tie Limited
Edinburgh Tram

Detailed Design Review Process

21 December 2006

B137102RC17a.

Mark-up: Jan 2007.

1 BACKGROUND

1.1 Purpose

The purpose of this document is to specify and recommend the process that should be adopted in the review of the detailed design submission from the System Design Services (SDS) Provider. ✓

1.2 Introduction

In the closing weeks of 2006 and first quarter [+ 2nd] of 2007 SDS is programmed to start delivery to the Client, tie, its detailed designs for the Edinburgh Tram Project for its acceptance. On submission these documents require to be reviewed by tie with assistance from the review teams comprising:

Tie has delegated responsibility for reviews to TSS, who will co-ordinate input from Tie, Transdev and CEC as required. Tie,

- The Technical Support Services (TSS) Provider;
- Transdev (the proposed tram operator);
- TEL(Transport Edinburgh Limited); and
- Other stakeholders (to be confirmed by tie).

For each deliverable "package" a Record of Review (ROR) must be prepared and submitted by the review teams to tie for onward transmission to SDS. This whole process requires to be completed within twenty working days.

within a maximum period of 20 business days from receipt of submission from SDS in accordance with the terms of the SDS contract

delete: It is recognised that the submission and subsequent processing of these documents will represent a logistical challenge in terms of the volumes involved and the imposed timescale.

Tie has instructed In recognition of this challenge TSS has been asked by tie to develop a robust *design review* process based on best industry practice to demonstrate that it will be able to meet the requirements of the detailed design review. As a result the recommended process specified in this report is based upon previous experience of the successful implementation of light rail projects, in particular the Nottingham and *irrelevant* Croydon tram schemes. Experience from these projects has shown that the manner in which the design deliverables are packaged on submission, i.e. in an integrated manner, can have a significant impact upon the design review process in terms of review resources and turnaround timescales.

At the outset, this report therefore recommends that the *SDS* design deliverables are reviewed from the beginning of the process in an integrated inter-disciplinary manner and that the SDS Provider is encouraged to submit its design submissions with the discipline layers "grouped" to avoid duplication or the need to overlay manually other submissions, e.g. alignment to show track, highway and OLE system deliverables. This is reflected in the Detailed Design Deliverables Matrix as shown in Appendix A, i.e. "integrated packaging". This will then allow the review to take place in accordance with the Detailed Design Integrated Review Matrix as shown in Appendix B.

Programme It is recognised that tie *SDS* already has an accepted *developed the* design deliverables programme from the SDS *packages and they will be delivered to tie the P3e* Provider (version 9). However, following discussions between SDS and TSS (from an agreed action *Not Acceptable to change tie/SDS agmts!* from the tie/TSS detailed design review meeting of 13th December 2006), SDS has indicated that the impacts on the version 9 programme should be minor. The SDS Provider is currently reviewing its deliverables programme to check how it fits with the Deliverables Matrix and it is expected that SDS will respond to this change early in January 2007.

The SDS Design Deliverables are already set in the SDS Contract.

TIE00002052_0002

No. *It is therefore strongly recommended that **tie** requests a re-submission of the SDS design deliverables programme to take account of the "integrated packaging" of deliverables, which has already received an agreement in principle from Transdev and SDS.*

2 STRUCTURE

2.1 Introduction

This section provides a detailed account of the structure of the process it is proposed to put in place for the review of the detailed design submission.

It is essentially in three parts:

- Process Flow Chart; ✓
- Timetable of Events; and ✓
- Responsibilities. ✓

2.2 Flow Chart

maximum 20 working days of he design SDS design (spec, dwgs docs)

The flow chart in Figure 2.1 outlines the process to be completed in the review of the documentation.

The following bullet points describe the process outlined in the chart:

tie to TSS

- Documents will be delivered by ~~SDS and go into the~~ tie ~~Document Control system~~.
- The submission will then pass to the Core Review Team (CRT), the Core Review Team Assistant (CRTA) and to the identified Lead Reviewer (LR).
- The Core Review Team (including the relevant Lead Reviewer for the deliverable package) will undertake a high level review of the documentation to determine if it is fit to be reviewed - items failing this test will be rejected from the process and immediately returned to SDS via **tie** Document Control.
- Where documents have passed this initial test and been accepted by the Core Review Team for full review, the Lead Reviewer will identify the review team and notify them of the extranet location of the deliverable.
- The review team carries out the review based on Review Criteria (see Section 3.4 Reviewer Actions and Completion of the ROR).
- Towards the end of the review the Lead Reviewer will arrange a meeting with all parties who have reviewed the document to agree the final Record of Review (ROR).
- The ROR will then be submitted to the Core Review Team for final checking before being passed back to **tie** Document Control for onward transmission to SDS.

Insufficient time for this

It should be noted that within the process there will be the opportunity to issue a Request for Further Information (RFFI) if any reviewer believes that there is a significant omission from the documentation.

Montse

In recognition of the challenging timescales of the process, it will be the responsibility of the ~~Core~~ TSS ~~Review Team Assistant~~ design to monitor progress of individual packages of work as they move through the review process. This role will require the pro-active monitoring of reviewers and setting up final review meetings *within the 20 working day period TSS (transden + CEC). and completion of consolidated ROR's for each design element.*
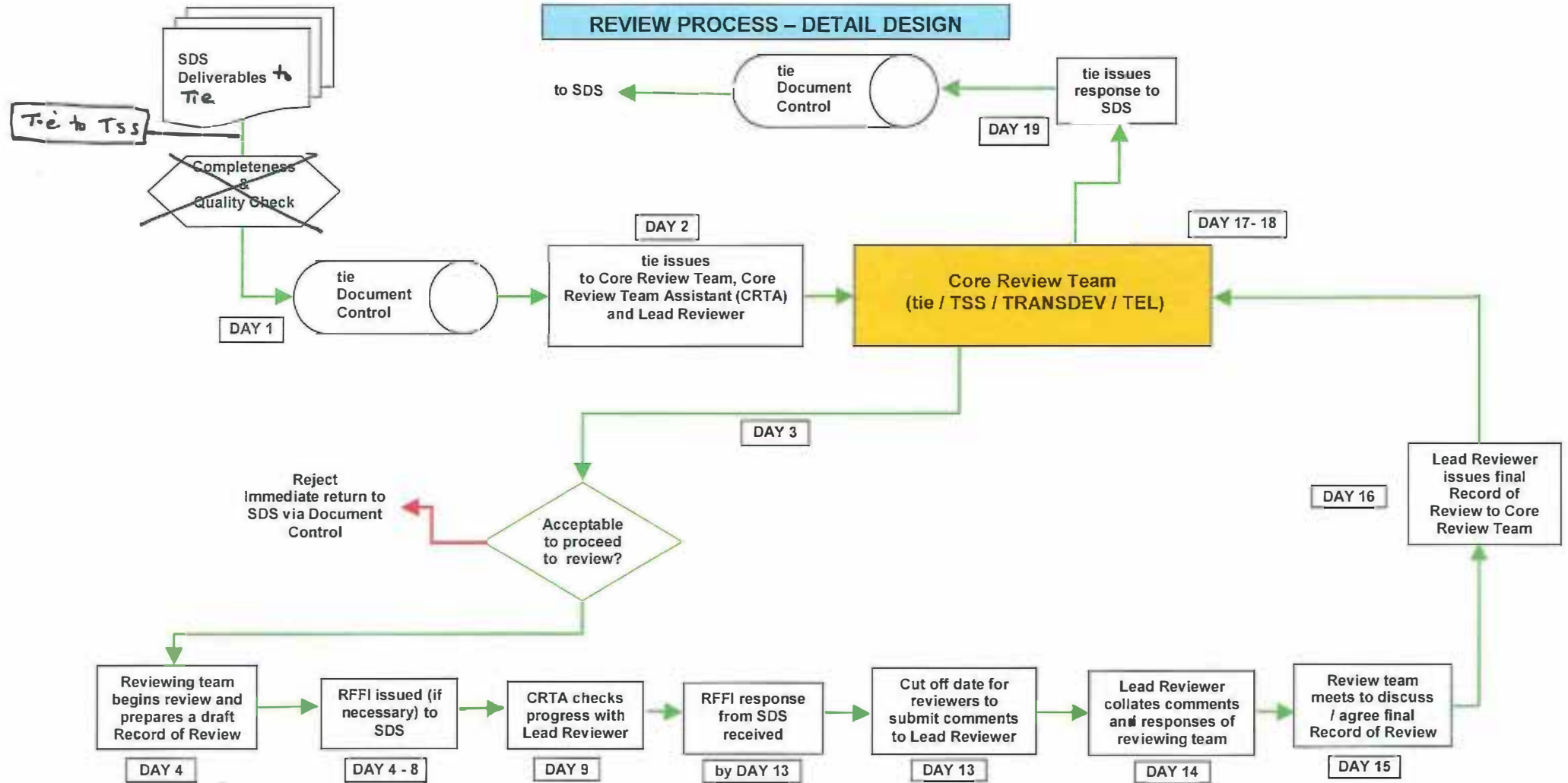
TIE00002052_0004

Figure 2-1: Process Flow Chart

TIE00002052_0005

2.3   Timetable of Events

[handwritten: The Contract between tie and SDS provides a maximum of 20 working Days for Review; thereafter it is deemed accepted.]

The foregoing flow chart provides an indication of the timescales that need to be met if the process is to achieve its goal of undertaking an inclusive integrated review of the submission with a response ~~going back to SDS~~ *[handwritten: to tie]* within the ~~stipulated~~ *[handwritten: contractual]* twenty working day period.

The following text provides more detail of the timetable of activities to be undertaken during the process.

Day 1

The process is based on SDS issuing deliverables to **tie** through the **tie** Document Control

[handwritten: Too late;]

- SDS will send a soft copy of all deliverables ~~by their preferred means~~ to *[handwritten: tie]* Document Control including the transmittal note. ~~The format of this transmittal note shall be agreed such that it will allow a simple 'cut and paste' into tie's document tracker and documents received register.~~
- ~~The receipt of the "package " i.e. the printed paper copies of the PDE's that SDS has produced of their designs, will be checked for completeness against the soft copy transmittal note. If it is correct the Document Controller will print the soft copy, sign it and return the signed copy to SDS. Note that more detail on the role of Document Control is covered later in this report.~~
- The review period starts upon signature by **tie**'s Document Controller that all items listed in the transmittal note exist in both hard and soft copy.

[handwritten: tie will issue the relevant deliverables to TSS.]

Day 2

Morning (completed by 12:00)

- **tie** Document Control places a soft copy of the deliverable on the extranet (accessible to all members of the review team) and informs the Core Review Team, Core Review Team Assistant and Lead Reviewer of its arrival.
- The Lead Reviewer will not act on the submission until instructed by Core Review Team Leader (CRTL).
- **tie** Document Control will create and place the pro-forma Record of Review (ROR) at the same extranet location as the deliverable and will complete the following details on the ROR for every deliverable component:
  - Header data;
  - Document number;
  - Title;
  - Originator;
  - Issue status and version; **?**
  - Required review date; and
  - Lead Reviewer name and role;

[handwritten: No. We will agree the template in advance.]

See Appendix D for an example of the blank pro-forma ROR.

Note 1   *[handwritten: ✓]*
There will be one ROR per deliverable. The Lead Reviewer has the responsibility to ensure that all reviewers' comments per deliverable are captured on the relevant ROR located on the extranet.

Note 2
In addition to the blank ROR pro-forma, **tie** document control must make available all the RORs that were produced during the Preliminary Design process for the relevant SDS submission. The relevant RORs should be located in the same extranet location as the current SDS deliverable submission for review.

[handwritten: No ⇒ TSS already have these docs. The PD ROR's will be on the shared Portal]

Day 3

Core Review Team Internal Gateway Review

- For each review item, a decision process is involved which will evaluate if a detailed review is required i.e. is the review item worthy of out of hand rejection or immediate approval? This is to be a brief high-level review acting as a coarse sieve to avoid redundant work / expenditure. It should focus on interfaces and general compliance with tie's requirements.

  The following should be answered for the review item(s):

  - Does it look right? *?*   *- Needs to be more Measurable.*
  - Does it fit the context of design?

and

No

- Compare the current submission to its predecessor and evaluate if appropriate changes have been made in relation to previous comments supplied by **tie.** If this last method is adopted **tie** Document Control will attach **tie**'s prior ROR comments and the SDS designers' response to each individual item (see Note 2 above).

or

- For documents that are being reissued, check that appropriate amendments have been made.

The output of this preliminary review is either to:

- Accept the submission which will then lead on to:
  - Informing the Lead Reviewer to proceed;
  - Updating the **tie** document tracker entry; and
  - Any initial comments by the Core Review Team being entered in the ROR, including appropriate guidance comments given to the review team.

or

- Reject the submission which will then lead on to:
  - Filling out the appropriate ROR with the reasons for the rejection;
  - Informing **tie** ~~Document Control~~ of the rejection and advising that the ROR is available for issue to SDS;
  - Updating the **tie** document tracker entry; and
  - **tie** Document Control notifying the Lead Reviewer and SDS of the rejection.

TIE00002052_0007

handwritten: ✱ start of Review at Day 4, 2 days lost already in a tight programme.

Day 4

Design Review

- The Lead Reviewer identifies the individuals from the review teams who will undertake the design review. This decision will be based on the following:

handwritten: ?

  - SDS Deliverables Schedule ~~accepted by~~ tie;
  - Detailed Design Deliverables Matrix as shown in Appendix A, i.e. "integrated packaging";
  - Detailed Design Integrated Review Matrix as shown in Appendix B; and
  - Detailed Design Reviewer Table as shown in Appendix C.

- The Lead Reviewer notifies all of the reviewers of the location of the deliverables (soft copy on extranet – see Day 2) and the ROR (soft copy on extranet – see Day 2);

handwritten: This shd have been done at day 2 ?

- The Lead Reviewer alerts the review and requests the reviewers to first check if there is any missing information. The Lead Reviewer will produce, if necessary, a Request for Further Information (RFFI) based on comments from the reviewers (see Appendix E for an example of the blank pro-forma RFFI);

- The reviewers endorse the ROR (soft copy on extranet) with their comments. See Note 3 for the ROR completion procedure and Section 3.4 Reviewer Actions for the requirements for the completion of the ROR; and

- The Lead Reviewer places a paper copy of the deliverables in the review areas (ideally one copy for all to write upon). See Note 4 for the requirements for writing upon paper copies and the capturing of these comments on the ROR (soft copy on extranet).

handwritten: ✱ No time for RFFI's.

Note 3

It is mandatory that, as a minimum, reviewers record the following information on the ROR as part of their reviews:

- In the "Ref" column record the "Grid" Location on drawing (see Section 3.2 Preparatory Work - Design Sheet Co-ordination - and Section 3.4 Reviewer Actions - including Figure 3.1 Drawing Grid for Reporting Comments);
- In the "Ref" column record the Document Section and Paragraph numbers;
- In the "Comment" column record a description of the issue. For each comment, the reviewer must record their initials, organisation and date; and
- In the "Schedule 9" column record the grounds for objection (see Section 3.4 Reviewer Actions);

handwritten: antiquated and time wasting

Note 4

handwritten: - why are we doing this.

In addition, those reviewers writing comments on the paper copies of the documents in the review areas must ensure that their comments are captured in a similar manner to that detailed above. Any reviewer annotating drawings / documents in this manner will also be responsible for capturing these comments on the ROR (soft copy on extranet). Reviewers must record their initials, organisation and date next to their comments on the paper copies. The following is suggested as an additional key to the identification of comments:

handwritten: - All comments to be recorded on ROR.

handwritten: - TSS to then consolidate the ROR.

handwritten: ?

tie = green pen
TSS = red pen
Transdev = blue pen
TEL = black pen

Hand-written comments or "general statements" on drawings or other documents which do not follow the process above will not form part of the review process and will be marked as such by the Lead Reviewer, i.e. "Not Relevant".

No time for RFFI's

By Day 8 (Days 4 to 8)

Reviewers issue without delay any RFFI's via the Lead Reviewer to the **tie** Document Controller. This is the final date to allow ample time for the SDS to source information and respond. This timescale is also chosen to allow the relevant party issuing the RFFI to review the information in any SDS response.

Day 9

The Core Review Team Assistant (CRTA) will check the progress of the review with the Lead Reviewer, checking that all reviewers are scheduled to finish by Day 13 so that collation will be possible. Should a significant delay be identified then the Lead Reviewer will inform the Core Review Team immediately of the actions he will undertake to address this delay i.e. is there is a requirement for an additional reviewer? *and notify tie !*

By Day 13 (i.e. within 5 working days of issue of RFFI)

~~This is the deadline by which responses to RFFIs shall be required from SDS.~~ The Core Review Team Assistant will monitor the delivery of the responses and prompt SDS as appropriate. The failure of SDS to respond to this timescale will result in the particular submission being rejected immediately.

Day 13

?

All reviewers will be required to have added all their comments to the ROR (soft copy on extranet) and informed their respective Lead Reviewers of such process by this date. Documents placed in the review area will be withdrawn and archived in a suitable location within tie's offices. Prior to archiving, an administrative resource (supplied by TSS) will check that all the comments written upon the drawings have been captured on the ROR. It is stressed that the responsibility for recording comments on the ROR lies with the individual reviewers and not the administrative personnel.

TSS

Day 14

The Lead Reviewer collates and issues all comments made on the particular package to all reviewers involved in that particular review.

Day 15

The Lead Reviewer chairs a final review of comments captured on the ROR with all relevant reviewers. Note that it may be necessary in the light of particular comments made on the submission to invite other parties to the review meeting to cover particular aspects of the submission.

Day 16

The Lead Reviewer issues the ROR for final review by the Core Review Team.

Day 17 / 18

Core Review Team Review

The Core Review Team members will have been presented with the Design Review (ROR) for tie's ~~Level A "no objection"~~ and must check that any comments provided are suitable for SDS, i.e. a peer review combined with contract and operational considerations.

If external stakeholders are present then a significant portion of both days may be required – it should be assumed that the Core Review Team will be meeting for a portion of the day only, due to other commitments or a request for a clarification etc. To introduce some flexibility and programme float that has been shown in the review will take place over two days.

Should the Core Review Team have any additional issues that require to be addressed then the ROR will be updated.

The Lead Reviewer will brief the review team on the output of this stage and any guidance provided by the Core Review Team for the reviewers.

Day 19

Response to ~~SDS~~ *tie for issue to SDS.*

The Core Review Team will issue the final ROR to SDS via the tie ~~Document Controller~~. The ROR will indicate the Review Status as follows:

- Level A - no objection;
- Level B - proceed subject to comments
- Level C - resubmit

The **tie** Document Controller will update the document tracker entry.

Note 5

At any stage, any reviewer who finds something significantly "wrong" with the design submission can alert the Lead Reviewer. On notification of this the Lead Reviewer will check and may reject the design on this basis and advise the Core Review Team, who will advise **tie** and return the submission to SDS.

1. What are the services TSS will perform in undertaking the review?

2. What are the criteria for review of SDS info and benchmark?

TIE00002052_0010

2.4 Responsibilities

This Section of the report provides an overview of the responsibilities of the parties involved in the process.

Core Review Team

It is proposed that the Core Review Team would comprise the following members:

Organisation & Role	Name	Additional Role on CRT	Deputy	Full-Time / Part-Time
tie technical	Gavin Murray	~~Engineering~~ Manager Design	Daniel Persson	FT
~~tie business case~~ tie	~~TBC~~		~~TBC~~	~~PT~~
tie ~~Documentation~~ tech. D.	~~Howard Emlyn Jones~~	~~Document Controller~~	TBC	PT
TSS technical	Ken Mosley or Raymond Millar	CRT Leader	TBC	FT
TSS technical	Paul Alliott		Jim Hunter	PT
Transdev	Jim Harries or Roger Jones		Jim Harries or Roger Jones	FT
TEL	Alasdair Richards			PT
Lead Reviewer	As Required		See Reviewer Table (Appendix C)	FT
CRT Assistant	Monsterrat Valverde-Franco		Chunglim Mak	FT

Table 2-1: Core Review Team Membership

Engineering Manager

This will be the nominated individual within **tie** who will lead the process on behalf of **tie** and be the prime point of contact with the Core Review Team and the review teams. This is designated as the ~~Engineering~~ Design Manager (~~EM~~).

The responsibilities for this role are:
- Endorsement of the design review process;
- Active participant on the Core Review Team;
- Principal liaison role with Design Review team; and
- Responsible for obtaining necessary **tie** resources to complete the task.

Core Review Team Leader

The Core Review Team Leader (CRTL) will:
- Lead initial gateway review, full review and final endorsement stages of every submission; and
- Ensure the provision of suitable comments on the RORs, which are clear and unambiguous for all comments to the SDS Provider.

TIE00002052_0011

Core Review Team Assistant

The role of the Core Review Team Assistant (CRTA) is to support the Core Review Team. The responsibilities include:
- Contacting those persons identified to undertake the review to notify them of the existence of new submissions, or updated revision of a document in the file directory (extranet);
- Distribution of documentation (soft and hard copies);
- Coordinate Core Review Team meetings;
- Management of the submissions review tracker on behalf of the Lead Reviewer and review teams (see Appendix G for an example of the tracker which will be available to all reviewers via the extranet);
- Pro-active monitoring of the review progress to ensure compliance with timetable;
- Provision of detailed and summary reports to the Engineering Manager to aid the monitoring of this process; and
- Monitoring the issue of RFFIs and their responses.

Document Controller

The Document Controller (DC) will be a critical player in this process. The responsibilities of this role are:
- Checking of incoming documents for completeness;
- Updating relevant spreadsheets and / or registers with information on incoming and outgoing documentation to meet required timescales;
- Quality check on incoming documentation and the provision of regular reports on its outcome to tie and SDS;
- The issuing of incoming and outgoing documentation relating to this process in liaison with the Core Review Team Assistant (CRTA);
- Making all RORs from the Preliminary Design process available to the review teams;
- Processing and preparing relevant document issue sheets;
- Management of documents; and
- Provision of summary and detail reports to SDS to ensure that any differences in the data associated with the interface between tie and SDS can be easily identified and corrected.

Lead Reviewer (See Appendix C for the table of Lead Reviewers)

The Lead Reviewer is responsible for:
- Taking delivery of the package for review;
- Alerting all reviewers to the arrival of the package and initiating the review process;
- Forwarding RFFIs for particular packages to the tie Document Controller;
- Coordinating the responses from the various reviewers and compiling the single Record of Review for the package under review to meet the specified timetable;
- Ensuring that a full interdisciplinary review is completed for each package under review;
- Resolving any issues / differences arising between reviewers, or, escalating any issues to the Core Review Team if required;
- Reporting back to the Core Review Team as necessary on the review undertaken;
- Setting up and chairing the final review meeting with all reviewers;
- Identifying any requirement to bring further expertise into the final review meeting; and
- Alerting the Core Review Team of the need to secure further resources if notified by any individual reviewer.

- Advising tie on a regular basis of progress
- Identifying design issues and RFI to tie on a regular basis

14

Reviewers (See Appendix C for the table of Reviewers)

The individual reviewers are responsible for:
- Accepting the packages and instruction to proceed with the review from the Lead Reviewer;
- Identification and production of an RFFI, if required (to be issued via the Lead Reviewer);
- Undertake the review and complete the ROR documentation to the specified procedures and timescales (See Note 3 for the ROR completion procedure and Section 3.4 Reviewer Actions for the requirements for the completion of the ROR);
- Following the correct procedure for writing comments on paper copies of the documents in the review areas and capturing these comments on the ROR (See Note 4 for the requirements for writing upon paper copies and the capturing of these comments on the ROR (soft copy on extranet);
- Interfacing with other review disciplines to ensure a complete review is undertaken;
- Alerting the Lead Reviewer if further review resources are required due to workload constraints; and
- Attend the final review meeting as required.

- Advise DTL of any design issues on a weekly basis
- Advise DTL of any RFI's on a wkly basis.

TIE00002052_0013

3 ACTIONS

3.1 Introduction

This Section provides an overview of the key elements of the process that it is believed need to be undertaken in order to achieve the overall aim of the exercise.

The first part considers the preparatory work that will require to be undertaken to ensure a solid foundation for the initiation of the review process. Absolutely critical to this is the Document Control process, which is described in the second section.

With a disparate team likely to be involved in the review process, and some new resources likely to be involved for the first time on the project, it is important that a clear remit is set for the reviewers. This is set out in the third part of this Section.

3.2 Preparatory Work

The following are considered to be the mandatory actions that will require to be undertaken ahead of the review process beginning.

Deliverables

[handwritten: This was agreed early in the process.]

tie need to agree the following with SDS:

- Deliverables Matrix: This must be sufficiently detailed such that delivery packs are identified i.e. the overarching text documents and associated drawings. It is important that discipline layers are grouped to avoid duplication or the need to overlay manually other submissions e.g. alignment to show track, highway and OLE poles.

- Delivery Programme: This is key to ensuring that the packages are delivered such that a review can be completed i.e. all required information present, 1a before 1b etc.. This will allow the balancing of the resource levels required for the review, identify in advance any specialised input that may be required, and indicate the key reviewers (inc. external stakeholders). *[handwritten: V.9 agreed 6.12.06]*

[handwritten: No!] The deliverables matrix will require to be approved by the Board / stakeholders (CEC, Transport Scotland, Transdev, SDS, MUDFA, Tramco) and the Core Review Team.

[handwritten: Paul Aliott + Kim Dorington]

Note 6
As stated in the Introduction to this proposal, it is recognised that tie already has an accepted design deliverables programme from the SDS Provider (version 9). However, following discussions between SDS and TSS (from an agreed action from the tie / TSS detailed design review meeting of 13th December 06), the SDS Provider is currently reviewing its deliverables programme to check how it fits with the recommended Deliverables Matrix (Appendix A). It is expected that SDS will respond early in January 2007.

ACTION: *It is strongly recommended that **tie** requests a re-submission of the SDS design deliverables programme to take account of the "integrated packaging" of deliverables, which has already received an agreement in principle from Transdev and SDS (Appendix A).*

TIE00002052_0014

Design Sign Off

[handwritten annotation: - What does this mean in this Review context]

A key item is that the nominated members require delegated authority from their parent organisations since they are indicating that, from their point of view, they are happy with capital expenditure or no further objection to a proposed design solution.

ACTION: *Delegated authority required from parent organisations.*

Document

Each deliverable will appear as a line item in the Deliverables Matrix.

Core Review Team

With regard to the setting up of the Core Review Team it will be necessary that **tie** agree the Core Review Team or additional stakeholder input required. It is proposed that the Core Review Team will comprise of a **tie**, Transdev, TEL and TSS member(s) with **tie** identifying any additional members that will require to be co-opted - see Section 2.4 Responsibilities of this report for the initial proposal for membership of the CRT.

ACTION: *tie to review, propose and accept the membership / structure of the Core Review Team.*

Delegation

For the process as outlined to work **tie** will require to delegate to TSS the validation of the detailed design.

ACTION: *tie to delegate to TSS.*

Design Sheet Co-ordination

[handwritten annotation: All comments on drawing need to be written off onto an RoR ∴ best to do it straight to RoR.]

The use of remote reviewers will require that a system is agreed to identify the location of comments made on drawings. Usually each drawing will be surrounded by a border of equidistant markings, top and bottom which are marked one to ten while the sides are marked 'A' to 'H'. This will provide a grid on which comments can be located on the drawings in order to allow remote reviewers to locate the reference for the comment. This may mean photocopying a coordinate grid on a clear acetate sheet to place over the drawing.

ACTION: *tie to request SDS to provide this border on the drawings. See Section 3.4 Reviewer Actions.*