

**This is Schedule One referred to in the foregoing Agreement between  
the Client and the SDS Provider**

**SCHEDULE ONE  
SCOPE OF SERVICES**

**1. General**

- 1.1 The SDS Provider shall:
- 1.1.1 perform all Design and Technical Services;
  - 1.1.2 give all general technical support described in this Schedule One;
  - 1.1.3 perform all management services described in this Schedule One; and
  - 1.1.4 assist the Client as may be required in accordance with this Agreement.

**2. Design and Technical Services**

**2.1 General**

- 2.1.1 The SDS Provider shall undertake all design and produce the Deliverables necessary to enable the Edinburgh Tram Network to be procured, constructed, tested and commissioned (taking account of the need to fully coordinate these activities, including with other physically-related projects, so as to minimise overall disruption) to meet the requirements of the Master Project Programme, and then operated and maintained.
- 2.1.2 The SDS Provider shall produce a design which shall deliver overall system functionality, capability and achieve the performance requirements of the Edinburgh Tram Network.
- 2.1.3 The SDS Provider shall produce a tram service simulation that will demonstrate the achievement of the required run times and service performance as the design progresses.
- 2.1.4 The SDS Provider shall ensure that the design covers all aspects of the Edinburgh Tram Network and the associated works adjacent to the proposed alignment.
- 2.1.5 The SDS Provider shall undertake all necessary research, surveys and investigations necessary to support the provision of a cost effective design.
- 2.1.6 The SDS Provider is responsible for ensuring that there are no gaps and omissions in the specification and design of the Edinburgh Tram Network [assuming a discount rate to be provided by **tie.** ]
- 2.1.7 The SDS Provider shall demonstrate that the detailed design has properly considered and adopted the most advantageous whole life cost solutions.
- 2.1.8 The SDS Provider shall deliver designs and/or Technical Specifications which shall include:

2.1.8.1 detailed alignment and associated civil and structural works;

2.1.8.2 specifications of sub system functionality and technical requirements for the following E & M system components:

- trams;
- tram track;
- OLE;
- traction and auxiliary power supply network (including network reinforcement if required);
- signals and control system (for both tram and highway traffic control);
- communication systems;
- integrated fare collection equipment;
- security systems; and
- depot systems and associated maintenance plant and equipment.

2.1.8.3 the infrastructure required to support the above E&M system components, which includes:

- civil and structural engineering works (formation, structures, retaining walls and the like);
- track formation;
- road works;
- traffic management systems;
- tram stops;
- depot, buildings and associated external works;
- substation buildings and associated external works;
- foul and surface water drainage systems;
- building services (M&E) infrastructure;
- building works associated with the Edinburgh Tram Network's E&M systems;
- environmental mitigation measures;
- hard and soft landscaping; and
- stray current and EMC control systems.

## 2.2 Design Approach

The SDS Provider shall approach the Design and Technical Services in a structured manner using a recognised 'V' life cycle model with regard to the integration of design engineering, systems engineering and safety engineering activities. The SDS Provider shall carry out the Design and Technical Services over three phases:

- Requirements Definition Phase;
- Preliminary Design Phase; and
- Detailed Design Phase.

## 2.3 Requirements Definition Phase

2.3.1 By the end of the Requirements Definition Phase, the SDS Provider shall have produced a set of Functional Requirements Specifications and the means by which they will be tested that have been agreed with the Client in accordance with the Review Procedure, such that the Preliminary Design Phase can commence.

2.3.2 During the Requirements Definition Phase, the SDS Provider shall:

2.3.2.1 develop the Functional Requirements Specification into full system requirement specifications that broadly align with the WBS;

2.3.2.2 identify and produce a series of management plans including; safety management/engineering, project management, environmental management, configuration management, verification and validation which will inform and direct the preliminary and detailed design processes;

2.3.2.3 undertake technology reviews such that the SDS Provider considers that the selected technologies will meet the requirements developed in this Requirements Definition Phase;

2.3.2.4 produce the initial safety case strategy, using GSN, and define the proposed arguments and the required supporting evidence to be provided;

2.3.2.5 record agreed requirements by a suitable means, such as a requirements database;

2.3.2.6 carry out and conclude early safety engineering activities such that 'safety' requirements are identified, assessed for risk and a hazard log initiated;

2.3.2.7 undertake any surveys required and incorporate relevant findings into the Functional Requirements Specifications and the Technical Specifications to be prepared by the SDS Provider;

2.3.2.8 deliver all Deliverables for the Requirements Definition Phase as are identified in Appendix 3 of this Schedule One; and

2.3.2.9 define in detail the format for the drawings and documents to be produced as part of the Services, ensuring that all requirements for manufacture, construction, commissioning, operation, maintenance, land and property agreements, utilities diversions, access,

wayleaves, servitudes and other third party agreements relative to the Edinburgh Tram Network, may be readily provided in appropriate formats from the same source computer files. If required by ~~the~~ Client, the SDS Provider shall also detail the format for drawings and documents which are to be produced outwith the scope of the Services

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2.3.3 The SDS Provider shall be responsible for undertaking and reporting on (inclusive of interpretative analysis) the following surveys along with any other surveys necessary to inform the design of the Edinburgh Tram Network including:

- ground penetrating radar;
- ground investigation and geotechnical surveys;
- contamination, pollution, air and water quality surveys;
- photographic surveys;
- topographical surveys;
- hydrographic surveys;
- archaeological surveys;
- structural, building & cellar surveys;
- condition of structure surveys;
- undertake Network Rail asset investigation study and prepare accurate engineering drawings for input into the detailed design process and Network Rail agreements;
- environmental and ecological surveys;
- noise and vibration baseline surveys;
- pre and post construction noise and vibration surveys;
- pre-condition dilapidation surveys of vulnerable third party structures;
- frontager surveys;
- radio surveys;
- traffic & public transport surveys;
- computer traffic/transport modelling; and
- 3-D representational modelling

The resultant analysis and reports from those surveys are to be used to develop the Functional Requirements Specifications and the Technical Specifications and to set base lines against which the impact of the Edinburgh Tram Network can be measured when built.

## 2.4 Preliminary Design Phase

- 2.4.1 By the end of the Preliminary Design Phase, the SDS Provider shall have produced a preliminary design for each Sector or Sub-Sector (as appropriate) to such a level that the SDS Provider, the Client and the relevant Approval Bodies are satisfied that when progressed, the detailed design in respect of each Sector or Sub-Sector (as appropriate) will deliver the agreed and specified system functionality, be acceptably safe, constructable, will comply with the Design Manual and deliver the Functional Requirements Specification agreed at the end of the Requirements Definition Phase.
- 2.4.2 The SDS Provider shall, initially at a high level for the whole of the Edinburgh Tram Network, and thereafter at a detailed level for each Sector or Sub-Sector (as appropriate) in the order referred to in the Programme Phasing Structure and Clauses 7.2 and 7.3 of the Agreement:
- 2.4.2.1 develop the track alignments and the associated track layout arrangements for the Edinburgh Tram Network;
  - 2.4.2.2 define tramstop and substation locations;
  - 2.4.2.3 propose appropriate technologies and agree the adoption of these for Edinburgh Tram Network with the Client;
  - 2.4.2.4 prepare generic details for each type(s) of tramstop layouts/arrangements, including equipment, lighting, building services and signage;
  - 2.4.2.5 carry out the preliminary design of the depot(s) layout and arrangement including trackwork, maintenance equipment, control centre and staff facilities;
  - 2.4.2.6 develop system architectures for supervisory control and communications and electrification and power elements;
  - 2.4.2.7 demonstrate that all elements of the preliminary design meet the Functional Requirements Specifications, especially those related to run-time, performance/reliability, integrated ticketing and safety;
  - 2.4.2.8 undertake such safety analysis that will allow further development of the safety case concurrent with the design to prove that the Edinburgh Tram Network is acceptably safe;
  - 2.4.2.9 further develop the Functional Requirements Specifications for the infrastructure, systems and the trams such that it is ensured that the preliminary design of the infrastructure, systems and the trams are compatible and meet the Requirements Specification for Overall System Operational and Performance Requirements;
  - 2.4.2.10 prior to the review of the whole preliminary design for the Edinburgh Tram Network (or part thereof), the SDS Provider shall produce for review the foreseen costs of taking that design forward to construction and commissioning;
  - 2.4.2.11 produce a migration plan that shows constructability and commissioning of the design as well as user training and

compliance with programmed dates for entering operational service; and

- 2.4.2.12 deliver all Deliverables for Preliminary Design Phase as are identified in Appendix 3 of this Schedule One.

## 2.5 Technology Reviews

The SDS Provider shall undertake comparative technology reviews so as to identify the most appropriate ways of delivering the functionality required of the Edinburgh Tram Network and its component parts. This shall include:

- establishing the latest dates for any modification of elements of design where the opportunity exists to change the specification as a result of advances in proven technology;
- investigating the feasibility of proven wireless telecommunication systems such as:
  - monitoring, control and recording of voice radio communications between the control centre and the trams, passenger help points and public address systems;
  - monitoring, control and recording of remote equipment data via radio;
  - monitoring, control and recording of real-time CCTV video images via wireless means; and
  - updating and control of passenger information displays by data radio means;
- ensuring the Edinburgh Tram Network has the most relevant ticketing, management and information systems; and
- illustrating the advantages and disadvantages relevant to moving from an Edinburgh Tram Network designed to deliver the operational and performance requirements (stated in the Requirements Specification for Overall System Operational and Performance Requirements ) with a 40 metre long 100% low floor tram to a 30 (+) metre long 70% (partial) low floor tram.

The SDS Provider shall conclude the comparative technology reviews during the early part of the Preliminary Design Phase and this shall include:

- a scoping study outlining the areas to be investigated;
- a programme outlining the latest date for modification of any specifications within the overall programme together with interaction of activities; and
- reports and presentations analysing and assessing the options and justifying the final selections of technologies in terms of time, cost, quality, safety, risk and maintainability.

## 2.6 Detailed Design

- 2.6.1 By the end of the Detailed Design Phase for each Sector or Sub-Sector (as appropriate) the SDS Provider shall have:
- 2.6.1.1 produced and delivered to the Client, the detailed design and specification of all the works, associated sub-systems and components and their associated installation drawings/schedules, test specifications, manuals and records (all of which shall have been approved in accordance with the Review Procedure.); and
  - 2.6.1.2 produced the detailed design of the Edinburgh Tram Network for each Sector or Sub-Sector (as appropriate), in the order referred to in the Programme Phasing Structure and Clauses 7.2 and 7.3 of the Agreement, such that the detailed design has full approval of the Client and the relevant Approval Bodies and such that the Edinburgh Tram Network as designed can be constructed, installed, tested and commissioned by Infracore and then operated and maintained.
- 2.6.2 The SDS Provider shall:
- 2.6.2.1 build upon the work done in the Preliminary Design Phase and produce detailed Deliverables for all elements of the infrastructure and associated systems for the Edinburgh Tram Network from which construction, installation, testing and commissioning activities can commence and be satisfactorily concluded;
  - 2.6.2.2 produce procurement specifications and associated schedules for all E&M systems and sub-systems for the Edinburgh Tram Network;
  - 2.6.2.3 produce a costed programme of the design and its construction;
  - 2.6.2.4 gain all relevant planning and other approvals and consents including traffic regulation orders (during construction and post-opening) to enable construction works to proceed in accordance with the requirements of the Master Project Programme;
  - 2.6.2.5 produce the plan for the installation/testing/commissioning of the Edinburgh Tram Network and associated sub-systems;
  - 2.6.2.6 ensure that E&M system suppliers produce appropriate training plans for operations and maintenance staff (including manuals) and trial running plans;
  - 2.6.2.7 demonstrate that all elements of the detailed design meet the requirements agreed, especially those related to run-time, performance/reliability and safety;
  - 2.6.2.8 undertake such safety analysis that will allow development of the safety case concurrent with the detailed design to prove that the system once constructed and operational will be acceptably safe;
  - 2.6.2.9 finalise the Technical Specifications such that it is ensured that the design of the infrastructure systems and the trams are compatible;
  - 2.6.2.10 at the review of the detailed design for each Sector or Sub-Sector (as appropriate) and prior to the review of the detailed design for the whole of the Edinburgh Tram Network (or part thereof), the SDS

Provider shall produce for review the foreseen cost of taking that detailed design forward to construction and commissioning; and

2.6.2.11 deliver all Deliverables for the Detailed Design Phase as are identified in Appendix 3 of this Schedule One.

## 2.7 Key Design Elements

2.7.1 The SDS Provider shall design:

2.7.1.1 the route from Haymarket to Ocean Terminal via Princes Street so as to:

- provide a look and feel that is at one with its surroundings whilst not detracting from the design elsewhere on the Edinburgh Tram Network;
- provide an efficient and effective means of constructing the tramline(s) with and without centre OLE poles that minimises disruption to Princes Street and Leith Walk and their users;
- provide a satisfactory interaction of trams, buses, pedestrians and other road users; and
- ensure a run time and performance that sustains economic success for the operation of the Edinburgh Tram Network by fully meeting the Functional Requirements Specifications.

2.7.1.2 The SDS Provider shall review the advantages and disadvantages of providing a chord at the south end of St. Andrew Square for use in perturbed circumstances and special events so that tram services from Picardy Place can traverse the chord and return towards Picardy Place on the clockwise track. Such review should contemplate the provision of removable OLE poles and wires and provide outline sketches and costs for providing this facility at St. Andrew Square.

2.7.1.3 The SDS Provider shall establish early in the Preliminary Design Phase the effective use of proven radio communications for voice and data transmission as an early priority as this will influence the design and constructability of the Edinburgh Tram Network.

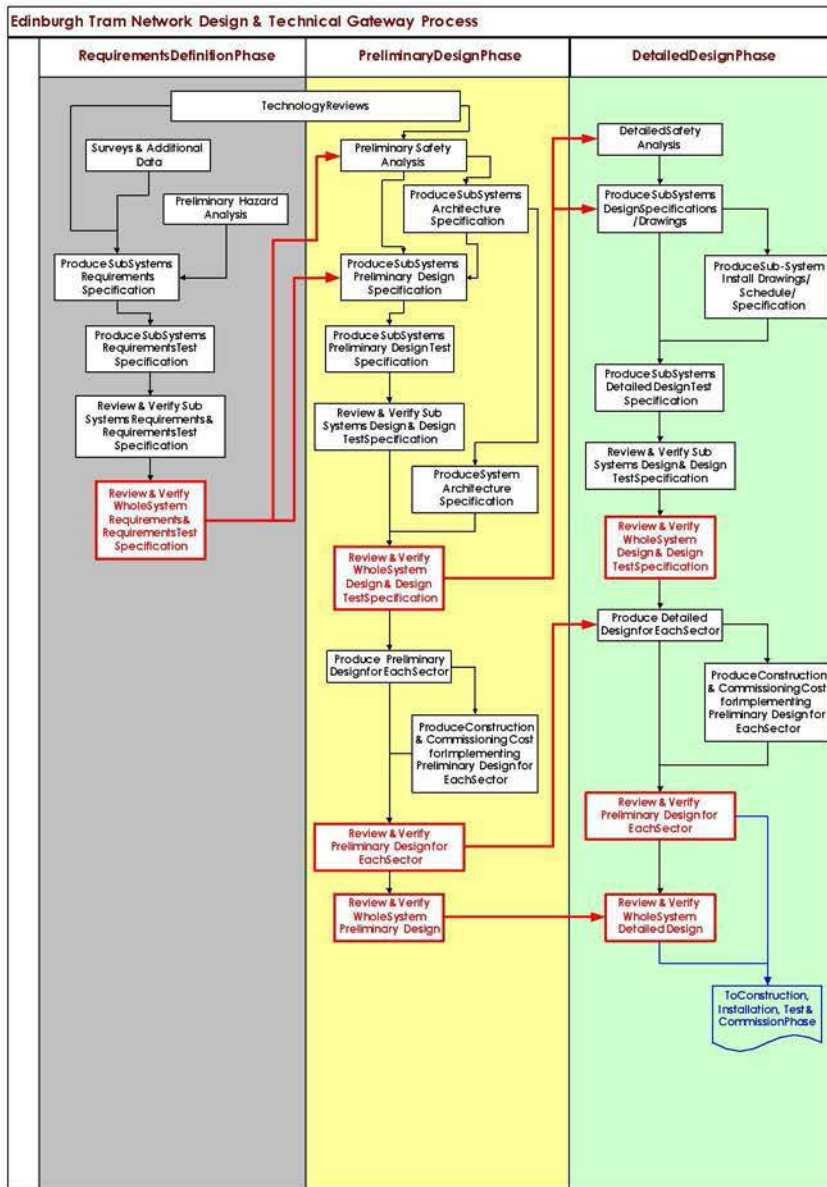
2.7.1.4 The SDS Provider shall establish early in the Preliminary Design Phase the parameters by which effective harmony of the infrastructure with the tram is achieved and therefore allow **the Client** to market test the tram manufacturers. Such design harmonisation shall ensure that tram types which meet the requirements are in current production and are likely to remain so at the time of likely procurement.

## 2.8 Design Review Process

2.8.1 The SDS Provider shall submit his Deliverables for review in accordance with the Review Procedure.

2.8.2 The SDS Provider shall comply with the Design and Technical Gateway Process. An example of how this Design and Technical Gateway Process will operate is set out below:





### 3. General Technical Support

#### 3.1 Procurement and Construction Support

- 3.1.1 The SDS Provider shall produce all technical documentation required for the procurement of the Infraco Contract and thereafter technical documentation to facilitate the construction and the commissioning of the Edinburgh Tram Network. This documentation shall be structured to provide the most detailed information for each part of the Edinburgh Tram Network, either as applicable to the technical element, or as is available reflecting the then current status of the design detail of the Sector or Sub-Sector. This documentation shall include drawings, Technical Specifications, bills of quantities, schedules of materials, a maintenance plan (including lifecycle) and schedules, and other items of documentation as may be required for procurement, construction, and pricing purposes.
- 3.1.2 In relation to the procurement of the Infraco Contract, the SDS Provider shall:
- answer queries/clarifications;
  - attend meetings;
  - confirm design details and rework any of the SDS Provider's design as necessary;
  - assist in the technical review of tenders;
  - review programmes and provide variance reports; and
  - review cost plans and provide variance reports.
- 3.1.3 There will be in addition, a period when the SDS Provider, whilst continuing to work for **the Client**, will need to assist the bidders for the Infraco Contract in the development of their tenders.
- 3.1.4 The SDS Provider shall produce all technical documentation required for the procurement of the Tram Supply Contract. This documentation shall include drawings, Technical Specifications and other items of documentation as may be required for procurement, construction, maintenance and pricing purposes.
- 3.1.5 In relation to the procurement of the Tram Supply Contract, the SDS Provider shall:
- answer queries/clarifications;
  - attend meetings;
  - confirm design details and rework any of the SDS Provider's design as necessary;
  - assist in the technical review of tenders;
  - review programmes and provide variance reports; and
  - review cost plans and provide variance reports.

3.1.6 The SDS Provider shall provide **tie** with expert advice and documentation in relation to other procurement activities for the Edinburgh Tram Network as required, including:

- preparation of tender documentation including bills of quantities and other documentation required for procurement purposes;
- answering queries/clarifications;
- attending meetings;
- confirming design details and reworking any of the SDS Provider's design as necessary;
- assisting in the technical review of tenders;
- maintenance plans (including lifecycle);
- review programmes and provide variance reports; and
- review cost plans and provide variance reports.

### 3.2 Utilities

3.2.1 The SDS Provider shall provide assistance to **tie** with the management of an advanced utilities diversion programme. This shall include:

- assessing the need for and acquiring relevant data relating to the presence and location of all buried and above ground utility services;
- agreeing the need for and extent of diversions;
- undertaking critical design and developing a strategy for all utilities diversions to minimise diversion requirements and out-turn costs;
- ensuring appropriate servitudes for access and possessions management;
- preparing C4 cost schedules;
- preparation of documentation (excluding the contract terms) associated with the proposal to appoint a single service agreement with a specialist contractor to carry out advanced utility diversions;
- activities required to support the utilities diversion process including, but not limited to, traffic management plans/traffic regulation orders, site meetings and all necessary re-designs;
- management of unidentified diversions and design re-work/modifications on an as required basis;
- on-site attendance on an as-required basis; and
- attendance at all meetings on an as-required basis.

3.2.2 The SDS Provider shall be responsible for the determination and design of all other utility diversions which are to be undertaken by Infracore.

### 3.3 Stakeholder Management

3.3.1 The SDS Provider shall assist **the Client** to minimise the adverse impact of the implementation of the Edinburgh Tram Network on stakeholders (both statutory and non statutory) and the general public. This shall include:

- securing, implementing and incorporating into the design all necessary Network Rail, BAA and other third party agreements;
- assisting by providing all technical details relevant to the compulsory purchase order process and land acquisition process (including wayleaves and servitudes);
- liaising with CEC, Scottish Executive, Historic Scotland, World Heritage Trust, Scottish Natural Heritage and others as required by **the Client** in relation to the performance of the Services;
- participating as appropriate in community liaison groups;
- providing input to information initiatives (media releases, newsletters, web site etc);
- assisting with the development and maintaining of a communications protocol for dealing with all stakeholders affected by the design & future construction of the Edinburgh Tram Network;
- assisting with the discharge of all Parliamentary Undertakings in relation to objectors and recording all actions taken in relation to stakeholder management; and
- management of the technical interface with Network Rail, BAA and other third parties.

### 3.4 Operations Development Support

3.4.1 The SDS Provider shall facilitate unity of the design of the Edinburgh Tram Network with the development of the Infraco Contract which shall include:

- liaising closely with the Operator to ensure consistency with operational aspirations and design constraints;
- providing support to obtain operational approvals and consents in respect of the Edinburgh Tram Network;
- providing technical support on public transport integration;
- providing technical support on systems integration; and
- providing technical support on the development of operational plans and management systems; and
- provide technical support with regard to operational interfaces with CEC traffic management systems.

### 3.5 Transport Modelling

- 3.5.1 Following the appointment by **tie** of the Joint Revenue Committee ("JRC") provided for pursuant to the DPOFA, the SDS Provider shall engage with the JRC to develop, test and commission a comprehensive and interdependent hierarchical transport modelling suite (the "SDS-JRC modelling suite") with the capability to model both wide area and localised impacts of the tram and of the different public transport service integration patterns on patronage.
- 3.5.2 The SDS Provider shall be jointly and severally responsible with the JRC for the planning, production and fitness for purpose of the SDS-JRC modelling suite which should demonstrate in simulation (as required under Section 3.5.9 below) that it meets all SDS Provider's individual requirements (both pre and post novation of the SDS Provider's contract) alongside the modelling needs and objectives of the JRC.
- 3.5.3 The SDS-JRC modelling suite shall be developed by a dedicated joint team combining equal contribution from both parties' relevant resources and skills and whose first task will be to prepare a composite model specification, work programme and resource submission for **tie's** approval. The joint team shall be located in the same office during the development, calibration and validation works on the SDS-JRC modelling suite which shall be capable of withstanding an independent audit at any stage of its life cycle.
- 3.5.4 Before approving the SDS-JRC modelling suite, **tie** may notify adjustment or further verification and calibration work following the initial demonstration and the SDS Provider shall make provision for this to be carried out before the SDS-JRC modelling suite is deployed.
- 3.5.5 The SDS-JRC modelling suite must be fully commissioned and approved by **tie** on or before 31 March 2006. The SDS Provider shall be jointly and severally responsible with the JRC for applying the SDS-JRC modelling suite to produce a model forecast scenario approved by **tie** for the first year after entry into public service of the Edinburgh Tram Network.
- 3.5.6 The SDS-JRC modelling suite shall be developed in order to produce all required outputs by the simplest functional principles. It shall satisfy the Scottish Executive STAG requirements and conform in all material aspects to the Department for Transport "Transport Analysis Guidance" as set out in the website WebTAG.
- 3.5.7 The outputs from the SDS-JRC modelling suite shall be robust and comprehensible and in a form which can subsequently be easily interrogated, using intuition and engineering judgement.
- 3.5.8 Throughout the life of the commission, the SDS Provider shall ensure the SDS-JRC modelling suite is regularly calibrated, updated and maintained (including upgrades) to resolve any issues that become apparent during use and to prevent it becoming obsolete.
- 3.5.9 The SDS-JRC modelling suite shall be capable of local modelling within the city centre and at key junctions in order to simulate with requisite precision the interaction of capacity, congestion and Edinburgh Tram Network design and operation. The SDS Provider and the JRC should ensure that the modelling suite is technologically current and that any novel features have been adequately tested. The SDS-JRC modelling suite shall function to:
- at a lower level, model the highly complex interaction between competing public transport, traffic movements and Level 1 tram priority in the city centre at multiple junctions and key interchanges;

- at the higher level, model congestion at key junctions in the wider network area and overall travel demands in the surrounding areas;
  - iterate until a state of equilibrium is reached between supply and demand.
- 3.5.10 The SDS Provider and the JRC shall be jointly and severally responsible for ensuring that the SDS-JRC modelling suite is capable of supporting the performance of the SDS Provider and of the JRC under their respective mandates with **tie**. The SDS-JRC modelling suite shall be configured to include the following applications, in addition to any application the SDS Provider considers necessary to answer its own or **tie's** requirements:
- public transport demand and patronage/revenue forecasting capable of modal disaggregation;
  - detailed traffic junction design recognition and evaluation and wider area effect assessment;
  - temporary traffic diversion and traffic regulation order impact analysis.
- 3.5.11 The SDS-JRC modelling suite shall be competent and responsive in relation to requested specific inputs for project evaluation tools, financial and economic case analysis (including funding options analysis) and risk assessment. The SDS-JRC modelling suite shall be sensitive to the interaction of the SDS Provider's detailed tram line design with vehicular traffic, pedestrians and other urban infrastructure users and capable of generating responses relevant for designing countermeasures to alleviate adverse knock-on affects in the wider area transport network.
- 3.5.12 The correction of any fault or incapacity in the SDS-JRC modelling suite shall be the joint and several responsibility of the SDS Provider and the JRC.
- 3.5.13 Copyright and all intellectual property rights in (and all related work in progress) the SDS-JRC modelling suite shall vest in **tie**. Use of the models by SDS Provider shall be by licence from **tie**.

### **3.6 Topics Register**

- 3.6.1 The SDS Provider shall participate in the management of the Topics Register.
- 3.6.2 The Topics Register is used to record all issues as they arise that require to be specifically addressed. The record is then amended as appropriate to track the manner in which issues have been resolved to the satisfaction of project. The SDS Provider is required to add to, or respond to issues as appropriate and attend regular review meetings at which the Topics Register will be updated and actions assigned.

#### 4. Management Services

##### 4.1 Project Management and Programme Requirements

4.1.1 The SDS Provider shall ensure all that Services and any advance works are organised and programmed to meet the overall requirements of the Master Project Programme. This shall include:

- updating the construction strategy for the Edinburgh Tram Network;
- integration with new projects e.g. Capital Streets and CETM;
- identifying long lead time works;
- defining the extent of advance works;
- establishing diversionary works agreements;
- maintaining, managing & updating relevant sub-programmes including all approvals and traffic regulation orders;
- maintaining, managing and updating relevant risk and issue registers; and
- managing all cost reporting including the impact of changes.

4.1.2 The SDS Provider shall prepare, update, maintain and amend (as required) the Programme which will be coincident to and aligned with that of the Client and the Master Project Programme. All programme updates and reports shall be electronically transmitted to the Client's Representative to enable progress monitoring at intervals, which will be agreed, but are likely to be weekly and monthly. This shall include as a minimum:

- initial outline of the Programme in Primavera P3e for detailed implementation;
- Programme to follow the detailed WBS and Programme Phasing Structure as outlined in Appendices 1 and 2 to this Schedule 1 (*Scope of Services*);
- Programme to be cost and resource (named) loaded down to activities;
- all resource reporting / time sheet and cost allocation to be coded to suit the WBS activities. The coding of activities and resources to be agreed with **tie**;
- time sheets to be completed weekly against planned works as generated by Primavera P3e, any deviations to be reported in a weekly slippage report and notification of remedial actions to be authorised by the Client's Representative;
- weekly time sheets are to be submitted by 09:00hrs on the Tuesday following the relevant week;



- Programme to be updated and submitted weekly with all cost and resources;
- monthly progress reporting to include as a minimum and to be issued 3 working days before the progress meeting:
  - planned versus actual cost and resource summary;
  - progress against milestones;
  - earned value report;
  - 4 week forecast;
  - 8 week critical impact notice (any internal or external factor which may affect programme delivery); and
  - labour histograms detailing planned, actual and forecast across all disciplines;
- programming input as required by the Client; and
- attendance at meetings as required by the Client.

#### 4.1.3 Work Breakdown Structure (WBS)

4.1.3.1 The SDS Provider shall structure the project using a suitable WBS in the form as outlined in Appendix 1 to this Schedule One and as is agreed by **tie**. Sufficient detail shall be included in the WBS to show adequate control of both internal and external resource. Deliverables must be clearly defined and denoted by a milestone which accords with the requirements of the Master Project Programme.

4.1.3.2 The WBS for this project should be designed to run from commencement of the Requirements Definition Phase through to the opening of the Edinburgh Tram Network to public service. The WBS should be segregated into both work type within discipline (in order to assist the SDS Provider and the Infracore to monitor, control and report on their specific roles) and is further divided into Stage Builds, Sectors and Sub-Sectors (as appropriate) to assist in the monitoring of progress along the Edinburgh Tram Network to aid integration of design, construction and commissioning.

4.1.3.3 The following WBS commitments are required from SDS Provider:

- **Requirements Definition Phase:** all documentation, programme costings etc. to be at WBS level;
- **Preliminary Design Phase:** all documentation, programme costings etc. to be at WBS level within each Stage Build, Sector or Sub-Sector (as appropriate);
- **Detailed Design Phase:** all documentation, programme costings etc. to be at WBS level within each Stage Build, Sector or Sub-Sector (as appropriate).

#### 4.1.4 Cost/Spend Curves

The SDS Provider shall submit cost/spend tables and cumulative curves to match the achievement of major deliverables and activities within the WBS.

#### 4.1.5 Critical Path

The SDS Provider shall ensure that tasks within the plans must be logically linked to ensure a critical path is derived, and show clearly any internal and external dependencies, constraints, hold and checkpoints that the SDS Provider believes are required for the successful completion of the project. Actual progress shall detail the named resource/s used.

#### 4.1.6 Resource Assignment

The SDS Provider shall ensure that all tasks on the plan are resourced and coded to an agreed coding structure to show the manpower required to complete the project on time. The manpower is required to be named personnel. However, if this is not possible in all cases, then generic skills and professions that are required for each task shall be clearly stated.

### 4.2 Risk Management

4.2.1 The SDS Provider shall adopt a process of risk management which shall include providing input to the risk allocation matrices to demonstrate the risk retention, sharing and transfer.:

~~4.2.1.1 maintaining close liaison with **tie**'s project team, technical, financial and other advisors and stakeholders regarding risk matters, with attendance and contribution to risk management meetings. This activity will include attendance at monthly meetings and ongoing liaison throughout the term of this Agreement;~~

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~~4.2.1.2 preparing, managing and maintaining a subset of the centrally held risk register to summarise all programme, approvals and risks to the Edinburgh Tram Network in connection with Deliverables and traffic regulation orders, and their proposed mitigation. The SDS Provider shall adopt the **tie** format for the risk register which shall include analysis of each risk in terms of 'likelihood' and 'impact' prior to and following mitigation; and shall maintain this format throughout the term of this Agreement. Where the SDS Provider is identified as the primary responsible party for taking action, the SDS Provider shall agree the dates for completion of agreed mitigations with **tie**;~~

~~4.2.1.3 providing input to the risk allocation matrices to demonstrate the risk retention, sharing and transfer;~~

~~4.2.1.4 preparing and submitting a progress report on the status of risk management and mitigation for each risk where planned mitigation is to be led by other advisors. The SDS Provider shall report the percentage complete of planned mitigation and residual risks. The SDS Provider shall agree the format within one month of the Effective Date and submit monthly reports throughout the term of this Agreement.~~

For the purposes of the above paragraph the term:

~~• "risk" shall be taken to mean all elements of risk including those risks arising from identified system hazards~~

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~~□ "risk register" shall be taken to mean all the record containing all elements of risk including those risks arising identified system hazards; i.e. shall incorporate the hazard log/hazard tracking system.~~

4.2.2 The SDS Provider shall:

| Required Action from the SDS Provider   | Timing/Frequency   |
|---|--|
| <p><u>Prepare and maintain a project risk management plan which shall confirm the objectives of the plan, the roles and responsibilities of the SDS Provider, the definitions of risk categorisation and impact, the risk management process and how the plan will be applied throughout the scheme development, design, procurement and construction phases of the Edinburgh Tram Network.</u></p> <p><u>This plan should indicate the critical success factors, key areas of focus and individuals involved.</u></p>  | <p><u>To be delivered by the SDS Provider to the Client within 1-month of the Effective Date and shall be maintained by the SDS Provider throughout the term of the Agreement</u></p>  |
| <p><u>Prepare and maintain an assumptions register to record all capex, opex, lifecycle, revenue, programme, quality, functionality and approvability assumptions and consequent risks to the Edinburgh Tram Network throughout scheme development, design, procurement and construction phases.</u></p> <p><u>The SDS Provider shall ensure that the assumptions register contributes to the project risk register referred to below.</u></p>  | <p><u>Agree format with the Client's designated risk manager (as notified to the SDS Provider from time to time) within 1-month of the Effective Date. The register shall be maintained by the SDS Provider throughout the term of the Agreement</u></p>   |
| <p><u>Maintain close liaison with the <b>tie</b> project team, the Operator, stakeholders, the Tram Supplier and <b>tie</b>'s technical, legal, financial and other advisors, regarding risk matters. The SDS Provider shall facilitate risk management meetings to support the scheme development, design, procurement and construction phases of the Edinburgh Tram Network.</u></p> <p><u>Liaison to include assistance with the risk identification procedure which is being carried out by the Client and attendance at management workshops which shall be facilitated by the SDS Provider to allow a sharing of previous experience.</u></p> | <p><u>Monthly meeting with the Client and <b>tie</b>'s project team (as notified to the SDS Provider from time to time) and ongoing liaison with <b>tie</b>'s project team, the Operator, stakeholders, the Tram Supplier and the <b>tie</b>'s technical, legal, financial and other advisors throughout the term of the Agreement</u></p> |
| <p><u>Prepare and maintain a project risk register to summarise all capex, opex, lifecycle, revenue, programme, quality, functionality and approvability risks to the Edinburgh Tram Network and their proposed mitigation. The project risk register should include analysis of</u></p>  | <p><u>Agree format of the project risk register with the Client's designated risk manager (as notified to the SDS Provider from time to time within 1-month of the Effective Date. The SDS Provider shall maintain, update and circulate the project risk register to parties designated by the Client from time to time on a bi-</u></p>  |

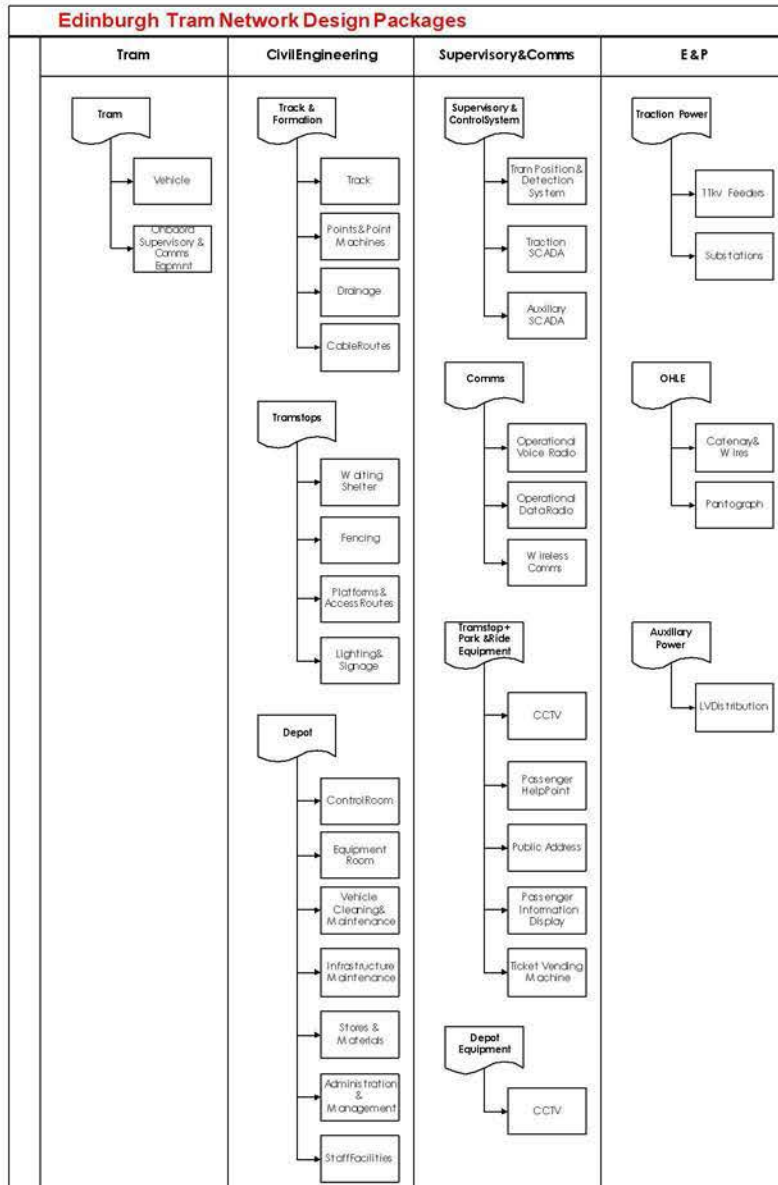
| Required Action from the SDS Provider  | Timing/Frequency   |
|--|--|
| <p><u>each risk in terms of 'likelihood' and 'impact' prior to and following mitigation, responsible owner of each risk and graphical summaries of risk profile. The risks to be addressed should include strategic, commercial, economic, legal and regulatory, organisational, environmental, technical, operational and infrastructure risks.</u></p>   | <p><u>monthly basis throughout the term of the Agreement.</u></p>  |
| <p><u>Prepare and submit a risk progress report to the Client on the status of risk management and mitigation giving a summary of new risks identified, new assumptions, key matters to be resolved and achievements.</u></p> <p><u>This report should indicate "Red-Amber-Green" (RAG) status on key components including planning permissions, specification compliance, incomplete design, programme for outstanding work, adequacy of investigations and surveys, constructability, compliance with CDM Regulations, Design Manual compliance, optimisation of run-time, interface design, Parliamentary objector concession, approvals which require to be obtained from the Client or the Client's Representative (for example approvals required in accordance with the Review Procedure), Consents and certification</u></p> | <p><u>Agree format with the Client's designated risk manager (as notified to the SDS Provider from time to time) within 1-month of the Effective Date and submit monthly report to the Client's said risk manager throughout the term of the Agreement</u></p>   |
| <p><u>Prepare and maintain a cost and programme contingency report indicating the recommended capital cost and programme contingency allowances to be considered.</u></p> <p><u>Report should also summarise the recommended mitigation for the construction and installation phase, the commissioning and defects resolution phase under the Infraco Contract (as such terms are defined in the Infraco Contract) and operational phase, including details of any residual development risks.</u></p> <p><u>Report should include a detailed quantitative risk analysis using the Monte Carlo simulation (@RISK4.5 and Pertmaster Project Risk or equivalents) for both cost and programme components.</u></p>  | <p><u>Submit final report to the Client within 1-month prior to publication of OJEU Notice (as notified by the Client to the SDS Provider) for the Infraco Contract. Report to be updated on quarterly basis thereafter throughout the term of the Agreement and submitted to the Client's designated risk manager (as notified to the SDS Provider from time to time)</u></p> |
| <p><u>Prepare and maintain a design construction risk report, indicating the risks to be considered by Infraco during remaining scheme development and construction including construction sequence, construction</u></p>  | <p><u>Submit final report to the Client's designated risk manager (as notified to the SDS Provider from time to time) within 1-month prior to the appointment of Infraco.</u></p>  |

| Required Action from the SDS Provider  | Timing/Frequency  |
|--|---|
| <u>methodologies, access, quality, approvals, security, safety, public relations and compliance with Parliamentary Bill and objector requirements.</u>   |   |
| <u>Prepare and maintain a design operation risk report indicating the risks to be considered by the Operator during remaining scheme development, the construction and installation phase under the Infraco Contract, the commissioning and defects resolution phase under the Infraco Contract and operational phase including maintenance, lifecycle replacement, quality, approvals including HMRI, security, safety, public relations and compliance with Parliamentary Bill and objector requirements.</u><br><br><u>Report to include HAZOP risk assessment for the scheme and detail contingency plans.</u> | <u>Submit final report to the Client's designated risk manager (as notified to the SDS Provider from time to time) within 3-months prior to start of commissioning and defects resolution phase under the Infraco Contract.</u> |

**4.44.3 Financial Modelling**

4.4.14.3.1 The SDS Provider shall provide inputs to the financial modelling process for the Edinburgh Tram Network which shall include capex and opex (including routine maintenance and lifecycle costs) estimates.

**APPENDIX 1**  
**WORK BREAKDOWN STRUCTURE**



APPENDIX 1

CONT'D

| Edinburgh Tram Network Design Packages |   |                     |       |
|--|---|---------------------|-------|
| Tram                                   | Civil Engineering   | Supervisory & Comms | E & P |
|  | <p><b>Highways</b></p> <ul style="list-style-type: none"> <li>→ Roadworks</li> <li>→ Car Parks</li> <li>→ Utilities</li> </ul> <p><b>Buildings</b></p> <ul style="list-style-type: none"> <li>→ Substations</li> <li>→ W. side Equipment Cabinets</li> <li>→ Travel Centre</li> </ul> <p><b>Structures</b></p> <ul style="list-style-type: none"> <li>→ Bridges</li> <li>→ Culverts</li> <li>→ Earthworks</li> <li>→ Retaining Walls</li> </ul> |                     |       |



**APPENDIX 2**  
**Programme Phasing Structure**

**APPENDIX 2**  
**Programme Phasing Structure**

| Stage Build | Description                | Sector | Sub-sector  | Criticality | Commissioning Sequence for Trial Running (Line 1&2 and Line 2only) | Commissioning Sequence for Trial Running (Line 1only) | Preliminary Design Approved By              | Detailed Design Approved By |           |           |
|-------------|----------------------------|--------|---|-------------|--|---|---|-----------------------------|-----------|-----------|
| ARP         | Airport - Gogarburn        | ARP1   | Airport - Gogarburn (inc)                           | C           | 3  |   | 28-Feb-06                                   | 30-Sep-06                   |           |           |
| DHY         | Depot - Haymarket          | DHY1   | Gogaburn (exc) - Gyle & Depot (inc)                 | A1          | 1  |   | 30-Nov-05                                   | 30-Mar-06                   |           |           |
|             |                            | DHY2   | Gyle (exc) - Edinburgh Park (inc)                   | C           |  |   | 28-Feb-06                                   | 30-Sep-06                   |           |           |
|             |                            | DHY3   | Edinburgh Park (exc) - South Gyle Access (inc)      | C           | 2  |   | 28-Feb-06                                   | 30-Sep-06                   |           |           |
|             |                            | DHY4   | South Gyle Access (exc) - Soughton Road North (inc) | C           |  |   | 28-Feb-06                                   | 30-Sep-06                   |           |           |
|             |                            | DHY5   | Soughton Road North (exc) - Murrayfield (exc)       | DHY5a       |  | Soughton Road(exc)-Balgreen Road(inc)                 | B   |                             | 30-Jan-06 | 30-May-06 |
|             |                            |        |   | DHY5b       | Balgreen Road(exc)-Murrayfield(exc)                                |   |   | 30-Jan-06                   | 30-May-06 |           |
|             |                            | DHY6   | Murrayfield (inc) - Haymarket (inc)                 | A(2)        | 3  |   | 30-Nov-05                                   | 30-Mar-06                   |           |           |
| HOT         | Haymarket - Ocean Terminal | HOT1   | Haymarket (exc) - St.Andrew Square (inc)            | HOT1a       | Haymarket(exc)-Shandwick Place(inc)                                | 4   | 3 (section now includes Haymarket Tramstop) | 30-Nov-05                   | 30-Mar-06 |           |
|             |                            |        |   | HOT1b       | Shandwick Place(exc)-Princes St West(inc)                          |   |   |                             |           |           |
|             |                            |        |   | HOT1c       | Princes St West(exc)-Waverley Bridge(inc)                          |   |   |                             |           |           |
|             |                            |        |   | HOT1d       | Waverley Bridge(exc)-St.Andrew SQ.(inc)                            |   |   |                             |           |           |
|             |                            | HOT2   | St.Andrew SQ.(exc)-Picardy Place(inc)               | A(2)        | 4  | 3   | 30-Nov-05                                   | 30-Mar-06                   |           |           |
|             |                            | HOT3   | Picardy Place (exc) - Foot of the Walk (inc)        | HOT3a       | Picardy Place(exc)-MacDonald Rd(inc)                               | A(2)  | 5   | 2                           | 30-Nov-05 | 30-Mar-06 |
|             |                            |        |   | HOT3b       | MacDonald Rd(exc)-Balfour St(inc)                                  |   |   |                             |           |           |
|             |                            |        |   | HOT3c       | Balfour St(exc)-Foot of the Walk(inc)                              |   |   |                             |           |           |
|             |                            | HOT4   | Foot of the Walk (exc) - Ocean Drive (inc)          | HOT4a       | Foot of the Walk(exc)-Constitution St(inc)                         | A(3)  | 6   | 1                           | 30-Nov-05 | 30-May-06 |
|             |                            |        |   | HOT4b       | Constitution St(exc)-Ocean Drive(inc)                              |   |   |                             |           |           |
|             |                            | HOT5   | Ocean Drive (exc) - Ocean Terminal (inc)            | A(3)        | 6  | 1   | 30-Nov-05                                   | 30-May-06                   |           |           |
| HOT6        | Leith Depot & Connections  |        |   | D           | 5  | 1   | 30-Mar-06                                   | 30-Nov-06                   |           |           |

|     |                             |      |   |       |  |    |   |   |           |           |
|-----|-----------------------------|------|---|-------|--|----|---|---|-----------|-----------|
| HCT | Haymarket - Crewe Toll      | HCT1 | Haymarket (exc) - Crewe Toll (inc)          | HCT1a | Roseburn Jct(exc)-Roseburn(inc)                | D  | 4 | 4 | 30-Mar-06 | 30-Nov-06 |
|     |                             |      |   | HCT1b | Roseburn(exc)-Ravelston Dykes(inc)             |    |   |   | 30-Mar-06 |           |
|     |                             |      |   | HCT1c | Ravelston Dykes(exc)-Craigleith(inc)           |    |   |   | 30-Mar-06 |           |
|     |                             |      |   | HCT1d | Craigleith(exc)-W.General Hosp-Crewe Toll(inc) |    |   |   | 30-Mar-06 |           |
| CTO | Crewe Toll - Ocean Terminal | CTO1 | Crewe Toll (exc) - Granton Square (inc)     | CTO1a | Crewe Toll(exc)-W. Granton(inc)                | D  | 5 | 5 | 30-Mar-06 | 30-Nov-06 |
|     |                             |      |   | CTO1b | W. Granton(exc)-Caroline Pk(inc)               |    |   |   | 30-Mar-06 |           |
|     |                             |      |   | CTO1c | Caroline Pk(exc)-Granton Waterfront(inc)       |    |   |   | 30-Mar-06 |           |
|     |                             |      |   | CTO1d | Granton Waterfront(exc)-Granton Sq.(inc)       |    |   |   | 30-Mar-06 |           |
|     |                             | CTO2 | Granton Square (exc) - Ocean Terminal (inc) | CTO2a | Sea Wall Survey                                | A1 | 6 | 6 | 30-Nov-05 | 28-Feb-07 |
|     |                             |      |   | CTO2b | Granton Sq.(exc)-Lower Granton Rd              | E  | 6 | 6 | 30-Mar-06 |           |
|     |                             |      |   | CTO2c | Lower Granton Rd-Newhaven Rd                   |    |   |   |           |           |
|     |                             |      |   | CTO2d | Newhaven Rd-Ocean Terminal(exc)                |    |   |   |           |           |
| GNB | Gogarburn - New bridge      | GNB1 | Gogaburn (exc) - Newbridge (inc)            |       |  |    |   |   |           | F         |

**APPENDIX 3**

**Deliverables**

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Director/Authorised Signatory

**TIE LIMITED**

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Director/Authorised Signatory

**[SDS PROVIDER]**