

Appendix A
Designer's Risk
Assessment

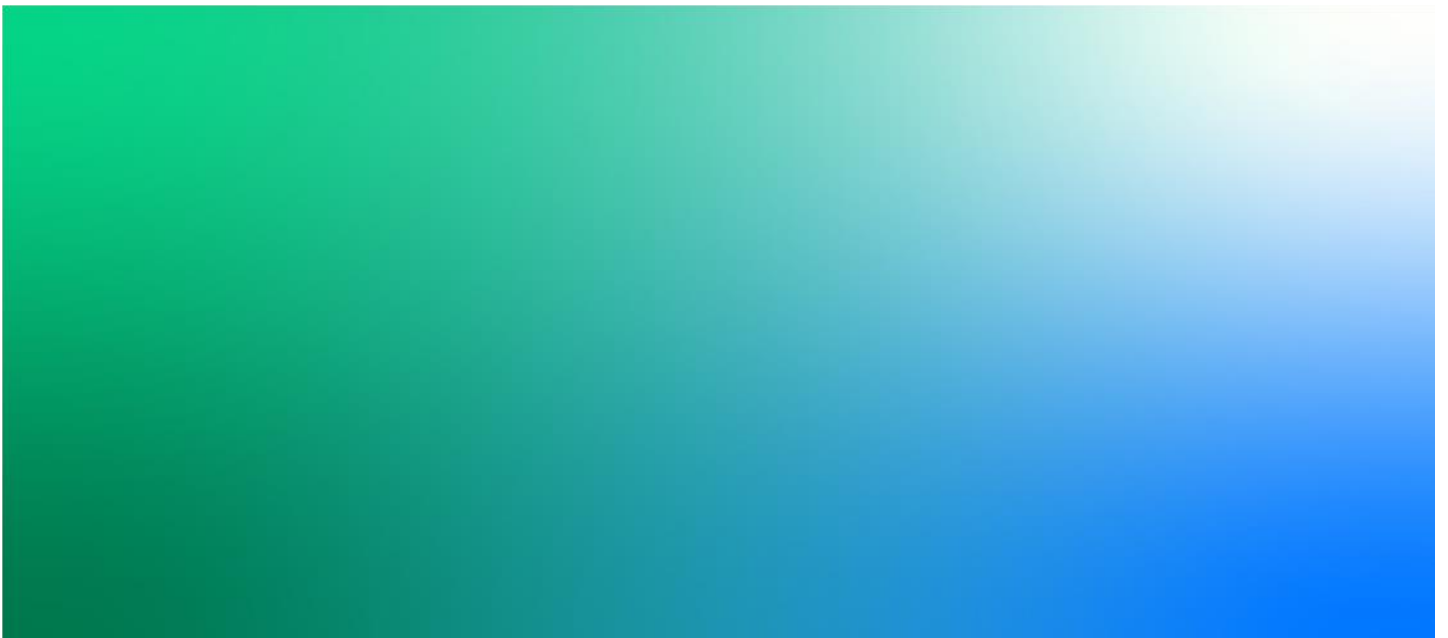


Jacobs

**BusConnects Dublin Core Bus Corridor Infrastructure Works –
Package B**
Designers Risk Assessment – Liffey Valley to City Centre CBC Scheme (CBC07)

01/06/22

BCIDB



Jacobs Engineering Ireland Limited

Merrion House
Merrion Road
Dublin 4, D04 R2C5
Ireland
T +353 1 269 5666
F +353 1 269 5497
www.jacobs.com

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DESIGN HAZARD ELIMINATION AND RISK REDUCTION REGISTER (ROI)

Latest Review Date	
Phase	
C	Construction
M	Maintain / Clean
U	Use as Workplace
D	Demolish
Project Name: Bus Connects	
Project Number: 32110901	
Design Package: Liffey Valley to City Centre	
Client: NTA	

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Risk ID	Formal Review Description	Phase	Particular or Non-Particular Risk (if applicable)	Activity	Potential Hazard	Person(s) Most at Risk	Prob	WPS	Initial Risk Rating	Discipline	Design Measures to Eliminate Hazards	Design Measures to Reduce Risk	Residual Prob	Residual WPS	Residual Risk Rating	Residual Risk Description	Included on Drawing No(s) or other doc. (give ref.)	Action By (Name or Role)	Target Date	Revised Target Date	Date Action Complete	Tracker Status	Comments	Primary Legislation		
H1	5: Design Stage Review	C	13. Interaction with traffic	Work is to be undertaken adjacent to live traffic.	Being struck by a passing vehicle.	Construction	2	4	8	Transport/Traffic	Divert traffic during construction where possible.	Provide an adequately sized buffer around the working area to limit how close vehicles can get to construction staff.	1	4	4	The Construction strategy and traffic management approach is not to close road/ divert traffic keep the road live								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007		
H2	5: Design Stage Review	C	20. Interaction with the public	Work is to be undertaken in areas of high pedestrian flow.	An interaction with an aggressive member of the public may lead to violence towards site staff.	Construction	2	3	6	Civil / Structural	Create a secure working area to prevent interface with the public.	NTA to provide public with information on the scheme so the public do not raise their concerns with site staff.	1	3	3									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007		
H3	5: Design Stage Review	C	1. Falling from height	Carriageway reconfiguration over M50 overbridge	Falling from height onto the M50.	Construction	2	4	8	Civil / Structural	None	Site staff to be fixed to a secure railing to prevent falls	1	4	4									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007		
H4	5: Design Stage Review	C	13. Interaction with traffic	Working above the running M50 motorway.	Falling into running high-speed traffic.	Construction	2	5	10	Civil / Structural	Temporarily close the M50.	Site staff to be fixed to a secure railing to prevent falls	1	2	2	The M50 cannot reasonably be closed due to its importance.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007		
H5	5: Design Stage Review			Parking bays along Ballyfermot Road in each direction fall towards the carriageway between 2% and 5%.	This crossfall intersecting with the mainline crossfall will create a channel, which will potentially become blocked and cause ponding.	Public	3	2	6	Civil / Structural	The parking bay is to fall in the same direction as the mainline with drainage along the kerb line.	The proposed edge of carriageway adjacent to the parking bay has a longitudinal fall of >0.5% which should allow satisfactory flow towards gullies.	1	2	2									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007		
				Channel running through bus lane on Sansfield road where the bus lane is reintroduced following the bus gate.	This channel will potentially become blocked and flood the bus system.	Public	3	3	9	Civil / Structural	The bus lane is to fall with the rest of the carriageway.	The proposed longitudinal fall is >0.5% which should allow satisfactory flow towards gullies.	1	2	2											Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
				Parking bay on Grattan Crescent falls towards the carriageway at a 1% gradient.	This crossfall intersecting with the mainline crossfall will create a channel, which will potentially become blocked and cause ponding.	Public	3	2	6	Civil / Structural	The parking bay is to fall in the same direction as the mainline with drainage along the kerb line.	The proposed edge of carriageway adjacent to the parking bay has a longitudinal fall of >0.5% which should allow satisfactory flow towards gullies.	1	2	2											
H6	5: Design Stage Review	U	13. Interaction with traffic	Vehicles driving along roads with a crossfall of >5% (schemewise) All instances recorded in Departures and Relaxations Tracker.	Excessive crossfall may cause vehicle sliding.	Public	5	3	15	Civil / Structural	Resurface road to decrease the crossfall.	Adequate drainage will reduce the surface water and reduce slipping	3	2	6	Max 5% gradients are not possible in some areas of the route. Departures have been raised.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007		

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H7	5: Design Stage Review	U	13. Interaction with traffic	Vehicles travelling between the mainline and side roads. Recorded in Departures and Relaxations Tracker.	A large difference in fall between the mainline and side road may be difficult for vehicles to traverse and cause damage.	Public	3	2	6	Civil / Structural	Adjust the mainline tie in to reduce the difference.	None.	1	2	2									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H8	5: Design Stage Review	U	13. Interaction with traffic	Vehicles entering the mainline. Recorded in Departures and Relaxations Tracker.	Visibility splay clashes with boundary wall.	Public	4	2	8	Civil / Structural	Take additional land to widen visibility envelope.	None.	1	2	2	In some areas with retained alignment, existing boundary walls are not to be removed and visibility splays considered acceptable.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
	5: Design Stage Review	U	20. Interaction with the public	Pedestrians walking on steep footways (5 - 6.3%) to the west of Coldcut Junction.	Slips and trips, excessive water run off to flood cycleways, difficult to traverse in wheelchairs and with push chairs.	Public	4	3	12	Civil / Structural	Adjust the carriageway level so footways fall at an absolute maximum of 5%.	None.	2	3	6	There is already a relatively steep verge. Reducing the footway crossfall would increase the verge which may result in instability.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
	5: Design Stage Review	U	20. Interaction with the public	Pedestrians walking on steep footways (5 - 10%) on the city-bound footway of Ballyfermot near Kylemore junction (tied into existing)	Slips and trips, excessive water run off to flood cycleways, difficult to traverse in wheelchairs and with push chairs.	Public	4	3	12	Civil / Structural	Adjust the carriageway level so footways fall at an absolute maximum of 5%.	None.	4	3	12	Reducing the crossfall would require increased land take. Therefore this likely cannot be amended.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H9	5: Design Stage Review	U	20. Interaction with the public	Pedestrians walking on steep footways (5 - 11%) by Grattan Crescent junction (tied into existing).	Slips and trips, excessive water run off to flood cycleways, difficult to traverse in wheelchairs and with push chairs.	Public	4	3	12	Civil / Structural	Adjust the carriageway level so footways fall at an absolute maximum of 5%.	None.	4	3	12	Reducing the crossfall would impact the surrounding buildings. Therefore this cannot be amended.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
	5: Design Stage Review	U	20. Interaction with the public	Cyclists using steep cycleway (5.7%) on northern arm of Kennelsfort junction	Slips and trips, excessive water run off to flood cycleways.	Public	3	3	9	Civil / Structural	None. Tying in to existing carriageway.	None.	3	3	9									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
	5: Design Stage Review	U	20. Interaction with the public	Cyclists using steep cycleway (5.8%) along Emmet Road	Slips and trips, excessive water run off to flood cycleways.	Public	3	3	9	Civil / Structural	None. Existing kerbs to be retained which means that the existing footway and carriageway at the kerb point are also retained.	None.	3	3	9									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H10	5: Design Stage Review	U	13. Interaction with traffic	Cyclist interaction with traffic at junctions.	Collisions between vehicles and cyclist.	Public	4	4	16	Civil / Structural	None	Junction designs to include cycle tracks. Cycle width increased.	3	3	9									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007

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H11	5: Design Stage Review	U	13. Interaction with traffic	Online Cycle Lanes (Schemewide)	Collisions between vehicles and cyclist	Public	4	4	16	Civil / Structural	Convert cycle lanes to offline cycle tracks	None	1	4	4									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007	
H12	5: Design Stage Review	U	13. Interaction with traffic	Bus Lanes online (without laybys) (Schemewide)	Collisions between buses at bus stops	Public	3	4	12	Civil / Structural	None	None	3	4	12									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007	
H14	5: Design Stage Review	U	20. Interaction with the public	Recessed cycleways falling towards footway either side of the junction on 1/2.	Flooding against the kerb between the cycleway and footway.	Public	3	3	9	Civil / Structural	Cycleways are to taper to match the carriageway crossfall at junctions. Longitudinal fall of >0.5% should carry the surface water to the road gullies at the junction. Kerbs with integrated drainage to be used.	None	2	3	6									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007	
		U	20. Interaction with the public	Recessed cycleways falling towards footway on 2/1	Flooding against the kerb between the cycleway and footway.	Public	3	3	9	Civil / Structural	Invert crossfall so cycleway falls toward carriageway. Kerbs with integrated drainage to be used.	The proposed longitudinal fall being >0.5% should allow satisfactory flow towards drainage at end of cycleway.	2	3	6									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007	
		U	20. Interaction with the public	Outbound recessed cycleways falling towards footway on 2/2	Flooding against the kerb between the cycleway and footway.	Public	3	3	9	Civil / Structural	None. Inverting the crossfall would increase the level at the back of the footway substantially. Kerbs with integrated drainage to be used.	The proposed longitudinal fall being >0.5% should allow satisfactory flow towards drainage at end of cycleway.	3	3	9									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007	
		U	20. Interaction with the public	Recessed cycleways falling towards footway on 2/2	Flooding against the kerb between the cycleway and footway.	Public	3	3	9	Civil / Structural	Invert crossfall so cycleway falls toward carriageway. Kerbs with integrated drainage to be used.	The proposed longitudinal fall being >0.5% should allow satisfactory flow towards drainage at end of cycleway.	2	3	6										Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
		U	20. Interaction with the public	Citybound recessed cycleways falling towards footway on Ballyfermot (4/2, 4/3)	Flooding against the kerb between the cycleway and footway.	Public	3	3	9	Civil / Structural	Resurfacing carriageway. Inverting the crossfall only would cause the footway to instead fall toward building fronts which would cause flooding. Kerbs with integrated drainage to be used.	The proposed longitudinal fall being >0.5% should allow satisfactory flow towards drainage at end of cycleway.	2	3	6										Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
		U	20. Interaction with the public	Outbound recessed cycleways falling towards footway on Ballyfermot (4/2, 4/3)	Flooding against the kerb between the cycleway and footway.	Public	3	3	9	Civil / Structural	Resurfacing carriageway. Inverting the crossfall only would cause the footway to instead fall toward building fronts which would cause flooding. Kerbs with integrated drainage to be used.	The proposed longitudinal fall being >0.5% should allow satisfactory flow towards drainage at end of cycleway.	2	3	6										Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007

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		U	20. Interaction with the public	Outbound recessed cycleways falling towards footway on Ballyfermot (5/2)	Flooding against the kerb between the cycleway and footway.	Public	3	3	9	Civil / Structural	Resurfacing carriageway. Inverting the crossfall only would cause the footway to instead fall toward the boundary wall which would cause flooding. Kerbs with integrated drainage to be used.	The proposed longitudinal fall being >0.5% should allow satisfactory flow towards drainage at end of cycleway.	2	3	6									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
		U	20. Interaction with the public	Outbound recessed cycleways falling towards footway on Sarsfield Road (6/1)	Flooding against the kerb between the cycleway and footway.	Public	3	3	9	Civil / Structural	None. Inverting the crossfall would increase the level at the back of the footway substantially, and the carriageway is not feasible to resurface. Kerbs with integrated drainage to be used.	The proposed longitudinal fall being >0.5% should allow satisfactory flow towards drainage at end of cycleway.	3	3	9									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H15	5: Design Stage Review	U	20. Interaction with the public	Outbound footway on Ballyfermot (3/2) falls towards outer edge.	Flooding against the existing boundary wall.	Public	3	3	9	Civil / Structural	Resurfacing carriageway and reducing the cycleway crossfall. Inverting the crossfall only would greatly raise the level at the back of the footway and require regrading of surrounding land.	The proposed longitudinal fall being >0.5% should allow satisfactory flow towards drainage at end of footway.	2	3	6									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
		U	20. Interaction with the public	Outbound footway on Ballyfermot (4/5) falls towards the building fronts.	Flooding against the existing buildings.	Public	3	3	9	Civil / Structural	Resurfacing access road. Inverting the crossfall only would greatly raise the level at the back of the footway which is not possible.	If a channel is built along the front of the buildings, a longitudinal fall of >0.5% should allow drainage to regular gullies.	2	3	6	If the channels are not regularly maintained, the building fronts may flood.							Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007	
		U	20. Interaction with the public	Outbound footway on Sarsfield Road (6/1) falls towards the building fronts across from St Laurence's Road	Flooding against the existing buildings.	Public	3	3	9	Civil / Structural	None. Significant road resurfacing would be required as the cycleway is already falling towards the footway.	If a channel is built along the front of the buildings, a longitudinal fall of >0.5% should allow drainage to regular gullies.	3	3	9	If the channels are not regularly maintained, the building fronts may flood.							Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007	
H16	5: Design Stage Review	U	20. Interaction with the public	Grade break in the outbound footway along Grattan Crescent creates a channel	Drainage along the channel may get blocked and if not maintained could cause flooding or ice.	Public	4	2	8	Civil / Structural	Remove the gradebreak and have all surface water fall towards the carriageway.	The proposed longitudinal fall being >0.5% should allow satisfactory flow towards gullies.	2	2	4									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
		U	20. Interaction with the public	Grade break in the citybound footway along Emmet Road creates a channel	Drainage along the channel may get blocked and if not maintained could cause flooding or ice.	Public	4	2	8	Civil / Structural	Remove the gradebreak and have all surface water fall towards the carriageway.	The proposed longitudinal fall being >0.5% should allow satisfactory flow towards gullies.	2	2	4									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
		U	20. Interaction with the public	Grade break in the outbound footway on Emmet Road near the junction with Grattan Crescent	Drainage along the channel may get blocked and if not maintained could cause flooding or ice.	Public	4	2	8	Civil / Structural	Remove the gradebreak and have all surface water fall towards the carriageway.	The proposed longitudinal fall being >0.5% should allow satisfactory flow towards gullies.	2	2	4									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007

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5	25	20	15	10	5
4	20	16	12	8	4
3	15	12	9	6	3
2	10	8	6	4	2
1	5	4	3	2	1
	1	2	3	4	5

SEVERITY

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H17	5: Design Stage Review	U	20. Interaction with the public	Reduced footpath widths in Dublin City Centre / Bray. Recorded in Departures and Relaxations Tracker.	Pedestrians too near carriageway / cycle tracks	Public	4	4	16	Civil / Structural	None	Widen footpaths to maintain standard widths	3	2	6									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H18	5: Design Stage Review	U	13. Interaction with traffic	Pedestrian alighting buses (Schemewide)	Pedestrians being hit by cyclist	Public	4	3	12	Civil / Structural	Bus islands / mini bus islands are provided at each stop to provide at least a step for alighting passengers to have visibility of oncoming cyclists.	Cycleways narrow on the approach to mini island bus stops to slow cycle traffic.	2	2	4									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H19	5: Design Stage Review	U	13. Interaction with traffic	Cyclists sharing road space with buses and general traffic .	Collision between cyclists and vehicles.	Public	4	4	16	Civil / Structural	Designed separate lanes for buses and cyclists where possible.	It is a relatively low-speed scheme which will increase driver reaction time and reduce the severity of the impact.	3	3	9									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H20	5: Design Stage Review	M	13. Interaction with traffic	Maintenance of grass central reserve (Schemewide)	Crossing live lanes near the maintenance works.	Maintenance	3	4	12	Civil / Structural	Maintenance Contractors Method Statement	None	2	4	8									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H21	5: Design Stage Review	M	13. Interaction with traffic	Maintenance of signalling	Working near running traffic.	Maintenance	4	4	16	Civil / Structural	None	Traffic islands to be big enough to provide a safe distance from running traffic.	2	4	8	Some traffic islands could be smaller can post risk. Carry maintenance works during less busy traffic period								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H22	5: Design Stage Review	U	20. Interaction with the public	Pedestrians crossing minor junctions (Schemewide)	Vehicles hitting pedestrian	Public	3	3	9	Civil / Structural	None	Design raised tables	3	2	6									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H23	5: Design Stage Review	C	6. Work near high-voltage power lines	Overhead power line near junction of Ballyfermot Road and Kylemore Road.	Utilities strike during construction	Construction	2	5	10	Civil / Structural	Contractors Method Statements to address	None	1	5	5							Contractor to prepare Method Statement to address risk	Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007	
H24	5: Design Stage Review	D	15. Vicinity of gas mains or installations	Construction on land currently owned by Cherry Orchard service station	Striking unexpected buried service	Construction	3	5	15	Civil / Structural	None	Utilities to confirm all buried services. Carry out scanning of services in advance of construction	2	5	10									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007

DESIGN HAZARD ELIMINATION AND RISK REDUCTION REGISTER (ROI)

Latest Review Date	
Phase	
C	Construction
M	Maintain / Clean
U	Use as Workplace
D	Demolish
Project Name: Bus Connects	
Project Number: 32110901	
Design Package: Liffey Valley to City Centre	
Client: NTA	

Probability	Worst Potential Severity (WPS) of Impact	Risk Rating
<p>1: Highly Unlikely</p> <p>2: Unlikely</p> <p>3: Possible</p> <p>4: Likely</p> <p>5: Highly Likely</p>	<p>1: Nil or slight injury / illness, property damage or environmental issue.</p> <p>2: Minor injury / illness, property damage or environmental issue.</p> <p>3: Moderate injury or illness, property damage or environmental issue.</p> <p>4: Major injury or illness, property damage or environmental issue.</p> <p>5: Fatal or long term disabling injury or illness. Significant property damage or environmental issue.</p> <p>10. Multiple fatalities and catastrophic event</p>	<p>NOTE: The purpose of Risk Rating is to determine which risks are significant. It is a subjective assessment and not an absolute or precise determination</p>

Risk ID notation: D (Drainage), H (Highways), S (Structures), U (Utilities)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Risk ID	Formal Review Description	Phase	Particular or Non-Particular Risk (if applicable)	Activity	Potential Hazard	Person(s) Most at Risk	Prob	WPS	Initial Risk Rating	Discipline	Design Measures to Eliminate Hazards	Design Measures to Reduce Risk	Residual Prob	Residual WPS	Residual Risk Rating	Residual Risk Description	Included on Drawing No(s) or other doc. (give ref.)	Action By (Name or Role)	Target Date	Revised Target Date	Date Action Complete	Tracker Status	Comments	Primary Legislation
H25	5: Design Stage Review	D	6. Work near high-voltage power lines	Breaking out existing road/pavement (schemewide)	Utility strike	Construction	3	5	15	Civil / Structural	None	Utilities to confirm all buried services.	2	5	10									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H26	5: Design Stage Review	C	8. Wells, underground earthworks & tunnels.	Realigning the carriageway under the railway at Sarsfield Road.	Causing structural instability in the supporting structure above.	Construction	3	5	15	Civil / Structural	Contractors Method Statements to address	None	2	5	10								Contractor to prepare Method Statement to address risk	Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H27	5: Design Stage Review	C	20. Interaction with the public	Flooding of private properties.	Footway crossfalls falling away from the carriageway will cause surface water to run off towards surroundings, which may include housefronts or driveways.	Public	3	2	6	Civil / Structural	Footways are to be designed falling towards the carriageway.	None	1	2	2									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H28	5: Design Stage Review	U	20. Interaction with the public	New junction layouts at Coldcut, Ballyfermot/Kyemore, Sarsfield and Cornmarket	Driver confusion may cause collisions	Public	3	3	9	Transport/Traffic	Information on the new junctions to be published ahead of completion, and temporary signage identifying new junction layouts.	None	1	3	3									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H29	5: Design Stage Review	D	2. Burial under earthfalls	Construction of tall retaining wall adjacent to Pitch and Putt on Sarsfield Road	Buried under earthfalls/unsupported earthworks slopes	Construction	3	4	12	Civil / Structural	Contractors Method Statements to address	Earthworks to be dug back at a 1:1 slope during wall construction and then to be filled in once complete to prevent toppling earth.	1	4	4								Contractor to prepare Method Statement to address risk	Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H30	5: Design Stage Review	U	20. Interaction with the public	New bus gate at NCH	Drivers may not realise the road is closed off to them and may make a dangerous manoeuvre.	Public	5	2	10	Transport/Traffic	Information on the new bus gate to be published ahead of completion, and temporary signage identifying new bus gate to be shown in advance of the junction with South Circular.	None	3	2	6									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
		U	20. Interaction with the public	Crown line between lanes along Sarsfield Road (5/3, 6/1) due to existing retained carriageway	Crown lines in unexpected positions may interfere with driver comfort/safety MORE THAN 5% DIFF	Public	2	3	6	Civil / Structural	Resurface road to ensure the crown line is along centre line	None	1	3	3									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007

Latest Review Date	
Phase	
C	Construction
M	Maintain / Clean
U	Use as Workplace
D	Demolish
Project Name:	Bus Connects
Project Number:	32110901
Design Package:	Liffey Valley to City Centre
Client:	NTA

Probability	Worst Potential Severity (WPS) of Impact	Risk Rating
<p>1: Highly Unlikely</p> <p>2: Unlikely</p> <p>3: Possible</p> <p>4: Likely</p> <p>5: Highly Likely</p>	<p>1: Nil or slight injury / illness, property damage or environmental issue.</p> <p>2: Minor injury / illness, property damage or environmental issue.</p> <p>3: Moderate injury or illness, property damage or environmental issue.</p> <p>4: Major injury or illness, property damage or environmental issue.</p> <p>5: Fatal or long term disabling injury or illness. Significant property damage or environmental issue.</p> <p>10. Multiple fatalities and catastrophic event</p>	<p>NOTE: The purpose of Risk Rating is to determine which risks are significant. It is a subjective assessment and not an absolute or precise determination</p>

Risk ID notation: D (Drainage), H (Highways), S (Structures), U (Utilities)

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Risk ID	Formal Review Description	Phase	Particular or Non-Particular Risk (if applicable)	Activity	Potential Hazard	Person(s) Most at Risk	Prob	WPS	Initial Risk Rating	Discipline	Design Measures to Eliminate Hazards	Design Measures to Reduce Risk	Residual Prob	Residual WPS	Residual Risk Rating	Residual Risk Description	Included on Drawing No(s) or other doc. (give ref.)	Action By (Name or Role)	Target Date	Revised Target Date	Date Action Complete	Tracker Status	Comments	Primary Legislation
H31	5: Design Stage Review	U	20. Interaction with the public	Proposed carriageway falls in reverse direction to the rest of the carriageway.	This has created a crest within the lane.	Public	2	3	6	Civil / Structural	Resurface road to ensure the crown line is along centre line	None	1	3	3									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
		U	20. Interaction with the public	Crown line between lanes along Grattan Crescent (7/1) due to existing retained carriageway	Crown lines in unexpected positions may interfere with driver comfort/safety	Public	2	3	6	Civil / Structural	Resurface road to ensure the crown line is along centre line	None	1	3	3									
H32	5: Design Stage Review	D	18. Significant demolition	Demolishing boundary walls where road widening is proposed (Schemewide)	Crushed / buried under construction debris	Construction	2	4	8	Civil / Structural	Contractor's Method Statements to address risk.		1	4	4								Contractor to prepare Method Statement to address risk	Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
S1	5: Design Stage Review	C	2. Burial under earthfalls	Construction of retaining walls (approx. 100m long in total) along the mainline, adjacent to the M50 overbridge (around Chainage B 300), where there is a major difference in level between existing road and adjacent ground	Buried under earthfalls / unsupported earthwork slopes	Construction	3	4	12	Civil / Structural	Contractor's Method Statements to address risk.		3	4	12								Contractor to prepare Method Statement to address risk	Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
S2	5: Design Stage Review	C	2. Burial under earthfalls	Construction of retaining walls (approx. 60m long in total) along the mainline, adjacent to Markiewicz Park (around Chainage B 3500), where there is a major difference in level between existing road and adjacent ground	Buried under earthfalls / unsupported earthwork slopes	Construction	3	4	12	Civil / Structural	Contractor's Method Statements to address risk.		3	4	12								Contractor to prepare Method Statement to address risk	Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
S3	5: Design Stage Review	C	2. Burial under earthfalls	Construction of retaining walls (approx. 80m long in total) along the mainline, adjacent to Longmeadows Pitch n Putt (around Chainage B 3850), where there is a major difference in level between existing road and adjacent ground	Buried under earthfalls / unsupported earthwork slopes	Construction	3	4	12	Civil / Structural	Contractor's Method Statements to address risk.		3	4	12								Contractor to prepare Method Statement to address risk	Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
S4	5: Design Stage Review	C	2. Burial under earthfalls	Construction of retaining walls (approx. 200m long in total) along the mainline, adjacent to Longmeadows Pitch n Putt (around Chainage B 3920), where there is a major difference in level between existing road and adjacent ground	Buried under earthfalls / unsupported earthwork slopes	Construction	3	4	12	Civil / Structural	Contractor's Method Statements to address risk.		3	4	12								Contractor to prepare Method Statement to address risk	Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
U1	5: Design Stage Review	C	1. Falling from height	Excavation of trenches, pits, chambers and manholes for utility installations.	Potential to fall from ground level into open excavation. Potential to fall from structure during construction of structure.	Construction	4	5	20	Civil / Structural	It has not been possible to completely eliminate the identified hazard. Diversion of existing utilities and work with the existing sewerage network has been avoided where possible. All utility provider & survey information will be supplied to the contractor.	Existing utilities will be retained in situ and protection details will be installed where this is technically acceptable by the service provider. This therefore reduces the quantity of work of this nature.	3	5	15	Falling from height							Typical risk on construction site that needs to be mitigated and managed by the contractor.	2013 Const Regs (FSPD)

DESIGN HAZARD ELIMINATION AND RISK REDUCTION REGISTER (ROI)

Latest Review Date	
Phase	
C	Construction
M	Maintain / Clean
U	Use as Workplace
D	Demolish
Project Name:	Bus Connects
Project Number:	32110901
Design Package:	Liffey Valley to City Centre
Client:	NTA

Probability	Worst Potential Severity (WPS) of Impact
<p>1: Highly Unlikely</p> <p>2: Unlikely</p> <p>3: Possible</p> <p>4: Likely</p> <p>5: Highly Likely</p>	<p>1: Nil or slight injury / illness, property damage or environmental issue.</p> <p>2: Minor injury / illness, property damage or environmental issue.</p> <p>3: Moderate injury or illness, property damage or environmental issue.</p> <p>4: Major injury or illness, property damage or environmental issue.</p> <p>5: Fatal or long term disabling injury or illness. Significant property damage or environmental issue.</p> <p>10. Multiple fatalities and catastrophic event</p>

Risk Rating

NOTE: The purpose of Risk Rating is to determine which risks are significant. It is a subjective assessment and not an absolute or precise determination

	1	2	3	4	5
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5
	1	2	3	4	5

Risk ID notation: D (Drainage), H (Highways), S (Structures), U (Utilities)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
Risk ID	Formal Review Description	Phase	Particular or Non-Particular Risk (if applicable)	Activity	Potential Hazard	Person(s) Most at Risk	Prob	WPS	Initial Risk Rating	Discipline	Design Measures to Eliminate Hazards	Design Measures to Reduce Risk	Residual Prob	Residual WPS	Residual Risk Rating	Residual Risk Description	Included on Drawing No(s) or other doc. (give ref.)	Action By (Name or Role)	Target Date	Revised Target Date	Date Action Complete	Tracker Status	Comments	Primary Legislation	
U2	5: Design Stage Review	C	2. Burial under earthfalls	Excavation of trenches, pits, chambers and manholes for utility installations.	Excavation, installation and backfilling of deep pipes. Even shallow excavations can result in trench collapse so it is important to never be complacent. Installation / Maintenance of pipes and manholes in the areas of high water table.	Construction	4	10	40	Civil / Structural	It has not been possible to completely eliminate the identified hazard. Diversion of existing utilities and work with the existing sewerage network has been avoided where possible. All utility provider & survey information will be supplied to the contractor.	Existing utilities will be retained in situ and protection details will be installed where this is technically acceptable by the service provider. This therefore reduces the quantity of work of this nature.	3	10	30	Burial under earth fall. Engulfment due to trench or slope collapse.								Typical risk on construction site that needs to be mitigated and managed by the contractor. Including the development of suitable temporary works.	2013 Const Regs (PSDP)
U3	5: Design Stage Review	C	4. Chemical or biological substances	Working to complete the cut-in and connections to the existing sewer main. Working on existing sewer manhole lids and chambers.	The biological hazard associated with working on sewer infrastructure incl. the toxic gases that can be found in sewers.	Construction	4	10	40	Civil / Structural	It has not been possible to completely eliminate the identified hazard. Diversion of and work with the existing sewerage network has been reduced as far as possible.	Existing sewers will be retained in situ and protection details will be installed where this is technically acceptable by the service provider. This therefore reduces the quantity of work of this nature.	3	10	30	Chemical or biological substances								Typical risk on construction site that needs to be mitigated and managed by the contractor.	2013 Const Regs (PSDP)
U4	5: Design Stage Review	C	6. Work near high-voltage power lines	Excavation in proximity to High voltage underground lines. Working under existing overhead high voltage lines.	Electrocution by coming in contact with high voltage conductors by service strike or contact with overhead lines.	Construction	4	10	40	Civil / Structural	It has not been possible to completely eliminate the identified hazard. Diversion of existing utilities and work with the existing sewerage network has been avoided where possible. All utility provider & survey information will be supplied to the contractor.	Existing utilities will be retained in situ and protection details will be installed where this is technically acceptable by the service provider. This therefore reduces the quantity of work of this nature.	3	10	30	Electrocution by coming in contact with high voltage conductors by service strike or contact with overhead lines.								The contractor needs to consider and mitigate against this risk by the development and implementation of a RAMS.	2013 Const Regs (PSDP)
U5	5: Design Stage Review	C	12. Assembly or dismantling of heavy prefabricated components	Working adjacent to existing structures, including retaining structures. Possible use of precast chambers if proposed by the contractor. Heavy watermain pipe - e.g. 450mm DI. Precast protection Slats may be used by contractor and require craneage.	Being crushed or entrapped by heavy object. Manual handling injury.	Construction	4	5	20	Civil / Structural	It has not been possible to completely eliminate the identified hazard. Diversion of existing utilities and work with the existing sewerage network has been avoided where possible. All utility provider & survey information will be supplied to the contractor.	Existing utilities will be retained in situ and protection details will be installed where this is technically acceptable by the service provider. This therefore reduces the quantity of work of this nature.	3	5	15	Being crushed or entrapped by heavy object. Manual handling injury.								The contractor needs to consider and mitigate against this risk by the development and implementation of a RAMS.	2013 Const Regs (PSDP)
U6	5: Design Stage Review	C	13. Interaction with traffic	Working in the vicinity of live traffic at all interfaces of the works. There is also the interaction with construction traffic throughout the site.	Operative being struck by vehicle. Pedestrian being struck by plant of vehicle.	Construction	4	10	40	Civil / Structural	It has not been possible to completely eliminate the identified hazard. Diversion of existing utilities and work with the existing sewerage network has been avoided where possible. All utility provider & survey information will be supplied to the contractor.	Existing utilities will be retained in situ and protection details will be installed where this is technically acceptable by the service provider. This therefore reduces the quantity of work of this nature.	3	10	30	Operative being struck by vehicle. Pedestrian being struck by plant of vehicle.								The contractor needs to consider and mitigate against this risk by the development and implementation of a RAMS.	2013 Const Regs (PSDP)

DESIGN HAZARD ELIMINATION AND RISK REDUCTION REGISTER (ROI)

Latest Review Date	
Phase	
C	Construction
M	Maintain / Clean
U	Use as Workplace
D	Demolish
Project Name:	Bus Connects
Project Number:	32110901
Design Package:	Liffey Valley to City Centre
Client:	NTA

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Risk ID	Formal Review Description	Phase	Particular or Non-Particular Risk (if applicable)	Activity	Potential Hazard	Person(s) Most at Risk	Prob	WPS	Initial Risk Rating	Discipline	Design Measures to Eliminate Hazards	Design Measures to Reduce Risk	Residual Prob	Residual WPS	Residual Risk Rating	Residual Risk Description	Included on Drawing No(s) or other doc. (give ref.)	Action By (Name or Role)	Target Date	Revised Target Date	Date Action Complete	Tracker Status	Comments	Primary Legislation
U7	5: Design Stage Review	C	15. Vicinity of gas mains or installations	Excavation of trenches, pits, chambers and manholes for utility installations.	Service strike on live gas main	Construction	4	10	40	Civil / Structural	It has not been possible to completely eliminate the identified hazard. Diversion of existing utilities and work with the existing sewerage network has been avoided where possible. All utility provider & survey information will be supplied to the contractor.	Existing utilities will be retained in situ and protection details will be installed where this is technically acceptable by the service provider. This therefore reduces the quantity of work of this nature.	3	10	30	Service strike on five gas main							The contractor needs to consider and mitigate against this risk by the development and implementation of a RAMS.	2013 Const Regs (PSDP)
U8	5: Design Stage Review	C	16. On or adjacent to pressure mains	Excavation in the vicinity of public utilities, watermains, gas main, sewer rising main.	Service strike on live gas main, water main, rising sewer main.	Construction	4	10	40	Civil / Structural	It has not been possible to completely eliminate the identified hazard. Diversion of existing utilities and work with the existing sewerage network has been avoided where possible. All utility provider & survey information will be supplied to the contractor.	Existing utilities will be retained in situ and protection details will be installed where this is technically acceptable by the service provider. This therefore reduces the quantity of work of this nature.	3	10	30	Service strike on five gas main, water main, rising sewer main.							The contractor needs to consider and mitigate against this risk by the development and implementation of a RAMS.	2013 Const Regs (PSDP)
U9	5: Design Stage Review	C	17. Confined spaces	Manhole and chamber entry as required. Deep Trench excavation.	Engulfment by hazardous gases.	Construction	4	10	40	Civil / Structural	It has not been possible to completely eliminate the identified hazard. Diversion of existing utilities and work with the existing sewerage network has been avoided where possible. All utility provider & survey information will be supplied to the contractor.	Existing utilities will be retained in situ and protection details will be installed where this is technically acceptable by the service provider. This therefore reduces the quantity of work of this nature.	3	10	30	Engulfment by hazardous gases.							The contractor needs to consider and mitigate against this risk by the development and implementation of a RAMS.	2013 Const Regs (PSDP)
U10	5: Design Stage Review	C	20. Interaction with the public	All Service Installations along live areas and at interface points will involve exposure of the public to work areas and vehicles.	Member of the public coming in contact with a work vehicle or entering the worksite.	Construction	4	10	40	Civil / Structural	It has not been possible to completely eliminate the identified hazard. Diversion of existing utilities and work with the existing sewerage network has been avoided where possible. All utility provider & survey information will be supplied to the contractor.	Existing utilities will be retained in situ and protection details will be installed where this is technically acceptable by the service provider. This therefore reduces the quantity of work of this nature.	3	10	30	Member of the public coming in contact with a work vehicle or entering the worksite.							The contractor needs to consider and mitigate against this risk by the development and implementation of a RAMS.	2013 Const Regs (PSDP)
D1	5: Design Stage Review	U	7. Exposure to drowning	Creation of new ponds and Swales giving rise to deep water when in operation	Risk of drowning	Public	3	5	15	Civil / Structural	Use of tree pits, filter drains and source measures to reduce pond/swale size	Shallow slopes applied to ponds/swales to reduce likelihood of fall. Pond depths typically designed for 0.5m water to reduce risk of drowning	1	5	5	Risk of drowning cannot be fully eliminated as ponds/swales remain								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
D2	5: Design Stage Review	C	2. Burial under earthfalls	Deep excavation of road to install and connect new gullies.	Risk of excavation collapse, burial	Construction	3	5	15	Civil / Structural	Design standard has been adjusted to remove requirement for gully replacement where existing kerb lines are retained	Combined side/surface entry gully proposed to reduce frequency and number of connections/excavations	2	5	10	Risk remains as new gully still need to be installed								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007

DESIGN HAZARD ELIMINATION AND RISK REDUCTION REGISTER (ROI)

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Project Name:	Bus Connects
Project Number:	32110901
Design Package:	Liffey Valley to City Centre
Client:	NTA

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D3	5: Design Stage Review	C	2. Burial under earthfalls	Creation of new ponds and Swales giving rise to deep water when in operation	Risk of excavation collapse, burial	Construction	3	5	15	Civil / Structural	Use of tree pits, filter drains and source measures to reduce ponds/swale size/need	Shallow slopes applied to ponds/Swales to reduce excavation depth.	1	5	5	Risk of excavation collapse cannot be fully eliminated as ponds/swales remain									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
D4	5: Design Stage Review	C	7. Exposure to drowning	Works near Emmet Road Culvert	Risk of sudden ingress of water into areas where work is taking place	Construction	2	5	10	Civil / Structural	Design standard has sought to minimise works to/near the culvert	Design standard has sought to minimise works to/near the culvert	1	5	5	Risk remains									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
D4	5: Design Stage Review	C	7. Exposure to drowning	Failure of drainage due to intense storms before it is operational	Risk of flooding	Construction	4	4	16	Civil / Structural	Design standard has sought to minimise extent of new drainage works although hazard cannot be eliminated due to requirement for work	Design standard has sought to minimise extent of new drainage works although risk cannot be reduced due to requirement for work	4	4	16	Risk remains as drainage works are inherent works requirement									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
D5	5: Design Stage Review	C	Not Applicable	Service strike during excavation/installation of new drainage infrastructure	Service strike	Construction	5	5	25	Civil / Structural	Design standard has minimised extent of new drainage works e.g. none required where kerb lines retained and no change in impermeable area	Full assessment of other services carried out with clash detection during design process	5	3	15	Risk remains, full GPR survey required to further reduce risk									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
D6	5: Design Stage Review	C	Not Applicable	Failure of brick or other sewers during connection by new works	Sewer collapse and failure, burial	Construction	3	5	15	Civil / Structural	Cannot be eliminated at this stage, connections to existing sewer network required for functional drainage system	Cannot be reduced at this stage, connections to existing drainage system required	3	5	15	Risk remains, condition survey of existing sewers should be completed to ascertain existing condition									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
D7	5: Design Stage Review	U	Not Applicable	Operation of road drainage network and treatment	Pollution incident due to failure of drainage interceptors	Public	3	4	12	Civil / Structural	Cannot be eliminated, use of vehicles on highway and outfalls to surface water network/streams required	SUDS measures include passive treatment include sediment filtration which have a very low probability of failure	3	3	9	Requirement for interceptors which could fail remains as insufficient space allowed for full SUDS measures									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
S5	5: Design Stage Review	C	8. Wells, underground earthworks & tunnels.	Poddle Culvert	Risk of failure / daamage	Construction	1	2	2	Civil / Structural	None. Existing culvert to remain.	None.	1	2	2	Risk remains.									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
S6	5: Design Stage Review	C	8. Wells, underground earthworks & tunnels.	Guinness Tunnel	Risk of failure	Construction	2	3	6	Civil / Structural	None. Existing tunnel to remain.	None.	2	3	6	Risk remains.									Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007

DESIGN HAZARD ELIMINATION AND RISK REDUCTION REGISTER (ROI)

Latest Review Date	
Phase	
C	Construction
M	Maintain / Clean
U	Use as Workplace
D	Demolish
Project Name:	Bus Connects
Project Number:	32110901
Design Package:	Liffey Valley to City Centre
Client:	NTA

Probability	Worst Potential Severity (WPS) of Impact	Risk Rating
<p>1: Highly Unlikely</p> <p>2: Unlikely</p> <p>3: Possible</p> <p>4: Likely</p> <p>5: Highly Likely</p>	<p>1: Nil or slight injury / illness, property damage or environmental issue.</p> <p>2: Minor injury / illness, property damage or environmental issue.</p> <p>3: Moderate injury or illness, property damage or environmental issue.</p> <p>4: Major injury or illness, property damage or environmental issue.</p> <p>5: Fatal or long term disabling injury or illness. Significant property damage or environmental issue.</p> <p>10. Multiple fatalities and catastrophic event</p>	<p>NOTE: The purpose of Risk Rating is to determine which risks are significant. It is a subjective assessment and not an absolute or precise determination</p>

Risk ID notation: D (Drainage), H (Highways), S (Structures), U (Utilities)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Risk ID	Formal Review Description	Phase	Particular or Non-Particular Risk (if applicable)	Activity	Potential Hazard	Person(s) Most at Risk	Prob	WPS	Initial Risk Rating	Discipline	Design Measures to Eliminate Hazards	Design Measures to Reduce Risk	Residual Prob	Residual WPS	Residual Risk Rating	Residual Risk Description	Included on Drawing No(s) or other doc. (give ref.)	Action By (Name or Role)	Target Date	Revised Target Date	Date Action Complete	Tracker Status	Comments	Primary Legislation
H33	5: Design Stage Review	C	20. Interaction with the public	St James's Hospital	Member of the public coming in contact with a work vehicle or entering the worksite.	Construction	4	3	12	Transport/Traffic	Create a secure working area to prevent interface with the public.	NTA to provide public with information on the scheme so the public do not raise their concerns with site staff.	3	3	9	Risk remains.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
U11	5: Design Stage Review	C	15. Vicinity of gas mains or installations	EIR Exchange	Service strike	Construction	2	3	6	Civil / Structural	It has not been possible to completely eliminate the identified hazard. Work with the existing service has been avoided. All utility providers & survey information will be supplied to the contractor.	Existing services will be retained in situ and protection details will be installed where this is technically acceptable by the service provider. This therefore reduces the quantity of work of this nature.	2	3	6	Risk remains.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
U12	5: Design Stage Review	C	15. Vicinity of gas mains or installations	Substation (Chainage B 3675)	Service strike	Construction	2	3	6	Civil / Structural	It has not been possible to completely eliminate the identified hazard. Work with the existing service has been avoided. All utility providers & survey information will be supplied to the contractor.	Existing services will be retained in situ and protection details will be installed where this is technically acceptable by the service provider. This therefore reduces the quantity of work of this nature.	2	3	6	Risk remains.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H34	5: Design Stage Review	C	20. Interaction with the public	LUAS	Driver confusion may cause collisions	Public	4	4	16	Transport/Traffic	Create a secure working area to prevent interface with the LUAS and public.	NTA to provide public with information on the scheme so the public do not raise their concerns with site staff.	3	4	12	Risk remains.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
S7	5: Design Stage Review	C	8. Wells, underground earthworks & tunnels.	Collars	Cellar collapse and failure, burial	Construction	2	3	6	Civil / Structural	Retain footways over cellars	Retain footways over cellars	1	3	3	Risk remains.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
S8	5: Design Stage Review	C	Not Applicable	Asbestos	Cancer / Illness	Construction	4	5	20	Civil / Structural	Refine the design to limit the length of pipe that is impacted	Refine the design to limit the length of pipe that is impacted	3	5	15	Risk remains.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H35	5: Design Stage Review	C	15. Vicinity of gas mains or installations	Irish Rail Depo / Seveso Site in close proximity to the scheme.	Large fuel storage area in close proximity to site.	Construction	4	5	20	Civil / Structural	None. Works outside of site boundary.	NTA to provide public with information on the scheme so the public do not raise their concerns with site staff.	3	5	15	Risk remains.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007

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H36	5: Design Stage Review	C	20. Interaction with the public	Schools	Member of the public / school students coming in contact with a work vehicle or entering the worksite.	Public	4	4	16	Civil / Structural	Create a secure working area to prevent interface with the school / public.	NTA to provide public with information on the scheme so the public do not raise their concerns with site staff.	3	3	9	Risk remains.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007	
S9	5: Design Stage Review	C	21. Structural strike	Bridges Sarsfield Road / Memorial Rd / M50 CB	Bridge / structure strike	Construction	3	3	9	Civil / Structural	Create a secure working area to prevent interface with the traffic / public.	NTA to provide public with information on the scheme so the public do not raise their concerns with site staff.	3	2	6	Risk remains.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007	
H37	5: Design Stage Review	C	Not Applicable	General Works	Temporary or permanent hearing damage / loss for construction workers / local residents	Construction	2	3	6	Civil / Structural	Noise reducing barriers and correct PPE to be used	NTA to provide public with information on the scheme so the public do not raise their concerns with site staff.	2	3	6	Risk remains.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007	
H38	5: Design Stage Review	C	Not Applicable	General Works	Noise and vibration disturbances for local residents	Public	1	3	3	Civil / Structural	Noise reducing barriers to be used	NTA to provide public with information on the scheme so the public do not raise their concerns with site staff.	1	3	3	Risk remains.								Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007	
H39	5: Design Stage Review	C	4. Chemical or biological substances		Exposure to chemicals, solvents or biological substances while carrying out the works.	Construction	1	4	4	Civil / Structural	Contractor's Method Statements to address risk.		1	4	4									Contractor to prepare Method Statement to address risk	Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H40	5: Design Stage Review	C	4. Chemical or biological substances	Lane realignment and road construction	Working with bitumen, bituminous liquids i.e. tack coat, sealing joints with molar bitumen, cementitious products, thermoplastics and road marking materials on the project.	Construction	4	4	16	Civil / Structural	Contractor's Method Statements to address risk.		4	4	16									Contractor to prepare Method Statement to address risk	Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007
H41	5: Design Stage Review	C	4. Chemical or biological substances	Lane realignment and road construction	Risks associated with removal of road markings i.e. inhalation of dust and fumes by Contractor personnel and by members of the public.	Construction	4	4	16	Civil / Structural	Contractor's Method Statements to address risk.		4	4	16									Contractor to prepare Method Statement to address risk	Safety Health and Welfare at Work (Construction) Regulations 2013, Safety Health and Welfare at Work (General Application) Regulations 2007