Council Chief Executive, a full review of TEL and tie's remuneration strategy by the Council Chief Executive will take place every three years to ensure that such strategy remains appropriate in the market from time to time	Richard Jeffrey	Report on remuneration policy principles to be adopted by TEL's Remuneration Committee to be submitted to Council's Chief Executive on an annual basis.
2.27	The setting and any alteration of the remuneration packages, including performance bonus incentive arrangements, for the Chairman of TEL and tie respectively will require the prior approval of the Chief Executive of the Council. The remuneration package, including performance bonus incentive arrangements, for the Chief Executive of TEL and tie will, on appointment, require approval by the Chief Executive of the Council and thereafter any changes will be determined by the Chairman of tie or TEL as the case may be, all subject to approval of the Remuneration Committee of the TEL Board.	Richard Jeffrey	Report on remuneration policy principles to be adopted by TEL's Remuneration Committee to be submitted to Council's Chief Executive on an annual basis.
2.28	TEL will provide a business plan for approval by the Council on an annual basis. TEL will incorporate within its annual business plan a full business plan for tie.	Stewart McGarrity / Alastair Richards	With agreement of CEC officers the first annual TEL Business Plan (incorporating tie and ETL) will be submitted late in 2010 following resolution of BSC uncertainties and then annually thereafter.
2.30	TEL shall not novate or otherwise transfer any rights or obligations under any contractual arrangement which the Council has approved and to which TEL is a party without the prior written consent of the Tram Monitoring Officer.	Steven Bell	TMO and TPB would be fully appraised of any such proposal - in any case there have not been any. TMO will be provided with full detail of any such arrangements prior to written approval being sought.
2.32	TEL shall liaise regularly with tie and the Council in the execution of publicity and communications arrangements.	Mandy Haeburn-Little	Regular comms between MHL and Isobel Reid. tie have now appointed Lynn McMath as Head of Media whose role includes close liaison with the Council and will monitor adherence to their policies and procedures as appropriate. This includes a weekly meeting with head of Communications at CEC.
2.33	TEL acknowledge that tie and the Project will be subject to an independent peer review panel concerning the management of the Project (including all the contract documentation) and TEL will implement all reasonable recommendations of the panel once approved under the governance arrangements set out in Schedule 2.	Richard Jeffrey	A Peer Review group was engaged to review OGC stage-gates (eg up to contract) and since the same individuals have been regularly engaged in an advisory basis on BSCdisputes etc. TEL (and tie) will comply with any future CEC requirement for independent peer review.
	tie OA May 05 – Surviving matters reserved to CEC		

	Except with the consent in writing of the Council tie shall not: Create any fixed or floating charge, lien (other than a lien arising by operation of law), security or encumbrance over the whole or any part of the undertaking, property or assets of the Company; Borrow or raise any sum of money other than in the ordinary and proper course of its business; Make any loan or advance or give any credit to any person, other than in the normal course of business; Give any guarantee or indemnity to secure the liabilities or obligations of any person; Sell, transfer, lease, assign or otherwise dispose of a material part of the undertaking, property and or assets of the Company or contract so to do; Issue any shares or any loan stock or any debentures or other securities convertible into shares or debentures or any options in respect of shares in the Company; Acquire, purchase or subscribe for any shares, debentures, mortgages or securities (or any interest therein) in any company, trust or other body; Register any transfer of shares in the capital of the Company; Appoint any person as Chief Executive or Chief Finance Officer of the Company; Enter into any partnership or profit sharing agreement with any person; Exceed the total expenditure budget contained in the Annual Business Plan by more than 5%, provided that the Company has sufficient funds to meet additional expenditure when incurred without requiring further funding beyond that provided for in the Annual Business Plan from the Council or any third party.	Stewart McGarrity	All green items are financially orientated and prohibited by DARs (ie nobody has authority to enter into such arrangements on behalf of tie. Also no such arrangement disclosed by annual internal or external audit. Other two items: Appointment of Richard Jeffrey as CEO of tie and appointment to Board was approved by full Council Due to slippage in programme we fell considerably short of the expenditure forecast in the tie 09/10 Business Plan.

City of Edinburgh Council - Transport Edinburgh Limited (TEL) and tie Limited
Checklist of compliance with Conditions of Operating Agreements May 2010

OA Ref	CONDITION	CEC MONITOR	NOTES ON PROCESS & COMPLIANCE
	TEL OA Dec 09 **(Obligations of CEC to tie/TEL or ETL)**		
3.2	The Council agrees to guarantee TEL's financial obligations in relation to certain aspects of the Project on terms acceptable to the Council.	Alan Coyle	CEC Guarantee to Infraco executed in May 2007 substantiates CEC's commitment to guarantee TEL's Financial Obligations.
3.3	On the basis that TEL has, in the reasonable opinion of the Council, provided adequate evidence that expenditure has been properly and appropriately incurred in relation to the provision of the Services and the Project, the Council will release the funding, or procure that tie releases the funding, which it has secured for such expenditure and shall pass funding to TEL or to tie, as appropriate, to allow TEL to discharge its obligations in terms of this Agreement.	Alan Coyle	Every 4 weeks TEL/tie provides CEC with a detailed application for funding and Cashflow statement. This is used to secure Transport Scotland and CEC Funding and is further substantiated with a transaction list from tie's ledger every period.
3.4	The Council will nominate a Council officer to act as a liaison point for day-to-day communication between TEL and the Council.	Dave Anderson	Letter dated 09/04/09 nominating Andy Conway as liaison point.
3.5	The Council will appoint a Tram Monitoring Officer. The Tram Monitoring Officer will be the Director of City Development or the Director of Finance or their nominee.	Dave Anderson	Letter dated 05/01/09 appointing Marshall Poulton as TMO.
3.6	The Tram Monitoring Officer will be responsible for determining what approval is required from within the Council to allow them to give any consent or recommendation required in terms of this Agreement. The Parties acknowledge that the Tram Monitoring Officer may require to obtain approval of their proposed actions from the full Council or from a relevant committee or sub-committee as appropriate.	Marshall Poulton	Through a regular briefings and meetings the TMO will communicate to TEL/tie the required level of approval. This may require approval by a Committee of the Council or approval from the CEC's Chief Executive.
3.7	The Council will ensure that, in the Council's opinion, adequate personnel are made available to the Project to fulfill the Council's role in relation to the Project and that all such personnel shall use reasonable skill and care in executing their responsibilities.	Marshall Poulton	CEC has a multi-disciplinary team of Engineering, Financial, Legal and Comms professionals working full time on the project. CEC's Tram Internal Planning Group meet once every 4 weeks, Chaired by the CEC's Chief Executive to discuss project matters.
3.8	The Council acknowledges that TEL may work on other projects in addition to the Project, but TEL will use its best endeavours to manage any such projects in such a way as to avoid any conflict with the terms of this Agreement. Any work to be executed by TEL on projects other than the Project must be approved by the Tram Monitoring Officer in advance of commitment by TEL.	Marshall Poulton	Once TEL/tie have written to the TMO requesting permission, the TMO will evaluate approve such projects in writing if deemed appropriate.