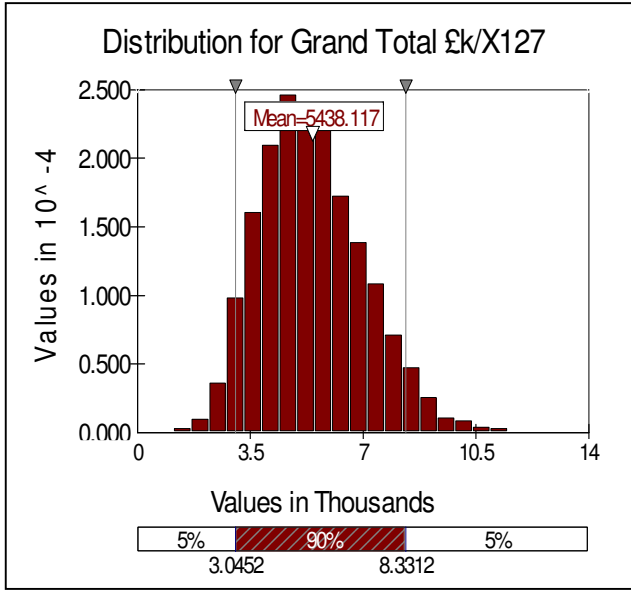
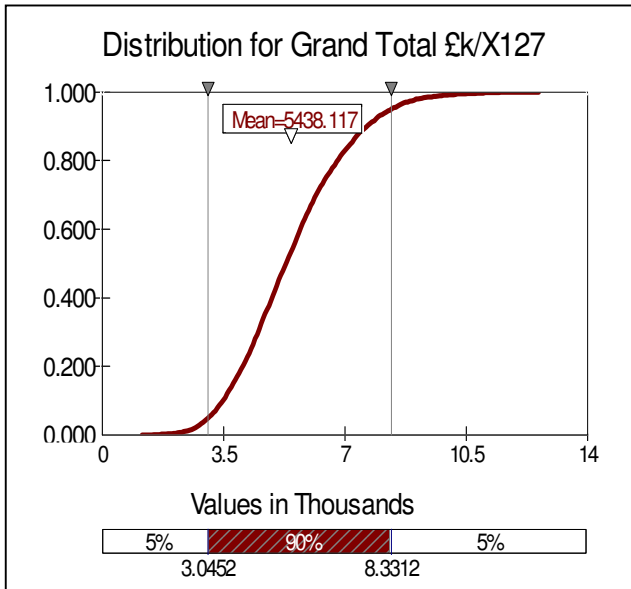


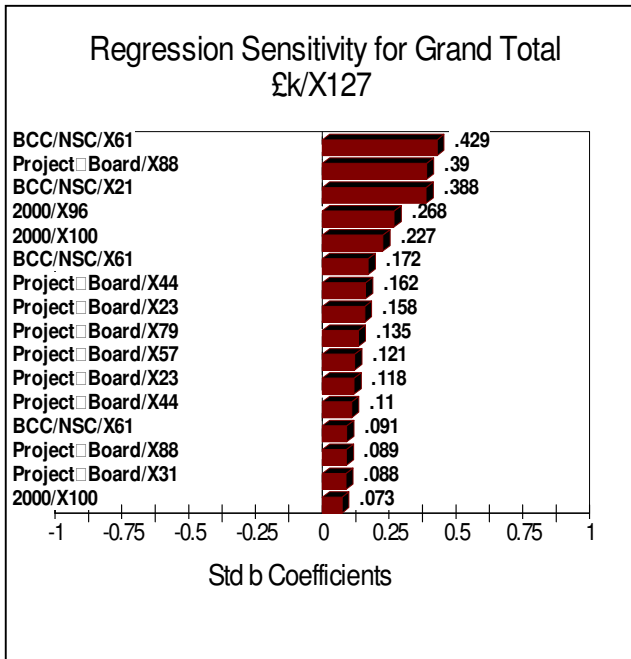
## Simulation Results for Preferred Option



Summary Information	
Workbook Name	PrefQRARegisterRev6v10031
Number of Simulations	1
Number of Iterations	5000
Number of Inputs	372
Number of Outputs	4
Sampling Type	Monte Carlo
Simulation Start Time	10/03/2010 15:19
Simulation Stop Time	10/03/2010 15:19
Simulation Duration	00:00:12
Random Seed	1



Summary Statistics			
Statistic	Value	%tile	Value
Minimum	£ 1,136	5%	£ 3,045
Maximum	£ 12,593	10%	£ 3,476
Mean	£ 5,438	15%	£ 3,762
Std Dev	£ 1,620	20%	£ 4,037
Variance	2625186.921	25%	£ 4,275
Skewness	0.513816297	30%	£ 4,492
Kurtosis	3.268893314	35%	£ 4,674
Median	£ 5,293	40%	£ 4,886
Mode	£ 4,635	45%	£ 5,082
Left X	£ 3,045	50%	£ 5,293
Left P	5%	55%	£ 5,507
Right X	£ 8,331	60%	£ 5,695
Right P	95%	65%	£ 5,917
Diff X	£ 5,286	70%	£ 6,163
Diff P	90%	75%	£ 6,447
#Errors	0	80%	£ 6,779
Filter Min		85%	£ 7,171
Filter Max		90%	£ 7,626
#Filtered	0	95%	£ 8,331



Sensitivity			
Rank	Name	Regr	Corr
#1	SBL041	0.428	0.427
#2	SBL002	0.390	0.399
#3	SBL063	0.390	0.382
#4	SBL071	0.263	0.266
#5	SBL092	0.229	0.232
#6	SBL041	0.173	0.192
#7	SBL019	0.162	0.185
#8	SBL015	0.157	0.164
#9	SBL032	0.130	0.127
#10	SBL027	0.115	0.130
#11	SBL015	0.115	0.145
#12	SBL019	0.109	0.108
#13	SBL041	0.094	0.076
#14	SBL046	0.090	0.092
#15	SBL016	0.073	0.098
#16	SBL032	0.069	0.074

**Quantified Risk Register for South Bristol Link**

**Rev:** 6 **04/03/2010**

**Direct Costs**

<b>Scheme:</b>	South Bristol Link				
<b>Milestone:</b>	Cost Estimate - 2009 Q3				
<b>Works Cost:</b>	£35.5m	Works from 2014/15 to 2016/17	£1.48m	per mth	
<b>Preparation</b>	£6.00m	Preparation until 2013/14 (5 years)	£100k	per mth	
<b>Modelling</b>	£1.00m	Modelling until 2012/13 (12 mths)	£83k	per mth	

likelihood		
	1 = Almost Certain	95.0%
Extreme Risk.	2 = Likely	50.0%
High Risk.	3 = Possible	25.0%
Medium Risk	4 = Unlikely	12.5%
Low Risk.	5 = Rare	5.0%

Risk Ref	Cause known control weakness or assumption "as a result of"	Event future/uncertain "may be possibility of that"	Consequence to objectives "which would lead to"	Mitigating Owner	Cost Impact Estimate			Likelihood	Mean outcome	Action to be taken
					Min (£k)	Max (£k)	Likely (£k)			
SBL Risk Log Ref										
<b>RESOURCES</b>										
SBL007	Compensation claims after the event that will have to be funded by Local Authorities - Part 1 Claims.	Compensation from adjacent residents demanding compensation	Financial / Budget	BCC/NSC	50	200	100	13%	13	Best estimate. Will differ with route. Contingency funds. Landscaping.
SBL012	Lack of capacity in terms of staffing, consultants, engineers, contractors with the required skills to undertake public consultations and secure Conditional and Final Approval.	Late or non-delivery of key elements of the Project.	Financial - consultant rates increase and internal staff need to be retained.	BCC/NSC	30	100	100	5%	5	Effective procurement of consultants/engineers. Adequate resources to employ necessary skills. Early identification of process to be followed, e.g. Framework.
<b>STRATEGIC / POLITICAL</b>										
SBL002	Unable to obtain funding for the initial pre-construction development costs £7m+	Preparation suspended or postponed.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	0	0	0	25%	0	Secure development contributions (s106). MTFP bids. Keeping Members informed. Secure access to infrastructure building funds. Explore other funding options e.g. RDA.
SBL015	Political uncertainty across all the authorities & Govt - elections may result in changes in priorities.	Preparation suspended or postponed.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	60	120	60	95%	57	Undertake programming with political cycles in mind. Keep Members informed.
SBL021	Interest Groups, Residents Groups etc. opposing the development, High Court Challenge causing delays and increasing costs.	Demonstrations disrupt public consultation, meetings and or restricting access to the site for surveys.	Financial - Additional public engagement required and potentially extended Public Inquiry.	Project Board	1	10	10	50%	5	Early identification of the issues. Produce a Communication Strategy.
SBL031	Adverse impact on Project of other transport initiatives, e.g. other bus rapid transit routes.	Changes of design of intersecting projects require redesign of Project. Business case undermined by other transport link	Financial - additional costs / reworking of Bid to ensure satisfactory business case.	Joint Transport Team	60	360	60	25%	15	Close liaison with other Project Boards and Teams. Joint Transport Team. Programme Steering Groups. Ensure Project integrates with other schemes.
SBL046	Local media adopts a negative stance - series of negative articles published.	Articles encourage significant resistance to the Project. Additional effort required to counter negative reports.	Scheme fails to win public and political support. Project delivered late.	Project Board	30	60	30	13%	4	Communication Strategy. Early media involvement to show scheme benefits. Openness.
SBL048	Governance model deemed unsuitable by DfT and liable to cause delay	MSBC to be amended and resubmitted	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	20	60	20	5%	1	Establish suitable working arrangements within LAs Cross-reference with successful submissions.
SBL058	Land use assumptions are inconsistent with draft regional plans	DfT Reject the Submission	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	60	360	120	25%	30	Early discussions with the DfT and Joint Executive
SBL061	Not obtaining support / consents from the public transport stakeholders (i.e. Network Rail, bus operators) leading to delay and extended project management	Submission of MSBC deadline missed.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	0	0	0	13%	0	Close liaison with transport stakeholders and regular briefings.
SBL062	Poor report from 4Ps Gateway Review leading to delay and extended project management.	Submission to DfT delayed as new procedures / structure adopted.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	60	180	60	25%	15	Follow DfT guidance and liaise with previous major project teams.
<b>STATUTORY PROCESS</b>										
SBL016	Change in legislation.	Change in legislation requires reworking of submissions and possibly additional surveys.	Late delivery of submissions and loss of allocation in RFA.	Project Board	50	100	50	5%	3	Speed of communication of changes and response.
SBL019	Failure to secure DfT approvals at key milestones.	Project delayed - Reworking of Submission required.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	300	600	300	25%	75	Liaise with DfT to manage expectations. Ensure quality of MSBC is as good as possible with the available information.
SBL033	Failure to secure planning permissions from the council	Reworking of Planning Application	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	150	600	150	5%	8	Early discussion and close contact with Planners. Pre-application advice.
									<b>18</b>	<b>28</b>
									<b>127</b>	<b>1523</b>

**Quantified Risk Register for South Bristol Link**

**Rev:** 6 04/03/2010

**Direct Costs**

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Risk Ref	Cause known control weakness or assumption "as a result of"	Event future/uncertain "may be possibility of that"	Consequence to objectives "which would lead to"	Mitigating Owner	Cost Impact Estimate			Likelihood	Mean outcome	Action to be taken
					Min (£k)	Max (£k)	Likely (£k)			
SBL034	Failure to secure requisite statutory powers (e.g. at public inquiry).	Project delayed. Process to be restarted.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	60	230	60	5%	3	Sound preparation and good design. Early consultation, Allowance made for Public Inquiry. Good legal advice.
SBL050	Failure to secure Network Rail consents and possessions	Project delayed - Reworking of Submission required.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	60	360	120	25%	30	Start the process of engagement with Network Rail in good time.
SBL060	Incomplete or late delivery of outputs by external consultants	Non-compliant bid submitted	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	0	0	0	25%	0	Fortnightly progress meetings or tele-conferences. Programmed targets.
<b>DESIGN</b>									<b>118</b>	<b>307</b>
SBL010	Changes in design standards.	Change in standards requires reworking of submissions and possibly additional surveys.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	60	180	60	5%	3	Apply "freeze" on standards at start of construction.
SBL027	Impact of poor environmental survey/assessment on the project - bats, badgers etc - additional delays, cost and public demonstration.	Lack of resources or problems with access causing delay.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	0	0	0	25%	0	Early Liaison with Statutory Bodies to achieve mutual understanding of requirements.
SBL041	Scheme crosses (goes under) a main rail line - increased costs and delays.	Network Rail Processes delay Project.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	700	3500	700	25%	175	Works costs determined Early discussion with Network Rail.
SBL042	Route crosses 'common' land in Bristol which is owned by the Council - if used the Council will have to replace with some more common land. Potential legal challenge by commoners. Focus for protestors. Additional mitigation costs.	Access denied by protesters for surveys and works.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	0	200	100	5%	5	Early research to identify issues, establish actual boundary. Legal advice. Identify exchange land and commoners. Build into Communication Strategy. Early reporting to Members (after research).
SBL049	Route was subject to flooding in 1963. Finished road level may constrain options at railway crossing.	Required finished road level to avoid flooding may require sub-standard height clearance at under-bridge.	Financial - Additional design to mitigate sub-standard provision and delay to submission. Loss of allocation in RFA.	Project Board	50	350	100	13%	13	Liaise with Environmental Agency and review options for railway crossing.
SBL051	Risk of increased costs due to the level difference between the A38 and the A370 (steep escarpment slope).	Road widening required for climbing lane also introduces more substantial and costly earthworks, drainage works, etc.	Financial - Business Case for Project undermined.	Project Board	6	36	12	25%	3	Carry out sufficient design to understand the risk.
SBL085	Sub-standard junctions may not pass the safety audit without negative comment.	Additional design required	Financial - Additional design costs and delay. Late or non-delivery of submissions. Loss of RFA allocation.	Project Board	60	180	60	25%	15	Carry out sufficient design to understand the risk. (Preliminary design exists)
SBL091	Local political uncertainty across both authorities may result in changes in priorities.	Additional design required	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	60	120	60	95%	57	Undertake programming with political cycles in mind. Keep Members informed.
<b>PROCUREMENT</b>									<b>271</b>	<b>880</b>
SBL086	Contractors do not respond to OJEU Notice	Re advertising Scheme	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	6	36	12	5%	1	Make use of experienced staff within council. Follow OJEU procedures diligently.
SBL087	Challenge made under OJEU Provisions	Re advertising Scheme	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	6	36	12	5%	1	Make use of experienced staff within council. Follow OJEU procedures diligently.
SBL088	Receipt of unrealistic tender(s)	Award of contract is delayed whilst additional assessment and discussions take place.	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	6	36	12	5%	1	Make use of experienced staff within council. Adopt appropriate assessment process in advance of tendering.

**Quantified Risk Register for South Bristol Link**

**Rev:** 6 04/03/2010

**Direct Costs**

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					Min (£k)	Max (£k)	Likely (£k)			
SBL Risk Log Ref									£k	*
SBL089	Agreement on Procurement not reached between promoting authorities.	Tender process is delayed whilst additional discussions take place.	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	6	36	12	5%	1	Make use of experienced staff within council. Follow OJEU procedures diligently.
SBL090	Gateway Review gives negative report.	Project Team responds to recommendations.	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	12	48	24	5%	1	Make use of experienced staff within council. Follow OJEU procedures diligently.
									0	
<b>CONSTRUCTION</b>									<b>4</b>	<b>46</b>
SBL032	Physical delays in the construction phase - demonstrators etc.	Works obstructed or access prevented requiring additional security and causing delay.	Financial - Delays in delivery and increased costs.	Project Board	100	500	250	50%	125	Early involvement with contractors. Site security. Early liaison with Police. Sound project management and planning processes. Thorough design.
SBL043	Unknown mines discovered leading to additional costs and delays.	Mine encountered. Works stopped and void to be grouted.	Financial - Additional works required and delivery delayed.	BCC/NSC	10	50	50	13%	6	Research. Site investigations. Site procedures take account of possibility.
SBL052	Unexpected Protected Species identified.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	6	120	12	25%	3	Thorough and appropriate surveys during the design phase. Transfer risk to Contractor to encourage appropriate construction methodology.
SBL053	Unexpected archaeology discovered on site	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	6	36	12	13%	2	Designer to ensure comprehensive studies to minimise the risk
SBL054	Noise pollution objections raised by residents during the works.	Works halted and opening date delayed.	Financial - Additional administration required and delivery delayed.	Project Board	25	250	50	13%	6	Draft and implement SEMP and ensure the contractor has signed up to it. Ensure proper engagement with affected parties.
SBL055	Unforeseen ground conditions including noxious weeds.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	25	250	50	25%	13	Ensure adequate ground investigations. Specific site surveys of high risk areas.
SBL056	Spillage / Pollution Incidents on Site	Works halted and opening date delayed.	Financial - Additional administration required and delivery delayed.	Project Board	6	36	12	13%	2	Contractor to ensure normal good practice is implemented to minimise the risk.
SBL063	Worse contaminated ground conditions encountered than anticipated - delay to works completion and additional mitigation costs.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	250	2800	1400	25%	350	Commission an early ground condition survey along proposed route.
SBL064	Inaccuracy of base mapping and land boundary information compared to that used for outline design - delay to programme and additional survey costs.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	60	500	100	13%	13	Commission an early ground topographical survey along proposed route.
SBL065	Design item omission, e.g small retaining wall - delay to works on site and additional works costs.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	30	500	50	13%	6	Detailed design checks prior to tendering.
SBL069	Traffic delays during construction of on highway improvements	Public Disquiet and additional diversion works instructed. Potentially additional costs.	Financial - Additional administration required and delivery delayed.	Project Board	30	250	50	13%	6	Anticipate and safeguard against problems.

**Quantified Risk Register for South Bristol Link**

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SBL070	Shortage of materials or skilled labour during local peak in planned construction activity. (2012 - 2015)	Works on site delayed and planned opening date missed. Bad publicity and additional indirect costs.	Financial - Additional works required and delivery delayed.	Project Board	60	250	100	5%	5	Liaise with WEPO and influence programming of Major Projects.
SBL071	Unidentified utilities encountered during construction	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	60	2000	1000	25%	250	Ensure full searches on Utility companies
SBL072	Delay in diversion of utilities	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	60	250	100	50%	50	Early engagement with utility companies. Transfer risk to Contractor to encourage continued engagement.
SBL073	Adverse weather (risk of flooding of works etc)	Works halted and opening date delayed.	Delivery delayed.	Project Board	60	250	100	12%	12	Prepare contingency plans
SBL074	Contractor misses Traffic Management Act booking for works	Works halted and opening date delayed.	Delivery delayed.	Project Board	30	125	50	5%	3	Early programming and discussion with Traffic Manager.
SBL092	Inclement weather during Network Rail Possession	Works continue when possible but Project incurs penalty costs	Financial - Additional costs.	Project Board	0	2000	500	25%	125	Transfer risk to Contractor to ensure all sensible mitigation measures are adopted.
SBL093	Scheme completion is delayed.	Delay in works completion increases Client supervision / management costs	Financial - Additional costs.	Project Board	0	100	50	25%	13	Anticipate and safeguard against problems.
<b>OPERATION</b>									<b>988</b>	<b>1396</b>
<b>TOTAL RISK COST</b>									<b>0</b>	<b>0</b>
<b>RISKS IDENTIFIED By CONTRACTOR (refer to separate register)</b>										
<b>TOTAL RISK COST</b>									<b>0</b>	

**TOTAL RISK VALUE £k** 1,525

**DURATION RISK VALUE £k** 2,655

**GRAND TOTAL £k** 4,180

**Quantified Risk Register for South Bristol Link**
**Rev: 6** 04/03/2010
**Delay Costs**

**Scheme:** South Bristol Link  
**Milestone:** Cost Estimate - 2009 Q3  
**Works Cost:** £35.5m Works from 2014/15 to 2016/17 £178k per mth  
**Preparation:** n/a Preparation until 2013/14 n/a per mth  
**Modelling:** n/a Modelling until 2009/10 n/a per mth

**Inflation at 6%**

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				Min (mths)	Max (mths)	Likely (mths)				
Design Team's Ref			*				mths	*		
<b>RESOURCES</b>										
SBL007	Compensation claims after the event that will have to be funded by Local Authorities - Part 1 Claims.	Compensation from adjacent residents demanding compensation	Financial / Budget	BCC/NSC	0	0	0	13%	0	Best estimate. Will differ with route. Contingency funds. Landscaping.
SBL012	Lack of capacity in terms of staffing, consultants, engineers, contractors with the required skills to undertake public consultations and secure Conditional and Final Approval.	Late or non-delivery of key elements of the Project.	Financial - consultant rates increase and internal staff need to be retained.	BCC/NSC	1	12	3	5%	0	Effective procurement of consultants/engineers. Adequate resources to employ necessary skills. Early identification of process to be followed, e.g. Framework.
<b>STRATEGIC / POLITICAL</b>										
SBL002	Unable to obtain funding for the initial pre-construction development costs £7m+	Preparation suspended or postponed.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	12	24	24	25%	6	Secure development contributions (s106). MTFP bids. Keeping Members informed. Secure access to infrastructure building funds. Explore other funding options e.g. RDA.
SBL015	Political uncertainty across all the authorities & Govt - elections may result in changes in priorities.	Preparation suspended or postponed.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	12	24	12	95%	11	Undertake programming with political cycles in mind. Keep Members informed.
SBL021	Interest Groups, Residents Groups etc. opposing the development, High Court Challenge causing delays and increasing costs.	Demonstrations disrupt public consultation, meetings and or restricting access to the site for surveys.	Financial - Additional public engagement required and potentially extended Public Inquiry.	Project Board	1	2	2	50%	1	Early identification of the issues. Produce a Communication Strategy.
SBL031	Adverse impact on Project of other transport initiatives, e.g. other bus rapid transit routes.	Changes of design of intersecting projects require redesign of Project. Business case undermined by other transport link	Financial - additional costs / reworking of Bid to ensure satisfactory business case.	Joint Transport Team	1	6	1	25%	0	Close liaison with other Project Boards and Teams. Joint Transport Team. Programme Steering Groups. Ensure Project integrates with other schemes.
SBL046	Local media adopts a negative stance - series of negative articles published.	Articles encourage significant resistance to the Project. Additional effort required to counter negative reports.	Scheme fails to win public and political support. Project delivered late.	Project Board	3	12	3	13%	0	Communication Strategy. Early media involvement to show scheme benefits. Openness.
SBL048	Governance model deemed unsuitable by DfT and liable to cause delay	MSBC to be amended and resubmitted	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	1	12	1	5%	0	Establish suitable working arrangements within LAs Cross-reference with successful submissions.
SBL058	Land use assumptions are inconsistent with draft regional plans	DfT Reject the Submission	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	1	6	2	25%	1	Early discussions with the DfT and Joint Executive
SBL061	Not obtaining support / consents from the public transport stakeholders (I.e. Network Rail , bus operators) leading to delay and extended project management	Submission of MSBC deadline missed.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	1	3	1	13%	0	Close liaison with transport stakeholders and regular briefings.
SBL062	Poor report from 4Ps Gateway Review leading to delay and extended project management.	Submission to DfT delayed as new procedures / structure adopted.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	1	3	1	25%	0	Follow DfT guidance and liaise with previous major project teams.
<b>STATUTORY PROCESS</b>										
SBL016	Change in legislation.	Change in legislation requires reworking of submissions and possibly additional surveys.	Late delivery of submissions and loss of allocation in RFA.	Project Board	6	12	6	5%	0	Speed of communication of changes and response.
SBL019	Failure to secure DfT approvals at key milestones.	Project delayed - Reworking of Submission required.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	6	12	6	25%	2	Liaise with DfT to manage expectations. Ensure quality of MSBC is as good as possible with the available information.
SBL033	Failure to secure planning permissions from the councils	Reworking of Planning Application	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	3	12	3	5%	0	Early discussion and close contact with Planners. Pre-application advice.
								<b>0</b>	<b>11</b>	
								<b>20</b>	<b>1397</b>	

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				Min (mths)	Max (mths)	Likely (mths)				
Design Team's Ref			*				mths	*		
SBL034	Failure to secure requisite statutory powers (e.g. at public inquiry).	Project delayed. Process to be restarted.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	0	0	0	5%	0	Sound preparation and good design. Early consultation, Allowance made for Public Inquiry. Good legal advice.
SBL050	Failure to secure Network Rail consents and possessions	Project delayed - Reworking of Submission required.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	1	6	2	25%	1	Start the process of engagement with Network Rail in good time.
SBL060	Incomplete or late delivery of outputs by external consultants	Non-compliant bid submitted	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	1	3	1	25%	0	Fortnightly progress meetings or tele-conferences. Programmed targets.
<b>DESIGN</b>								<b>3</b>	<b>189</b>	
SBL010	Changes in design standards.	Change in standards requires reworking of submissions and possibly additional surveys.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	1	3	1	5%	0	Apply "freeze" on standards at start of construction.
SBL027	Impact of poor environmental survey/assessment on the project - bats, badgers etc - additional delays, cost and public demonstration.	Lack of resources or problems with access causing delay.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	3	12	3	25%	1	Early Liaison with Statutory Bodies to achieve mutual understanding of requirements.
SBL041	Scheme crosses (goes under) a main rail line - increased costs and delays.	Network Rail Processes delay Project.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	0	12	12	50%	6	Works costs determined Early discussion with Network Rail.
SBL042	Route crosses 'common' land in Bristol which is owned by the Council - if used the Council will have to replace with some more common land. Potential legal challenge by commoners. Focus for protesters. Additional mitigation costs.	Access denied by protesters for surveys and works.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	0	12	3	5%	0	Early research to identify issues, establish actual boundary. Legal advice. Identify exchange land and commoners. Build into Communication Strategy. Early reporting to Members (after research).
SBL049	Route was subject to flooding in 1963. Finished road level may constrain options at railway crossing.	Required finished road level to avoid flooding may require sub-standard height clearance at under-bridge.	Financial - Additional design to mitigate sub-standard provision and delay to submission. Loss of allocation in RFA.	Project Board	0.25	3	0.5	13%	0	Liaise with Environmental Agency and review options for railway crossing.
SBL051	Risk of increased costs due to the level difference between the A38 and the A370 (steep escarpment slope).	Road widening required for climbing lane also introduces more substantial and costly earthworks, drainage works, etc.	Financial - Business Case for Project undermined.	Project Board	1	6	2	25%	1	Carry out sufficient design to understand the risk.
SBL085	Sub-standard junctions may not pass the safety audit without negative comment.	Additional redesign required	Financial - Additional design costs and delay. Late or non-delivery of submissions. Loss of RFA allocation.	Project Board	1	3	1	25%	0	Carry out sufficient design to understand the risk. (Preliminary design exists)
SBL091	Local political uncertainty across both authorities may result in changes in priorities.	Additional design required	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	1	2	1	95%	1	Undertake programming with political cycles in mind. Keep Members informed.
<b>PROCUREMENT</b>								<b>9</b>	<b>610</b>	
SBL086	Contractors do not respond to OJEU Notice	Re advertising Scheme	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	1	6	2	5%	0	Make use of experienced staff within council. Follow OJEU procedures diligently.
SBL087	Challenge made under OJEU Provisions	Re advertising Scheme	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	1	6	2	5%	0	Make use of experienced staff within council. Follow OJEU procedures diligently.
SBL088	Receipt of unrealistic tender(s)	Award of contract is delayed whilst additional assessment and discussions take place.	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	1	6	2	5%	0	Make use of experienced staff within council. Adopt appropriate assessment process in advance of tendering.
SBL089	Agreement on Procurement not reached between promoting authorities.	Tender process is delayed whilst additional discussions take place.	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	1	6	2	5%	0	Make use of experienced staff within council. Follow OJEU procedures diligently.

**Quantified Risk Register for South Bristol Link**
**Rev: 6** 04/03/2010
**Delay Costs**

**Scheme:** South Bristol Link  
**Milestone:** Cost Estimate - 2009 Q3  
**Works Cost:** £35.5m Works from 2014/15 to 2016/17 £178k per mth  
**Preparation:** n/a Preparation until 2013/14 n/a per mth  
**Modelling:** n/a Modelling until 2009/10 n/a per mth

**Inflation at 6%**

likelihood		
	1 = Almost Certain	95.0%
Extreme Risk.	2 = Likely	50.0%
High Risk.	3 = Possible	25.0%
Medium Risk	4 = Unlikely	12.5%
Low Risk.	5 = Rare	5.0%

Risk Ref	Cause known control weakness or assumption "as a result of"	Event future/uncertain "may be possibility of that"	Mitigating Owner	Cost Impact Estimate			Likelihood	Mean outcome	Action to be taken	
				Min (mths)	Max (mths)	Likely (mths)				
Design Team's Ref			*				mths	*		
SBL090	Gateway Review gives negative report.	Project Team responds to recommendations.	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	2	8	4	5%	0	Make use of experienced staff within council. Follow OJEU procedures diligently.
								0		
<b>CONSTRUCTION</b>								<b>1</b>	<b>42</b>	
SBL032	Physical delays in the construction phase - demonstrators etc.	Works obstructed or access prevented requiring additional security and causing delay.	Financial - Delays in delivery and increased costs.	Project Board	3	12	4	50%	2	Early involvement with contractors. Site security. Early liaison with Police. Sound project management and planning processes. Thorough design.
SBL043	Unknown mines discovered leading to additional costs and delays.	Mine encountered. Works stopped and void to be grouted.	Financial - Additional works required and delivery delayed.	BCC/NSC	1	1	1	13%	0	Research. Site investigations. Site procedures take account of possibility.
SBL052	Unexpected Protected Species identified.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	1	6	2	25%	1	Thorough and appropriate surveys during the design phase. Transfer risk to Contractor to encourage appropriate construction methodology.
SBL053	Unexpected archaeology discovered on site	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	1	6	2	13%	0	Designer to ensure comprehensive studies to minimise the risk
SBL054	Noise pollution objections raised by residents during the works.	Works halted and opening date delayed.	Financial - Additional administration required and delivery delayed.	Project Board	1	6	2	13%	0	Draft and implement SEMP and ensure the contractor has signed up to it. Ensure proper engagement with affected parties.
SBL055	Unforeseen ground conditions including noxious weeds.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	0.25	3	0.25	25%	0	Ensure adequate ground investigations. Specific site surveys of high risk areas.
SBL056	Spillage / Pollution Incidents on Site	Works halted and opening date delayed.	Financial - Additional administration required and delivery delayed.	Project Board	0.25	3	0.25	13%	0	Contractor to ensure normal good practice is implemented to minimise the risk.
SBL063	Worse contaminated ground conditions encountered than anticipated - delay to works completion and additional mitigation costs.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	1	6	2	25%	1	Commission an early ground condition survey along proposed route.
SBL064	Inaccuracy of base mapping and land boundary information compared to that used for outline design - delay to programme and additional survey costs.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	0.5	1	0.5	13%	0	Commission an early ground topographical survey along proposed route.
SBL065	Design item omission, e.g small retaining wall - delay to works on site and additional works costs.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	0.5	1	0.5	13%	0	Detailed design checks prior to tendering.
SBL069	Traffic delays during construction of on highway improvements	Public Disquiet and additional diversion works instructed. Potentially additional costs.	Financial - Additional administration required and delivery delayed.	Project Board	0.25	0.5	0.25	13%	0	Anticipate and safeguard against problems.
SBL070	Shortage of materials or skilled labour during local peak in planned construction activity. (2012 - 2015)	Works on site delayed and planned opening date missed. Bad publicity and additional indirect costs.	Financial - Additional works required and delivery delayed.	Project Board	1	3	1	5%	0	Liaise with WEPO and influence programming of Major Projects.

**Quantified Risk Register for South Bristol Link**

Rev: **6** 04/03/2010

**Delay Costs**

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**Inflation at 6%**

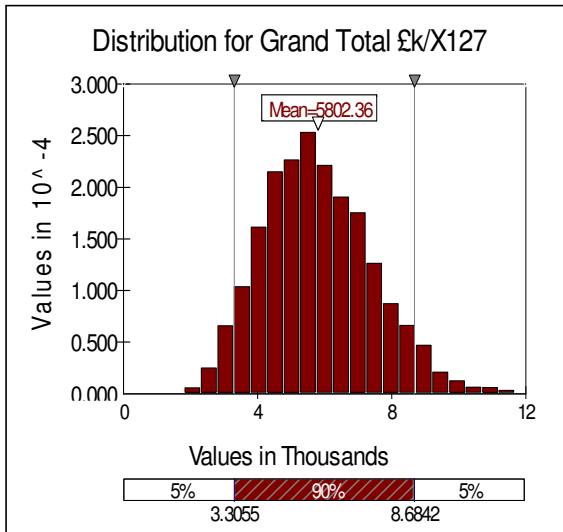
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Risk Ref	Cause known control weakness or assumption "as a result of"	Event future/uncertain "may be possibility of that"	Mitigating Owner	Cost Impact Estimate			Likelihood	Mean outcome	Action to be taken
				Min (mths)	Max (mths)	Likely (mths)			
SBL071	Unidentified utilities encountered during construction	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Project Board	1	6	2	25%	1	Ensure full searches on Utility companies
SBL072	Delay in diversion of utilities	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Project Board	1	6	1	50%	1	Early engagement with utility companies. Transfer risk to Contractor to encourage continued engagement.
SBL073	Adverse weather (risk of flooding of works etc)	Works halted and opening date delayed.	Project Board	0.5	1	1	12%	0	Prepare contingency plans
SBL074	Contractor misses Traffic Management Act booking for works	Works halted and opening date delayed.	Project Board	0.5	1	0.5	5%	0	Early programming and discussion with Traffic Manager.
SBL092	Inclement weather during Network Rail Possession	Works continue when possible but Project incurs penalty costs	Project Board	0	0	0	25%	0	Transfer risk to Contractor to ensure all sensible mitigation measures are adopted.
SBL093	Scheme completion is delayed.	Delay in works completion increases Client supervision / management costs	Project Board	0	6	3	25%	1	Anticipate and safeguard against problems.
<b>OPERATION</b>								<b>6</b>	<b>408</b>
								<b>0</b>	<b>0</b>
<b>TOTAL RISK COST</b>								<b>38</b>	
<b>RISKS IDENTIFIED By CONTRACTOR (refer to separate register)</b>									
<b>TOTAL RISK COST</b>								<b>0.0</b>	

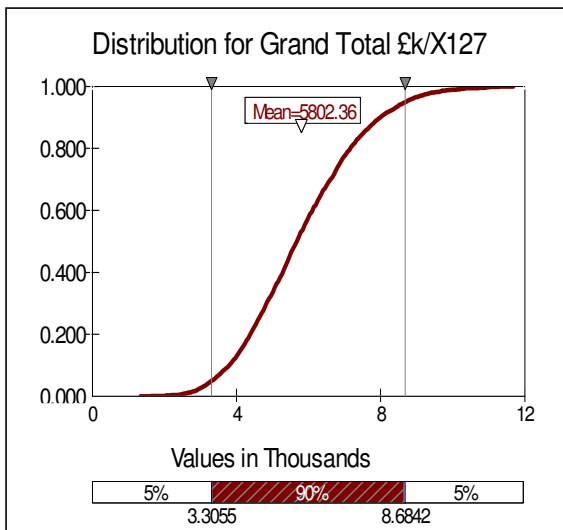
**TOTAL DELAY RISK mths** 37.9

**TOTAL RISK VALUE £k** 2655

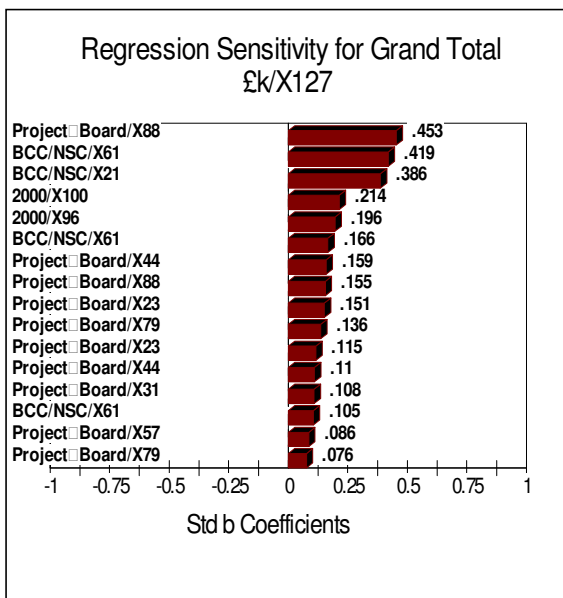
### Simulation Results for Lower Cost Option



Summary Information	
Workbook Name	rRev1vCS1.xls, SBLPrefQRA
Number of Simulations	1
Number of Iterations	5000
Number of Inputs	744
Number of Outputs	8
Sampling Type	Monte Carlo
Simulation Start Time	08/03/2010 17:26
Simulation Stop Time	08/03/2010 17:26
Simulation Duration	00:00:59
Random Seed	1



Summary Statistics			
Statistic	Value	%tile	Value
Minimum	£ 1,325	5%	£ 3,306
Maximum	£ 11,686	10%	£ 3,791
Mean	£ 5,802	15%	£ 4,121
Std Dev	£ 1,632	20%	£ 4,377
Variance	2665040.252	25%	£ 4,613
Skewness	0.399027486	30%	£ 4,833
Kurtosis	2.997771324	35%	£ 5,060
Median	£ 5,673	40%	£ 5,285
Mode	£ 6,711	45%	£ 5,463
Left X	£ 3,306	50%	£ 5,673
Left P	5%	55%	£ 5,881
Right X	£ 8,684	60%	£ 6,102
Right P	95%	65%	£ 6,339
Diff X	£ 5,379	70%	£ 6,605
Diff P	90%	75%	£ 6,861
#Errors	0	80%	£ 7,152
Filter Min		85%	£ 7,513
Filter Max		90%	£ 7,992
#Filtered	0	95%	£ 8,684



Sensitivity			
Rank	Name	Regr	Corr
#1	SBL063	0.454	0.455
#2	SBL041	0.417	0.421
#3	SBL002	0.383	0.376
#4	SBL092	0.212	0.210
#5	SBL071	0.188	0.188
#6	SBL041	0.170	0.183
#7	SBL019	0.164	0.186
#8	SBL063	0.154	0.138
#9	SBL015	0.149	0.156
#10	SBL032	0.135	0.128
#11	SBL015	0.114	0.121
#12	SBL019	0.110	0.112
#13	SBL046	0.106	0.121
#14	SBL027	0.088	0.102
#15	SBL032	0.073	0.085
#16	SBL016	0.073	0.100

**Quantified Risk Register for South Bristol Link - Lower Cost Option**

**Rev:** 1  
**Scheme:** South Bristol Link  
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**Works Cost:** £30.4m Works from 2014/15 to 2016/17 £1.26m per mth  
**Preparation** £6.00m Preparation until 2013/14 (5 years) £100k per mth  
**Modelling** £1.00m Modelling until 2012/13 (12 mths) £83k per mth

**Direct Costs**

04/03/2010

likelihood		
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Risk Ref	Cause known control weakness or assumption "as a result of"	Event future/uncertain "may be possibility of that"	Consequence to objectives "which would lead to"	Mitigating Owner	Cost Impact Estimate			Likelihood	Mean outcome	Action to be taken
					Min (£k)	Max (£k)	Likely (£k)			
<b>RESOURCES</b>										
SBL007	Compensation claims after the event that will have to be funded by Local Authorities - Part 1 Claims.	Compensation from adjacent residents demanding compensation	Financial / Budget	BCC/NSC	45	180	90	13%	11	Best estimate. Will differ with route. Contingency funds. Landscaping.
SBL012	Lack of capacity in terms of staffing, consultants, engineers, contractors with the required skills to undertake public consultations and secure Conditional and Final Approval.	Late or non-delivery of key elements of the Project.	Financial - consultant rates increase and internal staff need to be retained.	BCC/NSC	30	100	100	5%	5	Effective procurement of consultants/engineers. Adequate resources to employ necessary skills. Early identification of process to be followed, e.g. Framework.
<b>STRATEGIC / POLITICAL</b>										
SBL002	Unable to obtain funding for the initial pre-construction development costs £7m+	Preparation suspended or postponed.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	0	0	0	25%	0	Secure development contributions (s106). MTFP bids. Keeping Members informed. Secure access to infrastructure building funds. Explore other funding options e.g. RDA.
SBL015	Political uncertainty across all the authorities & Govt - elections may result in changes in priorities.	Preparation suspended or postponed.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	60	120	60	95%	57	Undertake programming with political cycles in mind. Keep Members informed.
SBL021	Interest Groups, Residents Groups etc. opposing the development, High Court Challenge causing delays and increasing costs.	Demonstrations disrupt public consultation, meetings and or restricting access to the site for surveys.	Financial - Additional public engagement required and potentially extended Public Inquiry.	Project Board	1	10	10	50%	5	Early identification of the issues. Produce a Communication Strategy.
SBL031	Scheme does not integrate with or compliment other transport initiatives, e.g. other bus rapid transit routes.	Changes of design of intersecting projects require redesign of Project. Business case undermined by other transport link	Financial - additional costs / reworking of Bid to ensure satisfactory business case.	Joint Transport Team	60	360	60	50%	30	Close liaison with other Project Boards and Teams. Joint Transport Team. Programme Steering Groups. Ensure Project integrates with other schemes.
SBL046	Local media adopts a negative stance - series of negative articles published.	Articles encourage significant resistance to the Project. Additional effort required to counter negative reports.	Scheme fails to win public and political support. Project delivered late.	Project Board	30	60	30	25%	8	Communication Strategy. Early media involvement to show scheme benefits. Openness.
SBL048	Governance model deemed unsuitable by DfT and liable to cause delay	MSBC to be amended and resubmitted	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	20	60	20	5%	1	Establish suitable working arrangements within LAs Cross-reference with successful submissions.
SBL058	Land use assumptions are inconsistent with draft regional plans	DfT Reject the Submission	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	60	360	120	25%	30	Early discussions with the DfT and Joint Executive
SBL061	Not obtaining support / consents from the public transport stakeholders (i.e. Network Rail, bus operators) leading to delay and extended project management	Submission of MSBC deadline missed.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	0	0	0	25%	0	Close liaison with transport stakeholders and regular briefings.
SBL062	Poor report from 4Ps Gateway Review leading to delay and extended project management.	Submission to DfT delayed as new procedures / structure adopted.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	60	180	60	25%	15	Follow DfT guidance and liaise with previous major project teams.
<b>STATUTORY PROCESS</b>										
SBL016	Change in legislation.	Change in legislation requires reworking of submissions and possibly additional surveys.	Late delivery of submissions and loss of allocation in RFA.	Project Board	50	100	50	5%	3	Speed of communication of changes and response.
SBL019	Failure to secure DfT approvals at key milestones.	Project delayed - Reworking of Submission required.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	300	600	300	25%	75	Liaise with DfT to manage expectations. Ensure quality of MSBC is as good as possible with the available information.
SBL033	Failure to secure planning permissions from the council	Reworking of Planning Application	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	150	600	150	5%	8	Early discussion and close contact with Planners. Pre-application advice.
									<b>146</b>	<b>3292</b>

**Quantified Risk Register for South Bristol Link - Lower Cost Option**

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04/03/2010

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likelihood		
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					Min (£k)	Max (£k)	Likely (£k)			
SBL Risk Log Ref				*				£k	*	
SBL034	Failure to secure requisite statutory powers (e.g. at public inquiry).	Project delayed. Process to be restarted.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	60	230	60	5%	3	Sound preparation and good design. Early consultation, Allowance made for Public Inquiry. Good legal advice.
SBL050	Failure to secure Network Rail consents and possessions	Project delayed - Reworking of Submission required.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	60	360	120	25%	30	Start the process of engagement with Network Rail in good time.
SBL060	Incomplete or late delivery of outputs by external consultants	Non-compliant bid submitted	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	0	0	0	25%	0	Fortnightly progress meetings or tele-conferences. Programmed targets.
<b>DESIGN</b>									<b>118</b>	<b>528</b>
SBL010	Changes in design standards.	Change in standards requires reworking of submissions and possibly additional surveys.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	60	180	60	5%	3	Apply "freeze" on standards at start of construction.
SBL027	Impact of poor environmental survey/assessment on the project - bats, badgers etc - additional delays, cost and public demonstration.	Lack of resources or problems with access causing delay.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	0	0	0	13%	0	Early Liaison with Statutory Bodies to achieve mutual understanding of requirements.
SBL041	Scheme crosses (goes under) a main rail line - increased costs and delays.	Network Rail Processes delay Project.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	700	3500	700	25%	175	Works costs determined Early discussion with Network Rail.
SBL042	Route crosses 'common' land in Bristol which is owned by the Council - if used the Council will have to replace with some more common land. Potential legal challenge by commoners. Focus for protestors. Additional mitigation costs.	Access denied by protesters for surveys and works.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	0	200	100	5%	5	Early research to identify issues, establish actual boundary. Legal advice. Identify exchange land and commoners. Build into Communication Strategy. Early reporting to Members (after research).
SBL044	Negative effect of chosen junctions on flow of traffic.	Business Case under-mined and reworking of design required.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	60	360	120	25%	30	Risk reopened for Lower Cost Option at Risk Workshop 03/10/2010
SBL049	Route was subject to flooding in 1963. Finished road level may constrain options at railway crossing.	Required finished road level to avoid flooding may require sub-standard height clearance at under-bridge.	Financial - Additional design to mitigate sub-standard provision and delay to submission. Loss of allocation in RFA.	Project Board	50	350	100	13%	13	Liaise with Environmental Agency and review options for railway crossing.
SBL051	Risk of increased costs due to the level difference between the A38 and the A370 (steep escarpment slope).	Road widening required for climbing lane also introduces more substantial and costly earthworks, drainage works, etc.	Financial - Business Case for Project undermined.	Project Board	6	36	12	13%	2	Carry out sufficient design to understand the risk.
SBL085	Sub-standard junctions may not pass the safety audit without negative comment.	Additional design required	Financial - Additional design costs and delay. Late or non-delivery of submissions. Loss of RFA allocation.	Project Board	60	180	60	25%	15	Carry out sufficient design to understand the risk. (Preliminary design exists)
SBL091	Local political uncertainty across both authorities may result in changes in priorities.	Additional design required	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	60	120	60	95%	57	Undertake programming with political cycles in mind. Keep Members informed.
<b>PROCUREMENT</b>									<b>299</b>	<b>1604</b>
SBL086	Contractors do not respond to OJEU Notice	Re advertising Scheme	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	6	36	12	5%	1	Make use of experienced staff within council. Follow OJEU procedures diligently.
SBL087	Challenge made under OJEU Provisions	Re advertising Scheme	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	6	36	12	5%	1	Make use of experienced staff within council. Follow OJEU procedures diligently.
SBL088	Receipt of unrealistic tenders	Award of contract is delayed whilst additional assessment and discussions take place.	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	6	36	12	5%	1	Make use of experienced staff within council. Adopt appropriate assessment process in advance of tendering.

**Quantified Risk Register for South Bristol Link - Lower Cost Option**

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SBL Risk Log Ref				*				£k	*	
SBL089	Agreement on Procurement not reached between promoting authorities.	Tender process is delayed whilst additional discussions take place.	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	6	36	12	5%	1	Make use of experienced staff within council. Follow OJEU procedures diligently.
SBL090	Gateway Review gives negative report.	Project Team responds to recommendations.	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	12	48	24	5%	1	Make use of experienced staff within council. Follow OJEU procedures diligently.
									0	
<b>CONSTRUCTION</b>									<b>4</b>	<b>95</b>
SBL032	Physical delays in the construction phase - demonstrators etc.	Works obstructed or access prevented requiring additional security and causing delay.	Financial - Delays in delivery and increased costs.	Project Board	100	500	250	50%	125	Early involvement with contractors. Site security. Early liaison with Police. Sound project management and planning processes. Thorough design.
SBL043	Unknown mines discovered leading to additional costs and delays.	Mine encountered. Works stopped and void to be grouted.	Financial - Additional works required and delivery delayed.	BCC/NSC	10	50	50	13%	6	Research. Site investigations. Site procedures take account of possibility.
SBL052	Unexpected Protected Species identified.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	6	120	12	25%	3	Thorough and appropriate surveys during the design phase. Transfer risk to Contractor to encourage appropriate construction methodology.
SBL053	Unexpected archaeology discovered on site	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	6	36	12	13%	2	Designer to ensure comprehensive studies to minimise the risk
SBL054	Noise pollution objections raised by residents during the works.	Works halted and opening date delayed.	Financial - Additional administration required and delivery delayed.	Project Board	25	250	50	13%	6	Draft and implement SEMP and ensure the contractor has signed up to it. Ensure proper engagement with affected parties.
SBL055	Unforeseen ground conditions including noxious weeds.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	25	250	50	13%	6	Ensure adequate ground investigations. Specific site surveys of high risk areas.
SBL056	Spillage / Pollution Incidents on Site	Works halted and opening date delayed.	Financial - Additional administration required and delivery delayed.	Project Board	6	36	12	5%	1	Contractor to ensure normal good practice is implemented to minimise the risk.
SBL063	Worse contaminated ground conditions encountered than anticipated - delay to works completion and additional mitigation costs.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	250	2800	1400	50%	700	Commission an early ground condition survey along proposed route.
SBL064	Inaccuracy of base mapping and land boundary information compared to that used for outline design - delay to programme and additional survey costs.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	60	500	100	13%	13	Commission an early ground topographical survey along proposed route.
SBL065	Design item omission, e.g small retaining wall - delay to works on site and additional works costs.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	30	500	50	13%	6	Detailed design checks prior to tendering.
SBL069	Traffic delays during construction of on highway improvements	Public Disquiet and additional diversion works instructed. Potentially additional costs.	Financial - Additional administration required and delivery delayed.	Project Board	30	250	50	13%	6	Anticipate and safeguard against problems.

**Quantified Risk Register for South Bristol Link - Lower Cost Option**

**Rev:** 1  
**Scheme:** South Bristol Link  
**Milestone:** Cost Estimate - 2009 Q3  
**Works Cost:** £30.4m Works from 2014/15 to 2016/17 £1.26m per mth  
**Preparation** £6.00m Preparation until 2013/14 (5 years) £100k per mth  
**Modelling** £1.00m Modelling until 2012/13 (12 mths) £83k per mth

04/03/2010

**Direct Costs**

likelihood		
	1 = Almost Certain	95.0%
Extreme Risk.	2 = Likely	50.0%
High Risk.	3 = Possible	25.0%
Medium Risk	4 = Unlikely	12.5%
Low Risk.	5 = Rare	5.0%

Risk Ref	Cause known control weakness or assumption "as a result of"	Event future/uncertain "may be possibility of that"	Consequence to objectives "which would lead to"	Mitigating Owner	Cost Impact Estimate			Likelihood	Mean outcome	Action to be taken
					Min (£k)	Max (£k)	Likely (£k)			
SBL070	Shortage of materials or skilled labour during local peak in planned construction activity. (2012 - 2015)	Works on site delayed and planned opening date missed. Bad publicity and additional indirect costs.	Financial - Additional works required and delivery delayed.	Project Board	60	250	100	5%	5	Liaise with WEPO and influence programming of Major Projects.
SBL071	Unidentified utilities encountered during construction	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	60	2000	1000	13%	125	Ensure full searches on Utility companies
SBL072	Delay in diversion of utilities	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	60	250	100	50%	50	Early engagement with utility companies. Transfer risk to Contractor to encourage continued engagement.
SBL073	Adverse weather (risk of flooding of works etc)	Works halted and opening date delayed.	Delivery delayed.	Project Board	60	250	100	5%	5	Prepare contingency plans
SBL074	Contractor misses Traffic Management Act booking for works	Works halted and opening date delayed.	Delivery delayed.	Project Board	30	125	50	5%	3	Early programming and discussion with Traffic Manager.
SBL092	Inclement weather during Network Rail Possession	Works continue when possible but Project incurs penalty costs	Financial - Additional costs.	Project Board	0	2000	500	25%	125	Transfer risk to Contractor to ensure all sensible mitigation measures are adopted.
SBL093	Scheme completion is delayed.	Delay in works completion increases Client supervision / management costs	Financial - Additional costs.	Project Board	0	100	50	25%	13	Anticipate and safeguard against problems.
<b>OPERATION</b>									<b>1199</b>	<b>2103</b>
<b>TOTAL RISK COST</b>									<b>0</b>	<b>0</b>
<b>RISKS IDENTIFIED By CONTRACTOR (refer to separate register)</b>										
<b>TOTAL RISK COST</b>									<b>0</b>	

**TOTAL RISK VALUE £k** 1,781

**DURATION RISK VALUE £k** 2,708

**GRAND TOTAL £k** 4,489

**Quantified Risk Register for South Bristol Link - Lower Cost Option**
**Rev: 1** **04/03/2010**
**Delay**

**Scheme:** South Bristol Link  
**Milestone:** Cost Estimate - 2009 Q3  
**Works Cost:** £30.4m Works from 2014/15 to 2016/17 £152k per mth  
**Preparation:** n/a Preparation until 2013/14 n/a per mth  
**Modelling:** n/a Modelling until 2009/10 n/a per mth

**Inflation at 6%**

likelihood		
	1 = Almost Certain	95.0%
Extreme Risk.	2 = Likely	50.0%
High Risk.	3 = Possible	25.0%
Medium Risk	4 = Unlikely	12.5%
Low Risk.	5 = Rare	5.0%

Risk Ref	Cause known control weakness or assumption "as a result of"	Event future/uncertain "may be possibility of/ that"	Mitigating Owner	Cost Impact Estimate			Likelihood	Mean outcome	Action to be taken	
				Min (mths)	Max (mths)	Likely (mths)				
Design Team's Ref				*			mths	*		
<b>RESOURCES</b>										
SBL007	Compensation claims after the event that will have to be funded by Local Authorities - Part 1 Claims.	Compensation from adjacent residents demanding compensation	Financial / Budget	BCC/NSC	0	0	0	13%	0	Best estimate. Will differ with route. Contingency funds. Landscaping.
SBL012	Lack of capacity in terms of staffing, consultants, engineers, contractors with the required skills to undertake public consultations and secure Conditional and Final Approval.	Late or non-delivery of key elements of the Project.	Financial - consultant rates increase and internal staff need to be retained.	BCC/NSC	1	12	3	5%	0	Effective procurement of consultants/engineers. Adequate resources to employ necessary skills. Early identification of process to be followed, e.g. Framework.
<b>STRATEGIC / POLITICAL</b>										
SBL002	Unable to obtain funding for the initial pre-construction development costs £7m+	Preparation suspended or postponed.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	12	24	24	25%	6	Secure development contributions (s106). MTFP bids. Keeping Members informed. Secure access to infrastructure building funds. Explore other funding options e.g. RDA.
SBL015	Political uncertainty across all the authorities & Govt - elections may result in changes in priorities.	Preparation suspended or postponed.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	12	24	12	95%	11	Undertake programming with political cycles in mind. Keep Members informed.
SBL021	Interest Groups, Residents Groups etc. opposing the development, High Court Challenge causing delays and increasing costs.	Demonstrations disrupt public consultation, meetings and or restricting access to the site for surveys.	Financial - Additional public engagement required and potentially extended Public Inquiry.	Project Board	1	2	2	50%	1	Early identification of the issues. Produce a Communication Strategy.
SBL031	Scheme does not integrate with or compliment other transport initiatives, e.g. other bus rapid transit routes.	Changes of design of intersecting projects require redesign of Project. Business case undermined by other transport link	Financial - additional costs / reworking of Bid to ensure satisfactory business case.	Joint Transport Team	1	6	1	50%	1	Close liaison with other Project Boards and Teams. Joint Transport Team. Programme Steering Groups. Ensure Project integrates with other schemes.
SBL046	Local media adopts a negative stance - series of negative articles published.	Articles encourage significant resistance to the Project. Additional effort required to counter negative reports.	Scheme fails to win public and political support. Project delivered late.	Project Board	3	12	3	25%	1	Communication Strategy. Early media involvement to show scheme benefits. Openness.
SBL048	Governance model deemed unsuitable by DfT and liable to cause delay	MSBC to be amended and resubmitted	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	1	12	1	5%	0	Establish suitable working arrangements within LAs Cross-reference with successful submissions.
SBL058	Land use assumptions are inconsistent with draft regional plans	DfT Reject the Submission	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	1	6	2	25%	1	Early discussions with the DfT and Joint Executive
SBL061	Not obtaining support / consents from the public transport stakeholders (i.e. Network Rail, bus operators) leading to delay and extended project management	Submission of MSBC deadline missed.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	1	3	1	25%	0	Close liaison with transport stakeholders and regular briefings.
SBL062	Poor report from 4Ps Gateway Review leading to delay and extended project management.	Submission to DfT delayed as new procedures / structure adopted.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	1	3	1	25%	0	Follow DfT guidance and liaise with previous major project teams.
<b>STATUTORY PROCESS</b>										
SBL016	Change in legislation.	Change in legislation requires reworking of submissions and possibly additional surveys.	Late delivery of submissions and loss of allocation in RFA.	Project Board	6	12	6	5%	0	Speed of communication of changes and response.
SBL019	Failure to secure DfT approvals at key milestones.	Project delayed - Reworking of Submission required.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	6	12	6	25%	2	Liaise with DfT to manage expectations. Ensure quality of MSBC is as good as possible with the available information.
SBL033	Failure to secure planning permissions from the councils	Reworking of Planning Application	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	3	12	3	5%	0	Early discussion and close contact with Planners. Pre-application advice.
								<b>21</b>	<b>3146</b>	

**Quantified Risk Register for South Bristol Link - Lower Cost Option**
**Rev: 1** **04/03/2010**
**Delay**

**Scheme:** South Bristol Link  
**Milestone:** Cost Estimate - 2009 Q3  
**Works Cost:** £30.4m Works from 2014/15 to 2016/17  
**Preparation:** n/a Preparation until 2013/14  
**Modelling:** n/a Modelling until 2009/10

**Inflation at 6%**

£152k per mth  
 n/a per mth  
 n/a per mth

likelihood		
1 = Almost Certain	95.0%	
2 = Likely	50.0%	
3 = Possible	25.0%	
4 = Unlikely	12.5%	
5 = Rare	5.0%	

Risk Ref	Cause known control weakness or assumption "as a result of"	Event future/uncertain "may be possibility of/ that"	Mitigating Owner	Cost Impact Estimate			Likelihood	Mean outcome	Action to be taken	
				Min (mths)	Max (mths)	Likely (mths)				
Design Team's Ref			*				mths	*		
SBL034	Failure to secure requisite statutory powers (e.g. at public inquiry).	Project delayed. Process to be restarted.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	0	0	0	5%	0	Sound preparation and good design. Early consultation, Allowance made for Public Inquiry. Good legal advice.
SBL050	Failure to secure Network Rail consents and possessions	Project delayed - Reworking of Submission required.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	1	6	2	25%	1	Start the process of engagement with Network Rail in good time.
SBL060	Incomplete or late delivery of outputs by external consultants	Non-compliant bid submitted	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	1	3	1	25%	0	Fortnightly progress meetings or tele-conferences. Programmed targets.
<b>DESIGN</b>								<b>3</b>	<b>410</b>	
SBL010	Changes in design standards.	Change in standards requires reworking of submissions and possibly additional surveys.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	1	3	1	5%	0	Apply "freeze" on standards at start of construction.
SBL027	Impact of poor environmental survey/assessment on the project - bats, badgers etc - additional delays, cost and public demonstration.	Lack of resources or problems with access causing delay.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	3	12	3	13%	0	Early Liaison with Statutory Bodies to achieve mutual understanding of requirements.
SBL041	Scheme crosses (goes under) a main rail line - increased costs and delays.	Network Rail Processes delay Project.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	0	12	12	50%	6	Works costs determined Early discussion with Network Rail.
SBL042	Route crosses 'common' land in Bristol which is owned by the Council - if used the Council will have to replace with some more common land. Potential legal challenge by commoners. Focus for protestors. Additional mitigation costs.	Access denied by protestors for surveys and works.	Late or non-delivery of submissions and loss of allocation in RFA.	BCC/NSC	0	12	3	5%	0	Early research to identify issues, establish actual boundary. Legal advice. Identify exchange land and commoners. Build into Communication Strategy. Early reporting to Members (after research).
SBL044	Negative effect of chosen junctions on flow of traffic.	Business Case under-mined and reworking of design required.	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	1	3	2	25%	1	Risk reopened for Lower Cost Option at Risk Workshop 03/10/2010
SBL049	Route was subject to flooding in 1963. Finished road level may constrain options at railway crossing.	Required finished road level to avoid flooding may require sub-standard height clearance at under-bridge.	Financial - Additional design to mitigate sub-standard provision and delay to submission. Loss of allocation in RFA.	Project Board	0.25	3	0.5	13%	0	Liaise with Environmental Agency and review options for railway crossing.
SBL051	Risk of increased costs due to the level difference between the A38 and the A370 (steep escarpment slope).	Road widening required for climbing lane also introduces more substantial and costly earthworks, drainage works, etc.	Financial - Business Case for Project undermined.	Project Board	1	6	2	13%	0	Carry out sufficient design to understand the risk.
SBL085	Sub-standard junctions may not pass the safety audit without negative comment.	Additional design required	Financial - Additional design costs and delay. Late or non-delivery of submissions. Loss of RFA allocation.	Project Board	1	3	1	25%	0	Carry out sufficient design to understand the risk. (Preliminary design exists)
SBL091	Local political uncertainty across both authorities may result in changes in priorities.	Additional design required	Late or non-delivery of submissions and loss of allocation in RFA.	Project Board	1	2	1	95%	1	Undertake programming with political cycles in mind. Keep Members informed.
<b>PROCUREMENT</b>								<b>9</b>	<b>1305</b>	
SBL086	Contractors do not respond to OJEU Notice	Re advertising Scheme	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	1	6	2	5%	0	Make use of experienced staff within council. Follow OJEU procedures diligently.
SBL087	Challenge made under OJEU Provisions	Re advertising Scheme	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	1	6	2	5%	0	Make use of experienced staff within council. Follow OJEU procedures diligently.
SBL088	Receipt of unrealistic tender(s)	Award of contract is delayed whilst additional assessment and discussions take place.	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	1	6	2	5%	0	Make use of experienced staff within council. Adopt appropriate assessment process in advance of tendering.

**Quantified Risk Register for South Bristol Link - Lower Cost Option**
**Rev: 1** **04/03/2010**
**Delay**

**Scheme:** South Bristol Link  
**Milestone:** Cost Estimate - 2009 Q3  
**Works Cost:** £30.4m Works from 2014/15 to 2016/17 £152k per mth  
**Preparation:** n/a Preparation until 2013/14 n/a per mth  
**Modelling:** n/a Modelling until 2009/10 n/a per mth

**Inflation at 6%**

likelihood		
	1 = Almost Certain	95.0%
Extreme Risk.	2 = Likely	50.0%
High Risk.	3 = Possible	25.0%
Medium Risk	4 = Unlikely	12.5%
Low Risk.	5 = Rare	5.0%

Risk Ref	Cause known control weakness or assumption "as a result of"	Event future/uncertain "may be possibility of/ that"	Mitigating Owner	Cost Impact Estimate			Likelihood	Mean outcome	Action to be taken	
				Min (mths)	Max (mths)	Likely (mths)				
Design Team's Ref			*				mths	*		
SBL089	Agreement on Procurement not reached between promoting authorities.	Tender process is delayed whilst additional discussions take place.	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	1	6	2	5%	0	Make use of experienced staff within council. Follow OJEU procedures diligently.
SBL090	Gateway Review gives negative report.	Project Team responds to recommendations.	Financial - Additional project management costs and delay. Late delivery of works.	Project Board	2	8	4	5%	0	Make use of experienced staff within council. Follow OJEU procedures diligently.
								0		
<b>CONSTRUCTION</b>								<b>1</b>	<b>91</b>	
SBL032	Physical delays in the construction phase - demonstrators etc.	Works obstructed or access prevented requiring additional security and causing delay.	Financial - Delays in delivery and increased costs.	Project Board	3	12	4	50%	2	Early involvement with contractors. Site security. Early liaison with Police. Sound project management and planning processes. Thorough design.
SBL043	Unknown mines discovered leading to additional costs and delays.	Mine encountered. Works stopped and void to be grouted.	Financial - Additional works required and delivery delayed.	BCC/NSC	1	1	1	13%	0	Research. Site investigations. Site procedures take account of possibility.
SBL052	Unexpected Protected Species identified.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	1	6	2	25%	1	Thorough and appropriate surveys during the design phase. Transfer risk to Contractor to encourage appropriate construction methodology.
SBL053	Unexpected archaeology discovered on site	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	1	6	2	13%	0	Designer to ensure comprehensive studies to minimise the risk
SBL054	Noise pollution objections raised by residents during the works.	Works halted and opening date delayed.	Financial - Additional administration required and delivery delayed.	Project Board	1	6	2	13%	0	Draft and implement SEMP and ensure the contractor has signed up to it. Ensure proper engagement with affected parties.
SBL055	Unforeseen ground conditions including noxious weeds.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	0.25	3	0.25	13%	0	Ensure adequate ground investigations. Specific site surveys of high risk areas.
SBL056	Spillage / Pollution Incidents on Site	Works halted and opening date delayed.	Financial - Additional administration required and delivery delayed.	Project Board	0.25	3	0.25	5%	0	Contractor to ensure normal good practice is implemented to minimise the risk.
SBL063	Worse contaminated ground conditions encountered than anticipated - delay to works completion and additional mitigation costs.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	1	6	2	50%	1	Commission an early ground condition survey along proposed route.
SBL064	Inaccuracy of base mapping and land boundary information compared to that used for outline design - delay to programme and additional survey costs.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	0.5	1	0.5	13%	0	Commission an early ground topographical survey along proposed route.
SBL065	Design item omission, e.g small retaining wall - delay to works on site and additional works costs.	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Financial - Additional works required and delivery delayed.	Project Board	0.5	1	0.5	13%	0	Detailed design checks prior to tendering.
SBL069	Traffic delays during construction of on highway improvements	Public Disquiet and additional diversion works instructed. Potentially additional costs.	Financial - Additional administration required and delivery delayed.	Project Board	0.25	0.5	0.25	13%	0	Anticipate and safeguard against problems.

**Quantified Risk Register for South Bristol Link - Lower Cost Option**
**Rev: 1** **04/03/2010**
**Delay**

**Scheme:** South Bristol Link  
**Milestone:** Cost Estimate - 2009 Q3  
**Works Cost:** £30.4m Works from 2014/15 to 2016/17  
**Preparation:** n/a Preparation until 2013/14  
**Modelling:** n/a Modelling until 2009/10

**Inflation at 6%**  
 £152k per mth  
 n/a per mth  
 n/a per mth

likelihood		
	1 = Almost Certain	95.0%
Extreme Risk.	2 = Likely	50.0%
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Risk Ref	Cause known control weakness or assumption "as a result of"	Event future/uncertain "may be possibility of/ that"	Mitigating Owner	Cost Impact Estimate			Likelihood	Mean outcome	Action to be taken
				Min (mths)	Max (mths)	Likely (mths)			
SBL070	Shortage of materials or skilled labour during local peak in planned construction activity. (2012 - 2015)	Works on site delayed and planned opening date missed. Bad publicity and additional indirect costs.	Project Board	1	3	1	5%	0	Liaise with WEPO and influence programming of Major Projects.
SBL071	Unidentified utilities encountered during construction	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Project Board	1	6	2	13%	0	Ensure full searches on Utility companies
SBL072	Delay in diversion of utilities	Works halted and opening date delayed. Potentially additional design work required. Works costs increase.	Project Board	1	6	1	50%	1	Early engagement with utility companies. Transfer risk to Contractor to encourage continued engagement.
SBL073	Adverse weather (risk of flooding of works etc)	Works halted and opening date delayed.	Project Board	0.5	1	1	5%	0	Prepare contingency plans
SBL074	Contractor misses Traffic Management Act booking for works	Works halted and opening date delayed.	Project Board	0.5	1	0.5	5%	0	Early programming and discussion with Traffic Manager.
SBL092	Inclement weather during Network Rail Possession	Works continue when possible but Project incurs penalty costs	Project Board	0	0	0	25%	0	Transfer risk to Contractor to ensure all sensible mitigation measures are adopted.
SBL093	Scheme completion is delayed.	Delay in works completion increases Client supervision / management costs	Project Board	0	6	3	25%	1	Anticipate and safeguard against problems.
<b>OPERATION</b>								<b>6</b>	<b>904</b>
<b>TOTAL RISK COST</b>								<b>39</b>	<b>0</b>
<b>RISKS IDENTIFIED By CONTRACTOR (refer to separate register)</b>									
<b>TOTAL RISK COST</b>								<b>0.0</b>	

<b>TOTAL DELAY RISK mths</b>	<b>38.7</b>
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<b>TOTAL RISK VALUE £k</b>	<b>2708</b>
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