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# Report on investigations into delays incurred to certain elements of the Infraco Works

in relation to the

## The Edinburgh Tram Project

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Prepared by: **Robert Burt** BSc(QS) LLM (Const Law) DipArb MRICS MCI Arb

and

**John Hughes** LLM (Const Law)

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On behalf of: **tie** Limited

under the instructions and directions of:

Susan Clark, Deputy Project Director, **tie** Limited

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Acutus  
Merlin House  
Mossland Road  
Hillington Park  
Glasgow  
G52 4XZ

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## Executive Summary

1. This report has been prepared to investigate and, where possible, identify areas of culpability for delays incurred to commencement, progress and completion of certain key elements, and hence Sectional Completion Dates A, B C & D, of the Infraco Works.
2. The investigations carried out to date indicate that **both parties to the Infraco Contract bear some responsibility for the delays incurred**. There is also the potential the SDS has contributed to those delays. Our current opinion on the parties respective culpability for delay has been summarised within '**Appendix (i)**' attached to this report.
3. These investigations have identified a number of key areas of further investigation and/or audit which are required in order to more accurately establish the precise measure of each party's culpability. As a consequence, a number of **recommendations** have been made within the main body of this report in relation to matters such as (i) the reasons for delays to IFC package issue dates (both original and revised packages); (ii) the dates when the Infraco Design was issued to SDS; (iii) the INTC process; and (iv) Infraco sub-contractor procurement. Items (i) and (ii) above are key areas of uncertainty where delays have occurred but the reasons for same are uncertain.
4. We have also made further recommendations in respect of **tie** maintaining a detailed INTC Master List Schedule, a more comprehensive IFC tracker process and the contemporaneous compilation of a detailed as-built programme.
5. For each of the Sectional Completion Dates we note the following in respect of our current estimate of liability for delay:-

1	2	3	4	5	6
Sectional Completion Date	Overall Projected Delay		Estimated tie culpability	Estimated Infraco culpability	Report Section
Section A	57 weeks	Lower Limit	25 weeks	14 weeks	Section 3
		Upper Limit	43 weeks	32 weeks	
Section B	57 weeks	Lower Limit	25 weeks	14 weeks	
		Upper Limit	43 weeks	32 weeks	
Section C	61 weeks	Lower Limit	61 weeks	0 weeks	Section 4
		Upper Limit	61 weeks	0 weeks	
Section D	61 weeks	Lower Limit	61 weeks	0 weeks	
		Upper Limit	61 weeks	0 weeks	

**Note:** The delay periods are measured against a mitigated view of Infraco's Revision 3 Setp 4 Issue 3 programme. Agreement has yet to be reached with Infraco as to the achievability of those dates.



6. In respect of **Section A** (Depot), **tie's** liability for delay is estimated to be between **25 to 43 weeks** (out of a total delay analysed of **57 weeks**). That is likely to give rise to a liability for area specific prolongation costs. Please refer to **Section 3** of this report for further details. Regarding the **Section B** date, although the projected delay is presently noted above as corresponding to the Section A delay, this is at risk of being further delayed due to the issues arising at Gogar landfill (please refer to paragraph 3.3.2(i) below).
7. **tie** culpability for delays to the **Section C** date is in all probability estimated to be the full period of the projected delay of **61 weeks** forecast by the most recent mitigation exercise (section **4.7** refers). This assumes that the Infraco's interpretation of how extension of time for Notified Departures (late completion of MUDFA Works) is not supported by the Adjudicator in the 'MUDFA Revision 8 Estimate' dispute decision. If it is, **tie's** potential liability for delay could be much higher (potentially circa. 100 weeks.) This is also likely to give rise to a **tie** liability for **project level prolongation costs**. **Section 4** of this report refers. The measure of prolongation costs to which Infraco may be entitled however, is not necessarily inextricably linked to the period of extension of time to which it is entitled. Matters such as concurrency and causation of the particular loss claimed will feature in any analysis of entitlement to additional payment. Failures on the part of SDS where proven by further audit and analysis may also entitle **tie** to deduct sums from payments due to Infraco. Detailed analysis of the costs ultimately claimed by Infraco will be required to ensure that any sums claimed is properly due taking all of the above into consideration.
8. The measure of the delay which will actually be incurred however is dependent upon Infraco's implementation of mitigation and/or other acceleration measures which could be adopted to limit the delays actually incurred. Agreement on such measures has yet to occur.
9. In this regard, at intermediate and sub-section level in particular, there is considerable evidence of **Infraco culpability for delay** in the various elements within Sections 2<sup>1</sup>, 5 & 7. This is highlighted within '**Appendix (i)**' attached. It is stressed that whilst this may not translate into a disallowable period of extension of time for the Section C date, it does/should preclude both Infraco and its sub-contractors' from an entitlement to recovery of the prolongation costs incurred during those periods of culpable delay. Much will depend on the nature and type of costs claimed or yet to be claimed.

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<sup>1</sup> Section 2 does not form part of this current exercise and report; Section 2 is not considered as important in terms of overall project delays.



10. It is important to note that the assessment of estimated culpability detailed above includes matters known about up to end of April 2010. Latest predictions on completion of the MUDFA Works show further slippage from the dates used in this analysis. As matters and construction progress, culpability is likely to change as the causes of delay change or responsibility moves from one party to another. It is therefore essential that **tie** continues to closely monitor, record and analyse progress of the various elements of the Infraco Works.



## Section 1 Introduction

### 1.1 Formal details

1.1.1 This report has been prepared by **Robert Burt** (Director) and **John Hughes** (Consultant), both of Acutus. Assistance was also provided by **Iain McAlister**, Associate Director at Acutus.

### 1.2 Instructions and issues to be addressed

1.2.1 On 3 March 2010 Acutus provided an initial view on potential **tie** liability for delay to the Infraco Works (Acutus email of 3 March 2010 refers). A subsequent meeting was held on 10 March 2010 between **tie** and Acutus to discuss those initial conclusions. At that meeting it was agreed that a further process of investigation would be undertaken by Acutus. Those investigations were to focus on certain 'prioritised' elements of the Infraco Works which were jointly identified as being likely to be critical to overall progress and completion. 27 'elements' were selected out of a total of 80 sections/areas which together form the Infraco Works. It was further agreed that a deadline of 12 May 2010 would be set for Acutus to report back to **tie**. A draft report was issued for discussion on that date.

1.2.2 Subsequent to the issue of that draft report, meetings were held with the **tie** personnel on 3 and 8 June 2010 to discuss issues arising from same. This final report incorporates the comments made and further information received.

1.2.3 Each element was given a priority level code<sup>2</sup> depending on the then perceived level of importance in respect of progress and delay to the relevant Sections and Sectional Completion Dates. Those prioritised elements are set out in the table below.

Priority level	Intermediate Section	Description of area / structure
1	1A4	Lindsay Road RW -W1
1	1A4	Road and Track
1	1A3	Victoria Dock Bridge - S16
1	1A3	Tower Place Bridge - S17
1	1A1	Road and Track
1	1B	Road and Track
1	1C2	Road and Track

<sup>2</sup> Priority level '1' being considered to have more relevance in terms of effect on progress and delay than level '2'



Priority level	Intermediate Section	Description of area / structure
1	1C3	Road and Track
2	5A	Russell RD RW - W3
1	5A	Russell RD RW - W4
1	5A	Murrayfield TS RW - W18
2	5A	Murrayfield TS
1	5A	Roseburn Viaduct - S21A
2	5A	Murrayfield Stadium Underpass - S21C
2	5A	Water of Leith Bridge - S21E
1	5A	Baird Drive Retaining Wall - W8
1	5A	Balgreen Road Bridge - S22A Incl. Balgreen Road Retaining Wall W9
1	5A	Balgreen Road Bridge - S22B
2	5B	Carrick Knowe Bridge - S23
2	5B	Road and Track
2	5C	Road and Track
1	5C	A8 Underpass - W28
1	5C	Depot Access Road Bridge - S32
1	6	Depot Building
1	6	Roads & Track – Depot
1	7a	Track - Section 7
1	7b	Gogarburn RW - W14/W15

1.2.4 The main objectives of this exercise were to identify, as far as possible within the time and from the records available:-

- a) the key matters which had caused or were causing delay to the elements under investigation, including delay to commencement, progress and projected completion;
- b) to identify areas of concurrent delay and express a view on the significance of same;
- c) to express our current opinion on the extent of **tie** liability in respect of delay to each element and from those elements the likely liability in respect of the Sectional Completion Dates; and
- d) to identify any areas of further investigation (including possible audits of Infraco’s files) which may be required.

1.2.5 It is anticipated that the output from this and other future exercises, undertaken by **tie** or others, will assist and inform decisions in respect of extensions of time and additional payment at Sectional Completion level. This process will also provide a platform from





which tie can assess, and if necessary defend, claims for additional payment from Infraco and/or its sub-contractors at Section and intermediate section level. It will also inform project risk profile considerations.

- 1.2.6 This report and the appendices attaching hereto, summarises our findings and opinion in respect of the above.

### 1.3 Information, data and documentation provided

- 1.3.1 Information and data required for the investigations, was identified and generally requested via a series of email questionnaires issued in respect of each element<sup>3</sup>. That information was subsequently provided by tie either by email or during discussions with tie personnel.

- 1.3.2 That said, during the investigations it became apparent that in some instances certain important data was not always / readily available. As a consequence, we have made specific recommendations within the subsequent sections (where relevant) regarding, for example, the need for further audits to be carried out by tie (including the type of information and documentation required to be recovered from Infraco during that process). For ease of reference any such 'recommendations' have been indicated thus "**Recommendation: ...**".

- 1.3.3 As noted above, a timescale for this exercise was set whereby it was agreed that Acutus would report back to tie on 12 May 2010. Further information was provided by tie personnel over the period from 1 June 2010 up to the completion of this final report. Due to the relatively short timescales, for the most part the information, data and advice upon which the current exercise and opinion is based, has been provided by tie personnel. That process is to be distinguished from separate interrogation and verification of the contemporaneous project evidence files by ourselves. While we have no reason to doubt the information and data provided, time has not permitted independent corroboration of the majority of that information.

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<sup>3</sup> Questions in respect of structure related questions were issued under cover of emails dated 22 March 2010, 23 March 2010, 12 April 2010, 19 April 2010, 22 April 2010, 26 April 2010 and 29 April 2020 refer. Separate emails were issued in respect of contractual questions, design processes and INTC data.



## **1.4 Meetings held**

1.4.1 A number of meetings were held with various **tie** project management staff over the course of the investigations. In this regard, meetings and/or telephone discussions were held with the following individuals:-

- a) Malcolm Butchert and Alisdair Dickinson (in respect of intermediate section 1A);
- b) Phil Dobbin (in respect of intermediate section 1B);
- c) David Burns (in respect of intermediate section 1C);
- d) Tom Cotter (in respect of intermediate sections 5A & 5B);
- e) Andrew Scott (in respect of intermediate sections 5C, 6 & 7); and
- f) Colin Neil.

(Note: Section 2 was not included in this exercise due to the fact that it was not considered to be a priority in terms of progress and/or delay to the overall Infraco Works)

1.4.2 Further meetings and dialogue were held with Damian Sharp (in respect of design processes and data), Fiona Dunn (re commercial issues such as INTC's and sub-contractor procurement) and Tom Hickman (regarding planning and as-built data).

1.4.3 It is relevant to note that all **tie** personnel were extremely helpful and willing to assist in this process, providing whatever assistance they could (often outwith normal working hours).



## Section 2 Preamble to analysis and conclusions

### 2.1 Generally

2.1.1 The investigations and analysis focussed on the following key headings which were highlighted as being consistently significant in terms of progress and delays. Those headings are:-

- A. The “Issue For Construction drawings” (**‘IFC’**) **process** – see report section **2.2** below and Section ‘A’ of each individual appendix;
- B. The “Infraco Notice of tie Change” (**‘INTC’**) **process** – see report section **2.3** below and Section ‘B’ of each individual appendix;
- C. The progress and completion of the **MUDFA Works or other utility works** – see report section **2.4** below and Section ‘C’ of each individual appendix;
- D. **‘Other’** matters such as sub-contractor procurement by Infraco, Work Package Plan (WPP) submissions by Infraco, the Infraco IDR/IDC process and other structure or area related issues arising during the investigations. See report section **2.5** below and Section ‘D’ of each individual appendix;
- E. Comparison of the **construction periods** included within Infraco’s Revision 1 and Revision 3 programmes – see report section **2.6** below and Section ‘E’ of each individual appendix; and
- F. **Availability of specific areas** (whether in whole or in part) – see Section ‘F’ of each individual appendix.

2.1.2 For consistency, progress and delays attaching to each element has been considered under each of the above headings.

2.1.3 Prior to outlining the specific findings in respect of each prioritised element it is prudent to make the following general comments in respect of each of the key headings.

### 2.2 IFC process

2.2.1 A key issue identified in a number of instances was the availability of design such that the works could commence or progress could be maintained. Matters such as late release of the IFC by the date identified in the Programme or a material breach by SDS in



performance of its obligations are Compensation Events under the Infraco Contract<sup>4</sup>. Those matters *may* give Infraco an entitlement to additional time and payment but only where they have been established as the direct cause of delay to the Works (albeit that Infraco entitlement to any additional payment is also subject to certain potential deductions as set out in Clauses 65.12.2 and 65.13). It is therefore important to identify and establish, as far as possible, whether any such Compensation Events were “... *the direct cause of a delay in achievement of the issue of a Certificate of Sectional Completion* ...” (emphasis added).

2.2.2 In addition, questions surrounding Infraco’s management<sup>5</sup> (or otherwise) of SDS and the IFC process generally were also raised by tie during the current exercise. That, together with the provisions of Clause 19.19<sup>6</sup>, tie’s liability for delays in respect of tie Changes and third party approval delays, render it essential that the ‘cause’ of any delay to the IFC’s be established (as distinct from merely identifying that a delay in IFC issue has occurred).

2.2.3 As a consequence, during the current exercise we requested and were provided with, a copy of tie’s “*SDS Approvals tracker*”<sup>7</sup>. That document provided information relating to the dates on which the ‘first’ IFC packages were planned to be issued and when/if they were actually issued. From that data we were able to establish whether any delay had in fact occurred to the (first) IFC.

2.2.4 It is apparent however that certain further information is required in order to establish, with a greater degree of certainty, the culpability for any such delay in IFC issue. That further information is not presently available, as further explained below:-

- a) **‘Cause’ of delays to Initial IFC:** the “*SDS Approvals tracker*” monitors only the issue of, and delays in respect of, the first IFC for each ‘package’. It does not however specifically identify the ‘cause’ of that delay. Potential causes of delay may include one or more of the following:-
  - i. late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);

<sup>4</sup> Clause 65 and Compensation Events (t) and (u) respectively

<sup>5</sup> Clauses 11.3 & 11.4 of the Infraco Contract refer

<sup>6</sup> Clause 19.19 limits tie’s liability for Compensation Events in certain circumstances related to failures on the part of Infraco

<sup>7</sup> Copy provided to us was the MS Excel file ref. ‘SDS Approvals tracker – download at 6 April 2010.xlsm’



- ii. a material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- iii. a failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule Part 14 (clause 19.19 refers);
- iv. a **tie** Change;
- v. A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC/NR interface); and/or
- vi. A requirement of CEC/NR for which tie will bear responsibility;

No doubt there are a number of other potential causes of delay not identified above. However, until further details are available it is not possible (in the majority of instances) to establish with any certainty the cause of and culpability for delay in the issue of the IFC's.

**Recommendation:** tie should (on a focussed basis) carry out an audit of identified IFC packages against which critical delays may have occurred.

**Recommendation:** a significant delay has been identified in respect of the design for **Roseburn Viaduct** within Intermediate Section 5A. Delay in the region of **114 weeks** is now forecast to be incurred to the IFC (incorporating the VE design) for this structure (see Appendix 11). This structure is crucial to the works in 5A which itself is key to completion of the 'off-street' works within Sectional Completion C. As a consequence, it is recommended that a detailed audit of this process of, and delays to, the design of this structure is undertaken.

- b) **Revised IFC drawings:** the current "*SDS Approvals tracker*" monitors only the first IFC issued in respect of each 'package'. It does not track either the timing of, or reasons for, the re-issue of subsequent revised IFC's for those packages.

**Recommendation:** tie should consider implementing a wider, more comprehensive IFC tracker capable of monitoring the subsequent revised issues of each IFC. That tracker should also endeavour to identify the reasons and culpability for the revisions made. This will more readily inform any subsequent analysis of delays.



- c) **Infraco Design:** there is no data presently available (to ourselves or **tie**) that can inform us as to when Infraco provided its design to SDS. We understand that although **tie** has requested this information from Infraco, it has refused to provide this information. This however affects, among other things, the consideration of Clause 65(t) and **tie's** ability to apply clause 19.19 where or if appropriate.

In this regard, we are advised that an audit is planned on selected areas of design which should retrieve this type of information (at least for the areas considered by the audit). We understand the proposed audit will also address (or attempt to address) retrieval of information on how, or how effectively, Infraco managed SDS. That information however is not yet available.

**Recommendation:** **tie** should press Infraco for the provision of data surrounding the provision of the Infraco Design to SDS.

- 2.2.5 As a consequence of the above, we have endeavoured where possible to identify the most likely causes underlying the delays. There is however some uncertainty surrounding the establishment of culpability for these delays. That uncertainty however could be addressed by the data obtained by implementation of the recommendations above.

## 2.3 INTC Process

- 2.3.1 A number of issues arise in respect of the INTC process. We have summarised those issues below together with notes on any interim assumptions made in respect of same.

- a) **INTC Master List: Recommendation** – **tie** may wish to consider maintaining a central master INTC schedule which monitors the various components<sup>8</sup> of the INTC process. That master list is likely to save time in the future locating the relevant details surrounding individual INTC's.
- b) **INTC's included in the current analysis:** we have relied on the **tie** project managers to highlight the key INTC's which have affected commencement, progress and delays to individual structures. A separate exercise is also underway by the **tie** commercial

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<sup>8</sup> Those components include (but are not necessarily limited to) data concerning the relevant location / structure, date Estimate required; relevant (reasonable) extended date for provision of the Estimate; whether revised Estimate required; date Estimate(s) issued; date of tie Change Order; whether subject to 80.13 instruction (and date); whether referred to DRP; date of reference to DRP; whether 80.15 instruction issued by tie; outcome of DRP and other Comments. An example of the type of master list was provided (and used) as part of this current exercise. That data could also be compiled using a database application if that format is preferred by tie.



team, where the current INTC master list is being populated with the relevant data. When complete, the master list will facilitate identification of all INTC's applicable to specific individual areas or structures, thus permitting a more comprehensive analysis to be undertaken. That exercise however is not yet complete – hence our reliance on the INTC's identified by the project management personnel.

**Recommendation:** that the **tie** commercial team continues to compile and maintain a detailed master list of all INTC's (and related data) in either Excel or database format.

- c) **Period for provision of Estimate:** Clause 80 provides that Estimates shall be provided by Infraco within an 18 Business Day period, unless an extended period is agreed by the Parties. We understand that few extensions were agreed by the Parties. There is also no data available to inform us as to **tie**'s position on any reasonable extended period. Time has not permitted us to review the contents of each INTC in order to arrive at a view on a reasonable<sup>9</sup> period for the provision of that Estimate. We have therefore, by necessity, proceeded on the basis that the 18 Business Day period applies to each INTC. It should therefore be borne in mind that this position could be subsequently challenged by Infraco and that a period longer than 18 Business Days may be held by a third party as being applicable / more reasonable.

**Period for tie to review and respond to Estimates:** in the current analysis we have not allowed any specific 'default' period for **tie** to review and respond to Estimates provided by Infraco. While it is accepted that this period will vary depending on the contents and nature of the Estimate, time has not permitted a review the contents of the various Estimates to establish for ourselves what we would consider to be a reasonable period. In any event it is also noted that Compensation Event (x) renders **tie** liable for the "*delay arising between the date tie is notified of a Notified Departure and the actual date on which tie issue a tie Change Order in respect of such Notified Departure*" (where that CE is the direct cause of delay).

As such, the time taken by **tie** beyond receipt of the Estimate has been attributed to **tie** as a period for which it is likely to be culpable. That position is generally in line with the advice received from DLA on 24 March 2010 (email timed at 15:44), where it was

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<sup>9</sup> Please refer to item 4 of the DLA advice note dated 16 January 2010.



noted that “... to avoid further delay/cost consequences, it would be open to tie to refer the Estimate for determination in accordance with DRP”.

- d) **Period taken by Infraco to issue INTC:** the recent exercises have identified a number of instances where significant periods of time have elapsed between an IFC issue date and the date on which Infraco has notified tie of an INTC. As an example, INTC 374 was notified on 26 February 2010. We are advised however that the Geotechnical IFC for this area was available to Infraco on or around 18 December 2008. That equates to a period of 62 weeks prior to notification. On the face of it that period is unreasonable and raises questions as to Infraco’s management of this process and the Works generally. Other similar examples are prevalent throughout several elements. Note: the Infraco Contract does not make specific provision for notification of INTC’s within a specific period.

**Recommendation:** that discussions are held with, or advice sought from, DLA to establish whether excessive time taken to notify INTC’s is a failure / breach by Infraco of its general obligations under the Contract.

- e) **Effect of 80.13 instruction:** we have been provided with a copy of tie’s letter dated 19 March 2010 issuing an 80.13 instruction in respect of a number of INTC’s. We also understand that Infraco has disputed the validity of an instruction under that clause. For present purposes we have proceeded on the premise that the tie 80.13 instruction is valid. In the event that it is found not to be valid, the conclusions concerning culpability for delay associated with those INTC’s may change. In this regard we have also proceeded on the premise that the issue of an 80.13 instruction by tie will not ‘open the door’ for Infraco to somehow argue that such an instruction could/should have been issued earlier. This is particularly relevant to circumstances where Infraco was in significant delay in the provision of Estimates for INTC’s prior to the issue of an 80.13 instruction. Whilst it is considered unlikely that Infraco would be successful in prosecuting such an argument it may be prudent to discuss this with DLA.

## 2.4 MUDFA and/or other utility works

- 2.4.1 Information regarding completion or projected completion of MUDFA or other utility works was obtained from two principles sources, being (i) information obtained from tie project





management personnel and (ii) the marked up photographs of the various sections produced by tie at periodic intervals.

**Recommendation:** that tie maintains a central database of MUDFA / utility commencement / completion dates (that information has proven difficult to extract).

## 2.5 Other

2.5.1 Sub-contractor procurement: data in respect of Infraco's procurement of its sub-contractor's was obtained from two principle sources, being (i) a copy of tie's audit report dated February 2010; and (ii) section 4.1.2.1 and Appendix 10.6 of the Infraco Period Report 3-1 to 24 April 2010. Review of that documentation shows that Infraco has not operated the procurement process in accordance with the Infraco Contract. This could have significant commercial implications as events unfold. In terms of the effect of the procurement process on progress and delays however, the investigations focussed on gaining an understanding of whether the procurement of sub-contractors affected progress of the Infraco Works themselves. In this regard, we note that it is quite possible that the issue of letters of intent (LOI's), as opposed to formal sub-contracts, could lead to delays to either a start on site or progress on site. That is particularly so because the LOI's issued by Infraco all appear to have restricted 'authorised value limits'. It is therefore important to understand whether, and in what way, this process actually affected the sub-contracts in question. That information however is not available from the audit; nor is it available from the Infraco Period Reports. The audit itself identifies this as a further action (at page 4 "Further Audit Requirements", where, in the last two sentences 'scope' and 'timeline' is discussed).

**Recommendation:** that a further audit is carried out by tie (as planned) which goes towards establishing the timing and details of the various extensions to the sub-contractor's letters of intent. That audit should also aim to gain sight of (or retrieve copies of) relevant correspondence between Infraco and the sub-contractors. That information should in turn assist in identifying whether this process caused delays to commencement / progress. Please note however that our initial conclusions in respect of the prioritised elements indicate that sub-contractor procurement process was not a significant obstacle to commencement or progress. This is explained in detail within the relevant appendices.



2.5.2 Infraco IDR/IDC process: Following discussions with Damian Sharp at tie, we understand that the original intent behind the provisions of Schedule Part 14 was that SDS would have its Inter-disciplinary Design Check (IDC) in place before issue of the IFC; and that Infraco's IDR/IDC would occur after that point. That is, Infraco would 'complete' its element of the design following receipt of the first IFC from SDS. As such, the 'IDC' shown in the flow chart at paragraph 2.2.13 in Schedule Part 14, was apparently intended to relate to the SDS IDC (not Infraco's IDC). That said, it was explained that the flow chart *could* also apply to the subsequent Infraco design process but in a separate timescale (it is this separate timescale that needs to be better understood). It was also explained that it was not anticipated that SDS would update its IFC for subsequent Infraco design input or change requests. However, it is apparent that this is now occurring such that revised IFC's are being issued by SDS following integration of Infraco Design; with Infraco submitting Compensation Event notices under CE(t). We have been unable to establish where the Infraco IDR/IDC process sits in terms of the contractual timeline.

In addition, we have not yet located where or if it is explicitly stated, or impliedly included, in the Infraco Contract that the Infraco Design has to be in place before construction starts (this may however fall out of Schedule Part 14 Part A clause 7). This should be discussed further to ensure that tie's position on this issue is protected. Other related contractual issues arising during our discussions with Damian Sharp include:-

- a) Does Compensation Event '(t)' relate only to the first IFC in respect of the 112 listed in the Design Delivery Programme (currently the projection is that 262 IFC's will be issued)?
- b) How should IFC's emanating from the development workshops feature in this process?
- c) How should the inclusion of Infraco's design in a subsequently revised IFC from SDS be addressed?

**Recommendation:** further investigation (via tie audit) into the provision of the Infraco Design and the subsequent timing of the integration of that Infraco Design into the SDS design.

**Recommendation:** clarification of the contractual issues raised above.



## 2.6 Comparison of the construction periods included within Infraco's Revision 1 and Revision 3 programmes

- 2.6.1 Within the individual analysis of each of the prioritised elements, we have undertaken a review of (i) the delay to start of the relevant structure / element; and (ii) any forecast delay to the finish of same.
- 2.6.2 We have also undertaken a review and comparison of the different construction periods included within the following programmes:-
- a) Infraco Revision 1 Programme;
  - b) Infraco Revision 3 Step 4 Issue 3 programme; and
  - c) Iain McAlister's opinion on a reasonable mitigated version of Infraco's programme Revision 3 Step 4 Issue 1<sup>[10]</sup>.
- 2.6.3 The latter review (of forecast delays to finish dates) necessarily includes consideration of any increased activity durations included within the Infraco Programme Revision 3 Step 4 Issue 3. Those durations have therefore been compared with the Infraco Revision 1 durations. We note however that no information has been provided by Infraco which substantiates the increased duration included in the latest programme.

### Compilation of as-built programme

- 2.6.4 Availability of accurate as-built data is and will be essential to the successful defence, or prosecution, of any claims and/or counterclaims. While some as-built information was made available by tie's project management personnel, the absence of detailed as-built data has hindered the current exercise. As such, it is important to reinforce the value of detailed as-built records and the contemporaneous compilation of a detailed record of as-built progress (ideally in programme format).

**Recommendation:** that tie allocates a resource (possibly a dedicated resource) to the compilation of an accurate and detailed as-built programme together with evidence files (which support / validate the entries within the as-built programme).

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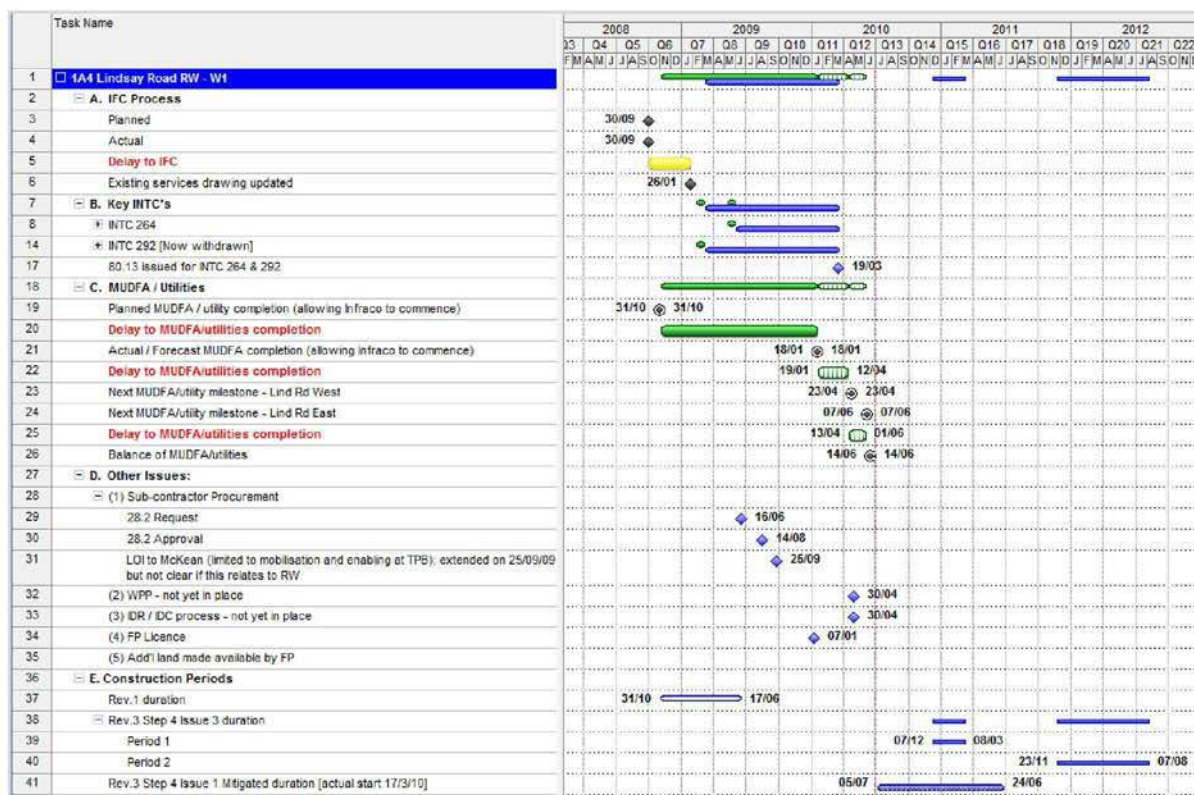
<sup>10</sup> Note: we have used the IM view of Infraco's programme Revision 3 Step 4 Issue 1 (as distinct from Revision 3 Step 4 Issue 3) due to the fact that the Issue 3 exercise has only recently been completed. As such there may ultimately be some minor differences between those two exercises which may require to be reconciled in the future. However for present purposes use of Revision 3 Step 4 Issue 1 provides the information necessary to consider indicative comparisons.



## 2.7 Process of review and analysis

2.7.1 The following provides a brief overview of the analysis undertaken in respect of each of the prioritised elements.

2.7.2 Summary programme: a simple summary programme has been prepared for each prioritised element identifying key facts in relation to ‘A. the IFC Process’; ‘B. the INTC process’; ‘C. MUDFA / Utilities’; ‘D. Other issues’; and ‘E. Construction periods’. Illustrating all of the above in a programme allowed us to view the inter-relationship of each of those issues graphically within the correct timeframe. See example below<sup>11</sup>.



2.7.3 ‘A. IFC Process’: planned and actual IFC issue dates were plotted in respect of the key IFC’s for the relevant structure or element. Where a delay was incurred to the IFC, information was sought in respect of the cause of that delay. At this stage, and particularly in relation to the time available, we have necessarily relied upon **tie** personnel’s interpretation of responsibility for the causes of the IFC delay (please refer to section 2.2 above). Delays were indicated by a **yellow bar** (indicating culpability for IFC delay has to be firmed up; in

<sup>11</sup> **Note:** it was necessary to establish a ‘cut-off’ date for the current exercise (in order to allow interim conclusions to be reached). For the most part a cut-off date of 30 April 2010 was selected (unless noted otherwise).



respect of 1C2, Appendix 7, however culpability for the IFC delay has been shown by a **green bar** indicating **tie** (CEC) culpability).

- 2.7.4 'B. INTC Process': information was obtained from **tie** project management personnel on the key INTC's which were thought to have affected commencement and/or progress. Information was then sought in respect of the key stages in the INTC process including notification date, date Estimate required, date Estimate submitted (if at all) and dates of any applicable 80.13 or 80.15 instruction. Culpability for delays through that process was categorised on the basis as set out at section 2.3 above. **Blue bars** indicate Infraco culpability; **Green bars** indicate **tie** culpability.
- 2.7.5 'C. MUDFA/Utilities': dates of planned and actual MUDFA and/or other utility completions were plotted. Culpability for same was indicated. Again, **blue bars** indicate Infraco culpability; **green bars** indicate **tie** culpability.
- 2.7.6 'D. Other issues': where possible the sub-contractor procurement process was tracked through the various stages including (i) clause 28.2 & 28.4 requests and approvals; and (ii) issue dates of letters of intent. Milestone dates were inserted for each.
- 2.7.7 'E. Construction Periods': where possible each chart contains details of the following constructions periods: (i) Revision 1 programme; (ii) Revision 3 Step 4 Issue 3; and (iii) IM mitigated version of Revision 3 Step 4 Issue 1<sup>[12]</sup>. This again allowed us to present a graphical representation of the respective durations within the correct timeframes. An assessment of the delays to start and delays to finish was then undertaken – that process being informed by information provided by, and discussions with, **tie** personnel.
- 2.7.8 'F. tie position on area availability': consideration has also been given to the question of area availability. That is, when in **tie**'s opinion Infraco could / should have commenced works in certain areas. This matter was discussed with the respective tie project management personnel in order to arrive at an opinion on same.
- 2.7.9 Thereafter, within section 'G. Conclusion', we have summarised our opinion, based on the information available, as to the (i) the significant events/issues affecting commencement and/or progress; (ii) concurrent issues/events which may have occurred; and (iii)

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<sup>12</sup> See footnote 10 on page 12 above



consideration of any events which would likely be considered to be the dominant cause of the delay to that element or area.



## Section 3 'Section A & B' – Conclusions arising from current analysis

### 3.1 Generally

3.1.1 Section 'A' is defined within Schedule Part 1 as "means completion of the Depot (including energisation) and the first Tram delivered to the Site and assembled and the completion of all tests required by the Employer's Requirements in relation to that Section".

3.1.2 Two prioritised elements relate to Section A, being (i) the 'Depot Building'; and (ii) 'Roads & Track – Depot'. We note the following in respect of each.

### 3.2 Section 6

3.2.1 **Section 6 Depot Building:** please refer to **Appendix 16** attached. The table below summarises the respective start / finish dates and activity durations within (incl. delays between) the Revision 1, Revision 3 and IM mitigated Rev.3 programmes.

6 Depot Building (taking Earthworks as start dates)					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	27/06/2008	07/04/2009	40.57 wks	07/04/2009	40.57 wks
Finish	01/06/2010	16/06/2011	54.29 wks	31/12/2010	30.43 wks
Cal. Duration	100.71 wks	114.43 wks	13.71 wks	90.57 wks	-10.14 wks

Our conclusions in respect of delay incurred to this structure can be summarised as follows:-

- (i) 'Significant' issues/events: the significant issues affecting commencement of the earthworks were (i) water main diversion; and (ii) INTC 187. The delay due to water main, causing delay to access – 01/08/08 (planned start) to 18/02/09 (when material start should have commenced). **35 week delay (tie culpability)**. INTC 187 (delay in provision of Estimate) appears to have caused a further **6 week delay to the earthworks (Infraco culpability)**. Thereafter there are questions surrounding Infraco performance in earthworks operations, commencement of foundations and steelwork – causing a **16 week delay** to foundations and steelwork. For the most part, excluding the water main, these appear to be Infraco culpability. That said, issues such as increased workscope in terms of earthworks volumes and foundation increased scope must be taken into account. For present purposes we have allocated a **Split liability for this 16 weeks period** (that is to say the liability



for this 16 week period has been split between the parties – see Appendix 16 attached and table below).

**Note:** the above is slightly different from previous information supplied to us. That is, previously we understood that tie’s position was that partial access was available on or around late 2008 (i.e. prior to the completion of the water main). The above however is the explanation we have recently received. If however the earlier tie position is correct the balance of culpability shifts more towards Infraco as a result of a failure to commence earlier. The measure of the shift in culpability is likely to be in the region of **6-10 weeks**.

- (ii) Concurrent issues: there is a question of the completion of the water main diversion (to 05/05/09) being concurrent. This however was not seen as critical to the building. No doubt Infraco will however focus on this and the time periods taken by tie for issue of TCO’s.
- (iii) Considerations of dominance: water main work will be difficult to argue as being anything other than dominant until 18/02/09 (but see note above). Thereafter, the delays to commencement of earthworks, foundations and steelwork are critical.
- (iv) As such, our current opinion on allocation of culpability can be summarised as follows:-

Description	Opinion on tie culpability	Opinion on Infraco culpability
<b>Delay to Start</b>	<i>Range of 25 to 35 weeks</i>	<i>Range of 6 to 16 weeks</i>
<b>Delay up to Steelwork erection:</b> further 16 week delay. This may have been caused by late procurement of steelwork (hence lower range of 0 weeks); but some allowance may also be due for increased earthworks and foundation work (need more detailed as-built data to conclude). There is also a further risk regarding Depot doors.	<i>Range of 0 weeks to 8 weeks</i>	<i>Range of 8 weeks to 16 weeks</i>
<b>Lower limit:</b>	<b>25 weeks</b>	<b>14 weeks</b>
<b>Upper limit:</b>	<b>43 weeks</b>	<b>32 weeks</b>

3.2.2 **Section 6 Roads & Track – Depot’:** please refer to **Appendix 17** attached.

Our conclusions in respect of delay incurred to this element can be summarised as follows:-





- (i) 'Significant' issues/events: There appear to be five main issues affecting this element. Those are (i) the water main delay; (ii) INTC 187; (iii) the delay to issue of the Roads IFC<sup>13</sup>; (iv) the delay to drainage design; and (v) delays to the OLE foundation design. The delay due to water main, delayed access to the site – from 01/08/08 (planned start) to 18/02/09 (when material start should have commenced). **35 week delay; tie culpability.** INTC 187 (delay in provision of Estimate) appears to have caused a further **6 week delay to the earthworks; Infraco culpability.** Thereafter there are questions surrounding the production of the Roads IFC and drainage design. This was not issued by SDS until 14/08/09 (52 weeks later than planned – albeit that the 41 week delay to commencement takes up the majority of that delay). This needs to be audited and analysed.
- (ii) Concurrent issues: there is a question of the final completion of the water main diversion to 05/05/09, being concurrent with other issues above. No doubt Infraco will focus on this and the time periods taken by tie for issue of TCO's. Infraco culpability in respect of the OLE foundations design may yet prove to cause further delay to progress (those delays however have yet to unfold). This should be monitored closely via as-built programme collation and other tie audits.
- (iii) Considerations of dominance: water main work will be difficult to argue as being anything other than dominant until 18/02/09 (as it restricted access to the whole site until mid February 2009). Thereafter, the delay to issue of the Roads IFC is likely to feature significantly in any delay analysis. Culpability for this delay may well rest with SDS (excusable under CE(t) or (u); but may also relate to Infraco failure to manage SDS). Risks remain that CEC was complicit in delay. Overall delay to this element and Section 'A' in particular however linked closely to completion of Depot Building (which at present is the longer more dominant string of activities).

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<sup>13</sup> Delay related to the IFC does not necessarily end with the initial IFC issues on 14/8/2009 given the comments made by CEC and the need to resolve those comments by SDS. However, work should have been able to commence on the roads at that point had other issues been resolved. Further investigation is needed of the subsequent IFCs to determine which issues were sorted when. This investigation would impact on the dates on which the roads could be completed. Further thought is needed about how much road was needed at which point for Sectional Completion Date – a number of outstanding issues are relevant to the ability to open the Depot Access Road to general traffic but they would not impact on the usability of the Depot Access Road formation as a construction and tram delivery route (per DS comments provided on 2 June 2010)



### 3.3 Conclusions in respect of Sections A & B

3.3.1 Please refer to '**Appendix (i)**' for a summary of the detail above and below.

3.3.2 In light of the above, we summarise our current opinion in respect of Sectional Completion Date 'A' as follows:-

(i) Sectional Completion Date 'A' 'time' implications: Potential **tie** liability:-

a. Lower Limit: **25 weeks**.

b. Upper Limit: **43 weeks**.

Note: in terms of Sectional Completion Date 'B' please refer to IM email of 04/03/10. That confirms the following *"The programme logic models the requirement to have the track sections 5C and 7A complete to achieve the Section B 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, we have previously been advised, in discussions with tie's E&M and operations staff, that the actual requirements of the test track is approximately 1km of live track running from the Depot. Having discussed this with tie's PMs 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 progresses 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."* This however is dependent on Infraco resolving the landfill site within the timescale required to suit the above. In this regard however, we were advised at the meeting on 3 June 2010 that completion of the landfill site may not be achieved until April/May 2011. Clearly this has the potential to affect the Sectional Completion Date B. This will require further consideration by **tie** as to the specific contractual and practical requirements for the test track.

(ii) Sectional 'financial' implications: in terms of site prelims it is noted that the majority of the 'time' implications above relates to delayed access to the area. As such, sub-contractor 'Sectional' time related costs should not have been incurred



by Infraco to any great extent, if at all. Infraco 'sectional' costs<sup>14</sup> are likely to be related to Section A dedicated management resources. On that basis, we note the following:

- a. Lower Limit: Infraco costs **25 weeks**; sub-contractor costs **6-10 weeks**.
- b. Upper Limit: Infraco costs **43 weeks**; sub-contractor costs **14-18 weeks**.

3.3.3 In terms of the current projected delays to completion of this Section, we note that within the Revision 3 programme Infraco has increased the projected duration of the Depot Building works by approximately 14 weeks. No substantiation has been provided by Infraco in respect of same. In our opinion no further time should be awarded to Infraco for increased durations until such time as the relevant substantiation is provided. This is particularly relevant in light of the current views on potential mitigation and/or acceleration measures<sup>15</sup>. That said, tie should consider when it needs to have the Depot and Test Track complete. If, for example, Section 'C' is significantly delayed, there may be little benefit in expediting the Depot completion at additional acceleration cost.

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<sup>14</sup> Overall 'Project' related prolongation costs are reconciled

<sup>15</sup> Iain McAlister's previous opinion on the Infraco Revision 3 Step 4 Issue 1 programme was that time (in the region of 10 weeks for the Depot Building and 23 weeks for the associated Roads & Track) could be saved. Please note, that where any of those measures are deemed to be 'acceleration' there may be costs implications for tie attaching to same.



## Section 4 'Sections C & D' – Conclusions arising from current analysis

### 4.1 Generally

4.1.1 Section 'C' is defined within Schedule Part 1 as “... **the carrying out and completion of Phase 1a to Newhaven (including energisation) and the spur or delta at Roseburn Junction and the completion of all tests required by the Employer's Requirements in relation to that Section, including those System Acceptance Tests that must be successfully completed prior to shadow running as provided for in the Employer's Requirements**”. This in effect comprises Sections 1, 2, 5 & 7.

4.1.2 It is relevant to also note that we are advised that Infraco are reverting to an original tie instruction at Roseburn Delta, i.e. to construct the earthworks for the cycleway as far as the Roseburn Terrace Bridge. This means that a small stretch of the civils works in Section 3A is required.

**Recommendation:** Consideration should therefore be given to ensuring that the necessary CEC approvals are in place timeously such that this issue does not become an obstacle to commencement or progress of the Infraco Works in this area.

4.1.3 Section 'D' is defined within Schedule Part 1 as “... **the completion of shadow running and commencement of revenue service approval obtained and the completion of all tests required by the Employer's Requirements in relation to that Section, including those System Acceptance Tests that must be successfully completed to enable Service Commencement**”. This was originally planned to complete 26 weeks after the completion of Section C.

### 4.2 Section 1

4.2.1 **Appendices 1 to 8** attached contain the current analysis and conclusions in respect of the following Section 1 prioritised elements:-

Appendix	Section	Description of area / structure
<b>Priority Level 1 Elements</b>		
1	1A4	Lindsay Road RW -W1
2	1A4	Road and Track
3	1A3	Victoria Dock Bridge - S16
4	1A3	Tower Place Bridge - S17
5	1A1	Road and Track



Appendix	Section	Description of area / structure
6	1B	Road and Track
7	1C2	Road and Track
8	1C3	Road and Track

4.2.2 From the attached, it is evident that the dominant delays to commencement (and completion) on intermediate sections 1A, 1B & 1C remain with the utility completions in each of those areas. The extent of those delays renders this Section the dominant sequence of activities which continue to drive Sectional Completion Date 'C'. That position remains true whether observing the Infraco Revision 3 programme or Iain McAlister's Revision 3 Issue 1 or Issue 3 mitigation exercises.

4.2.3 In terms of delay and consequent (mitigated) completion, the latest intermediates sections are 1B and 1C2 Road & track. On 4 March 2010 the then projected mitigated dates in respect of the Issue 1 programme were June and August 2012 respectively. That said, the recent Issue 3 mitigation exercise conducted by Iain McAlister in conjunction with tie and others, indicates that completion of Section C could be achieved by **11 May 2012**.

4.2.4 Please refer to report section 4.7 for our conclusions in respect of the effect of the above on Sectional Completion Date 'C'.

### 4.3 Section 5

4.3.1 **Appendices 9 to 15** attached contain the current analysis and conclusions in respect of the Section 5 priority '1' elements; Priority '2' elements are contained within **Appendices 20 to 26**, as follows:-

Appendix	Section	Description of area / structure
<b>Priority Level 1 Elements</b>		
9	5A	Russell RD RW - W4
10	5A	Murrayfield TS RW - W18
11	5A	Roseburn Viaduct - S21A
12	5A	Baird Drive Retaining Wall - W8
13	5A	Balgreen Road Bridge - S22A Incl. Balgreen Road Retaining Wall W9; including Balgreen Road Bridge - S22B
14	5C	A8 Underpass - W28
15	5C	Depot Access Road Bridge - S32
<b>Priority Level 2 Elements</b>		
20	5A	Russell RD RW - W3
21	5A	Murrayfield TS
22	5A	Murrayfield Stadium Underpass - S21C



Appendix	Section	Description of area / structure
23	5A	Water of Leith Bridge - S21E
24	5B	Carrick Knowe Bridge - S23
25	5B	Road and Track
26	5C	Road and Track

- 4.3.2 The analysis of the above confirms that at Project level the delays incurred in this Section of the works (although significant) are subsumed by the more extensive delays incurred within Section 1. This presumes that if Section 1 works are mitigated then so are the critical parts of Section 5. It also assumes no resource requirement linkage between the two Sections.
- 4.3.3 That said, the analysis of those Section 5 elements, clearly identify considerable periods of concurrent delay at an intermediate section level. Infraco culpability throughout this Section is significant. tie culpability is also present.
- 4.3.4 This analysis has also raised significant questions in respect of the timing and/or management of the design process.
- 4.3.5 As noted at paragraph 1.2.5, maintaining this form of record and analysis will enable tie to properly assess, and where necessary defend, claims for additional payment from Infraco and/or its sub-contractors at Section and intermediate section level. It may also assist tie in informing strategy in relation to its relationship and dealings with SDS.

#### 4.4 Section 7

- 4.4.1 **Appendices 18 and 19** attached contain the current analysis and conclusions in respect of the following Section 7 priority '1' elements:-

Appendix	Section	Description of area / structure
<b>Priority Level 1 Elements</b>		
18	7a	Track - Section 7
19	7b	Gogarburn RW - W14/W15

- 4.4.2 Similar comments apply here in relation to Section 7 as are made at paragraphs 4.3.2 to 4.3.5 above (re Section 5).



#### 4.5 Consideration of position adopted in the 'MUDFA Rev.8' adjudication

4.5.1 During the 'MUDFA Rev.8' adjudication process, a report was produced by Acutus<sup>16</sup> which concluded that "... it would appear to be possible to mitigate all of the MUDFA Revision 8 projected delays to the extent that there would be no requirement to extend any of the four Sectional Completion Dates"<sup>17</sup>.

4.5.2 It is acknowledged that, on the face of it, the comments made above in the MUDFA Rev.8 adjudication report may not appear to be consistent with our opinion on the delays to Section 1 and the culpability for same (even after mitigation). It is therefore necessary to explain how the two positions need to be reconciled.

4.5.3 The 'MUDFA Rev.8' adjudication focussed on projected delays to the completion of MUDFA works as at 28 March 2009. When compared to the Infraco Revision 1 Programme 'assumptions', the following delays to the MUDFA works were forecast to occur:-

	1	2	3	4
Int. Section	Revision 1 Prog.Dates	MUDFA Rev.8 Dates	Delay (wks)	
1A	31/10/2008	17/12/2009	58.86	
1B	01/08/2008	24/09/2009	59.86	
1C	31/10/2008	18/12/2009	59.00	
1D	19/12/2008	25/09/2009	40.00	

4.5.4 It was against the background of those delays (circa 59 weeks) that Iain McAlister's 'MUDFA Rev.8' report was drafted. Since that date however, the completion of the MUDFA works, within Section 1 in particular, have been further delayed, to the extent that the following delays (shown in columns 7 & 8 below) were forecast as at **April 2010** (we understand however that those dates have slipped further since April 2010):-

	1	2	3	4	5	6	7	8	9
Int. Section	Revision 1 Prog.Dates	MUDFA Rev.8 Dates	Delay (wks)	Rev3Step4Issue3 Range from	to	Delay in weeks [Rev.1 to Rev3S4I3]		Increase in delay (wks)	
1A	31/10/2008	17/12/2009	58.86	02/03/2010	13/12/2010	69.57	110.43	51.57	
1B	01/08/2008	24/09/2009	59.86	01/07/2010		99.86		40.00	
1C	31/10/2008	18/12/2009	59.00	07/05/2010	04/11/2010	79.00	104.86	45.86	
1D	19/12/2008	25/09/2009	40.00	30/01/2010	08/02/2010	58.14	59.43	19.43	

<sup>16</sup> Report Ref. J086-209 dated 5 May 2010 entitled "Expert Report regarding Estimate in Respect of INTC No. 429 MUDFA programme Revision 8 Delay and Disruption Resulting from Incomplete Utility Works"

<sup>17</sup> Paragraph 6.3.1



4.5.5 That is as at April 2010, the overall projected delays to MUDFA works in Section 1 had increased to circa **110 weeks**. That is, an increase of up to **52 weeks** beyond those forecast in the 'MUDFA Rev.8' programme are expected (see columns 8 & 9 in the table directly above). It was this Section that drove Sectional Completion Date C within the mitigated Issue 1 programme (see comments in report section 4.1 above).

Revision 3 Step 4 Issue 1 mitigation exercise

4.5.6 Iain McAlister's mitigation exercise on the Revision 3 (Step 4 Issue 1) programme<sup>18</sup> indicated that mitigation / acceleration *could* bring the projected completion date forward to circa July / August 2012<sup>19</sup>. That equated to an overall delay in the region of 73 to 77 weeks for Sectional Completion Date C. As noted, that delay was driven by the dominant delays in Section 1 (intermediate sections 1A, 1B & 1C in particular). The difference between the increased MUDFA delays (of up to 52 weeks) and the mitigated delay to Sectional Completion Date C (of 73 to 77 weeks) appeared to have been brought about by the introduction of different Traffic Management phasing within Section 1 (together with a degree of increased workscope as a result of INTC's). This added to the critical MUDFA / utility delays in Section 1 by upwards of 21 to 25 weeks.

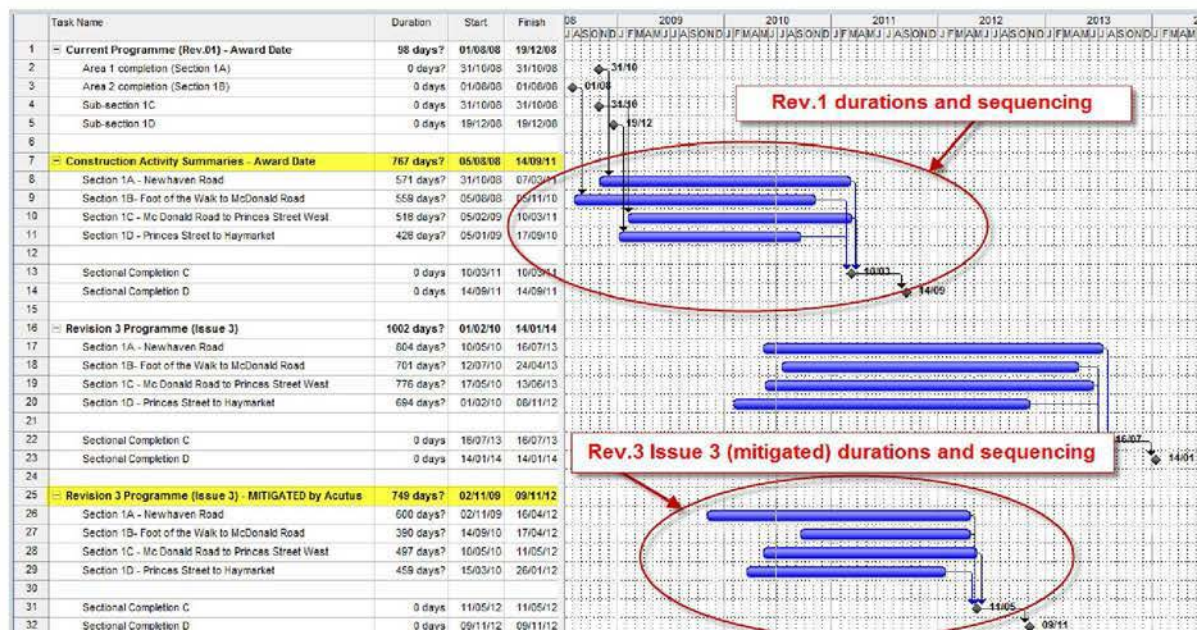
Revision 3 Step 4 Issue 3 mitigation exercise

4.5.7 Notwithstanding the above, as noted at paragraph 4.2.3, a further mitigation review exercise has recently been carried out, this time on the Infraco Issue 3 programme, by Iain McAlister in conjunction with tie and others. That exercise shows that a **mid May 2012** completion currently appears achievable. That however clearly requires Infraco's cooperation / engagement in adopting the relevant mitigation measures. This equates to an approximate overall delay to 'Section C' of **61 weeks**. This is driven by on-street intermediate **section 1B** (intermediate sections 1A & 1C are however projected to complete within a similar 'window'). This is demonstrated within the following summary chart (prepared from information extracted from the current 'Issue 3' mitigation exercise). That chart shows similar overall durations for the 'on-street' work between the Rev.1 and Rev.3 Issue 3 (mitigated) programmes.

<sup>18</sup> Including the joint 'mitigation' review with Blair Anderson. That review maintains the criticality of intermediate sections 1A, 1B & 1C. That exercise still indicates as a forecast completion of summer 2012.

<sup>19</sup> Email from Acutus (IM) of 4 March 2010 timed at 19:17hrs refers. That mitigation exercise did not allow for full depth construction i.e. it had been removed from the activity durations as directed by tie.





4.5.8 On the basis of the above, in our opinion the risk for this overall period of delay (of circa 61 weeks) appears to remain with tie<sup>20</sup>. A report on the 'Issue 3' mitigation exercise is expected to be issued during mid July 2010.

#### 4.6 Consideration of tie position re lack of early progress on 'off-street' works by Infraco

4.6.1 At a meeting held on 5 May 2010 tie reiterated its concern that the focus on dominant delays to MUDFA / utility works in the 'on-street' Section 1, would mask the effect that Infraco's lack of early progress on the 'off-street' Sections has on the programme for the 'on-street' sections when they become available. In particular, tie noted that had Infraco progressed the 'off-street' sections earlier, resources which now remain engaged on those delayed 'off-street' works, could/would have been applied to the 'on-street works' as those workfaces became available. Had that occurred, tie would have expected the 'on-street' sections to be completed earlier than currently planned by Infraco.

4.6.2 This has been discussed with Iain McAlister in order to understand what effect the above has/had on the collective discussions on potential mitigation which has been developed by

<sup>20</sup> Unless it can be proven that BSC's phasing and durations shown in the Rev.0 and Rev.1 programmes were always unachievable and that this is therefore an Infraco error. That however may be a difficult argument to prove and it may be the case that a third party determiner would consider it unreasonable to hold the Infraco liable for such a delay while at the same time tie benefits from mitigation of the MUDFA delay through the reduction of activity durations used in the original Rev. 01 and Rev. 1 (through increased productivity / increased resourcing / consumption of float).



lain, Blair Anderson and tie over recent weeks. In particular, we discussed the assumptions and constraints considered and applied when carrying out the mitigation exercise(s) on the Infraco Rev.3 programme(s).

4.6.3 Initial indications are that any resource constraints previously applied by Infraco on the 'on-street' sections were removed during the mitigation exercise, to the extent that resources are no longer driving the mitigated programme(s). As such, the degree to which this particular tie concern affects the overall Sectional Completion Date C is thought to be minimal.

4.6.4 That said, this matter can be further considered during the completion of the current mitigation review of the Infraco Revision 3 Step 4 Issue 3 programme.

## 4.7 Conclusions in respect of Section C & D

### Questions of 'criticality', 'dominance' and 'significance'

4.7.1 One of the key issues which we have had to consider when arriving at our opinion on respective culpability for delay to Sectional Completion Date 'C' is what effect the delays to the constituent elements have had on this sectional date. In particular, we considered how a third party tribunal would analyse same. In so doing, matters such as criticality, dominance, significance and the like are of paramount relevance.

4.7.2 In the present circumstances, we consider that the magnitude of the early and ongoing delays to the MUDFA and utility works renders arguments about concurrent (critical) delay more difficult to prosecute. This is particularly relevant to the respective delays evident in and between Section 1 and Sections 5 & 7. Whilst there is clearly Infraco culpable delay within Sections 5 & 7, the project critical path remains firmly fixed within Section 1 (intermediate sections 1A, 1B & 1C in particular are currently seen to be driving the Sectional Completion Date to 11 May 2012). Please refer to 'Appendix (i)' for details on our current opinion on respective culpability for delay in respect of each element.

4.7.3 Previous discussions have focussed on recent case law<sup>21</sup> which lends support in certain circumstances to a process of apportionment when considering culpability for delay and extension of time. The difficulty, which in our opinion will be faced in tie presenting a case on the basis of 'apportionment' however, is that the particular judgement in question

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<sup>21</sup> City Inn Ltd v Shepherd Construction Ltd [2007] ScotCS CSOH\_190 (30 November 2007)



focuses firstly on a test of dominance<sup>22</sup>. When considering the application of apportionment (if appropriate), the court went on to note that “*length of delay*” and the causative “*significance of the events for the Works as a whole*”<sup>23</sup> were factors which must be considered. Each of these three factors<sup>24</sup> pose significant hurdles for tie to overcome.

- 4.7.4 As a consequence, at Sectional Completion Date level it remains our opinion that Infraco will be excused for delays incurred up to circa **61** weeks (for Sectional Completion Date C) – please refer to paragraph 4.5.7 above. This assumes that the Infraco’s interpretation of how extension of time for Notified Departures (late completion of MUDFA Works) is not supported by the Adjudicator in the MUDFA Revision 8 Estimate dispute decision. If it is the upper limit will be higher (potentially up to circa. 100 weeks). The measure of the delay which will actually be incurred however is dependent upon Infraco’s implementation of mitigation and/or other acceleration measures which could be adopted to limit the delays actually incurred. Agreement on such measures has yet to occur.
- 4.7.5 For the most part the recent mitigation exercise on the ‘Issue 3’ programme has produced overall ‘on-street’ intermediate section durations similar to those programmed within the Rev.1 programme<sup>25</sup>. The exception to this is intermediate section 1B where the overall duration is approximately 70% of the Rev.1 programme duration (see programme extract at paragraph 4.5.7 above). The extent of mitigation thought to be “achievable” on 1B is considerable (circa 30%) and therefore even allowing for potential Infraco liability for a late start on that interim section, it seems unlikely that the projected mitigated date would be much better than currently assessed. Interim sections 1A and 1C follow very closely behind completion of 1B, therefore even if Infraco are held responsible for some of 1B slippage, 1A and 1C will take over and still dictate that a delay to completion of circa 61 weeks will result. BDDI – IFC issues are likely to also allow Infraco some time. Taking all of

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<sup>22</sup> Paragraphs 21 and 157 of the ‘City Inns’ judgement refer

<sup>23</sup> Paragraph 158 of the ‘City Inns’ judgement refer

<sup>24</sup> i.e. dominance, length of delay and causative significance

<sup>25</sup> Previously interim findings from the ‘Issue 3’ mitigation exercise indicated that increased activity durations and different TM phasing inserted by Infraco into the ‘Issue 3’ programme may have contributed to this mitigated 61 week forecast of delay. Further analysis and investigation has shown that these issues do appear to be material factors. That said, if this additional delay is the result of the Infraco correcting an error or shortcoming in the Rev. 01 programme then it could be considered unreasonable for tie to claim, for its own benefit, delay mitigation from reducing activity durations, when the benefit of such measures are required by the Infraco to accommodate a risk that it carries. On that basis it would appear sensible not to further reduce tie’s potential liability from 61 weeks as it is likely to prove very difficult if not impossible to secure support for such a reduction from a third party tribunal.



the above into consideration, it is likely that the lower limit will remain in the region of a period not too much less than the 61 weeks.

4.7.6 As a consequence, it is thought that the majority, if not all, of the period of delay is attributable to the late MUDFA/utility diversions. In light of the above in our opinion the risk for this overall period of delay (of circa 61 weeks) appears to remain with tie and is summarised as follows:-

Description	Opinion on tie culpability	Opinion on Infraco culpability
Lower limit:	61 weeks	0 weeks
Upper limit:	61 weeks	0 weeks

4.7.7 Those delays could also give rise to project level prolongation costs. The measure of prolongation costs to which Infraco may be entitled however, is not necessarily inextricably linked to the period of extension of time to which it is entitled. Matters such as concurrency and causation of the particular loss claimed will feature in any analysis of entitlement to additional payment.

4.7.8 In this regard, at Section and intermediate section level in particular, there is considerable evidence of Infraco culpability for delay in the various elements within Sections 2, 5 & 7 (and in certain elements of section 1). This is highlighted (for elements within Sections 1, 5 & 7) within 'Appendix (i)' attached. Whilst this may not translate into a disallowable period of extension of time, it does/should preclude both Infraco and its sub-contractors' from an entitlement to recovery of the prolongation costs incurred during those periods of culpable delay. Much will depend on the nature and type of costs claimed or yet to be claimed.

4.7.9 In relation to Sectional Completion Date 'D' we have assumed for present purposes that this will be 6 months after the Sectional Completion Date 'C' (acknowledging that tie may wish to take a view on whether this 6 month period can be reduced<sup>26</sup>).

Robert Burt

John Hughes

Dated: 25 June 2010

<sup>26</sup> Particularly if the off-street section can be completed significantly earlier to allow driver training and system testing to begin earlier



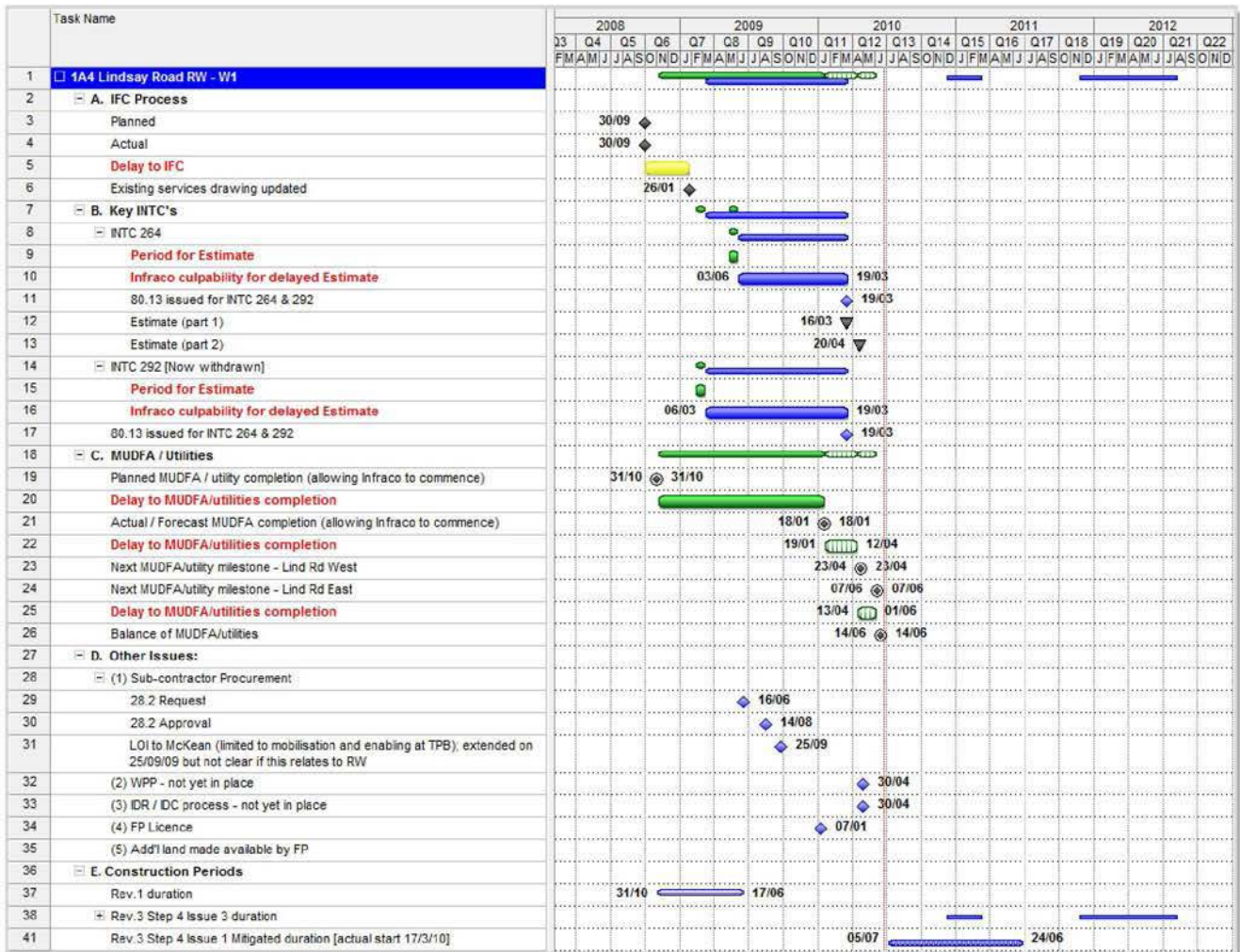
## LIST OF APPENDICES

Appendix	Section	Description of area / structure
<b>(i)</b>		Summary table of current view on respective party culpability for delay
<b>Priority Level 1 Elements</b>		
<b>1</b>	<b>1A4</b>	Lindsay Road RW -W1
<b>2</b>	<b>1A4</b>	Road and Track
<b>3</b>	<b>1A3</b>	Victoria Dock Bridge - S16
<b>4</b>	<b>1A3</b>	Tower Place Bridge - S17
<b>5</b>	<b>1A1</b>	Road and Track
<b>6</b>	<b>1B</b>	Road and Track
<b>7</b>	<b>1C2</b>	Road and Track
<b>8</b>	<b>1C3</b>	Road and Track
<b>9</b>	<b>5A</b>	Russell RD RW - W4
<b>10</b>	<b>5A</b>	Murrayfield TS RW - W18
<b>11</b>	<b>5A</b>	Roseburn Viaduct - S21A
<b>12</b>	<b>5A</b>	Baird Drive Retaining Wall - W8
<b>13</b>	<b>5A</b>	Balgreen Road Bridge - S22A Incl. Balgreen Road Retaining Wall W9; including Balgreen Road Bridge - S22B
<b>14</b>	<b>5C</b>	A8 Underpass - W28
<b>15</b>	<b>5C</b>	Depot Access Road Bridge - S32
<b>16</b>	<b>6</b>	Depot Building
<b>17</b>	<b>6</b>	Roads & Track – Depot
<b>18</b>	<b>7a</b>	Track - Section 7
<b>19</b>	<b>7b</b>	Gogarburn RW - W14/W15
<b>Priority Level 2 Elements</b>		
<b>20</b>	<b>5A</b>	Russell RD RW - W3
<b>21</b>	<b>5A</b>	Murrayfield TS
<b>22</b>	<b>5A</b>	Murrayfield Stadium Underpass - S21C
<b>23</b>	<b>5A</b>	Water of Leith Bridge - S21E
<b>24</b>	<b>5B</b>	Carrick Knowe Bridge - S23
<b>25</b>	<b>5B</b>	Road and Track
<b>26</b>	<b>5C</b>	Road and Track

Current view on respective party culpability		ANALYSIS OF LATE START				ANALYSIS OF LATE FINISH				
App. Section	Description of area / structure	Late Start	Upper/Lower Liability	tie culpability	Infraco culpability	Poss. SDS	IM Mitigated Period	Infraco Rev.3 Period		
							Tie	Infraco	tie	Infraco
<b>SECTIONAL COMPLETION DATE A</b>		Lower Limit	25 weeks	14 weeks						
		Upper Limit	43 weeks	32 weeks						
<b>Section 6</b>		<i>As depot building and Sectional Completion Date A</i>								
16	6 Depot Building	41 weeks	Lower Limit	25 weeks	6 weeks	Audit/Review	0 weeks	8 weeks	Assumes IM mitigated	
			Upper Limit	35 weeks	16 weeks	Audit/Review	8 weeks	16 weeks	Assumes IM mitigated	
17	6 Roads & Track - Depot	89 weeks	Lower Limit	See chart for details	52 weeks		See above	Driven by Depot Building		
			Upper Limit	See chart for details	81 weeks		See above	Driven by Depot Building		
<b>SECTIONAL COMPLETION DATE B</b>		See comments in Report at Paragraph 3.3.2								
<b>SECTIONAL COMPLETION DATE C</b>		Lower Limit	61 weeks	0 weeks						
		Upper Limit	61 weeks	0 weeks						
<b>SECTION 1</b>										
1	1A4 Lindsay Road RW -W1	72 weeks	Lower Limit	63 weeks	0 weeks	17 weeks	0 weeks	0 weeks	0 weeks	36 weeks
			Upper Limit	72 weeks	8 weeks	62 weeks	18 weeks	18 weeks	18 weeks	54 weeks
2	1A4 Road and Track	88 weeks	Lower Limit	77 weeks	4 weeks	28 weeks	-2 weeks	-2 weeks	-2 weeks	50 weeks
			Upper Limit	84 weeks	41 weeks	61 weeks	0 weeks	0 weeks	0 weeks	52 weeks
3	1A3 Victoria Dock Bridge - S16	79 weeks	Lower Limit	11 weeks	22 weeks	0 weeks	2 weeks	0 weeks	0 weeks	0 weeks
			Upper Limit	61 weeks	72 weeks	50 weeks	17 weeks	15 weeks	15 weeks	15 weeks
4	1A3 Tower Place Bridge - S17	61 weeks	Lower Limit	11 weeks	1 weeks	0 weeks	-29 weeks	-29 weeks	-29 weeks	-16 weeks
			Upper Limit	61 weeks	50 weeks	50 weeks	0 weeks	0 weeks	-13 weeks	0 weeks
5	1A1 Road and Track	54 weeks	Lower Limit	54 weeks	0 weeks	19 weeks	0 weeks	0 weeks	0 weeks	29 weeks
			Upper Limit	54 weeks	0 weeks	0 weeks	22 weeks	22 weeks	22 weeks	51 weeks
6	1B Road and Track	100 weeks	Lower Limit	31 weeks	0 weeks	9 weeks	-6 weeks	-6 weeks	-6 weeks	32 weeks
			Upper Limit	100 weeks	69 weeks	63 weeks	0 weeks	0 weeks	0 weeks	38 weeks
7	1C2 Road and Track	30 weeks	Lower Limit	30 weeks	0 weeks	0 weeks	0 weeks	0 weeks	0 weeks	32 weeks
			Upper Limit	30 weeks	0 weeks	0 weeks	16 weeks	16 weeks	16 weeks	48 weeks
8	1C3 Road and Track	41 weeks	Lower Limit	41 weeks	0 weeks	0 weeks	0 weeks	0 weeks	0 weeks	32 weeks
			Upper Limit	41 weeks	0 weeks	15 weeks	46 weeks	46 weeks	46 weeks	78 weeks
<b>SECTION 5</b>										
20	5A Russell RD RW - W3	107 weeks	Lower Limit	21 weeks	86 weeks	0 weeks	-16 weeks	-16 weeks	-16 weeks	-5 weeks
			Upper Limit	21 weeks	86 weeks	46 weeks	0 weeks	0 weeks	-11 weeks	0 weeks
9	5A Russell RD RW - W4	44 weeks	Lower Limit	17 weeks	22 weeks	0 weeks	-6 weeks	3 weeks	-6 weeks	3 weeks
			Upper Limit	22 weeks	27 weeks	66 weeks	0 weeks	0 weeks	0 weeks	0 weeks
10	5A Murrayfield TS RW - W18 <i>[Directly affected by RV VE - audit req'd]</i>	87 weeks	Lower Limit	0 weeks	0 weeks	0 weeks	0 weeks	0 weeks	0 weeks	22 weeks
			Upper Limit	113 weeks	113 weeks	113 weeks	5 weeks	5 weeks	5 weeks	27 weeks
21	5A Murrayfield TS <i>[Directly affected by RV VE - audit req'd]</i>	83 weeks	Lower Limit	0 weeks	0 weeks	0 weeks	-17 weeks	-17 weeks	-17 weeks	-12 weeks
			Upper Limit	83 weeks	83 weeks	63 weeks	0 weeks	0 weeks	0 weeks	63 weeks
11	5A Roseburn Viaduct - S21A <i>[Commencement delayed by VE exercise - audit]</i>	59 weeks	Lower Limit	0 weeks	0 weeks	0 weeks	-16 weeks	-16 weeks	-16 weeks	-6 weeks
			Upper Limit	78 weeks	78 weeks	78 weeks	0 weeks	0 weeks	-10 weeks	0 weeks
22	5A Murrayfield Stadium Underpass - S21C	106 weeks	Lower Limit	47 weeks	22 weeks	0 weeks	0 weeks	0 weeks	0 weeks	0 weeks
			Upper Limit	84 weeks	59 weeks	0 weeks	4 weeks	4 weeks	4 weeks	4 weeks
23	5A Water of Leith Bridge - S21E	46 weeks	Lower Limit	0 weeks	31 weeks	0 weeks	0 weeks	0 weeks	0 weeks	0 weeks
			Upper Limit	15 weeks	46 weeks	0 weeks	0 weeks	0 weeks	0 weeks	21 weeks
12	5A Baird Drive Retaining Wall - W8	105 weeks	Lower Limit	27 weeks	77 weeks	0 weeks	13 weeks		0 weeks	0 weeks
			Upper Limit	29 weeks	78 weeks	0 weeks	34 weeks	21 weeks	21 weeks	21 weeks
13	5A Balgreen Road Bridge - S22A Incl. Balgreen Road Ret.Walls W9 [incl. Balgreen Road Bridge - S22B]	94 weeks	Lower Limit	0 weeks	94 weeks	45 weeks	0 weeks	0 weeks	0 weeks	16 weeks
			Upper Limit	0 weeks	94 weeks	45 weeks	1 weeks	1 weeks	1 weeks	17 weeks
24	5B Carrick Knowe Bridge - S23	10 weeks	Lower Limit	0 weeks	8 weeks	0 weeks	18 weeks	11 weeks	18 weeks	11 weeks
			Upper Limit	3 weeks	10 weeks	0 weeks	40 weeks	33 weeks	40 weeks	33 weeks
25	5B Road and Track	39 weeks	Lower Limit	0 weeks	5 weeks	9 weeks	39 weeks	0 weeks	39 weeks	10 weeks
			Upper Limit	34 weeks	39 weeks	33 weeks	67 weeks	28 weeks	67 weeks	38 weeks
26	5C Road and Track	88 weeks	Lower Limit	9 weeks	16 weeks	21 weeks	-26 weeks	-26 weeks	-26 weeks	-14 weeks
			Upper Limit	72 weeks	79 weeks	21 weeks	0 weeks	0 weeks	-12 weeks	0 weeks
14	5C A8 Underpass - W28	7 weeks	Lower Limit	7 weeks	0 weeks	0 weeks	24 weeks	30 weeks	24 weeks	46 weeks
			Upper Limit	7 weeks	0 weeks	0 weeks	61 weeks	67 weeks	61 weeks	83 weeks
15	5C Depot Access Road Bridge - S32	32 weeks	Lower Limit	17 weeks	14 weeks	0 weeks	0 weeks	0 weeks	0 weeks	24 weeks
			Upper Limit	17 weeks	14 weeks	0 weeks	7 weeks	7 weeks	7 weeks	31 weeks
<b>SECTION 7</b>										
18	7a Track - Section 7	57 weeks	Lower Limit	22 weeks	18 weeks	15 weeks	-14 weeks	-14 weeks	-14 weeks	-9 weeks
			Upper Limit	39 weeks	35 weeks	15 weeks	0 weeks	0 weeks	0 weeks	5 weeks
19	7b Gogarburn RW - W14/W15	62 weeks	Lower Limit	0 weeks	45 weeks	21 weeks	Data not yet available			
			Upper Limit	17 weeks	62 weeks	95 weeks				
<b>SECTIONAL COMPLETION DATE D</b>		See comments in Report at Paragraph 4.7.9 (assumed 6 months after Sectional Completion Date C)								

Caution: Needs to be read in conjunction with individual Appendices. Allocation of costs claimed should not be based on simplistic analysis of the above

1A4 Lindsay Road RW - W1



- A. **IFC Process:** Initial IFC issued on time (planned 30/09/08; actual 30/09/08). Subsequent IFC's issued as follows:-
- (i) 'Existing services drawing' updated 26/01/09 to include services in relation to a section of the wall / earthworks package that had not been included in the original drawing. This does not appear in the Approvals Tracker provided; it is still not clear if this is a formal IFC. Although there is no information presently available to inform culpability for delay DS contends that this requirement to update the original IFC is evidence which points towards the position that the original IFC was incomplete (see Preamble). Potential reasons include:-
    - a. Late issue by SDS (CE(t));
    - b. A material breach by SDS (CE (u));
    - c. A tie Change;
    - d. A failure of Infracore in respect of its management of SDS or another breach by Infracore;
    - e. A requirement of FP for which tie will bear responsibility;

**Potential delay by SDS/tie; Infracore** [This may have influenced delay to commencement; much depends on the contemporaneous knowledge about MUDFA/utility works in this area. It is not clear why no services information was provided for that area by SDS. DS advises however, that "...this may be an (SDS / BSC) omission but it may also be the case that tie was carrying out diversions in that area and only provided services information after the original IFC. Allocation of culpability is clearly dependent on the factual backdrop to this issue". Further investigation required.

**Note:** recently (on 23/04/10) 2 new drawing's issued (sewer protection drawings Rev.2), not in previous IFC package. Rev.1 was issued on 21/05/09 for external approval. Effect not yet clear.
- B. **Key INTC's:** From the information provided it appears that Infracore issued 4 no. INTC's against this structure. INTC's 129, 292, 085 & 264 refer [Complete data on INTC's awaited]. Of the aforementioned it appears likely that **INTC 292** (Additional Ramp / Steps at Lindsay Road RTW) & **INTC 264** (Section 1A4 – groundworks) materially affected Infracore's ability to commence works in accordance with the Rev 01 programme. Both were the subject of an **80.13 instruction on 19/03/10**. Details as follows:-
- (i) **INTC 264:** issued 07/05/09; Estimate due 02/06/09; Infracore issued this estimate in two parts. The first estimate was received on 16/03/10 and the second (part of the) estimate on or around 20 April 2010 (the exact date to be checked). **Delay by tie in response to later estimate received in April 2010.** (First part of the estimate was addressed by 80.13 Notice issued on 19/03/10)
  - (ii) **INTC 292:** issued 09/02/09; Estimate due 05/03/09; No Estimate provided by Infracore. **Delay by Infracore.** MB advises that this INTC has now been withdrawn and therefore has negligible impact.
- C. **MUDFA / Utilities:** Planned completion 31/10/08. MUDFA / utilities works in association with Lindsay Road RTW's were partially completed to allow commencement at chainage 0-230 as at 18/01/10. MUDFA / utilities work beyond that date were / are forecast to complete as follows:-

- a. Lindsay Road West (23/04/10) – access to chainage 0-500 on westbound lane works;
- b. Lindsay Road East (07/06/10);
- c. Balance of MUDFA / Utilities works (14/06/10 albeit that part was made available as of 07/01/10).

We understand that an actual start on RW1a and RW1c was achieved on or around 17/03/10. This start was not dependent on any of the foregoing utility diversions. We are advised that a start of those structures could have been made on or around 07/01/10 (upon execution of the FP agreement). It appears therefore that the delay from circa 01/02/10 (allowing a reasonable period for mobilisation) to the actual start of 17/03/10 would be to Infraco’s account. **Delay by Infraco.**

**Delay by tie; tie culpability** Note: tie restricting Infraco access to this area pending resolution of the Infraco IDC certification process (see below). A further point of note is that MB advises that “Lindsay Road lowering occurring before the RW1a works could start restraint was removed by tie from the programme criticality by use of an alternative route by ADM, BSC were advised in January 2010 of this opportunity”. Any benefit from this opportunity of course relies on Infraco’s acceptance and subsequent implementation of same. It is our understanding that Infraco has not acted on this suggestion to date.

**D. Other Issues:**

- (i) **Sub-Contractor Procurement:** No formal sub-contract has been put in place for this section. It is also not clear whether any informal (LOI) is in place for road works in this section. LOI to McKean of 04/08/08 does not appear to cover 1A4 Lindsay Road RW; extended LOI issued 25/9/09 but scope not clear [subject to future tie audit]. **Delay by Infraco. Infraco culpability.**
- (ii) **WPP Process:** Not yet submitted (as advised by MB). This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.**
- (iii) **IDR/IDC process:** IDC not yet in place. Infraco programme of 18/12/09 does not contain details for this structure. Infraco delay. We understand that tie was restricting Infraco access to this area pending resolution of the Infraco IDC certification process. **Contractual position not yet resolved – see Preamble.**
- (iv) **FPA Licence:** Not in place until 07/01/10. This would have been an obstacle to commencement. Advised that delay arose from failure of SDS (or a failure of Infraco to manage SDS?) to provide ‘Category 2’ design calculations for ramp at TPB. SDS subsequently revised design to remove ramps as it could not satisfy FP as to suitability of design. This would have been an obstacle to commencement. It is understood that execution of this agreement on 07/01/10 allowed Infraco access to commence RW 1A & RW 1C. MB has since advised that this could have been applied for at anytime, and did not need to be influenced by Tower Bridge. TPB became the dominant factor simply because it was anticipated to come about first. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.**

**E. Construction Periods (covering walls 1A to 1D):**

1A4 Lindsay Road RW - W1						
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay	
Start	31/10/2008	07/12/2010	109.57 wks	05/07/2010	87.43 wks	
Finish	17/06/2009	07/08/2012	163.86 wks	24/06/2011	105.29 wks	
Cal. Duration	32.86 wks	87.14 wks	54.29 wks	50.71 wks	17.86 wks	

**Note:** MB suggested mitigation exercise shows overall commencement and completion in Intermediate Section 1A4 as 01/03/10 to 05/07/11 respectively. That equates to a period of **70 weeks**. No specific identification of RW.

- (i) **Delay to Start:** The table above refers to various programme dates. Forecast start dates differ between Issue 3, IM Issue 3, MB mitigated programme and MUDFA / Utility dates listed above. **Delay to start** was forecast to be a range between 87 weeks (05/07/10) and 109 weeks (07/12/10). Note however that the RW commenced on 17/03/10 (a delay to start of **72 weeks**). Primary causes of delay to start as follows:-
  - A. **IFC process:** The initial IFC was on time; planned date was 30/09/08; the actual was 30/09/08. Subsequent IFC dated 26/01/09 was **17 weeks late**. It is unclear as to whether this would have been material. There is no information presently available to inform culpability for delay to this subsequent IFC. Unless there is proof of Infraco breach, **it may be a CE under either 65(t) or (u)** (but uncertain).
  - B. **INTC’s:** **Delays by Infraco** in the submission of Estimates. Delay up to 19/03/10 when tie issued clause 80.13 instruction against first part estimate for INTC 264 (note tie responsible for standard 18 day Estimate period – see CE(x). Second part of estimate for INTC 264 issued in April 2010 has yet to be addressed by tie. **Delay by tie; tie culpability** (for delay in response).
  - C. **MUDFA / Utilities:** Planned completion 31/10/08. Partial completion at Lindsay Road RTW’s as at 18/01/10; further release of areas as at 23/04/10, 07/06/10 and 14/06/10. **Delay by tie; tie culpability.**
  - D. **Other:**
    - **Sub-Contractor procurement:** No formal sub-contract has been put in place for this section. It is also not clear whether any informal (LOI) is in place for road works in this section. **Delay by Infraco. Infraco culpability.** Effect of this is not clear – it could be a hindrance to progress – but details not available to establish scope of work under McKean LOI;
    - **WPP process:** Not yet submitted (as advised by MB). This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Unlikely to have significant impact;
    - **IDR/IDC process:** IDC not yet in place. tie restricting Infraco access to this area pending resolution of the Infraco IDC certification process.
    - **FPA Licence:** Not in place until 07/01/10. Delay arose from failure of SDS (Infraco?) to provide ‘Category 2’ design calculations. This would have been an obstacle to commencement. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.**

**Delay to Finish:** Issue 3 programme shows an **increase of circa 54 weeks** over the timescale in Rev.1 programme (majority of increase understood to be as a result of change in scope / design of wall construction and possibly Lindsay Road lowering). We are advised that the scope of the final retaining wall design is very different from the original scope. MB considers that the Infraco 1A retaining wall timescale is not unreasonable. IM mitigated view of Issue 3 also shows an increased duration of **18 weeks** to the Rev.1 programme (albeit **36 weeks** shorter than Infraco’s proposed Issue 3 programme). That increase appears to relate to additional TM phasing. MB mitigation proposal also has shorter overall duration for 1 than



Issue 3 (but RW not separately identified). Again, any benefit from this mitigation relies on Infraco's acceptance and subsequent implementation of same. It is our understanding that Infraco has not acted on this suggestion to date.

**F. tie position on area availability:**

- (i) We are advised that access for commencement of RW 1A & 1C was available as at 07/01/10 (following execution of FP agreement). That allowed Infraco access (unhindered by utilities) for those elements. Allowing for mobilisation it is reasonable to consider that Infraco could have commenced on or around 01/02/10. Also refer to section (C) above re MUDFA dates (available from January 2010 although in terms of RW construction this does not appear to have been the obstacle to commencement). It is notable however, that the remainder of works attaching to this structure cannot be undertaken until utilities are relocated. Expected date for completion of utilities works being 14 June 2010.

**G. Conclusion:**

- (i) **'Significant' issues/events:** In our opinion there were four main contributory factors, being (a) the IFC process; (b) the INTC process in respect of INTC 264 (we understand that INTC 292 has been withdrawn); (c) late completion of MUDFA/utilities; and (d) the late execution of the FP licence. Taking those events in chronological order:-

The initial IFC was issued on time on **30/09/08**; but a revision appears to have been issued on **26/01/09 (17 weeks later than planned)**. **MUDFA/utilities diversions** were supposed to be completed on **31/10/08** (to facilitate a start on 1A4 Lindsay Road RW 31/10/08). Those diversions however were not actually completed suffice to allow commencement until circa **18/01/10, with subsequent phased completions forecast to complete up to 14/06/10**. This is tie's culpability. Running concurrently with this was the **late provision by Infraco of the Estimates for INTC 264** (292 now withdrawn). Infraco issued this estimate in two parts. The first estimate was received on 16/03/10 and the second estimate in April 2010 (check exact date ). **Delay measured to 19/03/10** (when clause 80.13 instruction issued (against INTC 264 first part only); but may not have been an obstacle to actual commencement). This event could have delayed commencement in this area. It is notable that tie has yet to respond to the later estimate received in April 2010. Delay in response to receipt of same is a matter for which tie is responsible. In addition, the execution of the **FP licence** is understood to have been delayed by SDS such that it was not in place until **07/01/10**. This is either an SDS breach (which would excuse Infraco of the time) or if caused by a failure on the part of Infraco to manage SDS, it is a matter for which Infraco bears responsibility.

- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above.

- (iii) **Considerations of dominance:** availability of design and work areas are both equally important in terms of ability to commence. That said, if contemporaneously Infraco and SDS knew that the utilities diversions were significantly delayed, such that they did not have to progress the design in accordance with the original programme, then the works area availability will have more causative significance. In relative terms however Infraco will certainly argue that the late completion of MUDFA / utilities, and hence the late availability of the working area, will be more dominant (i.e. have more 'causative potency') than a delay in either the design issue or the INTC Estimate process which would / could have been overcome in accordance with the original programme had it been necessary.  
Bearing in mind however that commencement of RW 1A & 1C were not dependent on completion of utility diversions, those works could have commenced on or around execution of the FP licence. That is, it appears they could have commenced on or around 01/02/10 (allowing for mobilisation). Delays up to that point relate to the late execution of the FP licence (a matter for which SDS is responsible; possibly Infraco if breach of its obligation to manage SDS can be established).

As such, from the information available it appears that the key issue to commencement of the RW was the execution of the FP licence. It would be wrong however at this stage to entirely dismiss the potential (earlier) impact of MUDFA/utility diversions on commencement of these structures. This point may require further investigation.

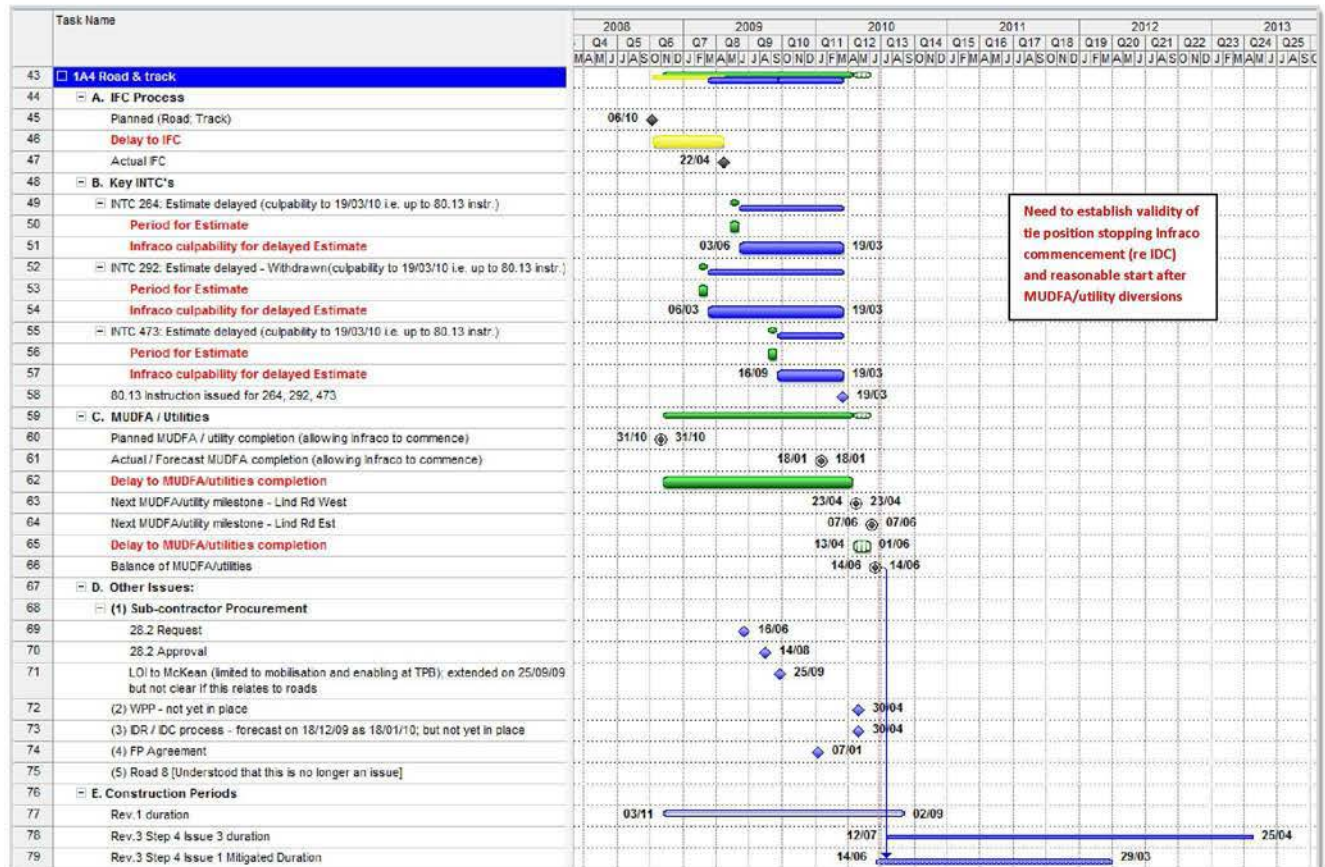
**H. Current assessment of culpability**

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
Used Actual Start of 17/3/10														
tie culpability					Infraco culpability					Poss. SDS culpability				
	From	to	Days	Weeks	Cause	From	to	Days	Weeks	Cause	From	to	Days	Weeks
<b>1. LOWER LIMIT</b>														
MUDFA / Utility diversions	31/10/08	18/01/10	444	63.43				0	-	IFC	30/09/08	25/01/09	118	16.86
			0	-				0	-				0	-
				<b>63.43</b>					<b>-</b>					<b>16.86</b>
<b>2. UPPER LIMIT</b>														
MUDFA / Utility diversions	31/10/08	17/03/10	502	71.71	Late start	18/01/10	17/03/10	58	8.29	FP TPB to 7/1	31/10/08	07/01/10	433	61.86
			0	-				0	-				0	-
				<b>71.71</b>					<b>8.29</b>					<b>61.86</b>

B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]					
	IM Mitigated Period		Infraco Rev.3 Period		IM mitigated period +18wks: this is likely to be BDDI/IFC issues and TM revised phasing. Culpability not clear; range of possibilities - upper / lower limits recognise extremes of liability. Infraco Rev.3 period +54 wks: On the basis that Infraco can mitigate to 18 weeks per IM analysis then Infraco lower limit restricted to anything in excess of 18wks. tie liability remains at lower limit of 0 wks if Infraco responsible for all increased durations
	tie	Infraco	tie	Infraco	
Lower Limit	0.00	0.00	0.00	36.00	
Upper Limit	18.00	18.00	18.00	54.00	

## 1A4 Road & Track



A. **IFC Process:** The initial IFC was 198 days (or 28 weeks) late; planned date was 06/10/08; the actual was 22/04/09<sup>1</sup>. There is no information presently available to inform culpability for delay (see Preamble). Potential reasons include:-

- Late issue by SDS (at its simplest a CE under 65(t));
- A material breach by SDS (again at its simplest form a CE under 65(u));
- A failure of Infracore to provide the Infracore Design to SDS (clause 19.19 refers);
- A tie Change;
- A failure of Infracore in respect of its management of SDS or another breach by Infracore (e.g. failure to properly manage the CEC/NR interface);
- A requirement of CEC for which tie will bear responsibility.

**Note:** DS advised that "late submission of TAA package followed by length of time needed to incorporate CEC comments because so many needed to be made on design". DS has further advised that on the basis of further IFC availability and approval dates – delay by SDS exists but in his opinion it is due to Infracore failing to manage the process. In our opinion this would clearly have an impact on culpability for this issue (needs to be established by audit or further investigation). Potentially a **delay by SDS, SDS /tie or Infracore?**

See also INTC 129 re CEC request for extension of time to Prior Approvals process.

**Note:** Further revision to IFC likely. DS advised "Full reasons not available but will have included incorporation of comments that weren't included in the first IFC - as discussed last week original IFC might have been a sensible mitigation but might have been deficient". MB advises that in his opinion MUDFA delays were exacerbated awaiting issue of IFC. MB considers this to be a failure on the part of Infracore to manage the SDS provider. It is our opinion that this may well be possible (needs to be established by audit or further investigation).

B. **Key INTC's:** From information provided it appears that Infracore issued 12 no. INTC's against this area. INTC's 093, 129, 166, 165, 257, 276, 287, 289, 292, 469, 473 & 264 refer. Of the aforementioned it appears likely that **INTC 264** (Lindsay Road Groundworks), **INTC 292** (Additional Ramp / Steps at Lindsay Road RTW) & **INTC 473** (Construction of 3no. sewer protection slabs & new chamber – Lindsay Road Schedule Part 2: - undefined prov. sum item 8) materially affected Infracore's ability to commence works in accordance with the Rev 01 programme. All of the foregoing were the subject of an **80.13 instruction on 19/03/10**. Details as follows:-

(i) **INTC 264:** issued 07/05/09; Estimate due 02/06/09; Infracore issued this estimate in two parts. The first estimate was received on 16/03/10 and the second estimate on or around 20 April 2010 (exact date to be confirmed). **Delay by Infracore.**

**Delay by tie in response to later estimate received in April 2010.** First estimate was addressed by 80.13 Notice issued on 19/03/10.

(ii) **INTC 292:** issued 09/02/09; Estimate due 05/03/09; No Estimate provided by Infracore. MB advises that this INTC has now been withdrawn and therefore has negligible impact. **Delay by Infracore.**

(iii) **INTC 473:** issued 20/08/09; Estimate due 15/09/09; No Estimate provided by Infracore. **Delay by Infracore.**

**tie** issued an 80.13 instruction on 19/03/10 covering all of the above.

See also INTC 129 re CEC request for extension of time to Prior Approvals process. Also note that more recent INTC re Ocean Terminal tramstop and finish may become an obstacle to progress.

<sup>1</sup> Note: 1 week after IFC issue geotechnical drawings were issued by SDS on 29/04/09. It is likely that these drawings triggered issue of INTC 264 on 07/05/09. These drawings are not listed in V31 of programme. (i.e. not part of original list of IFC's). These drawings were issued for external approval on 19/02/09. Question – did SDS provide to Infracore or did Infracore fail to notify?

- C. **MUDFA / Utilities:** Planned completion **31/10/08**. MUDFA / utilities works in association with Lindsay Road RTW's were partially completed to allow commencement at chainage 0-230 as at **18/01/10**. MUDFA / utilities work beyond that date are forecast to complete as follows:-
- Lindsay Road West (**23/04/10**) – access to chainage 0-500 on westbound lane works;
  - Lindsay Road East (**07/06/10**);
  - Balance of MUDFA / Utilities works (**14/06/10**).
  - MB further advises that MUDFA works at Ocean Terminal will not be completed until 28/06/10.

D. **Other Issues:**

- Sub-Contractor Procurement:** No formal sub-contract has been put in place for this section. It is also not clear whether any informal (LOI) is in place for road works in this section. LOI to McKean of 04/08/08 does not appear to cover 1A4 Road & track; extended LOI issued 25/09/09 but scope not clear [subject to future tie audit]. **Delay by Infraco. Infraco culpability.**
- WPP Process:** Not yet submitted (as advised by MB). This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.**
- IDR/IDC process:** IDC not yet in place. Infraco programme of 18/12/09 shows this as being forecast to be in place by 18/01/10. But not yet in place. Infraco delay. **tie** restricting Infraco access to this area pending resolution of the Infraco IDC certification process. See Preamble.
- FPA Licence:** Not in place until 07/01/10. This would have been an obstacle to commencement. Advised that delay arose from failure of SDS (or failure of Infraco to manage SDS?) to provide 'Category 2' design calculations for ramp at TPB. SDS subsequently revised design to remove ramps as it could not satisfy FP as to suitability of design. This would have been an obstacle to commencement. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.**

E. **Construction Periods:**

1A4 Road & Track					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	03/11/2008	12/07/2010	88.00 wks	14/06/2010	84.00 wks
Finish	02/09/2010	25/04/2013	138.00 wks	29/03/2012	82.00 wks
Cal. Duration	95.57 wks	145.57 wks	50.00 wks	93.57 wks	-2.00 wks

**Note:** MB suggested mitigation exercise shows overall commencement and completion in Intermediate Section 1A4 as 01/03/10 to 05/07/11 respectively. That equates to a period of **70 weeks**.

- Delay to Start:** The table above refers to various programme dates. Forecast start dates differ between Issue 3, IM Issue 3, MB mitigated programme and MUDFA / Utility dates listed above.

**Delay to start** is therefore forecast to be a **range between 84 weeks (14/06/10) and 88 weeks (12/07/10)**. MB mitigation exercise shows **immediate commencement** [albeit that exercise is now outdated in terms of commencement dates].

Primary causes of delay to start as follows:-

- IFC process:** The initial IFC was **198 days (or 28 weeks) late**; planned date was **06/10/08**; the actual was **22/04/09**. There is no information presently available to inform culpability for delay. Unless there is proof of Infraco breach, **it may be a CE under either 65(t) or (u)** (but uncertain).
- INTC's:** Delays by Infraco in the submission of Estimates. Delay up to 19/03/10 when tie issued clause 80.13 instruction. Infraco culpability. Tie culpability also extant for delay in response to second part estimate attaching to INTC 264.
- MUDFA / Utilities:** Planned completion **31/10/08**. Partial completion at Lindsay Road RTW's as at **07 or 18/01/10**; further release of areas as at 23/04/10, 07/06/10 and 14/06/10. **Delay by tie; tie culpability.**

D. **Other:**

- **Sub-Contractor procurement:** No formal sub-contract has been put in place for this section. It is also not clear whether any informal (LOI) is in place for road works in this section. **Delay by Infraco. Infraco culpability.** Effect of this is not clear – it could be a hindrance to progress – but details not available to establish scope of work under McKean LOI;
- **WPP process:** Not yet submitted (as advised by MB). This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Unlikely to have significant impact;
- **IDR/IDC process:** IDC not yet in place. **tie** restricting Infraco access to this area pending resolution of the Infraco IDC certification process.
- **FPA Licence:** Not in place until 07/01/10. Delay arose from failure of SDS (Infraco?) to provide 'Category 2' design calculations. This would have been an obstacle to commencement. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.**

- Delay to Finish:** Issue 3 programme shows an **increase of circa 50 weeks** over timescale in Rev.1 programme (majority of increase understood to be as a result of full-depth construction issue). IM mitigated view of Issue 1 however has slightly shorter duration than Rev.1 programme. MB mitigation proposal also has shorter duration than Issue 3 (70 weeks duration i.e. 10 weeks less than Issue 3). This mitigation is achieved by re-phasing the works (and is therefore only achievable if this mitigation is accepted / agreed by Infraco). Presently, increase in duration not justified by Infraco.

F. **tie position on area availability:**

- Refer to section (C) above re MUDFA dates (available from January 2010 - but in limited area ch.0-230). Thereafter **23/04/10** is next availability date (for Lindsay Road West). See however IDR/IDC comments at D above. **tie** presently of the opinion that Infraco are not able to commence due to incomplete IDC process.

G. **Conclusion:**

- 'Significant' issues/events:** In our opinion there were four main contributory factors, being (a) the IFC process; (b) the INTC process in respect of INTC's 264 & 473; (c) late completion of MUDFA/utilities; and (d) the late execution of the FP licence. Taking those events in chronological order:-

The IFC was planned to be issued on 06/10/08; it was actually issued on 22/04/09 (198 days late). MUDFA/utilities diversions were programmed to be completed on 31/10/08 (to facilitate a start on 1A4 Road & track 03/11/08). Those diversions however were not actually completed in phases during the period from 18/01/10 to 14/06/10. This is likely to be tie's culpability<sup>2</sup>. Running concurrently with this was the late provision by Infraco of the Estimates for INTC's 264 & 473. This is a matter for which Infraco is responsible. It is notable however, that Infraco issued this estimate in two parts for INTC 264. The first estimate was received on 16/03/10 and the second estimate in April 2010. (the exact date is not currently available). Delay measured to 19/03/10 (when clause 80.13 instruction issued (against INTC 264 first part only and INTC 473). Delay in response to the second part of INTC 264 is a matter for which tie is responsible. Each of those events would have delayed commencement in this area. In addition, the execution of the FP licence is understood to have been delayed by SDS such that it was not in place until 07/01/10. This is either an SDS breach (which would excuse Infraco of the time) or if caused by a failure on the part of Infraco to manage SDS, it is a matter for which Infraco bears responsibility.

The IDR/IDC process may also be a contributing factor affecting commencement from either 18/01/10 or 23/04/10 (but tie's ability to stop work from commencing on this basis is not clear).

- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above. They will however increase in significance as matters progress if they do pose an obstacle to work on the ground. **Discuss position being taken by tie.**
- (iii) **Considerations of dominance:** availability of design and work areas are both equally important in terms of ability to commence. That said, if contemporaneously Infraco and SDS knew that the utilities diversions were significantly delayed, such that they did not have to progress the design in accordance with the original programme, then the works area availability will have more causative significance. See previous comments re potential Infraco argument that the late completion MUDFA / utilities, and hence the late availability of the working area, will be more dominant (i.e. have more 'causative potency') than its delays which would / could have been overcome in accordance with the original programme had it been necessary.

As such, from the information available it appears that the two key issues to commencement of the road & trackworks in 1A4 are (i) the completion of the MUDFA / utility works; and (ii) the execution of the FP licence. There would appear to be equal causative potency of both issues up to January 2010; thereafter, the late completion of the utility diversions becomes the dominant issue.

**H. Current assessment of culpability**

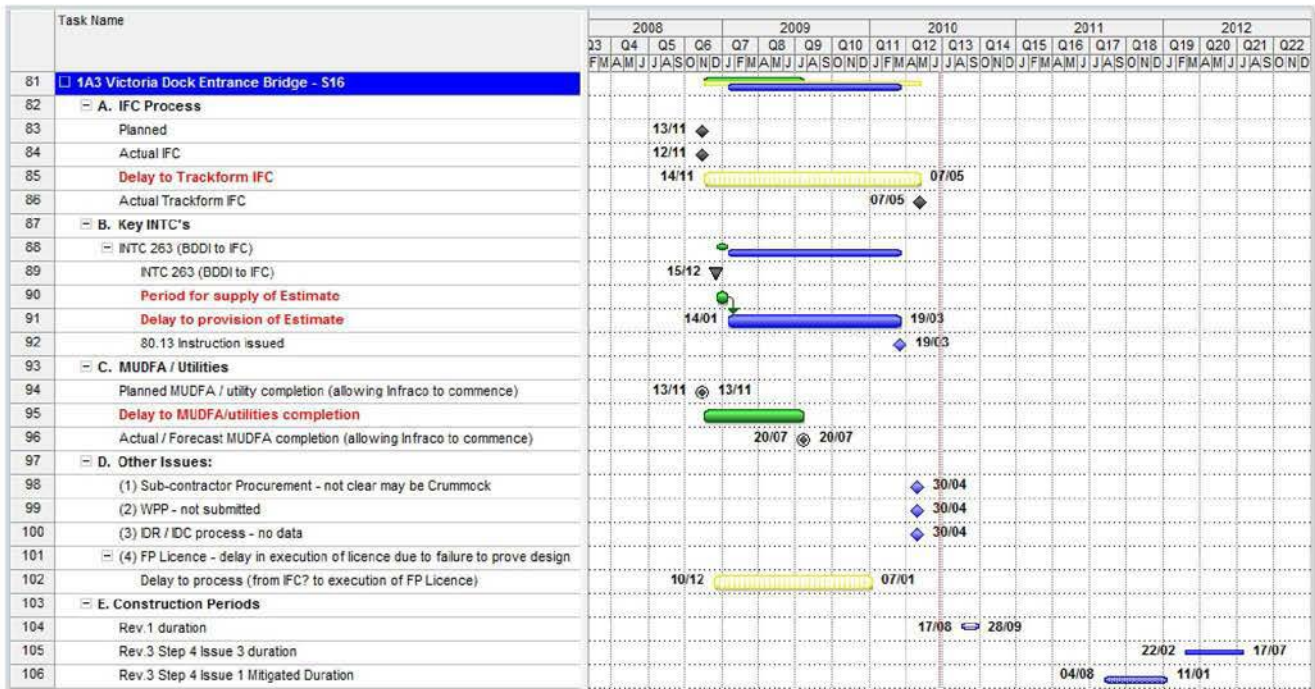
A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	tie culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
<b>1. LOWER LIMIT</b>														
MUDFA / Utility diversions	03/11/08	23/04/10	536	76.57	Late start	14/06/10	12/07/10	28	4.00	Delay to IFC	06/10/08	22/04/09	198	28.29
			0	-				0	-				0	-
				76.57					4.00					28.29
<b>2. UPPER LIMIT</b>														
MUDFA / Utility diversions	03/11/08	14/06/10	588	84.00	INTC's	03/06/09	19/03/10	289	41.29	FP TPB to 7/1	03/11/08	07/01/10	430	61.43
			0	-				0	-				0	-
				84.00					41.29					61.43

B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]					
	IM Mitigated Period		Infraco Rev.3 Period		
	tie	Infraco	tie	Infraco	
Lower Limit	-2.00	-2.00	-2.00	50.00	IM mitigated period -2wks: notwithstanding MUDFA / Utilities issues extant, this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco. Infraco Rev.3 period +50 wks: On the basis that Infraco can mitigate to -2 wks per IM analysis then Infraco lower limit restricted to anything in excess of -2 wks. tie liability remains at lower limit of -2 wks if Infraco responsible for all increased durations
Upper Limit	0.00	0.00	0.00	52.00	

<sup>2</sup> Note: this was discussed on 3 June 2010. It was noted that while there may have been an issue about an SDS failure to perform; there was also the question of agreement between tie and SDS re prioritisation of design packages.

## 1A3 Victoria Dock Entrance Bridge



A. IFC Process: Initial IFC issued on time (planned 13/11/08; actual 12/11/08). Subsequent IFC's issued as follows:-

- (i) **Trackform 07/05/10 in SDS v58.** There is no information presently available to inform culpability for delay (see Preamble). It is notable however, that the IFC issue date is still in advance of the works to this area. It of itself is unlikely to have been the direct cause of the delay in this area (or to the achievement of a Certificate of Sectional Completion for this Section). It should also be noted that this particular Trackform IFC would not have been an obstacle to Infraco's commencement or early progress of bridge works (this has been confirmed by MB). **Potential delay by SDS/tie; Infraco – but only to the area (not the Section)** [DS advises that integration of BSC trackform proposals into structures is entirely a matter for which Infraco is responsible. This however, is unlikely to have influenced delay to commencement of bridge or trackworks in this area.

B. **Key INTC's:** From information provided it appears that the Infraco issued 1 no. INTC in relation to this structure; INTC 263. We are further advised that INTC 263 (IFC Drawing Changes – Victoria Dock Entrance Bridge – Section 1A) appears to have materially / critically affected Infraco's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-

- (i) **INTC 263;** issued by Infraco on 15/12/08 (33 days after IFC issue). Estimate should have been submitted on or around 13/01/09. Estimate has not yet been submitted by Infraco. As at 30/04/10 this is 472 days later than permitted by the Contract. **Delay by Infraco. Infraco culpability for time taken to produce Estimate for INTC 230.**  
However, an **80.13 Instruction was issued by tie on 19/03/10** instructing Infraco to proceed with the works covered by that INTC. **Delay by Infraco; Infraco culpability for the protracted time taken to produce an Estimate** (which in effect precipitated the need for tie to issue the 80.13 in an attempt to maintain progress – see Preamble).

C. **MUDFA / Utilities:** Planned completion 13/11/08; actual 18/07/09, 247 days late. **Delay by tie; tie culpability.** Note: We are advised that service diversions are not yet fully complete. Nevertheless we understand that works are sufficiently complete to enable commencement. These issues are however subsumed with delays on and construction periods required for TPB.

D. **Other Issues:**

- (i) **Sub-Contractor Procurement:** No formal sub-contract has been put in place for this structure. It is also not clear whether any informal (LOI) is in place for road works in this section. **Delay by Infraco. Infraco culpability** (but due to start date for this structure it will not be critical at present) [Note: no details as to sub-contractor in place. Understood that Crummock may be appointed by Infraco for 1A3 – see Infraco Period Report No.3-1 report to 24/04/10].
- (ii) **WPP Process:** Not yet submitted (as advised by MB) as no sub-contractor appointed. This could be an obstacle to commencement (but unlikely at present). **Delay by Infraco. Infraco culpability.**
- (iii) **IDR/IDC process:** IDC not yet in place. Infraco programme of 18/12/09 does not contain details of the IDR / IDC process for this structure. **Infraco delay** (at present not affecting commencement because this is dependent on TPB). **tie** may restrict Infraco access to this area pending resolution of the Infraco IDC certification process.
- (iv) **FPA Licence:** Not in place until 07/01/10. We are advised that this delay arose from a failure of SDS (possibly Infraco to manage SDS?) to provide 'Category 2' design calculations for ramp at TPB. SDS subsequently revised design to remove ramps as it could not satisfy FP as to the suitability of its original design. This would have been an obstacle to commencement. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.** Critical nature of this issue is seen in Tower Place Bridge.

E. Construction Periods:

1A3 Victoria Dock Bridge - S16					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated	Delay
Start	17/08/2010	22/02/2012	79.14 wks	04/08/2011	50.29 wks
Finish	28/09/2010	17/07/2012	94.00 wks	11/01/2012	67.14 wks
Cal. Duration	6.14 wks	21.00 wks	14.85 wks	23.00 wks	16.86 wks

**Note:** MB suggested mitigation exercise shows overall commencement and completion in Intermediate Section 1A4 as 01/03/10 to 05/07/11 respectively. That equates to a period of **70 weeks**.

- (i) **Delay to Start:** The table above refers to various programme dates. Forecast start dates differ between Issue 3, IM Issue 3, MB mitigated programme and MUDFA / Utility dates listed above.

**Delay to start** is therefore forecast to be a range between **50 weeks (to 04/08/11) and 79 weeks (to 22/02/12)**.

Primary causes of delay to start as follows:-

- A. **IFC process:** no material impact;
- B. **INTC's:** Delay by Infraco in the submission of Estimate - (delay of **430 days** up to 19/03/10 when tie issued clause 80.13 instruction). **Delay by Infraco; Infraco culpability.** No material impact on commencement;
- C. **MUDFA / Utilities:** Planned completion **13/11/08**; actual completion **18/07/09**, **247 days late**. **Delay by tie; tie culpability.** no material impact – dependent on TPB;
- D. **Other:**
  - **Sub-Contractor procurement:** No formal sub-contract in place. Not clear whether any informal (LOI) is in place for works in this section. **Delay by Infraco. Infraco culpability** (but due to start date for this structure it will not be critical at present)
  - **WPP process:** Not yet submitted (as advised by MB). Could be an obstacle to commencement in future. **Delay by Infraco. Infraco culpability.** Unlikely to have significant impact;
  - **IDR/IDC process:** IDC not yet in place. This was clearly not an obstacle to commencement on Tower Place Bridge. **If not resolved prior to programmed commencement of VDEB, this may well prove an obstacle given current tie policy of restricting Infraco access area pending resolution of the Infraco IDC certification process site wide.**
  - **FPA Licence:** Not in place until 07/01/10. Delay arose from failure of SDS (Infraco?) to provide 'Category 2' design calculations. This would have been an obstacle to commencement. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.** No evidence available as to SDS/Infraco performance or management of process (subject to future audit).

- (ii) **Delay to Finish:** Issue 3 programme shows an increase of circa **15 weeks** over the timescale in Rev.1 programme. Current Infraco Rev.3 programme period (working period) considered reasonable by IM. The original Rev.1 programme duration was inserted in respect of a 'dummy' activity'.

F. tie position on area availability:

- (i) We are advised that the temporary diversion works required for VDEB were substantively complete on 18/07/09. It is notable however, that this work (although substantively complete) remains incomplete as at 30/04/10. (These incomplete works will not be critical until such times as the works to Tower Place Bridge are complete).

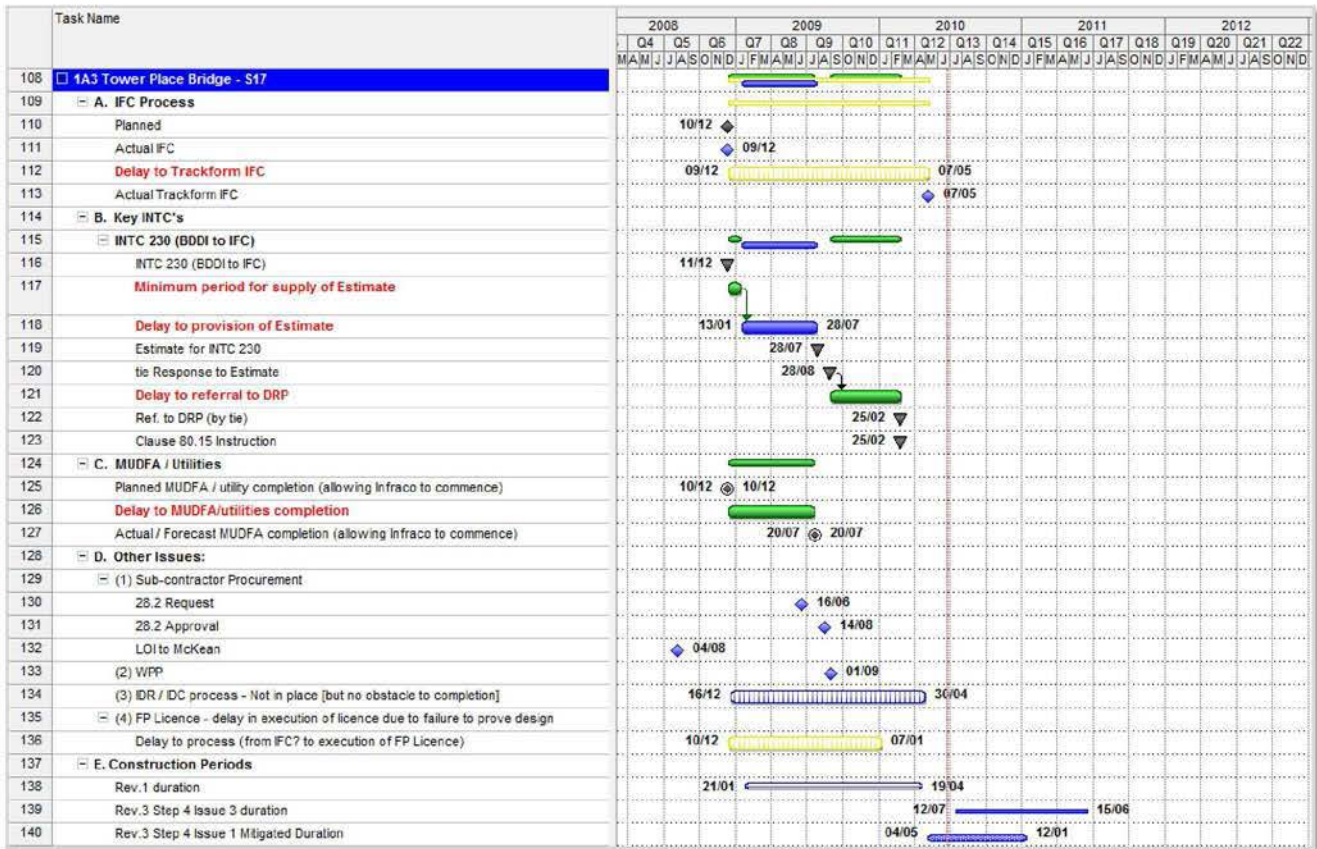
G. Conclusion:

- (i) **'Significant' issues/events:** This structure is dependent on the commencement and completion of TPB. Delay to actual start is forecast to be between 50 and 79 weeks (see table above). In our opinion the main factor was and is the delays to TPB. Running concurrent with TPB delays are (a) the INTC process in respect of INTC 263; (b) late completion of MUDFA/utilities; and (c) the late execution of the FP licence. However due to the delay on TPB, those matters are not critical to commencement of this structure. Increase in duration of 15 weeks appears to be considered reasonable by both IM & MB mitigation exercises.
- (ii) **Other concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing; the WPP process & the IDR/IDC process) have less of a bearing on the late commencement of this structure. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above.
- (iii) **Considerations of dominance:** It is the effect of the delays to TPB which materially affects the commencement of this structure. The other issues whilst running concurrently occur (at present) sufficiently in advance of the delayed start date such that they do not (presently) pose an obstacle to commencement.
- (iv) **Criticality:** Notwithstanding the above noted commentary on "Considerations of dominance", it does appear however, that issues attaching to VDEB are not of themselves critical to Section 1 completion. Clearly, the commencement of VDEB is dependent on the completion of works to Tower Place Bridge.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	tie culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
<b>1. LOWER LIMIT</b>														
Delay; timescale from FP to 80.15 instruction for INTC 230 (TPB)	07/01/10	22/03/10	74	10.57	Delay; from 80.13 instruction to Rev 3 commencement date	19/03/10	17/08/10	151	21.57	IFC on time	10/12/08	10/12/08	0	-
			0	-				0	-				0	-
				<b>10.57</b>					<b>21.57</b>					<b>-</b>
<b>2. UPPER LIMIT</b>														
MUDFA / Utilities (still not 100% complete on VDEB)	21/01/09	20/07/09	180	25.71	FP Licence	21/01/09	07/01/10	351	50.14	FP Licence	21/01/09	07/01/10	351	50.14
Delay; from INTC 230 estimate to 80.15 instruction (TPB)	20/07/09	25/02/10	220	31.43	Delay; from 80.13 instruction to Rev 3 commencement date	19/03/10	17/08/10	151	21.57				0	-
Infraco Mobilisation (TPB)	25/02/10	22/03/10	25	3.57				0	-				0	-
				<b>60.71</b>					<b>71.71</b>					<b>50.14</b>
<b>B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]</b>														
IM Mitigated Period = +17 wks	IM Mitigated Period			Infraco Rev.3 Period				IM mitigated period +17wks: this is likely to be BDDI/IFC issues , TM revised phasing or resequencing by Infraco. Culpability not clear; range of possibilities - upper / lower limits recognise extremes of liability. (Very much dependent on issues attaching to TPB which is the predecessor to commencement of VDEB). Infraco Rev.3 period +15 wks: On the basis that Infraco can mitigate to 15 weeks per it's analysis then Infraco lower limit restricted to anything in excess of 0 wks. tie liability remains at lower limit of 2 wks.If Infraco responsible for all increased durations						
Infraco Rev.3 Period = +15 wks	tie		Infraco	tie		Infraco								
Lower Limit	2.00	0.00	0.00	0.00	0.00									
Upper Limit	17.00	15.00	15.00	15.00	15.00									

1A3 Tower Place Bridge – S17



A. IFC Process: Initial IFC issued on time (planned 10/12/08; actual 09/12/08). Subsequent IFC's issued as follows:-

- (i) Trackform 07/05/10 in SDS v58. There is no information presently available to inform culpability for delay (see Preamble). It is notable however, that as Trackform requires the further integration of Infraco design there is a responsibility on Infraco to provide information to SDS for incorporation on time. Notwithstanding, it is likely that the late issue of this IFC flows from one or more of the following reasons:-
  - a. Late issue by SDS (CE under 65(t));
  - b. A material breach by SDS (a CE under 65(u));
  - c. A failure of Infraco to timeously provide the Infraco Design to SDS (clause 19.19);
  - d. A failure of Infraco in respect of its management of SDS or another breach by Infraco.

It should be noted however, that this particular Trackform IFC would not have been an obstacle to Infraco's commencement or early progress of bridge works (this has been confirmed by MB). An issue date of 11/01/10 although late would not appear to have affected the trackwork activities in this area, which were due to commence in the Rev.1 programme during June 2010 (this proceeds on the assumption that the Trackform IFC does not require amendments to the TPB IFC).

Potential delay by SDS/tie; Infraco – but only to the area (not the Section) [As noted at VDEB above, DS advises that integration of trackform proposals into structures is entirely a matter for which Infraco is responsible. This however, is unlikely to have influenced delay to commencement of bridge or trackworks in this area]

B. Key INTC's: From information provided it appears that the Infraco issued 3 no. INTC's in relation to this structure; INTC's 139, 230 & 405. We are advised that only INTC 230 (Tower Bridge Structure IFC Drawings) appears to have materially / critically affected Infraco's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-

- (i) INTC 230: issued by Infraco on 11/12/08 (2 days after IFC issue). Estimate should have been submitted on or around 12/01/09. Estimate actually submitted by Infraco on 28/07/09 i.e. 197 days later than permitted by the Contract. **Delay by Infraco. Infraco culpability for time taken to produce Estimate for INTC 230.** (MB advises that tie responded with what can now be considered a fairly accurate estimate in September '09).  
**80.15 Instruction issued by tie on 25/02/10. 184 days following receipt of Estimate (less 28 days for review & discussion of same). Delay by tie; tie culpability for time taken to issue 80.15 instruction following receipt of Estimate dated 28/07/09.**

C. MUDFA / Utilities: Planned completion 10/12/08; actual completion 18/07/09, 220 days late. **Delay by tie; tie culpability.**

D. Other Issues:

- (i) Sub-Contractor Procurement: 28.2 approval process: request submitted 16/06/09; approval granted 14/08/09. Note that this is much later than Rev.1 commencement date (21/1/09). However, first LOI (for mobilisation and enabling works) issued by Infraco on 04/08/08 (i.e. well in advance of Rev.1 commencement). **Delay by Infraco. Infraco culpability.** At best likely to be administrative delay by Infraco in terms of Rev.1 dates; however, it would be known post 04/08/08 that delay incurred to Bridge due to MUDFA works. Unlikely to have critical / dominant effect.
- (ii) WPP Process: Submitted September 2009 in place for December 2009. This could have been an obstacle to commencement. **Delay by Infraco. Infraco culpability.**



- (iii) **IDR/IDC process: IDC not yet in place.** This was clearly not an obstacle to commencement as commencement took place on 22/03/10 in advance of IDC. See Preamble.
- (iv) **FPA Licence:** Not in place until 07/01/10. Advised that delay arose from failure of SDS (Infraco?) to provide 'Category 2' design calculations for ramp at TPB. SDS subsequently revised design to remove ramps as it could not satisfy FP as to suitability of design. This would have been an obstacle to commencement. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.**

**E. Construction Periods:**

1A3 Tower Place Bridge - S17					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	21/01/2009	12/07/2010	76.71 wks	04/05/2010	66.86 wks
Finish	19/04/2010	15/06/2011	60.29 wks	12/01/2011	38.29 wks
Cal. Duration	64.86 wks	48.43 wks	-16.43 wks	36.29 wks	-28.57 wks

- (i) **Delay to [Actual] Start:** The table above refers to various programme dates. Actual start however was 22/03/09. This is **16 weeks** earlier than Infraco's Issue 3 programme; and **6 weeks** earlier than IM mitigated Issue 3 programme.

**Delay to actual start is therefore 61 weeks (21/01/09 to 22/03/10).**

Primary causes of delay to start as follows:-

- A. **IFC process:** no material impact;
- B. **INTC 230:** INTC issued on time; significant Infraco delay to provision of Estimate (197 days late); **tie delay (184 days) in dealing with Estimate through to 80.15 instruction on 25/2/10.** This is the last issue affecting commencement.  
Note: as discussed there may be a hypothetical argument concerning the effect of 'removing' the delay in the provision of the Estimate (such that an earlier 80.15 instruction and hence start could have been achieved). However, this does not sit well with the actions of tie in relation to the actual date of issue of the 80.15 instruction. **To discuss further.**
- C. **MUDFA / Utilities:** Planned completion 10/12/08; actual completion 18/07/09, **220 days late. Delay by tie; tie culpability.**
- D. **Other:**
  - **Sub-Contractor procurement:** First LOI issued in advance of IFC and planned start (although 28.2 process later). Appears to have limited impact;
  - **WPP process:** Submitted September 2009 in place for December 2009. This could have been an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Appears to have limited impact;
  - **IDR/IDC process:** **IDC not yet in place.** This was clearly not an obstacle to commencement as commencement took place on 22/03/10 in advance of IDC.
  - **FPA Licence:** Not in place until 07/01/10. Delay arose from failure of SDS (Infraco?) to provide. This would have been an obstacle to commencement. MB advises that this delay flows from two issues. The first being SDS / Infraco failure in the provision of 'Category 2' design calculations for TPB; and secondly SDS / Infraco failure to provide sufficient design information for retaining walls. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.**

- (ii) **Delay to Finish:** No further delay; in fact delay to finish is less than delay to start. That is, duration has been reduced which in turn reduces delay to completion of structure. Understood to be contributed to by a reduction in workscope.

**Note:** IM mitigated version of Rev.3 Issue 1 programme shows shorter duration than Infraco Issue 3 programme.

If earlier actual start of 22/03/09 is factored in, the delay to this structure and this area will be mitigated. The extent of that mitigation however will depend on the measures actually adopted by Infraco. The overall delay to Sectional Completion Date 'C' however remains as previously forecast (as delays to 1B & 1C maintain the critical delay to summer 2010 minimum).

**F. tie position on area availability:**

- (i) We are advised that the temporary diversion works required for Tower Place Bridge were completed on 18/07/09. This was followed by the removal of fibre optic cables which we understand took a further 6 weeks (approx). This should have facilitated an early September 2009 commencement date for Infraco works.

**G. Conclusion:**

- (i) **'Significant' issues/events:** Delay to actual start was 61 weeks. In our opinion there were three main contributory factors, being (a) the INTC process in respect of INTC 230; (b) late completion of MUDFA/utilities; and (c) the late execution of the FP licence. Taking those events in chronological order:-

MUDFA/utilities diversions were supposed to be completed on 10/12/08 (to facilitate a start on TPB by 21/01/09). Those diversions however were not actually completed until circa 18/07/09. This is tie's culpability. Running concurrently with this was the late provision by Infraco of the Estimate for INTC 230. That should have been provided by 12/01/09 (earliest) but was actually provided on 28/07/09. This is a matter for which Infraco is responsible. Both events would have delayed commencement of the structure. Beyond 28/07/09 however, tie's review and inaction on the Estimate for INTC 230 ran until 25/02/10 (when the 80.15 instruction was issued). In light of the advice from DLA dated 24 March 2010, this is a period for which tie bears the responsibility. In addition, the execution of the FP licence is understood to have been delayed by SDS such that it was not in place until 07/01/10. This is either an SDS breach (which would excuse Infraco of the time) or if caused by a failure on the part of Infraco to manage SDS, it is a matter for which Infraco bears responsibility.

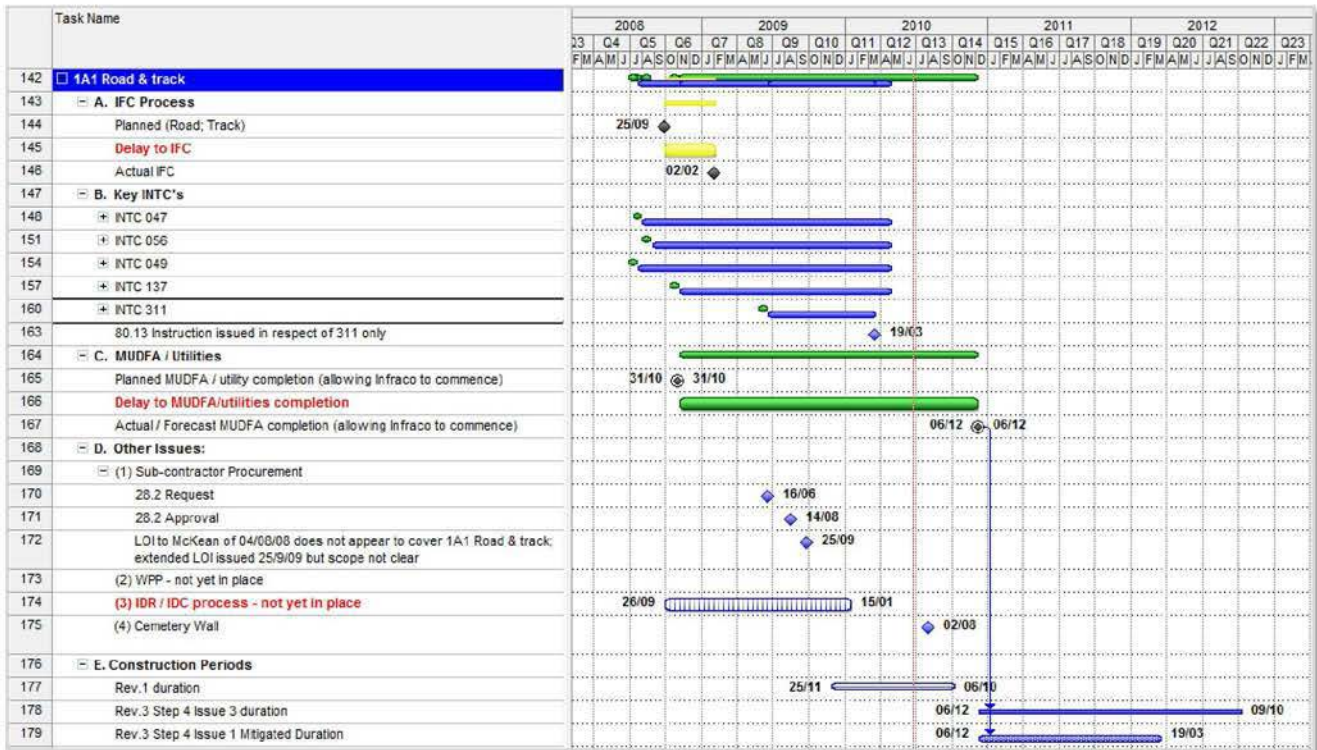
- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing; the WPP process & the IDR/IDC process) have less of a bearing on the late commencement of this structure. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above.

- (iii) **Considerations of dominance:** Of the three significant events highlighted above, in our opinion neither can be said to be 'the' truly dominant delay affecting commencement for the entirety of the period. In relative terms however Infraco will certainly argue that the late completion MUDFA / utilities, and hence the late availability of the working area, will be more dominant (i.e. have more 'causative potency') than its delay in the INTC Estimate process. They will also point to the tie delay in respect of INTC 230 – which runs beyond MUDFA / utilities completion. tie however may be able to reply by stating that 'but-for' the late submission of the Estimate, the 80.15 instruction could have been issued prior to the late completion of MUDFA (even allowing for their delay beyond receipt of the Estimate). That position would render more 'importance' to the late provision of the Estimate. That however is rather subjective as one cannot be certain that tie would have issued the 80.15 at an earlier date had Infraco issued its Estimate on time (or earlier than it did).
- The FP licence event is considered to be concurrent up to January 2010. It does however subsequently become 'overtaken' by the period of the INTC 230 process (and in particular the late issue of the 80.15 instruction).

#### H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	tie culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
<b>1. LOWER LIMIT</b>														
Delay; timescale from FP to 80.15 instruction for INTC 230	07/01/10	22/03/10	74	10.57	Delay to estimate for INTC 230 beyond MUDFA	20/07/09	28/07/09	8	1.14	IFC on time	10/12/08	10/12/08	0	-
			0	-				0	-				0	-
			<b>10.57</b>					<b>1.14</b>						
<b>2. UPPER LIMIT</b>														
MUDFA / Utilities	21/01/09	20/07/09	180	25.71	FP Licence	21/01/09	07/01/10	351	50.14	FP Licence	21/01/09	07/01/10	351	50.14
Delay; from INTC 230 estimate to 80.15 instruction	20/07/09	25/02/10	220	31.43				0	-				0	-
Infraco Mobilisation	25/02/10	22/03/10	25	3.57				0	-				0	-
			<b>60.71</b>					<b>50.14</b>					<b>50.14</b>	
<b>B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]</b>														
<b>IM Mitigated Period = -29 wks</b>	<b>IM Mitigated Period</b>			<b>Infraco Rev.3 Period</b>			<b>IM mitigated period -29 wks:</b> notwithstanding MUDFA / Utilities issues extant, this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco.							
<b>Infraco Rev.3 Period = -16 wks</b>	<b>tie</b>	<b>Infraco</b>	<b>tie</b>	<b>Infraco</b>	<b>Infraco Rev.3 period -16 wks:</b> Infraco clearly accepts the possibility for mitigation. Though currently not to the same extent as noted above. On the basis however that Infraco can mitigate to -29 wks per IM analysis then Infraco lower limit restricted to anything in excess of 0 wks. tie liability remains at lower limit of -29wks if Infraco responsible for all increased durations									
Lower Limit	-29.00	-29.00	-29.00	-16.00										
Upper Limit	0.00	0.00	-13.00	0.00										

1A1 Road & Track



A. IFC Process: The initial IFC was 130 days (or 19 weeks) late; planned date was 25/09/08; the actual was 02/02/09. There is no information presently available to inform culpability for delay (see Preamble). Potential reasons include:-

- Late issue by SDS (at its simplest a CE under 65(t));
- A material breach by SDS (again at its simplest form a CE under 65(u));
- A failure of Infraco to provide the Infraco Design to SDS (clause 19.19 refers);
- A tie Change;
- A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC/NR interface);
- A requirement of CEC/NR for which tie will bear responsibility.

Note: DS advises "late submission of TAA package followed by length of time needed to incorporate CEC comments due to poor / incomplete design". DS has further advised that on the basis of further IFC availability and approval dates – delay by SDS exists but in his opinion it is due to Infraco failing to manage the process. In our opinion this would clearly have an impact on culpability for this issue (requires audit or further investigation). **Delay by SDS, SDS /tie or Infraco?**

B. Key INTC's: From the information provided it appears that Infraco issued 6 No. INTC's against this area. INTC's 047, 056, 049, 086, 137 & 311 refer **[Complete data on INTC's awaited]**. Details as follows:-

- INTC 047: issued 04/07/08; Estimate due 30/07/08; No Estimate provided by Infraco. **Delay by Infraco.**
- INTC 056: issued 29/07/08; Estimate due 22/08/08; No Estimate provided by Infraco. **Delay by Infraco.**
- INTC 049: issued 24/06/08; Estimate due 18/07/08; An Estimate was provided by Infraco on 30/07/09 (377 days late). **Delay by Infraco.**
- INTC 137: issued 08/10/08; Estimate due 03/11/08; No Estimate provided by Infraco. **Delay by Infraco.**
- INTC 311: issued 22/05/09; Estimate due 17/06/09; No Estimate provided by Infraco. **Delay by Infraco.**

An 80.13 instruction was issued by tie on 19/03/10 in respect of INTC 311 only (as this appears to be a key INTC in terms of facilitating commencement).

C. MUDFA / Utilities: Planned completion 31/10/08; Forecast as at 30/04/10 was 06/12/10 – now forecast completion is end of February 2011 on Constitution Street ch 2600 – 2700. We are advised by tie PM staff that this is not sufficient however, to facilitate meaningful commencement on this section of the works. Meaningful commencement is dependent on MUDFA / Utilities completion to Victoria Bridge East Side to Baltic Street ch 1700 – 2300; that is forecast to complete on 06/12/10 (as forecast at 30/04/10).

**Delay by tie; tie culpability.**

D. Other Issues:

- Sub-Contractor Procurement:** No formal sub-contract has been put in place for this section. It is also not clear whether any informal (LOI) is in place for road works in this section. LOI to McKean of 04/08/08 does not appear to cover 1A1 Road & track; extended LOI issued 25/9/09 but scope not clear [subject to future tie audit]. **Delay by Infraco. Infraco culpability.**
- WPP Process:** Not yet submitted (as advised by MB). This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.**
- IDR/IDC process:** IDC not yet in place. Infraco programme of 18/12/09 shows this as being forecast to be in place by 15/01/10; but not yet in place. **Delay by Infraco. Infraco culpability.**
- Cemetery Wall:** Cemetery used to extend across Constitution Street. As a consequence, there are Archaeological and Historic Scotland issues governing the requirement to move skeletons displaced by the tram works. Given the intricacies attaching to these works the potential for further delays exist. We are advised that any works extending beyond August / September 2010 are likely to have a critical impact on works to 1B.

E. Construction Periods:

1A1 Road and Track					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	25/11/2009	06/12/2010	53.71 wks	06/12/2010	53.71 wks
Finish	06/10/2010	09/10/2012	104.86 wks	19/03/2012	75.71 wks
Cal. Duration	45.14 wks	96.29 wks	51.14 wks	67.14 wks	22.00 wks

**Note:** MB suggested mitigation exercise shows overall commencement and completion in Intermediate Section 1A as 01/03/10 to 05/03/12 respectively. That equates to an overall period of **105 weeks** (but is not comparable with the above 1A1 split).

- (i) **Delay to Start:** The table above refers to various programme dates. Forecast start dates differ between Issue 3, IM Issue 1, MB mitigated programme and MUDFA / Utility dates listed above.

**Delay to start** is therefore forecast to be **54 weeks (06/12/10)** in terms of both the Rev.3 and IM Rev.3 mitigation programmes. **MB mitigation exercise shows immediate commencement** [albeit now outdated].

Primary causes of delay to start as follows:-

A. **IFC process:** The initial IFC was **198 days (or 28 weeks) late**; planned date was **25/09/08**; the actual was **02/02/09**. There is no information presently available to inform culpability for delay. **Unless there is proof of Infraco breach, it will be a CE under either 65(t) or (u).**

B. **INTC's:** Lengthy delays by Infraco in the submission of Estimates. Delay at least up to 19/03/10 when tie issued clause 80.13 instruction.

C. **MUDFA / Utilities:** Planned completion **31/10/08**. Partial completion at Constitution Street ch 2600 – 2700 as at **31/05/10**; further release of areas as at **06/12/10**. We understand this is the area required to make meaningful progress. **Delay by tie; tie culpability.**

D. **Other:**

➤ **Sub-Contractor procurement:** No formal sub-contract has been put in place for this section. It is also not clear whether any informal (LOI) is in place for road works in this section. **Delay by Infraco. Infraco culpability.** Effect of this is not clear – it could be a hindrance to progress – but details not available to establish scope of work under McKean LOI. Without evidence to the contrary Infraco may be able to argue 'just-in time' procurement / authorisation.

➤ **WPP process:** Not yet submitted (as advised by MB). This *could* be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Unlikely to have significant impact;

➤ **IDR/IDC process:** IDC not yet in place. (tie's ability to stop work from commencing on this basis is not clear – see Preamble).

➤ **Cemetery Wall:** Works yet to commence. This could be an obstacle to commencement on 1B Road & Track if incomplete as at September 2010. If incomplete as at the forecasted completion of MUDFA / Utilities works i.e. 06/12/10, this will impact on the meaningful commencement of works to 1A1 Road & Track. **Potential future delay by tie; tie culpability.**

- (ii) **Delay to Finish:** The Issue 3 programme shows an increase of circa **51 weeks** over timescale in Rev.1 programme (majority of increase understood to be as a result of full-depth construction issue). IM mitigated view of Issue 3 also shows an increased duration of **22 weeks** over the Rev.1 programme period (albeit 35 weeks shorter than Infraco's proposed Issue 3 programme).

MB mitigation proposal also has shorter duration than Issue 3. **Discuss how this is to be pursued with / instructed to Infraco.**

F. **tie position on area availability:**

- (i) Refer to response (C) above re MUDFA dates (available from **06/12/10**).

G. **Conclusion:**

- (i) **'Significant' issues/events:** In our opinion there were three main contributory factors, being (a) the IFC process; (b) the INTC process in respect of INTC's 264, 292 & 473; and (c) late completion of MUDFA/utilities. Taking those events in chronological order:-

The IFC should have been issued on **25/09/08**; it was actually issued on **02/02/09 (130 days late)**. **MUDFA/utilities diversions** were planned to be completed on **31/10/08** (to facilitate a start on 1A1 Road & track on 25/11/09). Those diversions however are not forecast to complete until **06/12/10**. This is tie's culpability. Running concurrently with this was the **late provision by Infraco of the Estimates** for INTC's 047, 056, 049, 137 & 311. Those Estimates have yet to be provided. This is a matter for which Infraco is responsible. **Delay measured to 19/03/10** for INTC 311 (when clause 80.13 instruction issued). Each of those events (i.e. IFC, MUDFA, INTC's) could have delayed commencement in this area.

The **IDC process** could also be a contributing factor if Infraco has failed / fails to adhere to a contractual process (but tie's ability to stop work from commencing on this basis is not clear – see Preamble).

- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above.

- (iii) **Considerations of dominance:** availability of design and work areas are both equally important in terms of ability to commence. That said, if contemporaneously Infraco and SDS knew that the utilities diversions were significantly delayed, such that they did not have to progress the design in accordance with the original programme, then the works area availability (due to MUDFA / utility delays) will have more causative significance. See previous comments re potential Infraco argument that the late completion MUDFA / utilities, and hence the late availability of the working area, will be more dominant (i.e. have more 'causative potency') than its delays which would / could have been overcome in accordance with the original programme had it been necessary.

As such, in our opinion the delay to the MUDFA/utility works in 1A1 Road & Track is the dominant / critical factor affecting commencement and hence completion in this intermediate section.

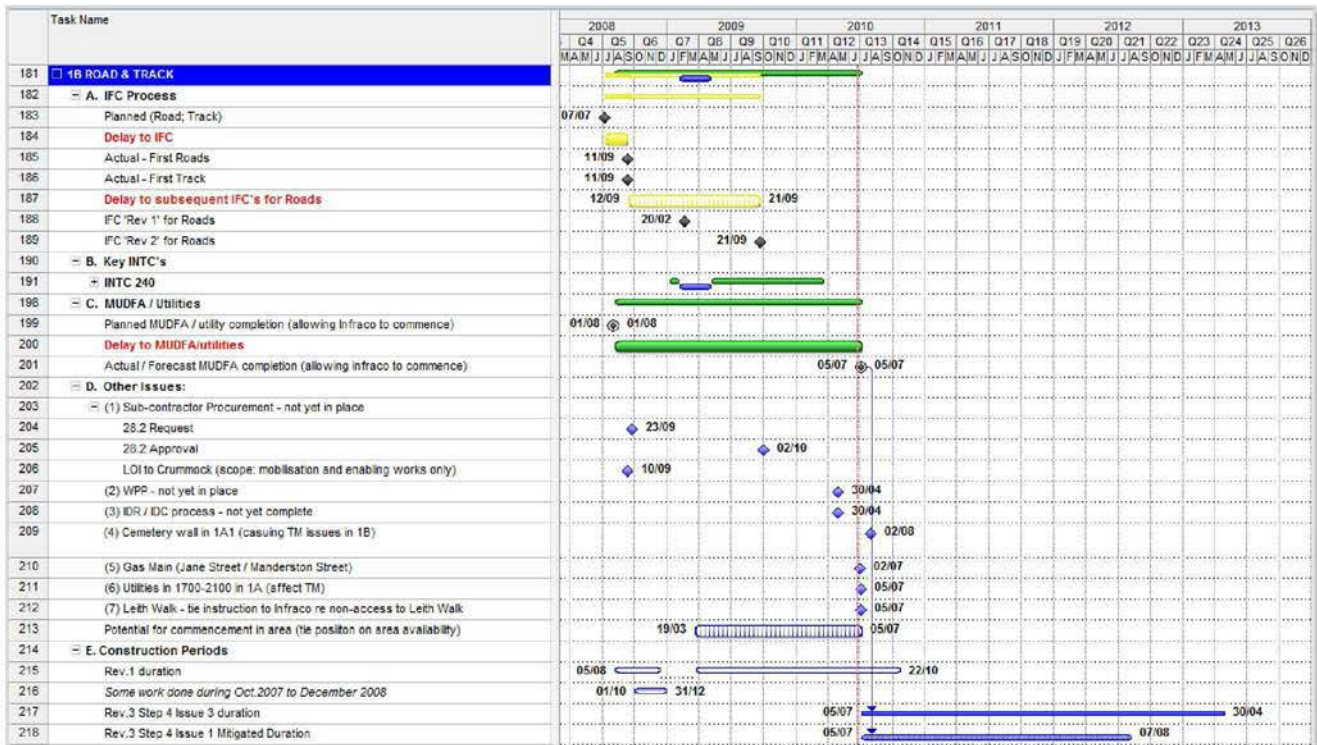
H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	tie culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
<b>1. LOWER LIMIT</b>														
MUDFA / Utilities	25/11/09	06/12/10	376	53.71				0	-	Delay to IFC	25/09/08	02/02/09	130	18.57
			0	-				0	-				0	-
				<b>53.71</b>										<b>18.57</b>
<b>2. UPPER LIMIT</b>														
MUDFA / Utilities	25/11/09	06/12/10	376	53.71										-
			0	-				0	-				0	-
				<b>53.71</b>										<b>-</b>

B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = +22 wks Infraco Rev.3 Period = +57 wks	IM Mitigated Period		Infraco Rev.3 Period											
	tie	Infraco	tie	Infraco										
Lower Limit	0.00	0.00	0.00	29.00	IM mitigated period +22wks; this is likely to be BDDI/IFC issues and TM revised phasing. Culpability not clear; range of possibilities - upper / lower limits recognise extremes of liability. Infraco Rev.3 period +51 wks: On the basis that Infraco can mitigate to 22 wks per IM analysis then Infraco lower limit restricted to anything in excess of 22 wks. tie liability remains at lower limit of 0 wks if Infraco responsible for all increased durations									
Upper Limit	22.00	22.00	22.00	51.00										

## 1B Road & Track



A. **IFC Process:** Initial IFC was 9.5 weeks late (planned 07/07/08; actual 11/09/08). This IFC was not issued as 1 no. IFC, it was divided into 2no. separate IFC's, addressing Roads and Track separately. Subsequent IFC's issued as follows:-

(i) 'Rev 1' Roads (20/02/09) & Rev '2' Roads (21/09/09). There is no information presently available to inform culpability for delay to the foregoing (see Preamble). It is notable however, that as Trackform and Roads requires the further integration of Infraco design there is a responsibility on Infraco to provide information to SDS for incorporation on time. Potential reasons for the late issue of IFC's to this area include:-

- Late issue by SDS (CE under 65(t));
- A material breach by SDS (a CE under 65(u));
- A failure of Infraco to timeously provide the Infraco Design to SDS (clause 19.19);
- A failure of Infraco in respect of its management of SDS or another breach by Infraco.

Infraco commenced some works on or around October 2008. This would indicate that this commencement was influenced by the late 'First Road & First Track' IFC's issues – but works appear to have been stopped because of the effect of the incomplete MUDFA / utility works. Comments flowing from meeting at Edinburgh Park on 03/06/10 suggest that questions exist as to the completeness of IFC's issued against this area. It is notable however that the later 'Rev 1 & Rev 2' Road's IFC's were clearly not an obstacle to Infraco's commencement or early progress on 1B Road & Track. (This however is a matter which requires further investigation. This investigation should also examine the possibility that the 'First Track' IFC issued on 11/09/08 was potentially an alignment drawing not track as labelled).

[Potential delay by SDS/tie; Infraco](#)

B. **Key INTC's:** From the information provided it appears that Infraco issued around 48 no. INTC's against this area [Complete data on INTC's awaited]. There is insufficient information available at present to establish which INTC's are significant. The only INTC which was identified as having the potential to cause delay to commencement or progress was INTC 240. It is noted however that all of the foregoing were the subject of an 80.13 instruction issued to Infraco on 19/03/10. As such, notwithstanding Infraco delay in provision of Estimates, on the assumption that Infraco complies with that instruction, these INTC's should not provide an obstacle to commencement or progress.

C. **MUDFA / Utilities:** Planned completion 01/08/08. MUDFA / utilities works are partially complete on Leith Walk: Southbound Carriageway (ch 900 – 150). However current advice is that commencement / subsequent progress on this section of the works is dependent on forecast MUDFA / utilities completions as follows:-

- (i) Leith walk : Foot of the Walk to Jane Street was forecast as 30/04/10 (now appears likely to be July 2010) [Delay by tie; tie culpability](#)  
 (ii) Leith Walk: Jane Street to McDonald Road was forecast as 05/07/10 (now appears likely to be September 2010) [Delay by tie; tie culpability](#)

Original, tie PM advice was that meaningful material commencement could not be made until 5 July 2010. However at meeting held at Edinburgh Park on 03/06/10, PD was of the opinion that Infraco could have commenced works in the Section of 1B running from Leith Walk to Jane Street on or around 12/03/09. That being the case, Infraco culpability would attach to its delay in reacting to this workforce availability. Cautionary Note: to what extent a start on that date would reduce the overall period of works after *all* utility diversions had been completed is somewhat subjective. As such, caution should be exercised when / if arguing that Infraco is responsible for delays post 12/03/09.

D. **Other Issues:**

- (i) Sub-Contractor Procurement: Understood that Crummock may be appointed by Infraco for 1B – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. [Delay by Infraco. Infraco culpability.](#) The significance of this issue will increase on completion of utility issues cited as obstacles to Infraco commencement. .

- (ii) WPP Process: Not yet submitted. This *could* be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Again, the significance of this issue will increase as the 5 July 2010 nears.
- (iii) IDR/IDC process: Not yet in place. Infraco letter/programme of 18/12/09 identifies the requirement for 11 separate IDR/IDC's. Only 6 are shown in that programme. It is highly unlikely that Infraco will be permitted by tie to commence without this paperwork in place. This may merit further discussion. **Delay by Infraco. Infraco culpability.**
- (iv) Cemetery Wall: The original cemetery extended into Constitution Street. As a consequence there are Archaeological and Historic Scotland issues governing the requirement to move skeletons displaced by the tram works. Given the intricacies attaching to these works, the potential for further delays exist. Although this workscope is outwith intermediate section 1B, the impact of this work extending beyond August / September 2010 is likely to have a consequential impact on TM requirements on 1B Road & Track works. **No current delay (but potential to cause delay).**
- (v) Gas Main (Jane Street / Manderston Street): We have been advised that this is an issue which has not yet been discussed with Infraco. The current position is that if SDS design proposals do not meet SGN's requirements/aspirations, the potential exists for further substantive delays. At best this issue will rely on reasonable mitigation on the part of Infraco. This could therefore be an obstacle to future progress. **No current delay (but potential to cause delay)**
- (vi) Leith Walk Railway Bridge: SDS culpability exists in regard to progress of design with respect to trackform design. Shallow depth issues also exist which SDS have failed to address timeously.

E. Construction Periods:

1B Road and Track					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	05/08/2008	05/07/2010	99.86 wks	05/07/2010	99.86 wks
Finish	22/10/2010	30/04/2013	131.57 wks	07/08/2012	93.57 wks
Cal. Duration	115.57 wks	147.29 wks	31.71 wks	109.29 wks	-6.29 wks

- (i) Delay to Start: The table above refers to various programme dates. Both the Issue 3 and IM mitigated programme use the same projected start date of 05/07/10. This was the same date that the PM's considered meaningful progress could be made. We are advised however that earlier commencement could have been made in relation to the outbound carriageway chainages 100 – 300 and 600 – 900 on or around 12/03/09. That is to say, the delays to MUDFA / utility works have dictated and are dictating the commencement date. The **delay to start** is therefore forecast to be circa **100 weeks**. Primary causes of delay to start as follows:-
  - A. IFC process: The initial IFC was **9.5 weeks late**; planned date was **07/07/08**; the actual was **11/09/08**. Subsequent revisions to the 'Roads' IFC were issued on 20/02/09 & 21/09/09. It is unclear as to whether these revisions would have been material to commencement (certainly (re)commencement was actually delayed by utility works beyond those later IFC dates). There is no information presently available to inform culpability for delay to these subsequent IFC's. Unless there is proof of Infraco breach, **this could be a CE under either 65(t) or (u).**
  - B. INTC's: see comments above. **[Complete data on INTC's awaited]**. Notwithstanding Infraco delay in provision of Estimates, on the assumption that Infraco complies with that instruction, these INTC's should not provide an obstacle to commencement or progress.
  - C. MUDFA / Utilities: Planned completion **01/08/08**. Partial availability on Leith Walk: Southbound Carriageway (ch 900 – 150); further release of areas as at **30/04/10 & 05/07/10**. tie PM advice is that meaningful commencement cannot be made until **5 July 2010**. **Delay by tie; tie culpability.**
  - D. Other:
    - Sub-Contractor procurement: Understood that Crummock may be appointed by Infraco for 1B – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.** The significance of this issue will increase as the 05/07/10 nears.
    - WPP process: Not yet in place. This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Unlikely to have significant impact if in place on time for commencement;
    - IDR/IDC process: yet in place. Infraco letter of 18/12/09 identifies the requirement for 11 separate IDR/IDC's. Only 6 are shown in that programme. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place (tie's ability to stop work from commencing on this basis is not clear – see Preamble) **Delay by Infraco; Infraco culpability.**
    - Other potential obstacles to commencement / progress: Cemetery wall; Gas main at Manderston Street & Jane Street; utility works to ch.1700 to 2100 (Section 1A1 Constitution Street) affecting TM.
- (ii) Delay to Finish: Issue 3 programme shows an **increase of circa 32 weeks** over the timescale in Rev.1 programme (majority of increase understood to be as a result of full-depth construction issue). IM mitigated view of Issue 3 shows a slight reduction in duration of **6 weeks** to the Rev.1 programme.  
There is presently no justification for the increased Rev.3 duration.

F. tie position on area availability:

- (i) Despite current / earlier availability on Leith Walk (outbound carriageway chainages 100 – 300 and 600 – 900), we are currently advised that Infraco have to date declined to commence works on 1B Road & Track until all MUDFA / Utilities issues are completed. These works conclude on Leith Walk: Jane Street to McDonald Road on or around 05/07/10. **Delay by tie; tie culpability** For initial MUDFA / Utility delays. **Infraco culpability** would appear to exist with respect to its delayed reaction to the above noted workforce availability on or around 12/03/09. (Cautionary Note: the reasonableness of that tie position will however have to be established. That is to say, to what extent a start on that date would reduce the overall period of works after *all* utility diversions had been completed is somewhat subjective. As such, caution should be exercised when / if arguing that Infraco is responsible for delays post 12/03/09).

G. Conclusion:

- (i) 'Significant' issues/events: In our opinion there were three main contributory factors, being (a) the IFC process; (b) the INTC process; and (c) late completion of MUDFA/utilities. Taking those events in chronological order:-

The IFC was programmed to be issued on **07/07/08**; the first IFC was actually issued on **11/09/08 (9.5 weeks late)**. This appears to have facilitated commencement in this area. This is either a CE under 65(t) (or possibly a failure by Infraco to manage SDS). Subsequent revisions were issued on 20/02/09 & 21/09/09 – those revisions however were issued after Infraco had stopped work in this area (and did not of themselves facilitate a restart). **MUDFA/utilities diversions** were supposed to be completed on **01/08/08** (to facilitate a start on 1B on 05/08/08). Those diversions however are forecast to be sufficiently complete suffice to allow re-commencement on **05/07/10**. This is tie's culpability.

The IDR/IDC process may also be a contributing factor affecting IDR commencement (but tie's ability to stop work from commencing on this basis is not clear).

- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area. This is evident from the actual (partial) commencement in October 2008. Whilst in isolation these issues may have been critical to commencement, their significance is considerably diminished by the occurrence of the events in G(i) above. They may however become more significant in the lead up to the area availability in July 2010.
- (iii) **Considerations of dominance:** availability of design and work areas are both equally important in terms of ability to commence. The late issue of the first IFC in this area does appear to have affected commencement. That said, if contemporaneously Infraco and SDS knew that the utilities diversions were significantly delayed, such that they did not have to progress the design in accordance with the original programme, then the works area availability will have more causative significance. We understand that an instruction was issued by tie (post Christmas 2008 embargo; INTC 250) such that Infraco was instructed not to work in 1B until further instructed by tie. As a minimum that would appear to restrict access up to partial availability on Leith Walk: Southbound Carriageway (ch 900 – 150). See also previous comments re potential Infraco argument that the late completion MUDFA / utilities, and hence the late availability of the working area, will be more dominant (i.e. have more 'causative potency') than its delays which would / could have been overcome in accordance with the original programme had it been necessary.

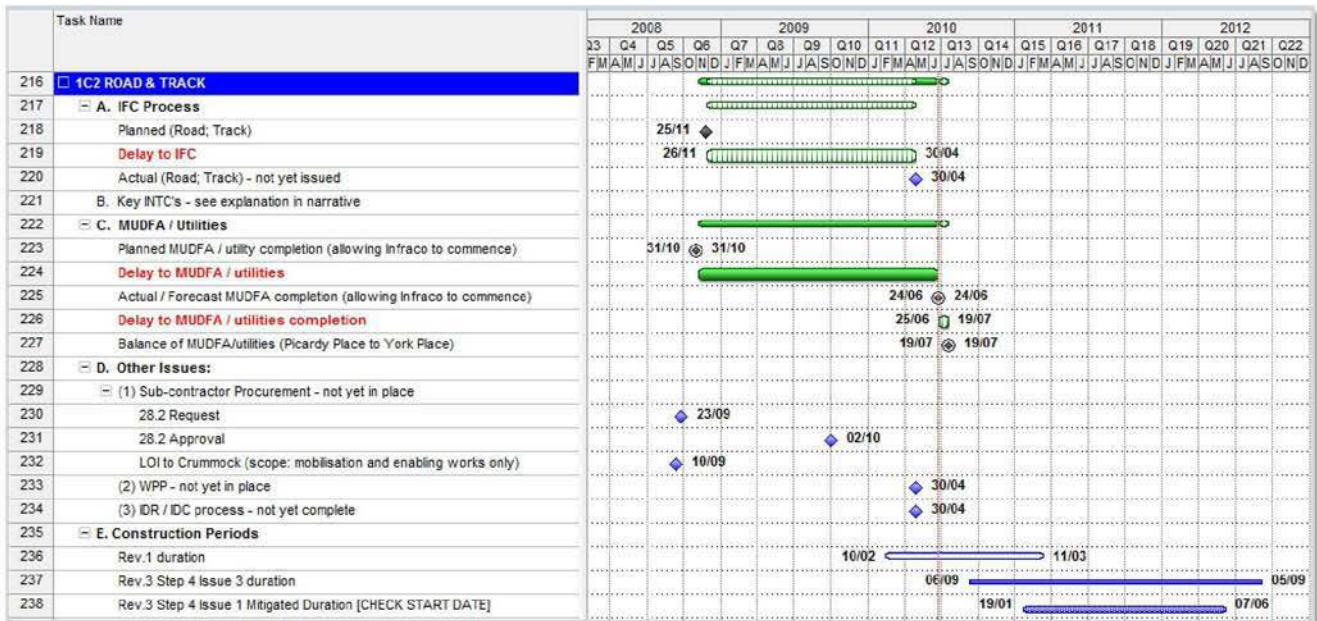
As such, in our opinion the delay to the MUDFA/utility works in 1B Road & Track is the dominant / critical factor affecting commencement and hence completion in this intermediate section.

**H. Current assessment of culpability**

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	tie culpability				Infraco culpability				Poss. SDS culpability					
	From	to	Days	Weeks	Cause	From	to	Days	Weeks	Cause	From	to	Days	Weeks
<b>1. LOWER LIMIT</b>														
MUDFA / Utilities	05/08/08	12/03/09	219	31.29				0	-	Delay to 1st IFC	07/07/08	11/09/08	66	9.43
			0	-				0	-				0	-
				<b>31.29</b>					<b>-</b>					<b>9.43</b>
<b>2. UPPER LIMIT</b>														
MUDFA / Utilities	05/08/08	05/07/10	699	99.86	Poss. Late start	12/03/09	05/07/10	480	68.57	Delay to last IFC	07/07/08	21/09/09	441	63.00
			0	-				0	-				0	-
				<b>99.86</b>					<b>68.57</b>					<b>63.00</b>
<b>B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]</b>														
<b>IM Mitigated Period = -6 wks</b>		<b>IM Mitigated Period</b>				<b>Infraco Rev.3 Period</b>				<b>IM mitigated period -6 wks:</b> notwithstanding MUDFA / Utilities issues extant, this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco. <b>Infraco Rev.3 period +32 wks:</b> On the basis that Infraco can mitigate to -6 wks per IM analysis then Infraco lower limit restricted to anything in excess of -6 wks. tie liability remains at lower limit of -6 wks if Infraco responsible for all increased durations.				
<b>Infraco Rev.3 Period = +32 wks</b>		<b>tie</b>	<b>Infraco</b>	<b>tie</b>	<b>Infraco</b>	<b>tie</b>	<b>Infraco</b>	<b>tie</b>	<b>Infraco</b>					
Lower Limit		-6.00	-6.00	-6.00	32.00									
Upper Limit		0.00	0.00	0.00	38.00									



1C2 Road & Track



- A. **IFC Process:** Initial IFC is currently **74 weeks late** (planned 25/11/08; as at 30/04/10 the actual IFC is **yet to be issued**). DS advises that "... design not yet approved and still subject to change". DS also advised that the "... current design parameters were instructed by CEC and revised design parameters now being instructed – mainly to allow Picardy Place to function in traffic flow terms but also to take account of potential Henderson Global (St James Quarter)". From the above we understand that there are two concurrent issues. The first is that the SDS design is incomplete or not satisfactory to CEC. However the second issue (Henderson Global / St James Quarter) is outwith Infraco control. From discussion with DS, this appears to be the main issue delaying completion of the design in this area. Further information provided by DS on 02/06/10 states that "... delay for 1C2 Roads is attributable to CEC (and thus tie) except for any time where we can substantiate unreasonably slow progress by SDS / BSC, eg period taken to produce design estimates. SDS design unsatisfactory to CEC is a red herring because CEC instructed the constraints that give rise to unsatisfactory traffic impacts and CEC has had to relax those constraints to try to find an acceptable design". It is therefore likely that the late issue of this IFC flows from one or more of the following possibilities:-
  - Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
  - A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
  - A failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule. Part 14 (clause 19.19 refers);
  - A tie Change;
  - A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC interface);
  - A requirement of CEC for which tie will bear responsibility;

**Delay by SDS, SDS /tie or Infraco?** As a minimum however, it is expected that Infraco will be excused the time for this delay due to CEC indecision concerning Henderson Global (St James Quarter) design requirements.
- B. **Key INTC's:** From the information provided it appears that Infraco issued around **13 no. INTC's** against this area [Complete data on INTC's awaited]. Of those INTC's 2No. are known to have TCO issued against them (INTC's 91 & 169). Beyond that however, there is insufficient information available at present to establish which INTC's are significant. That said, it is noted that 7 No. of the foregoing were the subject of an **80.13 instruction issued to Infraco on 19/03/10**. As such, notwithstanding Infraco delay in provision of Estimates, on the assumption that Infraco complies with that instruction, these INTC's should not provide an obstacle to commencement or progress. In respect of the remainder, the obligation remains with Infraco to provide Estimates (which are overdue in terms of Clause 80 timescales).
- C. **MUDFA / Utilities:** Planned completion was **31/10/08**. MUDFA / Utilities are forecast to complete at Broughton Street Junction on **24/06/10**. Meaningful commencement is dependent on MUDFA / Utilities completion on York Place / Elder Street to North St Andrews Square and Picardy Place to York Place on **18/07/10**. **Delay by tie; tie culpability**
- D. **Other Issues:**
  - (i) **Sub-Contractor Procurement:** Understood that Infraco has verbally advised that they are not sure how much work they will self-deliver and how much they may sub-contract. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.** The significance of this issue will increase as the 06/09/10 nears (this is the earliest date of commencement in this area between Issue 3 and IM mitigated programme).
  - (ii) **WPP Process:** Not yet submitted. This *could* be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Again, the significance of this issue will increase as the 06/09/10 nears.
  - (iii) **IDR/IDC process:** Not yet in place. Infraco letter / programme of 18/12/09 identifies the requirement for 12 separate IDR/IDC's. Only 6 are shown in that programme. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. **Delay by Infraco. Infraco culpability.**