

South Reading Mass Rapid Transit Phase 3 (Town Centre) - Risk Register

Review Date:	15/06/2017	Prepared by:	LC
Checked by:	SE	Approved by:	SE

Risk Identification			Impact	Risk Rating (Pre Mitigation)			Risk Management	Risk Rating (After Mitigation)			Contingency (After Mitigation)			
Ref	Risk Category	Risk Description	Time [T], Cost [C], Quality [Q]	likelihood [1-5]	Impact [1-5]	Overall Risk Rating	Proposed Mitigating Actions	Mitigation Risk Owner	likelihood [1-5]	Impact [1-5]	Overall Risk Rating	Total Risk Estimate (£)	Probability of Occurrence (%)	Total Risk Allowance (£)
1.1	Stakeholder	Unknown requirements related to public rights of way, key constraints missed.	T, C	3	3	9	Agenda item for relevant stakeholders, PRoW officers etc	Designer / Local Authority	1	2	2	30,000	15%	£ 4,500
1.2	Stakeholder	Stakeholder and public consultation outcomes significantly affect project and options, with potential also to influence Client Reputation.	T, C	2	3	6	Consider Consultation / Community engagement strategy once options more defined (an also how information may need to be presented), including any potential need to engage with lobby groups, businesses and emergency services. Stakeholder and public consultation exercise will seek to inform and manage any objections.	Designer / Local Authority	1	3	3	35,000	15%	£ 5,250
1.3	Stakeholder	Objections from local residents/businesses during works phases.	T, C	2	3	6	Ensure local residents/businesses aware of scheme progress and early liaison is undertaken.	Designer / Local Authority	1	2	2	30,000	15%	£ 4,500
1.4	Stakeholder	Objections through the TRO process/Planning and Consultation Process (including the Environment Agency)	T, C	2	2	4	Outline work has progressed. The scheme is within highway or safeguarded land. The principle of MRT has been consulted upon through preparation of various policy documents. Detailed transport assessment work is planned. Early engagement with EA essential.	Designer / Local Authority	1	2	2	30,000	15%	£ 4,500
1.5	Stakeholder	TM restrictions on works operations.	T, C	3	3	9	Liasion with third party land owners ref access and permission to utilise 'work zones', thus potentially decreasing TM required on mainline A33.	Designer / Local Authority	2	3	6	50,000	30%	£ 15,000
2.0	Design	Discrepancies with level / survey information to accurately determine geometry leading to incorrect assumptions	T, C, Q	3	2	6	Topographical survey to be obtained. Ensure survey stations are established on-site and any discrepancies identified to the / by the design team to be resolved early.	Designer	1	2	2	30,000	15%	£ 4,500
2.1	Design	Insufficient interface with adjacent road junctions (requiring additional junction alteration works)	T, C, Q	3	3	9	Ensure wider area and detail established during design stage	Designer	2	2	4	40,000	30%	£ 12,000
2.2	Design	Unable to achieve design parameter standards based on existing site constraints	T, C, Q	3	5	15	Ensure any departures identified during design stage and inform Client. Assess associated safety implications is necessary,	Designer	2	3	6	50,000	30%	£ 15,000
2.3	Design	Work scope increase	T, C	3	5	15	Scope & concept early sign-off. Phased approach to design so as to limit potential for project creep	Designer	2	3	6	50,000	30%	£ 15,000
3.1	Utilities	Unforeseen statutory undertakers apparatus (including drainage) impacted by proposals (i.e. diversions), affecting deliverability, programme and cost.	T, C, Q	3	5	15	Statutory Undertaker information to be obtained during detailed design following NRSWA process. Review of utility information previously obtained from schemes undertaken within the area early in scheme design.	Designer	4	5	20	89,000	85%	£ 75,650
3.2	Utilities	Major disruption to residents during utility diversion works	T, C	3	3	9	Ensure utility diversion plan is established and works co-ordinated to minimise potential impact to local residents.	Designer	2	3	6	50,000	30%	£ 15,000
3.3	Utilities	Unplanned 'emergency' works to statutory undertakers apparatus (Time related) within the local area (non scheme related)	T, C	2	3	6	Given scheme location is on a primary route all works should be planned with Local Authority.	Local Authority	1	3	3	35,000	15%	£ 5,250
4.1	Construction	Works impacted by Events	T, C, Q	3	3	9	Local Authority would be party to any major events and can programme/inform of events/works/closure date constraints to minimise impact. Local events and constraints generally known and understood by design team based on local knowledge of area (Reading FC matches, etc).	Local Authority	2	1	2	30,000	30%	£ 9,000
4.2	Construction	Local area vehicle height / weight / width restrictions may impact on transport strategy and site access restrictions.	T, C	2	3	6	Review and include on constraints plans (keep planning requirements and legal processes under review)	Designer	1	2	2	30,000	15%	£ 4,500
4.3	Construction	Change in working hours legislation	T, C, Q	3	3	9	Legislation changes will be known in advance and as such can be built into the programme and contingencies.	Designer / Local Authority	1	3	3	35,000	15%	£ 5,250
4.4	Construction	Legislation changes will be known in advance and as such can be built into the programme and contingencies.	T, C	3	3	9	Inclusion of preliminaries and contingency within project total. Seek to address, if not alternative materials and methods will be considered to minimise budgetary increase.	Designer / Local Authority	1	3	3	35,000	15%	£ 5,250
4.5	Construction	Poor weather conditions delay work	T, C, Q	3	3	9	Weather dependent items can be programmed for more clement weather periods, if possible. Robust Programming.	Contractor	2	4	8	55,000	30%	£ 16,500
4.6	Construction	Scheme costs significantly increase.	T, C, Q	3	5	15	Costs have been reviewed in detail since previous submissions and contingency has been built into the overall scheme cost.	Designer / Local Authority	2	4	8	55,000	30%	£ 16,500

Risk Identification			Impact	Risk Rating (Pre Mitigation)			Risk Management	Risk Rating (After Mitigation)			Contingency (After Mitigation)			
Ref	Risk Category	Risk Description	Time [T], Cost [C], Quality [Q]	likelihood [1-5]	Impact [1-5]	Overall Risk Rating	Proposed Mitigating Actions	Mitigation Risk Owner	likelihood [1- 5]	Impact [1-5]	Overall Risk Rating	Total Risk Estimate (£)	Probability of Occurrence (%)	Total Risk Allowance (£)
4.7	Construction	Noise Impact - during works	T, C, Q	3	3	9	Contractor to follow working hours/guidelines stated within Contract Documents. If occurring, will be assessed and mitigated through design process and suitable means of mitigation such as fencing, windows, bunding etc. in line with industry guidance.	Contractor / Local Authority	1	3	3	35,000	15%	£ 5,250
4.8	Construction	Air Quality - Dust, etc during works	T, C, Q	3	3	9	Prevention measures to be adopted during works.	Contractor / Local Authority	1	3	3	35,000	15%	£ 5,250
													£ 243,850	

South Reading Mass Rapid Transit Phase 3 (Southside) - Risk Register

Review Date:	15/06/2017	Prepared by:	LC
Checked by:	SE	Approved by:	SE

Risk Identification			Impact	Risk Rating (Pre Mitigation)			Risk Management	Risk Rating (After Mitigation)			Contingency (After Mitigation)			
Ref	Risk Category	Risk Description	Time [T], Cost [C], Quality [Q]	likelihood [1-5]	Impact [1-5]	Overall Risk Rating	Proposed Mitigating Actions	Mitigation Risk Owner	likelihood [1-5]	Impact [1-5]	Overall Risk Rating	Total Risk Estimate (£)	Probability of Occurrence (%)	Total Risk Allowance (£)
1.1	Planning	Additional or changed permanent land take compared to reference case, leading to additional costs and CPO / Order Process impacts	T, C	2	5	10	1. Pre determination of land ownership. 2. Land safeguarded. 3. Early identification of risks/issues and scheme progressed sufficiently at planning stage.	Designer / Local Authority	1	3	3	51,000	15%	£ 7,650
1.2	Planning	Additional or changed temporary land take compared to reference case, leading to additional cost and CPO / Order process impacts	T, C	2	3	6	1. Ensure land footprint confirmed / safeguarded early during preliminary / detailed design. 2. Determine exact land footprint requirements for scheme based on topographical survey/detailed land ownership records.	Designer / Local Authority	1	3	3	51,000	15%	£ 7,650
1.3	Planning	Compensation risks increase due to alignment variance	T, C	2	3	6	As above	Designer / Local Authority	1	3	3	51,000	15%	£ 7,650
1.4	Planning	Inadequate early consideration of key environmental factors which later impacts on planning and statutory consent processes and cost.	T, C	3	3	9	1. Stakeholder consultation and local knowledge (review factors considered for previous schemes in local area) to identify and scope key issues that may impact on option development. 2. Review and development of planning strategy at appropriate project stage and seek Screening opinion where necessary, with pre app discussions.	Designer	1	2	2	45,365	15%	£ 6,805
1.5	Planning	Permanent Scheme: Change to Environmental Impact, Mitigation Requirements and risk levels: Archaeology, Noise, Vibration, Contamination, Geology / Hyrdogeology.	T, C, Q	3	3	9	Early survey work. Monitor and control as necessary	Designer / Local Authority	1	3	3	51,000	15%	£ 7,650
1.6	Planning	Consents / Approvals (Planning condition sign off (Safeguarded Land)) delayed	T, C	3	3	9	1. Ensure timescales for consents/approvals met. 2. Importance of scheme to be understood by all parties.	Local Authority	2	3	6	75,000	30%	£ 22,500
2.1	Stakeholder	Unknown requirements related to public rights of way, key constraints missed.	T, C	3	3	9	Agenda item for relevant stakeholders, PRoW officers etc	Designer / Local Authority	1	2	2	45,365	15%	£ 6,805
2.2	Stakeholder	Stakeholder and public consultation outcomes significantly affect project and options, with potential also to influence Client Reputation.	T, C	2	3	6	Consider Consultation / Community engagement strategy once options more defined (an also how information may need to be presented), including any potential need to engage with lobby groups, businesses and emergency services. Stakeholder and public consultation exercise will seek to inform and manage any objections.	Designer / Local Authority	1	3	3	51,000	15%	£ 7,650
2.3	Stakeholder	Objections from local residents/businesses during works phases.	T, C	2	3	6	Ensure local residents/businesses aware of scheme progress and early liaison is undertaken.	Designer / Local Authority	1	2	2	45,365	15%	£ 6,805
2.4	Stakeholder	Objections through the TRO process/Planning and Consultation Process (including the Environment Agency)	T, C	2	2	4	Outline work has progressed. The scheme is within highway or safeguarded land. The principle of MRT has been consulted upon through preparation of various policy documents. Detailed transport assessment work is planned. Early engagement with EA essential.	Designer / Local Authority	1	2	2	45,365	15%	£ 6,805
2.5	Stakeholder	Developers propose amendments to safeguarding	T, C	3	3	9	Early engagement with developers to be undertaken.	Designer / Local Authority	3	2	6	75,000	65%	£ 48,750
2.6	Stakeholder	TM restrictions on works operations.	T, C	3	3	9	Liasion with third party land owners ref access and permission to utilise 'work zones', thus potentially decreasing TM required on mainline A33.	Designer / Local Authority	2	3	6	75,000	30%	£ 22,500
3.1	Design	Discrepancies with level / survey information to accurately determine geometry leading to incorrect assumptions	T, C, Q	3	2	6	Topographical survey to be obtained. Ensure survey stations are established on-site and any discrepancies identified to the / by the design team to be resolved early.	Designer	1	2	2	45,365	15%	£ 6,805
3.2	Design	Delay, cost escalation and change of scheme scope due to unknown ground conditions and geoenvironmental considerations.	T, C, Q	2	3	6	Review of risks and potential work scope with geotechnical specialists - discuss with team and Client - agree and implement scope where / if necessary.	Designer	1	2	2	45,365	15%	£ 6,805
3.3	Design	Insufficient interface with adjacent road junctions (requiring additional junction alteration works)	T, C, Q	3	3	9	Ensure wider area and detail established during design stage	Designer	2	2	4	55,000	30%	£ 16,500
3.4	Design	Unable to achieve design parameter standards based on existing site constraints	T, C, Q	3	5	15	Ensure any departures identified during design stage and inform Client. Assess associated safety implications is necessary,	Designer	2	3	6	75,000	30%	£ 22,500
3.5	Design	Work scope increase	T, C	3	5	15	Scope & concept early sign-off. Phased approach to design so as to limit potential for project creep	Designer	2	3	6	75,000	30%	£ 22,500
3.6	Design	Patronage forecasts are overestimated	T, C	3	3	9	Models have been based upon the most recent available local data and not assumed from generic data	Designer	1	2	2	45,365	15%	£ 6,805

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3.7	Design	Traffic management proposals unacceptable to Client.	T,C	3	3	9	Ensure traffic mangement propoals are discussed and agreed with Local Authority	Designer / Local Authority	1	3	3	51,000	15%	£ 7,650	
4.1	Utilities	Unforeseen statutory undertakers apparatus (including drainage) impacted by proposals (i.e. diversions), affecting deliverability, programme and cost.	T, C, Q	3	5	15	Statutory Undertaker information to be obtained during detailed design following NRSWA process. Review of utility information previously obtained from schemes undertaken within the area early in scheme design.	Designer	4	5	20	320,000	85%	£ 272,000	
4.2	Utilities	Major disruption to residents during utility diversion works	T, C	3	3	9	Ensure utility diversion plan is established and works co-ordinated to minimise potential impact to local residents.	Designer	2	3	6	75,000	30%	£ 22,500	
4.3	Utilities	Unplanned 'emergency' works to statutory undertakers apparatus (Time related) within the local area (non scheme related)	T, C	2	3	6	Given scheme location is on a primary route all works should be planned with Local Authority.	Local Authority	1	3	3	51,000	15%	£ 7,650	
5.1	Ecology	Proposed scheme has potential to impact protected species which may require a design or mitigation response	T, C	4	5	20	Ensure ecology surveys are undertaken ASAP and relevant mitigation measures are incorporated. Local knowledge of the area obtained from previous scheme ecological surveys (M4 J11, Island Road and A33 Improvements). Previous studys to be reviewed and potential impacts assessed.	Designer	2	3	6	75,000	30%	£ 22,500	
5.2	Ecology	Proposed scheme has potential to impact valued habitats (i.e. species-rich grassland) which may require a design or mitigation response	T, C	3	5	15	Ensure ecology surveys are undertaken ASAP and relevant mitigation measures are incorporated. Local knowledge of the area obtained from previous scheme ecological surveys (M4 J11, Island Road and A33 Improvements). Previous studys to be reviewed and potential impacts assessed.	Designer	1	3	3	51,000	15%	£ 7,650	
6.1	Construction	Works impacted by Events	T, C, Q	3	3	9	Local Authority would be party to any major events and can programme/inform of events/works/closure date constraints to minimise impact. Local events and constraints generally known and understood by design team based on local knowledge of area (Reading FC matches, etc).	Local Authority	2	1	2	45,365	30%	£ 13,610	
6.2	Construction	Local area vehicle height / weight / width restrictions may impact on transport strategy and site access restrictions.	T, C	2	3	6	Review and include on constraints plans (keep planning requirements and legal processes under review)	Designer	1	2	2	45,365	15%	£ 6,805	
6.3	Construction	Unforeseen Ground Conditions / Contaminated material. Site for MRT South (Southside) previously a greyhound stadium. Associated foundations, etc may still be present.	T, C, Q	3	5	15	Undertake geotechnical ground study - early investigations. Pre contract surveys will determine existing conditions and allowances for localised soft spots will be included. Early investigations to be undertaken.	Designer	2	4	8	95,000	30%	£ 28,500	
6.4	Construction	Change in working hours legislation	T, C, Q	3	3	9	Legislation changes will be known in advance and as such can be built into the programme and contingencies.	Designer / Local Authority	1	3	3	51,000	15%	£ 7,650	
6.5	Construction	Legislation changes will be known in advance and as such can be built into the programme and contingencies.	T, C	3	3	9	Inclusion of preliminaries and contingency within project total. Seek to address, if not alternative materials and methods will be considered to minimise budgetary increase.	Designer / Local Authority	1	3	3	51,000	15%	£ 7,650	
6.6	Construction	Poor weather conditions delay work	T, C, Q	3	3	9	Weather dependent items can be programmed for more clement weather periods, if possible. Robust Programming.	Contractor	2	4	8	95,000	30%	£ 28,500	
6.7	Construction	Scheme costs significantly increase.	T, C, Q	3	5	15	Costs have been reviewed in detail since previous submissions and contingency has been built into the overall scheme cost.	Designer / Local Authority	2	4	8	95,000	30%	£ 28,500	
6.8	Construction	Noise Impact - during works	T, C, Q	3	3	9	Contractor to follow working hours/guidelines stated within Contract Documents. If occurring, will be assessed and mitigated through design process and suitable means of mitigation such as fencing, windows, bunding etc. in line with industry guidance.	Contractor / Local Authority	1	3	3	51,000	15%	£ 7,650	
6.9	Construction	Air Quality - Dust, etc during works	T, C, Q	3	3	9	Prevention measures to be adopted during works.	Contractor / Local Authority	1	3	3	51,000	15%	£ 7,650	
6.10	Construction	Existing pavement construction is in poor condition / requires maintenance / not suitable for MRT route.	T, C, Q	3	3	9	Allow suitable cost contingency within scheme budgets.	Designer	3	3	9	-	65%	£ -	
6.11	Construction	Delay at key access points (Reading Gate Retail Park, Green Park, Madjeski, Tesco Distribution Centre) due to works TM leading to significant disruption and need for increased off-peak (including night) working.	T, C, Q	3	5	15	Early engagement with stakeholders to understand operations and agree individuals requirements.	Designer / Local Authority	2	5	10	164,000	30%	£ 49,200	
6.12	Construction	Conflicts with other local area schemes on the network. TM methodology inadequate / requires amendment - TM scope increases during construction. Road closures and TTM Closure of M4 due to RTA, etc causes congestion along A33.	T, C	2	3	6	Understand early the timeline for other possible construction schemes proposed in the local vicinity and programme accordingly. Contractor to be proactive in providing TM methodology and layouts, and identifying / confirming phasing to suit TTRO's	Designer / Contractor / Local Authority	3	3	9	-	65%	£ -	

Risk Identification			Impact	Risk Rating (Pre Mitigation)			Risk Management	Risk Rating (After Mitigation)			Contingency (After Mitigation)			
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6.13	Construction	Fill material for embankments - large volumes required cannot be sourced locally thus increasing cost.	T, C, Q	3	3	9	Investigate potential sources of materials.	Contractor / Designer	2	2	4	55,000	30%	£ 16,500
6.14	Construction	TM leads to significant delays, resulting in complaints from the public	T, C	3	3	9	Relates to item 3.9. 1. Scheme traffic management to be carefully considered. 2. PR strategy to be developed. 3. Utilise local knowledge of traffic management implications from schemes previously undertaken on A33. 4. Possibility that certain elements of the works can be undertaken from third party land (adjacent to the A33) - subject to agreement, to reduce traffic management implications.	Designer / Contractor / Local Authority	2	3	6	75,000	30%	£ 22,500
7.1	Maintenance	Poor road surface conditions for MRT vehicles. The roads running around the Madjeski Stadium may suffer from landfill settlement. Long term maintenance maybe a problem - unacceptable operationally and significant maintenance costs.	T, C, Q	3	3	9	Allow suitable maintenance cost contingency.	Designer / Local Authority	1	3	3	51,000	15%	£ 7,650
8.1	Archaeological	Archaeology impacted as a result of the scheme leading to possible delays	T, C	2	2	4	Engage and arrange for Archaeologist to attend site during site clearance / excavation works.	Designer / Local Authority	1	2	2	45,365	15%	£ 6,805
													£ 820,253	

South Reading Mass Rapid Transit Phase 4 - Risk Register

Review Date:	15/06/2017	Prepared by:	LC
Checked by:	SE	Approved by:	SE

Risk Identification			Impact	Risk Rating (Pre Mitigation)			Risk Management			Risk Rating (After Mitigation)			Contingency (After Mitigation)		
Ref	Risk Category	Risk Description	Time [T], Cost [C], Quality [Q]	likelihood [1-5]	Impact [1-5]	Overall Risk Rating	Proposed Mitigating Actions	Mitigation Risk Owner	likelihood [1-5]	Impact [1-5]	Overall Risk Rating	Total Risk Estimate (£)	Probability of Occurrence (%)	Total Risk Allowance (£)	
1.1	Planning	Additional or changed permanent land take compared to reference case, leading to additional costs and CPO / Order Process impacts	T, C	2	5	10	1. Pre determination of land ownership. 2. Land safeguarded. 3. Early identification of risks/issues and scheme progressed sufficiently at planning stage.	Designer / Local Authority	1	3	3	80,000	15%	£ 12,000	
1.2	Planning	Additional or changed temporary land take compared to reference case, leading to additional cost and CPO / Order process impacts	T, C	2	3	6	1. Ensure land footprint confirmed / safeguarded early during preliminary / detailed design. 2. Determine exact land footprint requirements for scheme based on topographical survey/detailed land ownership records.	Designer / Local Authority	1	3	3	80,000	15%	£ 12,000	
1.3	Planning	Compensation risks increase due to alignment variance	T, C	2	3	6	As above	Designer / Local Authority	1	3	3	80,000	15%	£ 12,000	
1.4	Planning	Inadequate early consideration of key environmental factors which later impacts on planning and statutory consent processes and cost.	T, C	3	3	9	1. Stakeholder consultation and local knowledge (review factors considered for previous schemes in local area) to identify and scope key issues that may impact on option development. 2. Review and development of planning strategy at appropriate project stage and seek Screening opinion where necessary, with pre app discussions.	Designer	1	2	2	75,000	15%	£ 11,250	
1.5	Planning	Permanent Scheme: Change to Environmental Impact, Mitigation Requirements and risk levels: Archaeology, Noise, Vibration, Contamination, Geology / Hyrdogeology.	T, C, Q	3	3	9	Early survey work. Monitor and control as necessary	Designer / Local Authority	1	3	3	80,000	15%	£ 12,000	
1.6	Planning	Consents / Approvals (Planning condition sign off (Safeguarded Land)) delayed	T, C	3	3	9	1. Ensure timescales for consents/approvals met. 2. Importance of scheme to be understood by all parties.	Local Authority	2	3	6	95,000	30%	£ 28,500	
2.1	Stakeholder	Potential loss of floodplain - Consultation with EA required. Change of design maybe required i.e. cantilevered footway solution.	T, C	3	5	15	1. Early consultation with Environment Agency required. 2. Undertake design work early to explore feasibility of alternative design solutions in order to reduce impact to floodplain. 3. Follow design assumptions ascertained from previous schemes within the area.	Designer	3	2	6	95,000	65%	£ 61,750	
2.2	Stakeholder	Unknown requirements related to public rights of way, key constraints missed.	T, C	3	3	9	Agenda item for relevant stakeholders, PRoW officers etc	Designer / Local Authority	1	2	2	75,000	15%	£ 11,250	
2.3	Stakeholder	Inadquate consideration of future maintenance and access both to infrastructure and adajcent buildings - impacts on deliverability and future operational liability.	T, C, Q	2	3	6	Early discussion with maintaining authority on requirements, accessibility review and liaison with developers.	Designer	1	2	2	75,000	15%	£ 11,250	
2.4	Stakeholder	Stakeholder and public consultation outcomes significantly affect project and options, with potential also to influence Client Reputation.	T, C	2	3	6	Consider Consultation / Community engagement strategy once options more defined (an also how information may need to be presented), including any potential need to engage with lobby groups, businesses and emergency services. Stakeholder and public consultation exercise will seek to inform and manage any objections.	Designer / Local Authority	1	3	3	80,000	15%	£ 12,000	
2.5	Stakeholder	Objections from local residents/businesses during works phases.	T, C	2	3	6	Ensure local residents/businesses aware of scheme progress and early liaison is undertaken.	Designer / Local Authority	1	2	2	75,000	15%	£ 11,250	
2.6	Stakeholder	Objections through the TRO process/Planning and Consultation Process (including the Environment Agency)	T, C	2	2	4	Outline work has progressed. The scheme is within highway or safeguarded land. The principle of MRT has been consulted upon through preparation of various policy documents. Detailed transport assessment work is planned. Early engagement with EA essential.	Designer / Local Authority	1	2	2	75,000	15%	£ 11,250	
2.7	Stakeholder	Developers propose amendments to safeguarding	T, C	3	3	9	Early engagement with developers to be undertaken.	Designer / Local Authority	3	2	6	95,000	65%	£ 61,750	
2.8	Stakeholder	TM restrictions on works operations.	T, C	3	3	9	Liasion with third party land owners ref access and permission to utilise 'work zones', thus potentially decreasing TM required on mainline A33.	Designer / Local Authority	2	3	6	95,000	30%	£ 28,500	
3.1	Design	Discrepancies with level / survey information to accurately determine geometry leading to incorrect assumptions	T, C, Q	3	2	6	Topographical survey to be obtained. Ensure survey stations are established on-site and any discrepancies identified to the / by the design team to be resolved early.	Designer	1	2	2	75,000	15%	£ 11,250	
3.2	Design	Delay, cost escalation and change of scheme scope due to unknown ground conditions and geoenvironmental considerations.	T, C, Q	2	3	6	Review of risks and potential work scope with geotechnical specialists - discuss with team and Client - agree and implement scope where / if necessary.	Designer	1	2	2	75,000	15%	£ 11,250	

Risk Identification			Impact	Risk Rating (Pre Mitigation)			Risk Management			Risk Rating (After Mitigation)			Contingency (After Mitigation)		
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3.3	Design	Insufficient interface with adjacent road junctions (requiring additional junction alteration works)	T, C, Q	3	3	9	Ensure wider area and detail established during design stage	Designer	2	2	4	85,000	30%	£ 25,500	
3.4	Design	Unable to achieve design parameter standards based on existing site constraints	T, C, Q	3	5	15	Ensure any departures identified during design stage and inform Client. Assess associated safety implications is necessary.	Designer	2	3	6	95,000	30%	£ 28,500	
3.5	Design	Work scope increase	T, C	3	5	15	Scope & concept early sign-off. Phased approach to design so as to limit potential for project creep	Designer	2	3	6	95,000	30%	£ 28,500	
3.6	Design	Increases in structural scope of works - strengthening of existing structures required (culverts etc.) due to additional lanes being added to the carriageway and also changes to retaining wall requirements due to widening works adjacent to existing ditches / watercourses / headwalls	T, C	2	5	10	1. Design to be progressed early in order to mitigate any potential issues and allow alternative solutions to be progressed (if possible). 2. As-built structural drawings and inspection records to be assessed to identify and foresee any potential issues.	Designer	3	4	12	210,000	65%	£ 136,500	
3.7	Design	Increase in structural foundation design / retaining structure design.	T, C	3	3	9	Undertake early site investigation works / Ensure AIP process is followed.	Designer	3	2	6	95,000	65%	£ 61,750	
3.8	Design	Patronage forecasts are overestimated	T, C	3	3	9	Models have been based upon the most recent available local data and not assumed from generic data	Designer	1	2	2	75,000	15%	£ 11,250	
3.9	Design	Traffic management proposals unacceptable to Client.	T,C	3	3	9	Ensure traffic management proposals are discussed and agreed with Local Authority	Designer / Local Authority	1	3	3	80,000	15%	£ 12,000	
4.1	Utilities	Utility works unable to be undertaken within the contractors proposals / programme and requires a variation in order leading to cost/programme impacts	T, C, Q	3	3	9	Place orders ASAP with those Statutory Undertakers affected. Early liaison/co-ordination required. Contractor to mitigate against programme /cost risks.	Designer / Local Authority	2	3	6	95,000	30%	£ 28,500	
4.2	Utilities	Unforeseen statutory undertakers apparatus (including drainage) impacted by proposals (i.e. diversions), affecting deliverability, programme and cost.	T, C, Q	3	5	15	Statutory Undertaker information to be obtained during detailed design following NRSWA process. Review of utility information previously obtained from schemes undertaken within the area early in scheme design.	Designer	4	5	20	400,000	85%	£ 340,000	
4.3	Utilities	Major disruption to residents during utility diversion works	T, C	3	3	9	Ensure utility diversion plan is established and works co-ordinated to minimise potential impact to local residents.	Designer	2	3	6	95,000	30%	£ 28,500	
4.4	Utilities	Unplanned 'emergency' works to statutory undertakers apparatus (Time related) within the local area (non scheme related)	T, C	2	3	6	Given scheme location is on a primary route all works should be planned with Local Authority.	Local Authority	1	3	3	80,000	15%	£ 12,000	
5.1	Ecology	Proposed scheme has potential to impact protected species which may require a design or mitigation response	T, C	4	5	20	Ensure ecology surveys are undertaken ASAP and relevant mitigation measures are incorporated. Local knowledge of the area obtained from previous scheme ecological surveys (M4 J11, Island Road and A33 Improvements). Previous studies to be reviewed and potential impacts assessed.	Designer	2	3	6	95,000	30%	£ 28,500	
5.2	Ecology	Proposed scheme has potential to impact valued habitats (i.e. species-rich grassland) which may require a design or mitigation response	T, C	3	5	15	Ensure ecology surveys are undertaken ASAP and relevant mitigation measures are incorporated. Local knowledge of the area obtained from previous scheme ecological surveys (M4 J11, Island Road and A33 Improvements). Previous studies to be reviewed and potential impacts assessed.	Designer	1	3	3	80,000	15%	£ 12,000	
6.1	Construction	Works impacted by Events	T, C, Q	3	3	9	Local Authority would be party to any major events and can programme/inform of events/works/closure date constraints to minimise impact. Local events and constraints generally known and understood by design team based on local knowledge of area (Reading FC matches, etc).	Local Authority	2	1	2	75,000	30%	£ 22,500	
6.2	Construction	Local area vehicle height / weight / width restrictions may impact on transport strategy and site access restrictions.	T, C	2	3	6	Review and include on constraints plans (keep planning requirements and legal processes under review)	Designer	1	2	2	75,000	15%	£ 11,250	
6.3	Construction	Unforeseen Ground Conditions / Contaminated material.	T, C, Q	3	5	15	Undertake geotechnical ground study - early investigations. Pre contract surveys will determine existing conditions and allowances for localised soft spots will be included. Early investigations to be undertaken.	Designer	2	4	8	120,000	30%	£ 36,000	
6.4	Construction	Change in working hours legislation	T, C, Q	3	3	9	Legislation changes will be known in advance and as such can be built into the programme and contingencies.	Designer / Local Authority	1	3	3	80,000	15%	£ 12,000	
6.5	Construction	Legislation changes will be known in advance and as such can be built into the programme and contingencies.	T, C	3	3	9	Inclusion of preliminaries and contingency within project total. Seek to address, if not alternative materials and methods will be considered to minimise budgetary increase.	Designer / Local Authority	1	3	3	80,000	15%	£ 12,000	
6.6	Construction	Flooding of floodplain areas preventing access and works being undertaken	T, C	3	3	9	All flooding records to be obtained and provided within Contract Documents. Probability to be assessed and Contractor to mitigate against flooding where possible. Mitigation measures to be written into Contract Documents.	Designer / Contractor	2	4	8	120,000	30%	£ 36,000	
6.7	Construction	Poor weather conditions delay work	T, C, Q	3	3	9	Weather dependent items can be programmed for more clement weather periods, if possible. Robust Programming.	Contractor	2	4	8	120,000	30%	£ 36,000	

Risk Identification			Impact	Risk Rating (Pre Mitigation)			Risk Management	Risk Rating (After Mitigation)			Contingency (After Mitigation)			
Ref	Risk Category	Risk Description	Time [T], Cost [C], Quality [Q]	likelihood [1-5]	Impact [1-5]	Overall Risk Rating	Proposed Mitigating Actions	Mitigation Risk Owner	likelihood [1-5]	Impact [1-5]	Overall Risk Rating	Total Risk Estimate (£)	Probability of Occurrence (%)	Total Risk Allowance (£)
6.8	Construction	Scheme costs significantly increase.	T, C, Q	3	5	15	Costs have been reviewed in detail since previous submissions and contingency has been built into the overall scheme cost.	Designer / Local Authority	2	4	8	120,000	30%	£ 36,000
6.9	Construction	Noise Impact - during works	T, C, Q	3	3	9	Contractor to follow working hours/guidelines stated within Contract Documents. If occurring, will be assessed and mitigated through design process and suitable means of mitigation such as fencing, windows, bunding etc. in line with industry guidance.	Contractor / Local Authority	1	3	3	80,000	15%	£ 12,000
6.10	Construction	Air Quality - Dust, etc during works	T, C, Q	3	3	9	Prevention measures to be adopted during works.	Contractor / Local Authority	1	3	3	80,000	15%	£ 12,000
6.11	Construction	Existing pavement construction is in poor condition / requires maintenance / not suitable for MRT route.	T, C, Q	3	3	9	Allow suitable cost contingency within scheme budgets.	Designer	3	3	9	150,000	65%	£ 97,500
6.12	Construction	Delay at key access points (Reading Gate Retail Park, Green Park, Madjeski, Tesco Distribution Centre) due to works TM leading to significant disruption and need for increased off-peak (including night) working.	T, C, Q	3	5	15	Early engagement with stakeholders to understand operations and agree individuals requirements.	Designer / Local Authority	2	5	10	160,000	30%	£ 48,000
6.13	Construction	Conflicts with other local area schemes on the network. TM methodology inadequate / requires amendment - TM scope increases during construction. Road closures and TTM Closure of M4 due to RTA, etc causes congestion along A33.	T, C	2	3	6	Understand early the timeline for other possible construction schemes proposed in the local vicinity and programme accordingly. Contractor to be proactive in providing TM methodology and layouts, and identifying / confirming phasing to suit TTRO's	Designer / Contractor / Local Authority	3	3	9	150,000	65%	£ 97,500
6.14	Construction	Fill material for embankments - large volumes required cannot be sourced locally thus increasing cost.	T, C, Q	3	3	9	Investigate potential sources of materials.	Contractor / Designer	2	2	4	85,000	30%	£ 25,500
6.15	Construction	TM leads to significant delays, resulting in complaints from the public	T, C	3	3	9	Relates to item 3.9. 1. Scheme traffic management to be carefully considered. 2. PR strategy to be developed. 3. Utilise local knowledge of traffic management implications from schemes previously undertaken on A33. 4. Possibility that certain elements of the works can be undertaken from third party land (adjacent to the A33) - subject to agreement, to reduce traffic management implications.	Designer / Contractor / Local Authority	2	3	6	95,000	30%	£ 28,500
7.1	Maintenance	Poor road surface conditions for MRT vehicles. The roads running around the Madjeski Stadium may suffer from landfill settlement. Long term maintenance maybe a problem - unacceptable operationally and significant maintenance costs.	T, C, Q	3	3	9	Allow suitable maintenance cost contingency.	Designer / Local Authority	1	3	3	80,000	15%	£ 12,000
8.1	Archaeological	Archaeology impacted as a result of the scheme leading to possible delays	T, C	2	2	4	Engage and arrange for Archaeologist to attend site during site clearance / excavation works.	Designer / Local Authority	1	2	2	75,000	15%	£ 11,250
														£ 1,620,000