

	A	B	C	D	E	F	G	H	I	J
1	Notes									
2										
3	Quick Expected Value is a “quick and dirty” way of approximating the mean of an individual risk.									
4	Adding up the QEVs of all risks should roughly equate to the Total Mean output of the simulation. It is									
5	possible to simulate the means of each risk with the sum of the simulated means approximating more									
6	closely to the Total Mean output. However, this simulation is too cumbersome for normal PCs to run									
7	in a reasonable time.									
8										
9	The spreadsheet has been used to calculate the Quick Expected Value of each risk and this has been									
10	summed in order to allow calculation of the % allocation of risk as follows:-									
11										
12										
13										
14										
15	The % allocation of risk has then been applied to the total simulation output at P90 level in order to									
16	provide a “P90 value” for individual risks and consequently, each risk grouping. The equation for									
17	obtaining the “P90 value” is as follows:-									
18										
19										
20										
21	The calculation has been done in this manner because, in a similar manner to the averaging of									
22	averages, the simulated P90 outputs of individual risks or risk groupings will not add up to the									
	simulated P90 Output.									

EDINBURGH TRAM NETWORK Master Pareto Risk Register for Project 1A Only												
RISK ID		RISK DESCRIPTION			VALUE			TREATMENT				
Risk ID	Key Contract Impacted	Cause	Risk Event	Effect	% Risk Allocation by Quick Expected Value	Quick Expected Value (Mean)	Allocation Value (% Allocation from Total P&O)	Treatment Strategy	Comments			
139	Utilities Diversions (MUDFA)	Utilities diversion outline specification only from plans	Uncertainty of Utilities location and consequently required diversion work/unforeseen utility services	Increase in MUDFA costs or delays as a result of carrying out more diversions than estimated	13.794%	4,300,500	5,917,708	1. Review design information and re-measure during design workshops with Utilities Companies and MUDFA. 2. Develop PC sums into quantified estimates. 3. In conjunction with MUDFA, undertake trial excavations to confirm locations of utilities. 4. Identify increase in services diversions. MUDFA to resource/re-programme to meet required timescales.				
343	Inflation	General delay to programme with various causes e.g. failure to obtain approvals on time; parliamentary processes, delays due to lack of prioritisation of BAA agreement with new owners	Delay to completion	Inflation at 5% causes increased out-turn cost due to delay	7.829%	2,440,867	3,358,757	See mitigations for underlying delay risks	This is a general delay risk that reflects the financial impact of inflation due to delay. Risk is treated through other activities.			
352	Land & Property	Some properties may result in higher land compensation claims than anticipated	Land compensation for high risk properties	Additional uplift on compensation claims	7.377%	2,300,000	3,164,918	1. Initiate early negotiations between DV and landowners. 2. Liaise with CEC Planning.				
214	Infrastructure (InfraCo)	Scope of Network Rail Infrastructure alteration is not yet defined	Network Rail Infrastructure requirements are not met during design	Re-work and consequent delay to programme, increase in cost over and above base estimate	5.132%	1,600,000	2,201,682	Risk owned by Jeff Lloyd. Treatment plan not yet entered into ARM.				
172	Infrastructure (InfraCo)	Area of possible contamination (unlicensed tip) has been highlighted during desk study immediately to west of Gogar Burn - Investigation for CERT project indicates that this consists of building rubble and domestic waste.	Tramway runs through area of possible contamination and special foundation is required to cope with "unstable" ground	Increase in costs to provide special foundation solution	4.330%	1,350,000	1,857,669	1. Obtain ground investigation information, design accordingly and include costs in base estimate. DETAILED SI REPORT AVAILABLE W/ 9 FEBRUARY - DESIGN AND ASSESSMENTS WILL BE AVAILABLE AFTER PUBLICATION. 2. Include SI Report and information in next issue of information to InfraCo				
348	Project Management	Project not completed to programme due to employee controlled issues.	Project end date extended.	Project Management and overhead costs to cover delay.	3.464%	1,080,000	1,486,135	1. Implement controls. 2. Review InfraCo bids. 3. Undertake opportunity reviews. 4. Deliver MUDFA to time.				
48	Infrastructure (InfraCo)	Two stage tender pricing does not achieve price certainty for works at first stage.	Price certainty is not achieved	Price creep post tender (during pre-construction period). Tender evaluation period exceeds 2 months currently planned. Bidder may attempt to price low at first stage.	3.169%	988,000	1,359,539	Cost checking of detailed designs and applying value engineering where major divergences emerge	High level treatment plan reflecting that this is a general delay risk to reflect the cost impact of project management if there is a delay. True solution found with other treatment plans and project management methods.			
164	Utilities Diversions (MUDFA)	Assets uncovered during construction that were not previously accounted for	Unknown and abandoned assets affect scope of MUDFA and/or InfraCo work	Re-design and delay as investigation takes place and solution implemented	3.079%	960,000	1,321,009	See Risk 139 - treatment plans linked.				
135	Infrastructure (InfraCo)	Electrical interference caused by proximity to existing Network Rail routes	Network Rail Immunisation has not been included in base estimate or requirements are over and above what has been included for	Increased design and construction requirements to ensure interference does not occur	2.887%	900,000	1,238,446	Apply Immunisation				
360	Land & Property	Landowner disagrees with District Valuer's Assessment of land value and submits a Certificate of Appropriate Alternative Development - Plot 162	Submission of CAAD Claim	Increase in land value for plot	2.847%	887,500	1,221,245	TBA				
44	Project Management	SDS contractor does not deliver the required consents before novation	Late prior consents	Delay to programme with additional resource costs	2.598%	810,000	1,114,601	Project to actively facilitate delivery of consents				
70	Project Management	SDS does not provide its defined deliverables (technical specs) in accordance with the SDS contract	Poor definition in tender spec	Creates impact on the InfraCo ability to develop its tender - pricing and supply chain. Increase in time for BAFO and increase in costs	2.598%	810,000	1,114,601	See SDS Recovery Strategy Response Item 4				
359	Land & Property	Landowner disagrees with District Valuer's Assessment of land value and submits a Certificate of Appropriate Alternative Development - Plot 150	Submission of CAAD Claim	Increase in land value for plot	2.598%	810,000	1,114,601	TBA				
47	Infrastructure (InfraCo)	Late utility diversion works within carriageway in advance of InfraCo works; MUDFA poor performance.	Late design, late approvals and other matters outside MUDFA control; MUDFA is late.	Increase in price and time delay in the InfraCo contract. InfraCo could end up delay to commencement or with utility diversion and would have to price for or have to carry out unplanned re-	2.575%	802,750	1,104,625	TBA				
178	Infrastructure (InfraCo)	Procurement Strategy novates SDS to InfraCo after Detailed Design	Limited input on buildability from InfraCo	Design re-work at outset will result in higher bids	2.502%	780,000	1,073,320	TBA				
354	Land & Property	Land and property values experience a net reduction in value as a result of the introduction of the Tram	Part 1 Claims for land and property	Possible successful claims resulting in increased costs to project with impact after construction	2.249%	701,250	964,956	TBA				

A	B	C	D	E	F	G	H	I	J	K	L	M	N
21	66	Infrastructure (InfraCo)	Contracts not integrated	Inadequate system integration	Time delay and interface problems between specialist contractors' sub systems	1.871%	583,333	802,697	Contract alignment exercise due to be completed before return of Consolidated Proposals will mitigate this risk				
22	81	Infrastructure (InfraCo)	Insufficient time to develop complete tender designs	Inadequate design development for tender stage.	Infraco may price for additional reworking of design for compliant or variant proposals	1.783%	555,750	764,740	Plan being agreed with Infraco bidders to prioritise release of detailed design information at an appropriate level for pricing				
23	342	Infrastructure (InfraCo)	Two data cable nests co-incide with Tram alignment at Gogar	BT Gogar data cable nest diversion	Long lead and construction times	1.604%	500,000	688,026	Site surveys being undertaken				
24	154	Tram Vehicles (TramCo)	Increase in specification over and above assumptions in base estimate regarding equipment and quality specification for tram vehicles	Business case runtime and CEC requirements (change in equipment and quality specification)	Increased cost of tramsets	1.588%	495,000	681,145	Tendered costs within estimate allowance				
25	102	Design (SDS)	Change in Design Kinematic Envelope requirements	Detail design leads to kinematic envelope impact on vertical and horizontal alignment	Realignment of track to accommodate an increased 3 dimensional safe zone around the preferred route	1.403%	437,500	602,022	TBA				
26	11	Land & Property	Contractors' methodology not adequately assessed	Land required for access to workfront not acquired	Additional management and acquisition costs relating to acquiring land to gain access	1.283%	400,000	550,420	Ensure that details of Infraco bidders additional land requirements are obtained prior to selection of preferred bidder and that bidder or tie have clear plans to acquire additional land prior to commencement of work				
27	21	Utilities Diversions (MUDFA)	Diversion/ relocation of utilities requires to be outside of LoD	Diversion of utilities outside of LoD	Additional disruption and costs	1.260%	392,667	540,329	TBA				
28						80%	24,885,117	34,243,193					

	A	B	C	D	E	F	G	H	I
1	EDINBURGH TRAM NETWORK Master								
2	Black Risk Register for Project 1A Only								
3	RISK ID		RISK DESCRIPTION				TREATMENT		
4	Risk ID	Key Contract Impacted	Cause	Risk Event	Effect	Treatment Strategy	Comments		
5	282	Infrastructure (InfraCo)	Procurement has high level of risk transfer to contractors	Failure to sustain suitable interest from the market throughout the bid process	Increased price of bids; Withdrawal of bidders during bid process	1. Identify feasible alternatives to risk allocation and allow negotiation of risk allocation.			
6	281	Project Management		Insufficient planning of procurements and controls on management and contract costs	Weak procurement plan; scope/cost creep; damage to reputation	1. Improve robustness of procurement plan. 2. Finalise project estimate and functional specification and apply change control. 3. Undertaken further Value Engineering.			
7	274	Project Management		Failure to engage with Transdev in order to amend DPOFA in line with the development of the Infraco and Tramco procurements. This includes negotiation to secure Transdev acceptance of a subcontract to support system commissioning and responsibilities.	Failure to achieve most effect commercial solution; Delay in resolutions of Agreements	1. Engage with Transdev to ensure adjustments to DPOFA and negotiate requirements.	Sub Impact Category: DPOFA		
8	268	Project Management	Business case is not approved or is approved subject to the gaining of additional funding	Funding not secured or agreements not finalised regarding the total aggregate funding including £45m CEC contribution; developer contributions; cashflow/funding profile; financial covenant; and public sector risk allocation e.g. inflation	Possible showstopper; Delays and increase in out-turn cost may affect affordability.	1. Acquire confidence in contingency figures. 2. Develop and implement strategy for additional contributions. 3. Ensure close and continual interactions with TS and CEC to establish funding delivery confidence and agreement.	Sub Impact Category: Business Case		
9	269	Project Management	Doubts over costs and staying within budget, political issues relating to where responsibility should lay.	Agreement on financial over-run risks sharing has not been reached between CEC and TS due to doubts over costs staying in budget.	Potential showstopper to project if agreement not reached.	1. Facilitate agreement between CEC and TS. 2. Hold discussions with CEC and TS to ensure adequate release of funds at appropriate periods of time. 3. Understand commitments by TS and CEC regarding Phase 1A and 1B.	Sub Impact Category: Business Case		
10	273	Project Management		Business case is not approved during February 2007 due to Infraco tender returns not adequately informing business case.	Delay until Summer 2007 due to lack of political commitment due to impending elections; Resultant cost impacts (inflation) on total cost; political support may evaporate; Leads to Risk 264.	1. Manage expectations on the part of TS and CEC as to the certainty with respect to cost which are reflected in the business case. 2. Ongoing fortnightly reviews with bidders and mid term contractual mark up to inform above treatment. 3. Maintain procurement programme to deliver critical business case inputs.	Sub Impact Category: Business Case		
11	264	Project	Political support is lost or political opposition to scheme increases due to lack/loss of confidence in business case (Infraco Costs). Failure to provide information, election campaigning etc	Political risk to continued commitment of TS/CEC support for Tram scheme	Reversal of decisions by incoming administrations in either or both CEC and Holyrood. Project becomes key political issue during election campaign; Protract decision making and unnecessary debate during consideration of business case.	1. Regular briefings and discussions with senior CEC and TS officers particularly in relation to Full Council presentations. 2. Monitor likely outcomes and do our best to brief all relevant parties about the project in a balanced way. 3. Hearts and Minds campaign including Senior Executive Officer meetings with Councillors and MSPs and utilising the tram sounding board meeting with CEC and selected elected transport leads. 4. Provide confidence on Infraco costs in Business Case ensuring that 70% costs are firm. 5. Make contact and engage with Senior SNP Leaders to address the effect of the project becoming a key political issue during election campaigning. 6. Continue to provide accurate information on status of project to address the effect that the incoming administration after the May 07 elections may reverse decision to proceed.			
12	279	Infrastructure (InfraCo)		Third party consents including Network Rail, CEC Planning, CEC Roads Department, Historic Scotland, Building Fixing owner consent is denied or delayed.	Delay to programme. Risk transfer response by bidders is to return risk to tie. Increased out-turn cost if transferred and also as a result of any delay due to inflation.	1. Engagement with third parties to discuss and obtain prior approvals to traffic management plans, landscape and habitat plans, TTROs, TROs and construction methodologies in relation to archaeological and ancient monuments. 2. Identify fallback options. 3. CEC Planning - Mock application by SDS.			

	A	B	C	D	E	F	G	H	I
13		187	Project Management	Poor relationships with stakeholders including political, Network Rail and other major organisations, businesses, frontages, special interest groups (including Spokes, SHN etc), Equalities Transport (DDA), media, community councils and residents associations	Project loses political and public support	Loss of funding support, delays due to protests	1. Seek support from pro-tram lobby groups to promote positive views 2. Continue with Hearts and Minds Campaign 3. Regular involvement with stakeholders to keep them informed and to better understand their concerns 4. Develop strategies to counteract any negative comments.		

	A	B	C	D	E	F	G	H	I	J
1	EDINBURGH TRAM									
2	Other Risk Register for Project 1A Only									
3	RISK ID		RISK DESCRIPTION				TREATMENT			
4	Risk ID	Key Contract Impacted	Cause	Risk Event	Effect	Value	Treatment Strategy		Comments	
5	Contingenci									
6	O1		Unanticipated costs arising out of the detailing of the scheme	Design Development between Initial Proposal and completion of detailed design	Increase in construction cost	24m	Cost checking of emerging detailed designs and applying value engineering to any variances with allowance		24m is a contingency allowance which equates to 7% of Infracost. This is adequate for this stage of the tendering and design process	
7	Contractual Negotiation Risks									
8	O2			General negotiation risk	Leverage in negotiations lost		Keep two bidders in competition for as long as possible. Settle all major contractual issues prior to return of Consolidated Proposals		See Item 3 in Response also	
9	O3			Capped contract liabilities			To get the best position at optimum value from negotiating contract terms. Infracost to speculate overhead and profit margin against their failure and that of Tramco and SDS once novated. Termination provision to be added into the contract in the event that caps are or are forecast to be breached		See Item 3 in Response also	
10	O4		Infracost will not accept SDS as designer	Failure to novate SDS	Potential failure to transfer design and performance risk		To get the best position at optimum value from negotiating contract terms. To put Project in minimum risk position ensure that detailed design of price and risk critical items is completed and accepted by Infracost prior to Financial Close. As a fallback ensure that Infracost takes responsibility for the system performance and detailed designs even if they do not wish to continue with designer.		See Item 3 in Response also	
11	O5			Exclusion of liability for obtaining consents and approvals e.g. prior approvals and TRO	Potential delay and additional costs if not obtained in time		To obtain critical consents prior to Financial Close or to have clear and agreed plan with authorities giving consents to gain consents by the required dates		See Item 3 in Response also	
12	O6			Transport Scotland and CEC indemnities on payment not provided	Bidders walk away		Transport Scotland to provide indemnities sought or an equivalent arrangement.		See Item 3 in Response also	
13										
14	Programme									
15	O7			Current Programme completion dates not met			Apply Value Engineering savings to create programme contingency within current forecast delivery into revenue service dates.		Financial allowance included within Quantified Risks. See also Item 2 in Response	
16										
17										
18										
19										
20										

	A	B	C	D	E
1	EDINBURGH TRAM PROJECT				
2	Risk Simulation Phase 1A Only				
3	12-Feb-07				
4					
5	Distribution for Cost @RISK / Overall				
6	Contingency/BT368				
7					
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23					
24	Summary				
25	P50	£32.3m	Rounded Up		
26	P90	£42.9m	Rounded Up		
27	[Random Seed 1958267957]				

Item	Code	Project	Phase	Start	End	Description	Category	Sub-Category	Priority	Status	Value	Cost	Revenue	Profit	Margin	Notes
1	0000	00000000	Phase 1	2023-01-01	2023-12-31	Initial project setup and planning	Construction	General	High	On Track	1,000,000	1,000,000	0	0	0%	Project start-up costs
2	0000	00000000	Phase 2	2024-01-01	2024-06-30	Site preparation and foundation work	Construction	General	High	On Track	2,500,000	2,500,000	0	0	0%	Site prep and foundation
3	0000	00000000	Phase 3	2024-07-01	2024-12-31	Main structure construction	Construction	General	High	On Track	10,000,000	10,000,000	0	0	0%	Main building structure
4	0000	00000000	Phase 4	2025-01-01	2025-06-30	Interior finishing and MEP installation	Construction	General	High	On Track	5,000,000	5,000,000	0	0	0%	Interior fit-out and MEP
5	0000	00000000	Phase 5	2025-07-01	2025-12-31	Final inspection and handover	Construction	General	High	On Track	1,000,000	1,000,000	0	0	0%	Final handover and closeout
6	0000	00000000	Phase 6	2026-01-01	2026-12-31	Post-project evaluation and reporting	Construction	General	High	On Track	500,000	500,000	0	0	0%	Post-project review
7	0000	00000000	Phase 7	2027-01-01	2027-12-31	Long-term maintenance and support	Construction	General	High	On Track	1,000,000	1,000,000	0	0	0%	Long-term support costs
8	0000	00000000	Phase 8	2028-01-01	2028-12-31	Final project closure and documentation	Construction	General	High	On Track	200,000	200,000	0	0	0%	Final project closure
9	0000	00000000	Phase 9	2029-01-01	2029-12-31	Archival and historical record keeping	Construction	General	High	On Track	100,000	100,000	0	0	0%	Archival and records
10	0000	00000000	Phase 10	2030-01-01	2030-12-31	Final project review and lessons learned	Construction	General	High	On Track	50,000	50,000	0	0	0%	Final project review

ID	Type	Project Name	Start Date	End Date	Phase	Status	Priority	Risk	Budget		Actual		Forecast		Comments	Last Update	Owner	Project Manager	Sponsor
									Planned	Actual	Planned	Actual	Planned	Actual					
1	Task	1000000	2023-01-01	2023-01-31	Planning	Completed	Low	Low	1000000	1000000	1000000	1000000	1000000	1000000	Project planning completed successfully.	2023-01-31	John Doe	Jane Smith	ABC Corp
2	Task	1000000	2023-02-01	2023-02-28	Analysis	In Progress	Medium	Medium	1000000	800000	1000000	900000	1000000	950000	Analysis phase progressing well.	2023-02-28	John Doe	Jane Smith	ABC Corp
3	Task	1000000	2023-03-01	2023-03-31	Design	Not Started	High	High	1000000	0	1000000	0	1000000	0	Design phase to begin next month.	2023-03-01	John Doe	Jane Smith	ABC Corp
4	Task	1000000	2023-04-01	2023-04-30	Development	Not Started	High	High	1000000	0	1000000	0	1000000	0	Development phase to begin next month.	2023-04-01	John Doe	Jane Smith	ABC Corp
5	Task	1000000	2023-05-01	2023-05-31	Testing	Not Started	High	High	1000000	0	1000000	0	1000000	0	Testing phase to begin next month.	2023-05-01	John Doe	Jane Smith	ABC Corp
6	Task	1000000	2023-06-01	2023-06-30	Deployment	Not Started	High	High	1000000	0	1000000	0	1000000	0	Deployment phase to begin next month.	2023-06-01	John Doe	Jane Smith	ABC Corp
7	Task	1000000	2023-07-01	2023-07-31	Post-Deployment	Not Started	High	High	1000000	0	1000000	0	1000000	0	Post-deployment phase to begin next month.	2023-07-01	John Doe	Jane Smith	ABC Corp
8	Task	1000000	2023-08-01	2023-08-31	Project Close	Not Started	High	High	1000000	0	1000000	0	1000000	0	Project close phase to begin next month.	2023-08-01	John Doe	Jane Smith	ABC Corp
9	Task	1000000	2023-09-01	2023-09-30	Review	Not Started	High	High	1000000	0	1000000	0	1000000	0	Review phase to begin next month.	2023-09-01	John Doe	Jane Smith	ABC Corp
10	Task	1000000	2023-10-01	2023-10-31	Reporting	Not Started	High	High	1000000	0	1000000	0	1000000	0	Reporting phase to begin next month.	2023-10-01	John Doe	Jane Smith	ABC Corp
11	Task	1000000	2023-11-01	2023-11-30	Final Review	Not Started	High	High	1000000	0	1000000	0	1000000	0	Final review phase to begin next month.	2023-11-01	John Doe	Jane Smith	ABC Corp
12	Task	1000000	2023-12-01	2023-12-31	Project Completion	Not Started	High	High	1000000	0	1000000	0	1000000	0	Project completion phase to begin next month.	2023-12-01	John Doe	Jane Smith	ABC Corp

Project No.	Project Name	Project Type	Start Date	End Date	Status	Phase	Priority	Owner	Manager	Team Lead	Team Members	Budget	Actual	Variance	Progress %	Key Milestones	Risks	Dependencies	Notes
101	Project A	Phase 1	2023-01-01	2023-03-31	Completed	Phase 1	High	John D.	John D.	Jane S.	Mike T.	\$100,000	\$100,000	\$0	100%	Phase 1 completed on time and within budget.	Low	None	Phase 1 completed successfully.
102	Project B	Phase 2	2023-04-01	2023-06-30	On Track	Phase 2	Medium	Jane S.	Jane S.	John D.	Mike T.	\$200,000	\$195,000	\$5,000	85%	Phase 2 progressing well with minor budget variance.	Medium	Resource availability	Phase 2 on track.
103	Project C	Phase 3	2023-07-01	2023-09-30	Delayed	Phase 3	High	Mike T.	Mike T.	Jane S.	John D.	\$300,000	\$320,000	-\$20,000	60%	Phase 3 experiencing delays and budget overruns.	High	Scope creep	Phase 3 delayed.
104	Project D	Phase 4	2023-10-01	2023-12-31	Planned	Phase 4	Low	John D.	John D.	Jane S.	Mike T.	\$150,000	\$0	\$150,000	0%	Phase 4 not yet started.	Low	None	Phase 4 planning.

