





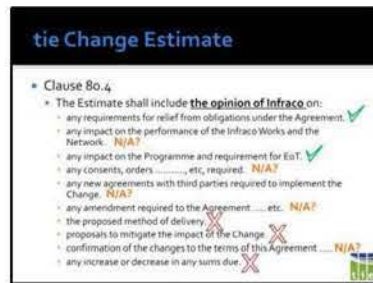
On 8 July 2009 the Infraco submitted a Notice of tie Change in relation to the provision by **tie** of the MUDFA Rev. 8 programme. That notice states that the Infraco has identified a Notified Departure which is a Mandatory tie Change, and accordingly the Notified Departure mechanism set out in Schedule Part 4, clause 3.2.1 applies.

This is a summary of the mechanism set-out in Clause 80. - (progressive reveal)

It is acknowledged that Infraco has served a considerable number of notices in relation to MUDFA delays and a specific notice in relation to the MUDFA Rev. 8 programme issued by **tie**.

It is acknowledged that the Infraco submitted to **tie** what it described as "the Estimate" relating to the MUDFA Rev. 8 Notice. This was not submitted within the prescribed 18 business day period but shortly thereafter. (**tie** makes no issue of the point in this mediation forum.)

On 3 September 2009 representatives of the Parties did meet to discuss the submitted Estimate. That meeting concluded on an understanding that both parties would undertake further work in preparation for subsequent discussions. On 4 September 2009, i.e. the day following that first meeting, the Infraco served a Notice of Dispute, thereby, putting this matter into the DRP. From **tie**'s perspective, this was entirely unexpected, particularly as only the day before it has opened discussions what is a relatively complex matter that has significant contractual and commercial implications for both parties.



Clause 80.4 sets-out what the Estimate shall include.

(progressive reveal)

Taking each of these in turn.

It is acknowledged that the Estimate seeks relief from contractual obligations, i.e. Adjustment of the Sectional Completion Dates.

There would appear to be no issues relating to impact on performance of the Infraco Works.

It is acknowledged that the Estimate includes an impacted programme and this has been used as the basis for the claimed requirement for extension of time.

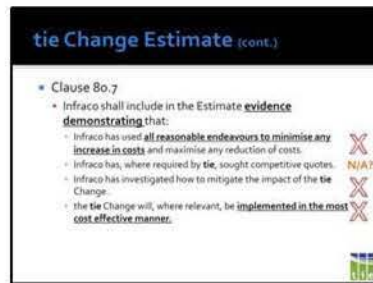
The next three requirements would appear to be inapplicable to this particular **tie** Change.

It is noted that the Estimate does not include the proposed method of delivery. The impacted programme does not represent the proposed or actual method of delivery.

Whilst the Estimate states that the Infraco has applied mitigation measures, careful inspection of the programme indicates this not to be the case. The adjustments made to the impacted programme merely correct or adjust preferential logic and re-run processes to effect Infraco imposed resource constraints.

It would appear there are no changes to the Agreement to be confirmed.

Finally, it is acknowledged by both parties that the Estimate, as it currently stands, does not include Infraco's opinion on any increase or decrease in any sums due.



Further to the requirements of Clause 80.4, Clause 80.7 states that the Estimate **shall include evidence demonstrating that:** (ref. the four bullet points above)

The Estimate, as currently presented, contains nothing in relation to these matters.

It may be the case that the requirements to seek competitive quotes is not applicable to this particular **tie** Change.

Notwithstanding, **tie** considers the other three specific requirements for evidence, along with the missing mitigation and price adjustment information required under Clause 80.4, to be fundamental requirements of a competent Estimate. They are essential pieces of information in evidencing and agreeing the most cost effective implementation of this **tie** Change.

Without such information the Estimate is incomplete and therefore incompetent.

It cannot be used, in any meaningful way, to consider the actual impact of this **tie** Change on the Infraco Works and the adjustment required to any sums due.

It provides no information on the means and options that are or may be available to the parties to mitigate the impact of this **tie** Change.

It provides no information on which the parties can meaningfully consider the most cost effective method of implementing this **tie** Change.

On 28th August 2009 **tie** wrote to the Infraco stressing the requirement for such information so that it could prepare for the Clause 80.9 discussion of the Estimate. In that letter **tie** also set-out what it considered to be opportunities to mitigate the impact of the **tie** Change and that could contribute to its delivery in a more cost effective manner.



These are the opportunities noted in **tie**'s letter. This is not an exhaustive list, merely examples of where **tie** considered cost effective mitigation measures should be investigated and, where appropriate, implemented by the Infraco.

Briefly commenting on each of these:

Revision of TM Arrangements

Some TM revisions are already being implemented. Others are clearly possible, yet the Infraco has ignored these mitigation measures in the delay analysis contained in the Estimate.

Lifting embargos

Likewise, some embargos have already been relaxed and there is clearly scope for further relaxations. **tie** has made the Infraco aware of this, yet Infraco's analysis ignores this.

Lifting Infraco imposed constraints

Self imposed resource constraints and preferential programming logic are driving a significant proportion of the projected delay. Relaxation of some of these would appear to greatly reduce the cost implications of this **tie** Change.

Advancement of available works

Infraco's delay analysis shows wide-spread delay across all of the Infraco Works yet only a relatively small proportion of these are physically delayed by late completion of utilities diversions. Infraco's failure to progress readily available parts of the Works is increasing the demand for on resources in the later stages of the project. This is creating further and avoidable projected delay. It is also increasing the adverse impact of the Infraco imposed constraints referred to above.

Reduction of the duration of some of the critical path activities

There would appear to be opportunities to reduce the durations of some activities in the programme. It is noting that many of these activities appear to be on the critical paths to the Sectional Completion Dates. Where the cost of reducing these durations is nil or relatively small compared with the saving realised from delay mitigation and reduction in prolongation costs, such a mitigation measure clearly forms part of the most cost effective implementation of this **tie** Change.

Review of Designs

tie considers that some of the designs currently being promoted by the Infraco are inefficient both in terms of construction cost and time required for their construction. These shortcomings in the Infraco's obligations are contributing to the delay projected in the Estimate.



In its Notice of Dispute dated 4 September 2009 and subsequent Position Paper dated 15 September 2009, the Infraco states that;

(progressive reveal)

tie disagrees with all of these points.

It is clear from examination of the submission made by the Infraco and analysis conducted by **tie** that the delay presented in the Estimate can readily be mitigated to reduced the projected impact of the MUDFA 8 delays.

Clause 80 makes no reference to “acceleration”.

The Infraco Contract does not define the term “acceleration”.

tie does not understand why the Infraco considers it contractual correct to exclude what it claims to be “acceleration measures”, in their entirety, from the preparation of the Estimate. To do so ignores the specific contractual obligations to mitigate the impact of the **tie** Change and implement it in the most cost effective manner.

The Estimate, as currently submitted, denies **tie** the information necessary for it to formulate and issue a **tie** Change Order. The Infraco’s failure, and in some respects refusal, to provide this information is preventing the proper and timeous application of the contractual processes set-out in Clause 80.



In addition to the specific requirements of Clause 80, the Contract contains the following general obligations.

(Progressive reveal)

tie considers the Infracore's approach to this Estimate to be contrary to all of these obligations and a deliberate (?) obstruction to the prescribed contractual process for dealing with **tie** Change. The consequences of the Infracore's approach are projections of avoidable delay that give rise to considerable additional cost.

tie wants to engage with the Infracore to discuss and agree the Estimate but it must do so in accordance with the Contract.

It is important to note that **tie** is a publicly accountable body and does not have licence to cut across contract provisions, particularly where the matters being dealt with have a significant commercial impact. It has a duty to ensure that the Contract is correctly administered and that both parties received their fair entitlements. To agree the Estimate, in the form that it has currently been presented, would be a flagrant breach of that duty.





Methodology

“As-planned” impacted

A methodology much criticised in established case law for the following reasons;

Entirely theoretical

Takes no account of actual progress

Takes no account of any re-sequencing

Ignores any duty to mitigate the delays

Errors

Some of the dates used are, in **tie’s** opinion, incorrect.

The programme network contains some erroneous links between MUDFA milestones and sections of the Infraco Works.

Principles

The impacted MUDFA 8 dates have been applied to all works on each section of the route. The impacted date represents the actual or forecast completion date for the latest utility diversion on that section. Given that the average section is approximately 2km long, it is readily apparent that not all of the Infraco Works on that section cannot commence before the final utility is diverted.

The Infraco delay analysis is constrained by resource limitations imposed by the Infraco. This significantly increases the projected delay to completion. Relaxation of these constraints would appear to be a readily deliverable and cost effective mitigation measure. The Infraco has refused to enter discussions about such mitigation prior to the award of extensions of time based on delay analyses that take no account of such mitigation.

The Infraco delay analysis is based on a programme network that retains preferential from the original programme. Some of this logic has now been superseded. Some of it is entirely preferential and could readily be revised as means of mitigation. The Infraco has refused to consider such adjustment prior to **tie’s** award of extension of time.

Examination of the detail of the programme indicates there are many possible means of mitigating delay through adjustment of resources, re-sequencing, adjustment of constraints and the likes. The Infraco has refused to consider such adjustment prior to **tie’s** award of extension of time.

Unanswered questions

It is becoming apparent that the activity interdependencies detailed in the Infraco impacted programme are no necessarily on the critical paths that are driving actual progress on site.

The Infraco’s delay analysis ignores what was also happening to other activities at the same time as the MUDFA delays were occurring. It appears to **tie** that in many sections the MUDFA delays are not on the critical path and that other issues are in fact driving the various Sectional Completion Dates.

Conclusion

The substance of these criticisms, along with the considerable and most important omissions from the Estimate are considered to by Infraco create obstacles to the proper operation of the contract and in particular the requirements of mechanisms set out in



TM

The contract requirements impose certain constraints on traffic management. The logic network of the Infraco's original programme contained links to order the planned works to meet these requirements. Subsequently, **tie** has granted relaxations to some of these constraints to provide a means of mitigating delay. **tie** has indicated to Infraco that further relaxations would be considered, particularly if they would provide effective delay mitigation. The Infraco's delay analysis maintains the programming logic from the original programme thereby ignoring this opportunity to mitigate.

Embargos

In a similar manner the contract requirements impose certain embargos in certain areas at certain times. Again, the Infraco has ignored the mitigation opportunities that could be realised from any relaxations that could be delivered by **tie**.

Resources

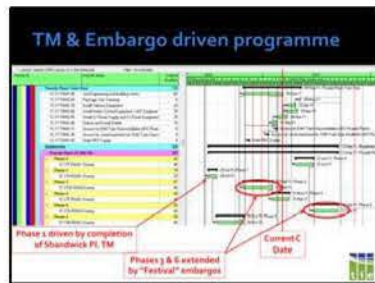
The resource constraints on the number of track and OLE gangs to be made available for the execution of the works is entirely a creation of the Infraco. There would appear to be no physical or practical reason for strict adherence to this constraint.

Re-ordering

The impacted programme retains the preferential logic of the original thereby ignoring further mitigation opportunities.

Additional Resources

No consideration appears to have been given to reducing the duration of activities on the critical path by increasing resources and/or working additional hours. This most common method of mitigation has not been considered as part of the Infraco's claim submission.







Although not shown as such on this slide, these activities form the critical path to Sectional Completion Date C, according to the Infracore's MUDFA 8 with mitigation delay analysis.

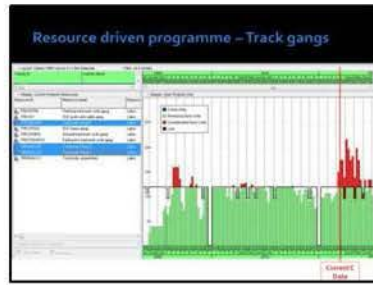
Once again, the duration of the sequence of physical activities that make-up the require works is prolonged because of resource constraints. In this example a resource driven delay of over 7 months is apparent.

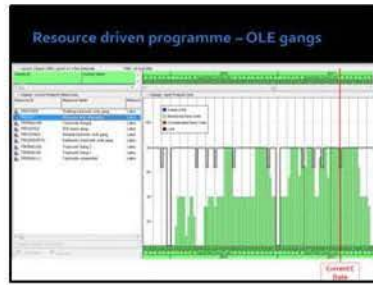


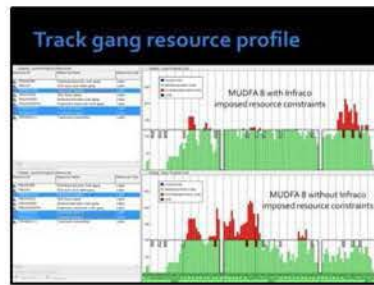
Removing the computer generated resource constraint and not only is the delay reduced, this section of the works has a projected completion 7 months ahead of the CURRENT Section C Completion Date.

This exemplifies one of the basic flaws of an entirely theoretical analysis. The computer software is projecting significant delays that make no sense and, with a little bit of advance planning can be readily mitigated.

The peak demand for OLE resource could be overcome by employing an additional gang of men and equipment for a relatively short period of time.







It is accepted that a programme cannot be based on an infinite availability of resources. From a practical point of view it is also necessary to be able to plan and procure resources in advance and deploy them in an efficient manner. If resource constraints are lifted, a prudent construction planner should check the demand created by such action.

This is the resource demand profile for the Infraco's MUDFA 8 delay analysis. It, generally, adheres to the Infraco's stated resource constraint of three track laying gangs.

Removing the computer generated resource constraint creates this revised profile. It is apparent that there is a requirement for more than three track gangs during the earlier stages of the Project. It would appear that this could be satisfied by one additional gang, given some programming refinement.



Examination of the other imposed resource constraint, overhead line gangs, shows a similar but more pronounced profile comparison.

Lifting the computer generated resource constraint shows the two gang limit to be exceeded for a relatively short period of time. Adding one more gang for a relatively short period of time appears to satisfy the demand.

This mitigation measure on its own reduces the overall delay to completion by three months.

Sectional Completion Dates				
Current Programme Review	MUDRA 6 Claim	ExT Allowed by Infraco (calendar days)	Comment	
A	1 June 2012	13 Dec 2012	181	Completion of the Depot so that it may receive trams.
B	1 July 2012	28 Jan 2013	181	Section B date is 28 days after the Section A date, ensuring sufficient track is laid away from the Depot.
C	22 Mar 2013	22 Nov 2013	333	Completion of all Infraco construction works other than the final two phases of Platform 1.
D	6 Sept 2013	20 May 2014	257	Section D date is 6 months after the Section C date.

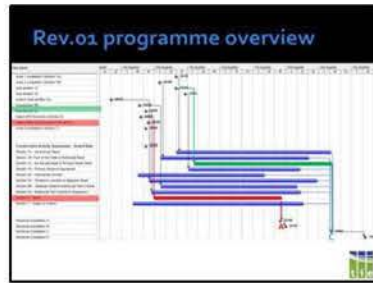
This table summarises the delays as currently claimed by the Infraco.

Section B is simply calculated as 28 days after Section A.

Section D is simply calculated as 6 months after Section C.

For these reasons we will focus only on the Section A & C completion dates in our review of the Infraco's delay analysis.

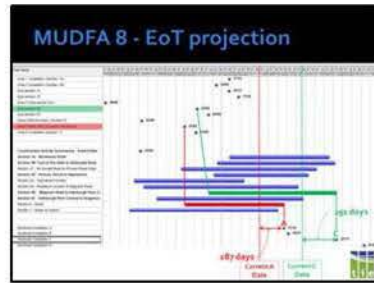




This slide summarises the Rev.01 programme. Each section is represented by a single bar.

Sectional Completion Date A is driven by the Depot programme.

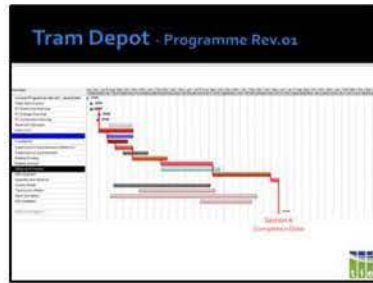
Sectional Completion Date C is driven by the Section 1C programme



The MUDFA 8 programme shows a 187 day projected delay to completion of the Depot.

The critical path to Section C completion now runs through Section 5B, albeit Section 1B is not far behind.

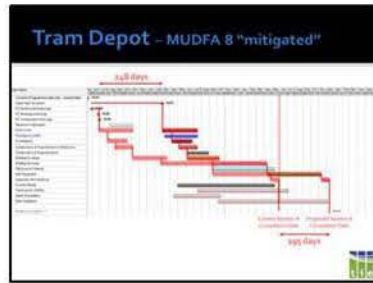
To understand what is actually driving these delays closer examination of the facts and analysis is required.



This is a summary of the Depot programme as detailed on the Rev. 01, “current” Programme.

The critical path flows through these activities.

It is relevant to note that the Water Main diversion is not on the critical path. The critical path is kicked-off by the release of the Earthworks design.



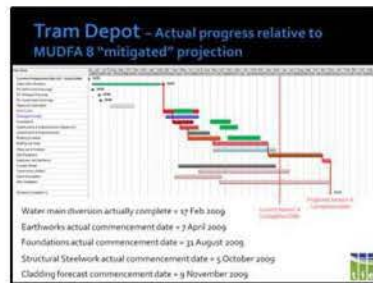
The MUDFA mitigated programme shows the planned sequence delayed as follows.

It shows the Water Main delay impacting on all of the following activities.

(Click)

This is the original critical path from which the 195 day delay is measured.

However, missing from this programme is all of the other events and progress that was ongoing around the same time.



If the following facts are added to the programme a very different picture emerges.

The water main diversion was actually completed earlier than the date the Infraco has impacted into its delay analysis programme.

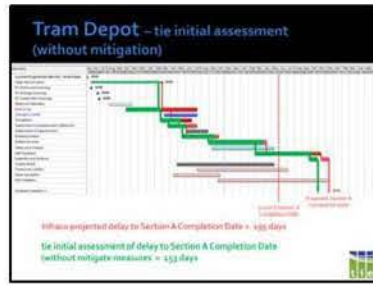
The earthworks didn't actually start until 7 April 2009. From this it is clear than the water main was not driving commencement of the earthworks. It gives rise to the question "What was actually driving commencement of the earthworks?"

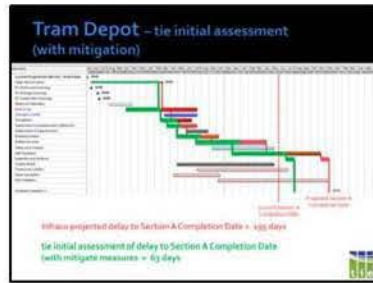
When the earthworks were complete there was another delay until the commencement of the building foundations. It gives rise to the question "What was actually driving commencement of the foundations?"

The erection of the building's steel frame did not commence when sufficient foundations were available. It is understood that the steel had not been fabricated in time. In the summer of 2008 tie instructed the Infraco to procure the steelwork in advance and agreed to accept responsibility for proceeding at risk. This gives rise to the question "Why was the steel frame not ready for erection when over one year earlier the Infraco had been instruction to procure it?"

The cladding is forecast to commence in early November 2009.

This chart brings into question the Infraco's assertion that late completion of the Water Main diversion was the cause of the need to revise the Sectional Completion A Date. It appears that this is not the case. There appear to be several other delays that are actually driving the Depot and the water main diversion is ot one of them.





Section 5B

- Slides to be developed





Section 2 Utility Diversions Rev 1 Finish NO MILESTONE **MUDFA Rev 8 Finish 19May09**
S19 Haymarket viaduct Rev 1 Start 31Jul08 **MUDFA Rev 8 Start 31Jul08**
Track works Haymarket to Roseburn Rev 1 Start 09Sep08 **MUDFA Rev 8 Start 19May09**



Section 5B Utility Diversions Rev 1 Finish 11Apr08 **MUDFA Rev 8 Finish 23May09**

S23 Carricknowe bridge Rev 1 Start 12Aug08 **MUDFA Rev 8 Start 12Aug08**

W11 Bankhead Drive RW Rev 1 Start 24Jun08 **MUDFA Rev 8 Start 26May09**

S26 South Gyle Access bridge Rev 1 Start 24Jun08 **MUDFA Rev 8 Start 26May09**

Track works Balgreen Road to Saughton Road North Rev 1 Start 25Aug08 **MUDFA Rev 8 Start 28Apr09**

Track works Saughton Road North to Bankhead Rev 1 Start 04Nov08 **MUDFA Rev 8 Start 26May09**

Track works Bankhead to Edinburgh Park Station Rev 1 Start 20Aug08 **MUDFA Rev 8 Start 26May09**

Track works Edinburgh Park Station to Edinburgh Park Central Rev 1 Start 20Aug08 **MUDFA Rev 8 Start 26May09**

Section 5C – Edinburgh Park Central to
Gogarburn



Section 7 – Gogarburn to Edinburgh Airport







The MUDFA 8 programme presents a delay analysis which the Infracore claims to show the actual impact of the MUDFA 8 delays on the Sectional Completion Dates. This analysis is entirely theoretical and gives no consideration to what has and is actually happening on the Project as a whole.

In determining whether the Sectional Completion Dates should be revised as a consequence of the MUDFA 8 delays it is necessary to determine, in accordance with the terms of the Contract, if they are driving, or will drive these completion dates. Examination of the Infracore's MUDFA 8 analysis identifies, throughout the Project, other delays that appear to be actually on the critical path to the Sectional Completion Dates. This slide shows three examples of what appear to be other delays that will actually be on the critical path.

(Reveal examples)

Haymarket Viaduct. – The MUDFA 8 programme shows this structure to be complete by now, yet it has barely started and no work has taken place on it for quite some time. More importantly, this actual delay has exceeded by quite some margin all of the available float shown on the MUDFA 8 programme. If this actual progress was to be inserted in the MUDFA 8 programme the MUDFA delays would not be driving some or all of the Sectional Completion Dates.

Russell Road Bridge shows a very similar situation. Contrary to **tie's** specific instructions, the Infracore has not started this structure. If the actual delay was to be inserted into the MUDFA 8 programme it would exceed the available float and contribute to a critical path longer than the one presented by the Infracore in the Estimate.

There are many more examples like this spread throughout the Infracore's MUDFA 8 delay analysis. These exemplify the serious shortcoming of an "as-planned impacted" analysis. This is one of the principle reasons why the courts have discredited this form of analysis, particularly where it is used on large-scale and complex Projects.