tie's position is that BSC has not complied with its obligations and have frustrated tie's ability to formally review and comment on the design. Analysis of the reasoning offered by tie outlined below:

1.1 Clause 10 Development

1.1 tie have never formally advised Infraco that we have frustrated the intended process of tie's ability to formally review and comment on the relevant deliverables. The SDS Design Programme shows dates that design is issued for approval to CEC and when IFC will be issued to tie. The Siemens submission Schedule shows when design packages will be issued by BSC (Siemens) to tie for review.

1.1.1.1 tie misquote Clause 10.1 adding brackets around "and procure that CEC does so". This changes the meaning of the clause and is incorrect. Clause 8.2 of Schedule Part 14 states "this information is supplementary to information required to be produced by the Infraco in order to satisfy the approval requirements of and Consents from other third parties and Approval Bodies".

Prior to Novation of SDS to the Infraco tie relinquished their obligation to review SDS designs and advised SDS that they did not want SDS to issue review material in the form of design deliverables between August 2007 and Novation. Confirmation of completion of these deliverables was requested and provided be SDS under cover of letter only.

This clearly demonstrated tie's position on review of the SDS design and their inability to undertake such reviews.

tie do not mention Clause 10.8 which allows them to call a meeting to discuss the deliverables during their preparation. tie have used this to call meetings on SRU Accommodation Works and Roseburn Viaduct. They have also requested meetings on Section 1A design issues but did not provide agenda of meeting or contact the proposed Infraco representative to advise availability for the meeting.

1.1.1.2 tie state that Infraco "appears to have breached its obligations. We do not accept tie's statement and confirm that Infraco are following Clause 10 and Schedule Part 14. Refer additional commentary on Schedule Part 14.

During the period of tie management of the SDS Agreement, tie failed to undertake the contractual review of the SDS design as detailed in the SDS Agreement. SDS has produced 67 versions of the design programme and which have been issued to tie, 31 of which were issued prior to the date of Novation during which time tie failed consistently to meet their contractual review obligations to the point where deliverables were not even issued to tie by SDS at their request.

The programme issued by SDS subsequent to Novation has included all elements of the civils design works including where the design has been amended as a result of change due to the inclusion of the system wide on street track form design. The design submissions for the systems elements of the works are included in the Siemens Submissions Schedule as part of the client design which has also been issued and reviewed by tie in ROR responses.

It should be noted that Under Clause 10.1 that upon receipt of such design tie are to procure that CEC requires the review of such deliverables. The failure of tie to manage and coordinate the reviews to be undertaken by CEC in an effective and timely manner has impacted considerably on the delay in achieving approval for the design.

It should be noted that there are a number of design changes to be instructed by tie to allow the integrated design to be issued.

Further, TEL attend the IDR/IDC workshops and the civils design is discussed (where necessary) at the PSCC and ICP liaison meetings.

1.1.1.3 In preparation of the Infraco Contract a series of programme review meetings were held between SDS and tie, prior to the Novation of SDS into the BSC consortium, to finalise the SDS design delivery programme. tie reviewed the SDS programme, requested changes that were made and agreed the programme for completion of eth SDS deliverables which was subsequently bound into the contract. This was Version 31.

In the SDS Design Programme Version 31 tie did not request that a further review of the design be included by tie upon completion of the design, to be initiated by BSC. On the contrary, based upon the review that tie had undertaken up to the point of Novation, tie requested that the tie review period be removed. This can be clearly seen in the two versions of the SDS programme which tie eventually bound into the Infraco contract (version 26) and SDS Novation Agreement (Version 31). For this reason no such tie review period is indicated in Version 31 of the SDS design programme. This would have instantly extended design delivery dates and reflects tie's view on tie's position not to review all of the completed design.

(ii) 67 versions of the SDS programme have been issued either directly to tie (pre novation) or to BSC and forwarded to tie (post novation). This included all deliverables instructed by tie, but not items where change instructions was not provided by tie but work was required to finalise the design and achieve Approvals and Consents. This includes misalignment changes and changes in requirements by tie or other statutory consultees. This resulted in considerable delay to the design delivery programme and programme uncertainty.

(iv) The Design Integration Programme was issued to tie for information to demonstrate that Infraco have coordinated the Design Integration Process. Further revisions of the programme were shown to tie as part of a Clause 104 Audit on Design Management in May / June 2010.

1.1.1.4 Clause 10.6 of the Infraco Contract was not reflected by tie in the development and approval of the Version 31 of the SDS design programme. tie removed their review of the SDS design- refer 1.1.1.3 above.

Both 10.6 and 10.10 clearly identify that deliverables should be delivered to tie. All deliverables are issued to tie. This contradicts somewhat with Schedule 14.

In addition, this is in clear contradiction to tie's instruction to SDS not to provide designs for tie review during the development of the design managed by tie and instead to produce Design Assurance Statements to demonstrate design quality and compliance. In the development of the Contract Design programme tie clearly were not intending to review the SDS design deliverables.

1.1.1.5 Clause 10.10 reiterates that tie's review would include other third parties including CEC – 5 copies of each deliverable (IFC). The original intention was for two copies to be issued to CEC doe their information / records. The design delivery material being procured for review by tie, see clause 10.1.

1.1.1.6 Clause 10.10 must be read in conjunction with Schedule Part 14. IFCs are issued to tie ahead of construction works.

Additional Commentary on Schedule 14

Schedule Part 14 Clause 3.1 states "Design Deliverables to be reviewed using the procedure set out in the Design Management Plan. Clause 2.9.1 of the Design Management Plan (Schedule Part 14 Part C) states that tie's Engineering Services Director is responsible for overall management of this plan.

It should be noted that Schedule Part 14 Part C Clause 2.5.1 states "The systems design and tram vehicle are not subject to CEC Technical Approval; they are subject to design review by tie". This would suggest trackform is not subject to CEC technical Approval and that the civils design does not need to be submitted to tie for review.

tie's Engineering Services Director (Tony Glazebrook) has previously advised BSC (verbally only) that the intention of Schedule 14 from a design review process was for the Infraco design only (i.e. Siemens Systems design) as tie did not have resources to review the Civils design. Furthermore, this is covered by the submission of the DAS and elements / packages of the Civils design have been reviewed by tie.

Reviews by tie include Operational Design Reviews with Transdev and CEC.

Clause 8.2 states "this information is supplementary to information required to be produced by the Infraco in order to satisfy the approval requirements of and Consents from other third parties and Approval Bodies.

Clause 2.2.1.3 of the Design Management Plan states *"a tie led 4-week Design Review process.....is to review **selected** design packages for the effective integration of the design elements to create an operationally acceptable tram system"*.

Clause 2.7.1 (Design Review) describes the purpose of the tie led Design Review. This is primarily concerned with providing assurance that tie can demonstrate to the ICP that the requirements of ROGS are being met.

Clause 2.3.3 covers Minor Design Changes – this should be compared against the type of Informatives being raised by CEC!

Exhibit No. 20

1.1 System Integration

1.1.1 Refer System Integration Plan (Shabu has supporting documents)

1.1.2 tie must instruct necessary design changes to allow integration of design to be completed. Refer outstanding design changes and issues that tie need to resolve – Monthly Progress Report to tie.

1.2 Failure to submit

tie's position is that BSC has not produced and submitted for review an integrated trackform design. Analysis of the reasoning offered by tie outlined below:

1.2.1 No comment

1.2.2 System Integration Plan has been issued to tie. tie have reviewed this and given it Level B status.

1.2.3 Refer response to Exhibit 19.

1.2.4 tie state that they have not received and integrated trackform design for the On-street sections of the works and that they have a no knowledge of the date for receipt of such a deliverable. This is in conflict with the instruction to BSC to proceed with the construction of trackform installation on Princes Street. Combined drawings for the trackform were issued to tie prior to the construction of the works on Princes Street and on the basis of the tie instruction to proceed it must be assumed that they felt that there was sufficient detail and level of confidence in the BSC and SDS Integrated design to instruct the works on what is the most prestigious Street on the route.

The design intent and configuration of all types of track forms being installed in Princes Street was provided at tender stage by BSC and technically reviewed by tie and their technical consultant TSS and assumed to be deemed technically appropriate and acceptable.

The Integrated track form design has been submitted to tie and to CEC and has been the subject of the formal BSC review process i.e. Interdisciplinary Design Review Interdisciplinary Design Check, and has been issued formally for construction.

1.2.5 The status of the DAS cannot be declared IFC until such time as the design is complete in the relevant subsection. This requires that all change in any subsection be Instructed, designed and formally subjected to design review, the IDR, IDC and all comments incorporated prior to the issue of the IFC versions. For these reasons the DAS documentation cannot be considered complete until all design has been instructed and completed and issued for construction and until that point will be issued as interim. This does not preclude the construction of elements of the works that are not subject to change and have been through the formal design review and quality checks and issued IFC.

The DAS documents were developed as a means for tie to alleviate themselves from their obligations and responsibilities to CEC to review the civils design as detailed in schedule 9 of the SDS Agreement. This was a result in their total failure to undertake a timeous review of

the SDS preliminary design which was delivered to tie in June 2006 and should have been reviewed within a 4 week period and was eventually completed by tie and comments issued in January 2007.

Also refer to our letter 25.1.201/SN/6311 highlighting a list of issues that needed to be resolved to allow the DAS to be finalised.

1.2.6 refer 1.2.5

1.2.7 It is unclear on what basis tie considers that the design is not fully integrated. Design drawings were produced for the on-street trackform design. These were issued to tie for review and comments received by Infraco. tie have approved the trackform as Level A or B (except where they have gone reverted back to Level C which is not in accordance with Schedule Part 14).

tie is unable to refuse issue of a PTCW on the basis of a fully integrated design. **Even tie's lawyers appear to agree with Infraco on this!** There is no express contractual provision stating that it is a pre-requisite to PTCW. Furthermore the reference to Third Parties is exemplarised in tie's PTCW form. From this, it is clear the third party approvals relate to access, not design completion.

Furthermore, Infraco is responsible for any errors, ambiguities etc in the design and therefore can progress at its own risk. Refer Clause 10.12 of the Infraco Contract.

1.2.8 Systems designs are to be submitted to tie under Schedule Part 14. This includes Trackwork.

The integrated design is shown on SDS drawings which have been submitted to tie as IFC ahead of the construction works. The design was integrated prior to Princes Street being installed. Following completion of Princes Street and the appearance of defects/deterioration, Infraco held around 10 workshops to test the integration principles. The conclusion of these workshops was that the design implemented in Princes Street was and is integrated.

More recently, during the submissions for repair of Princes Street and Trackform Informatives, integrated design details have been submitted to both tie and CEC.

1.3 Timeous production of Integrated Design

1.3.1 The design was integrated prior to implementation of Princes Street - refer to 1.2.8 above.

CEC and tie are continuing to ask questions about the trackwork design and responses are being given. Infraco has not been revising the design, simply providing answers about the existing design.

Furthermore, date on Rev 1 Programme was not achieved as tie had not provided the necessary instructions to align the civils design with the Infraco Proposals and the ERs under the Development Workshop Process. Refer timeline for trackform workshop – outlined in response to tie's Mediation Statement.

1.3.2 Refer to 1.2.8 and 1.3.1 above.

1.3.3 Who do tie refer to as “our” within this statement? Refer to 1.3.1 above

1.3.4 CEC has provided Technical Approval for the Roads Design for each subsection; expect for Section 1C2 (due to Picardy Place issue)

In this, there were Informatives requesting details of the trackform once it had been selected. The trackform was submitted to close the informative. Subsequently CEC has requested further information. Refer to 1.3.1 and further details within response to Exhibit 21.

The comment stated within 1.3.4 was not stated by CEC within initial Informative wording.

1.3.5 Refer to 1.2.7 above

1.3.6 Refer to 1.2.7 above

1.3.7 tie's letter 5400 expounded their concerns about the defects in Princes Street. Infraco's letter reference 6728 responded to tie’s letter reference 5400.

The presentation given on 2/12/10 also gave the reasons for defects in Princes Street. These were all related to the unrealistic deadlines for re-opening Princes Street.

Notably, whilst Infraco was telling tie that the re-opening date could not be achieved (documented), tie was telling CEC that it could be achieved, in apparent total denial of the true status. It was under these circumstances, with a client who denied the reality of trying to complete Princes Street to realistic deadlines that the work was carried out.

1.3.8 Infraco does not consider that the Ground Improvement Layer (or TIL) is an issue delaying finalisation of design and integration. tie refer to INTC 588 which relates specifically to the special shallow trackform design that may be required due to known utility or other conflicts as well as the transition slabs at the dock bridges that are still to be instructed by tie. The Ground Improvement Layer design was instructed by tie and had been completed and installed at Princes St and within Section 2A.

tie also refer to this being “unapproved”. The TIL has been approved by CEC so Infraco is unsure as to what tie is referring to here.

The proposed design for the TIL was challenged rigorously by both BB and Siemens on several occasions. Furthermore, this formed part of a tie Audit was BSC provided details to tie in letter 25.1.201/CBr/4781 on 24 February 2010.

Subsequently, in response to the challenges, SDS provided Infraco with a detailed report justifying the choice and design of the TIL. Refer to ULE90130 SW-REP-00824-Iss2 Rev2

Infraco were in receipt of the tie instruction for the ground Improvement Layer in February 2009. This instructs SDS to produce a schedule of formation treatment solutions that form the basis of the selection of the improvement layer as the construction progresses. A testing methodology to be adopted during construction was also developed. This will be used to determine the appropriate improvement layer where necessary from the schedule of treatments.

One of the basic considerations of the change was the assumption of "Void spanning requirement" to be in City centre.

The generic solutions were to comprise of dig out existing material and replace with varying solutions depending on location and track form type.

3 no solutions were considered:

- RC Slab
- Notionally granular fill
- Reinforced grid in fill

In the development of the design for the city centre section of the route the void spanning requirement and ground conditions identified during site investigation and road excavation (during track installation and previous MUDFA utilities works) resulted in the RC slab being the only viable solution through the city centre which would deliver the prerequisite 120MPa bearing pressure under the trackform. This 120MPa bearing pressure is required for the installation of Rheda track form in the on street sections and is required for the lifetime of the track form i.e. 50 years.

The risk of not installing the RC slab under the trackform and the potential for voids to develop was clearly evident during the track installation works on Princes Street. Significant voids were identified under the roads as the excavation works progressed ahead of track installation. The reasons for the development of the voids were not identified and the likelihood of further voiding during the next 50 years cannot be ruled out.

For these reasons Infraco do not consider the installation of the reinforcement layer to prevent efficient construction, prevent a certificate of Commencement or represent an inefficient expenditure of cost, but is a fundamental requirement for the safe installation of the Rheda trackform in Edinburgh, as procured by tie.

General Statement on a "fully Integrated and Approved Design"

As part of Project Carlisle, tie was pushing for the final fully integrated design and the associated Design Assurance Statements (DAS). Infraco issued letter 25.1.201/SN/6311 dated 05 August 2010 to tie highlighting the outstanding issues that are outwith Infraco's control and that need to be resolved to achieve final fully integrated and approved design. tie have not responded to this letter or assisted in resolving the vast majority of these issues to date.

It should also be noted that these issues are discussed with tie on a regular basis through Design Change Issues Meetings, Approvals Taskforce, Monthly Progress Meetings and separate focussed meetings and formal correspondence.

Exhibit No. 21

1.1 Clause 19 Consents

1.1.1 No comment

1.1.2 No comment

1.1.3 tie's position is that BSC has not obtained necessary Consents. Analysis of the reasoning offered by tie is that BSC and SDS have failed to secure approval of the integrated roads and on street track designs as required by the Contract.

It should be noted that Schedule Part 14 Part C Clause 2.5.1 states "The systems design and tram vehicle are not subject to CEC Technical Approval; they are subject to design review by tie". This would suggest trackform is not subject to CEC technical Approval and that the civils design does not need to be submitted to tie for review.

Up to the date of the CEC letter 1 Feb 2011, the approval of the roads design was subject only of the Informative closure in relation to the track form to provide the details of the track componentry. This was delivered in December 2010 and responded to by CEC on 1 February 2011. CEC requested further information and stated that they now require a full technical approval for the trackform.

A rectification plan for the works undertaken on Princes Street has been developed and issued by BSC. This details the remedial works to be undertaken and the alternative design option available should it be deemed preferable to CEC.

At no point has BSC advised that the system currently indicated on the design drawings is not fit for purpose, but that the alternative design may, with the experience to date on the Princes Street works, offers a better solution for the particular circumstances in Edinburgh.

It is unclear what additional information is required to close the Informative, and it is suggested that this can be easily resolved through discussion with CEC technical experts. This is in progress and a meeting was convened with CEC experts on 23 February to discuss these issues. Additional information was requested by CEC from the trackform designer.

1.1.4 It should be noted that CEC have changed position from what was previously requested under the initial Informative. Refer below history:

The trackform is covered under CEC Category 6 – Track Details Informatives:

CEC Comment ID 3263 dated 13 March 2009 stated *"Details of Track to be provided to CEC for comment once available".* At this point CEC did not state that this would then require a full Technical Approval.

CEC Comment ID 11220 dated 16 August 2010 stated "'Details of track including pavement construction". This is to apply Sectionwide although raised by CEC Roads on Section 5A (outwith their remit).

CEC's letter dated 15 November 2010 stated that they required further details not previously specified above including formation improvement layers (previously reviewed by

CEC and deemed not necessary for approval) and details on how the choice of improvement layer has been optimised – all new requirements.

CEC's letter dated 01 February 2011 then goes even further including examples of where the system is used elsewhere.

This all follows on from tie procuring a system (following a review of the Infraco Proposal by their consultants) that they accepted through procurement and subsequent approval under Schedule Part 14.

Furthermore, tie are now acting as a Technical Review body on behalf of CEC – this is frustrating the process and allowing tie a further review of the trackform. In parallel to this, tie have advised Infraco that some trackform design reviews have been moved from Level B to Level C which is not in line with the procedure within Schedule Part 14.

1.1.5 Refer 1.1.4.

1.2 Permit to Commence Works

1.2.1 tie is unable to refuse issue of a PTCW on the basis of a fully integrated design. **Even tie's lawyers appear to agree with Infraco on this!** There is no express contractual provision stating that it is a pre-requisite to PTCW. Furthermore the reference to Third Parties is exemplarised in tie's PTCW form. From this, it is clear the third party approvals relate to access (as stated in 3.4.1 of Schedule Part 3), not design completion.

This appears to be a repeat of what was mentioned within Exhibit 20.

1.2.2 Refer 1.2.1

1.2.3 No design team input

1.2.4 tie appear to quote / reference only part of the Clause. An approval Body means ..... and any other third parties who **are to issue or provide Consents.** tie are confusing access and design issues.

1.2.5 No comment – refer above

1.2.6 tie's lawyers appear to agree with tie. Infraco do not agree with tie's position. The position adopted by tie appears to further illustrate that they are not experienced in delivering projects of this nature and suggests that they do not want the on street works to progress.

Consider this....if all approvals have to be in place prior to the PTCW being issued by tie, we should all go home and come back in two or three years when tie have completed the TRO process, CEC have approved the remainder of the design (Section 1C2, Section 3) and discharged all the Informatives, tie and CEC Planning have decided which TVM and system branding they want to have and all parties (tie, CEC, BAA, Forth Ports, SRU, Network Rail, Scottish Water etc) have agreed that the design will not change again!

Exhibit No. 22 – Defects to Princes St

tie have made 22 statements within Exhibit 22 regarding defects to Princes Street. Some are wholly incorrect, others are correct and the defects have been repaired. Others are correct and we await resolution of the rectification plan issues with tie and CEC. The defects mentioned that are specific to the trackform / road interface are repeated (and responded to) within the tie's Mediation Statement.

There are a small number of "new" points raised by tie within this Exhibit and these are responded to below.

Point 1 IFCs issued ahead of Princes St works. CEC's Informative relating to track details was not raised as an issue prior to commencement of works or prior to putting traffic back on Princes St in November 2009.

Point 2 The track informative was outstanding but as agreed with tie and CEC in mid November 2009, the technical informatives needed to be closed out but this would not stop traffic being put back onto Princes St and indeed, specifically the track informative was not raised as a major issue by CEC at this time.

Point 3 tie allege "a lack of Ground Investigation leading to excessive amount of reactive design". This is a fundamental misunderstanding of the roads design process agreed by all parties prior to and post Novation.

Considerable work has been done in Edinburgh to ascertain the nature of the ground conditions through the city centre. This includes desk top studies, visual inspection, ground penetrating radar, core sampling, falling weight deflectometer and Dynamic Cone Penetrometer testing. Road condition survey was carried out in 2006 by SDS and identified below surface deformation in areas of the ETN alignment.

Inspection of the roads reviewing present condition, failures etc was carried out in advance of the roads design. This was followed by a survey of the various cellars in close proximity to the track which was undertaken by Aperio in 1st quarter of 2006, visual inspections during the MUDFA works diverting existing utilities, then additional testing and finally the installation of the track on Princes Street.

Mouchel Group Plc (MG Plc) performed a site investigation on Princes Street, including coring and Dynamic Cone Penetrometer (DCP) testing every 50m in June 2008. In June 2009, Bureau Veritas UK Ltd performed a site investigation in Princes Street and Leith Walk, in the form of DCP testing and plate bearing tests every 10m. The results of this testing concluded a highly variable subgrade performance with CBR values ranging from 1.5% to 10%.

The investigation of the ground conditions undertaken over the duration of the design has consistently indicated extremely variable ground conditions.

Point 4 tie allege "Infraco did not apply the requirements of DMRB for the foundation design or for integration with existing pavements". This is again wrong. The design was in line with DMRB and CEC Roads approved the roads design (Appendix 7/1) for both the SDS original design (full depth reconstruction) and the second roads design instructed under the Development Workshop on Roads.

Point 5 Point 5 to Point 22 covered above. Refer responses to Exhibit 19 – 21 for further details (and response to tie's Mediation Statement)

Exhibit for Princes Street Defects – Rectification Plan