A1 Birtley to Coal House

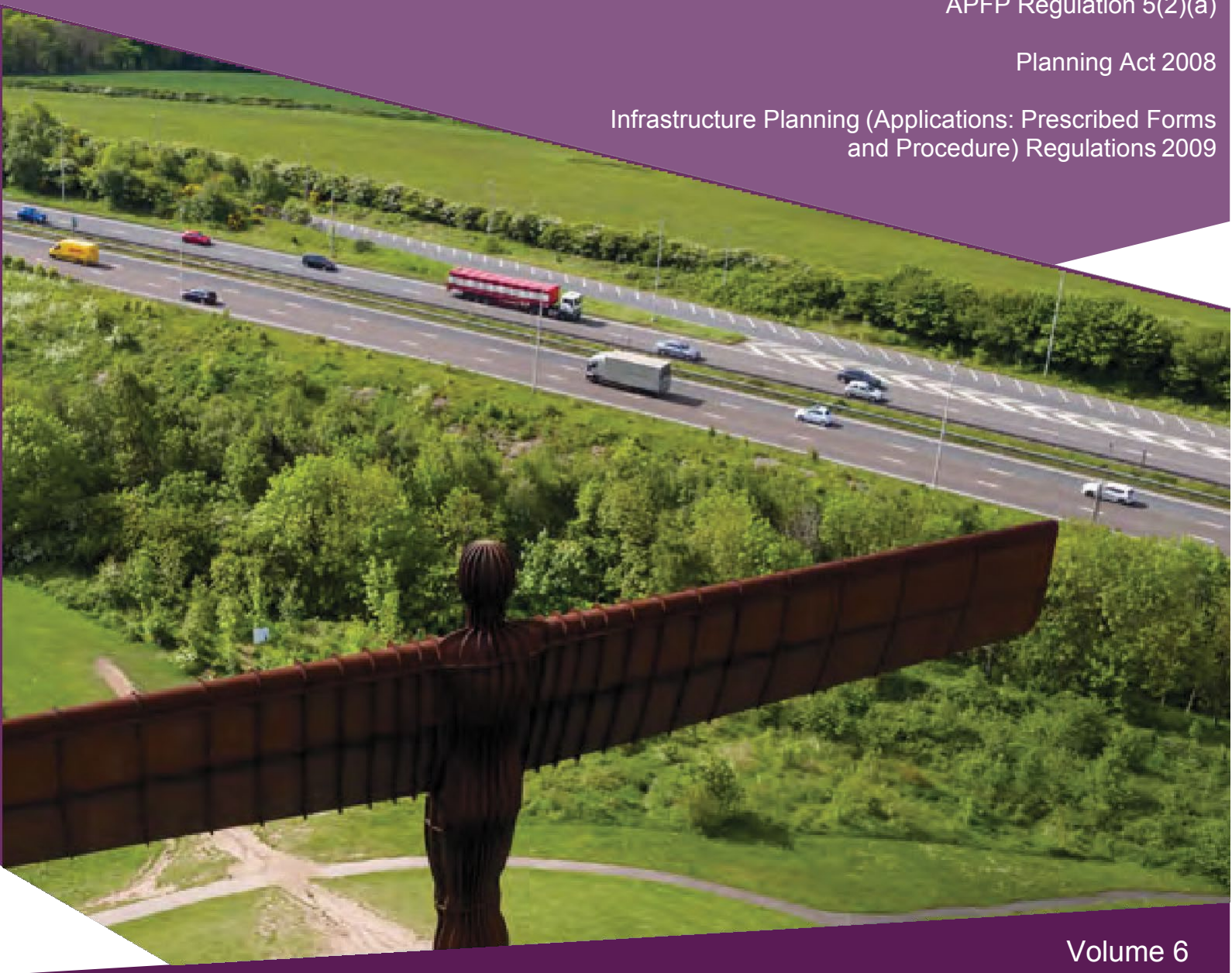
Scheme Number: TR010031

6.3 Environmental Statement – Appendix 13.3 Highways Agency Water Risk Assessment Tool

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



Volume 6

August 2019

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009

A1 Birtley to Coal House

Development Consent Order 20[xx]

Environmental Statement - Appendix

Regulation Reference:	APFP Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010031
Application Document Reference	TR010031/APP/6.3
Author:	A1 Birtley to Coal House Project Team, Highways England

Version	Date	Status of Version
Rev 0	14 August 2019	Application Issue

Appendix A

Method **A** **R**esults (**R**unoff **A**ssessment)

Step 1 Whole Scheme

HIGHWAYS AGENCY

Highways Agency Water Risk Assessment Tool version 1.0 November 2009

Annual Average Concentration	Copper	Zinc	
Step 2	-	-	ug/l
Step 3	-	-	ug/l

Soluble - Acute Impact

Copper	Zinc
Runoff Fails Toxicity Test. Try River Impact.	Runoff Fails Toxicity Test. Try River Impact.

Sediment - Chronic Impact

Runoff Fails Toxicity Test. Try River Impact.

Sediment deposition for this site is judged as:

Accumulating?	-	-	Low flow Vel m/s
Extensive?	-	-	Deposition Index

Location Details

Road number	A1		HA Area / DBFO number		
Assessment type	Non-cumulative assessment (single outfall)				
OS grid reference of assessment point (m)	Easting	424935		Northing	558620
OS grid reference of outfall structure (m)	Easting	424935		Northing	558620
Outfall number	Whole scheme		List of outfalls in cumulative assessment		
Receiving watercourse	River Team				
EA receiving water Detailed River Network ID			Assessor and affiliation	Beth woolley WSP	
Date of assessment	20/04/2018		Version of assessment	V1	
Notes	Sum of all outfall impermeable areas contributing.				

Step 1 Runoff Quality

AADT: >=100,000 | Climatic region: Colder Dry | Rainfall site: Newcastle upon tyne (SAAR 680mm)

Step 2 River Impacts

Annual 95%ile river flow (m^3/s): 0 (Enter zero in Annual 95%ile river flow box to assess Step 1 runoff quality only)

Impermeable road area drained (ha): 1 | Permeable area draining to outfall (ha): 1

Base Flow Index (BFI): 0.5 | Is the discharge in or within 1 km upstream of a protected site for conservation? No D

For dissolved zinc only — Water hardness: Low = <50mg CaCO3/l D

For sediment impact only — Is there a downstream structure, lake, pond or canal that reduces the velocity within 100m of the point of discharge? No D

- Tier 1: Estimated river width (m): 5
- Tier 2: Bed width (m): 3 | Manning's n: 0.07 D | Side slope (m/m): 0.5 | Long slope (m/m): 0.0001

Step 3 Mitigation

	Brief description	Estimated effectiveness: Treatment for solubles (%)		Attenuation for solubles - restricted discharge rate (l/s)		Settlement of sediments (%)	
Existing measures		0	D	Unlimited	D	0	D
Proposed measures		0	D	Unlimited	D	0	D

Predict Impact

Show Detailed Results

Exit Tool

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Summary of predictions

		Soluble - Acute Impact		Sediment - Chronic Impact							
		Copper	Zinc	Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene
Prediction of impact	Step1										
	Step2										
	Step3										

DETAILED RESULTS

In Runoff

Step 1

		Copper	Zinc	Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene
		RST24		Toxicity Threshold							
Allowable Exceedances/year		1	1	1	1	1	1	1	1	1	1
No. of exceedances/year		76.50	99.20	97.40	117.50	6.10	41.50	96.30	41.50	19.20	78.90
No. of exceedances/worst year		86	107	109	138	12	51	104	51	28	88
		RST6									
Allowable Exceedances/year		1	1								
No. of exceedances/year		28.80	63.00								
No. of exceedances/worst year		43	75								
		(ug/l)	*(ug/l)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(ug/kg)*	*(ug/kg)*	*(ug/kg)*	*(ug/kg)*	*(ug/kg)*
Thresholds	***RST24***	21	60	***Toxicity*** 197	315	3.5	16770	875	2355	245	515
Thresholds	***RST6***	42	120								
Event Statistics Mean		31.55	173.85	526	2036	1	15858	2743	2632	168	742
90%ile		60.39	356.07	1084	4499	3	35481	6138	5890	376	1661
95%ile		73.53	485.30	1363	6145	3	54904	9498	9114	582	2569
99%ile		136.52	922.50	2130	8873	5	89125	15419	14795	945	4171

In River (no mitigation)

Step 2

	Copper	Zinc
	RST24	
Allowable Exceedances/year	2	2
No. of exceedances/year	-	-
No. of exceedances/worst year	-	-
No. of exceedances/summer	-	-
No. of exceedances/worst summer	-	-
	RST6	
Allowable Exceedances/year	1	1
No. of exceedances/year	-	-
No. of exceedances/worst year	-	-
No. of exceedances/summer	-	-
No. of exceedances/worst summer	-	-
Annual average concentration (ug/l)	-	-
	(ug/l)	*(ug/l)*
Thresholds	***RST24*** 21	60
Thresholds	***RST6*** 42	120
Event Statistics Mean	-	-
90%ile	-	-
95%ile	-	-
99%ile	-	-

Step 2

Velocity - m/s

DI -

% settlement needed - %

Tier 1 is used for the calculation

In River (with mitigation)

Step 3

	Copper	Zinc
	RST24	
Allowable Exceedances/year	2	2
No. of exceedances/year	-	-
No. of exceedances/worst year	-	-
No. of exceedances/summer	-	-
No. of exceedances/worst summer	-	-
	RST6	
Allowable Exceedances/year	1	1
No. of exceedances/year	-	-
No. of exceedances/worst year	-	-
No. of exceedances/summer	-	-
No. of exceedances/worst summer	-	-
Annual average concentration (ug/l)	-	-
	(ug/l)	*(ug/l)*
Thresholds hresholds	***RST24*** 21	60
Thresholds	***RST6*** 42	120
Event Statistics Mean	-	-
90%ile	-	-
95%ile	-	-
99%ile	-	-

DI -

Details of the chosen rainfall site	
SAAR (mm)	**680**
Altitude (m)	**75**
Easting	**4248**
Northing	**5648**
Coastal distance (km)	**18**

Step 2 Whole Scheme

HIGHWAYS AGENCY

Highways Agency Water Risk Assessment Tool version 1.0 November 2009

Soluble - Acute Impact

Annual Average Concentration

	Copper	Zinc	
Step 2	0.06	0.39	ug/l
Step 3	-	-	ug/l

Copper: Pass

Zinc: Pass

Sediment - Chronic Impact

Pass

Sediment deposition for this site is judged as:

Accumulating?	No	0.15	Low flow Vel m/s
Extensive?	No	-	Deposition Index

Location Details

Road number	A1		HA Area / DBFO number		
Assessment type	Non-cumulative assessment (single outfall)				
OS grid reference of assessment point (m)	Easting	424935		Northing	558620
OS grid reference of outfall structure (m)	Easting	424935		Northing	558620
Outfall number	Whole scheme		List of outfalls in cumulative assessment		
Receiving watercourse	River Team				
EA receiving water Detailed River Network ID			Assessor and affiliation		Beth woolley WSP
Date of assessment	20/04/2018		Version of assessment		V1
Notes	Sum of all outfall impermeable areas contributing.				

Step 1 Runoff Quality

AADT: >=100,000 | Climatic region: Colder Dry | Rainfall site: Newcastle upon tyne (SAAR 680mm)

Step 2 River Impacts

Annual 95%ile river flow (m^3/s): 0.382 (Enter zero in Annual 95%ile river flow box to assess Step 1 runoff quality only)

Impermeable road area drained (ha): 21.4 | Permeable area draining to outfall (ha): 0

Base Flow Index (BFI): 0.67 | Is the discharge in or within 1 km upstream of a protected site for conservation? No D

For dissolved zinc only

Water hardness: Medium = 50-200 CaCO3/l

For sediment impact only

Is there a downstream structure, lake, pond or canal that reduces the velocity within 100m of the point of discharge? No D

Tier 1 Estimated river width (m): 6.5

Tier 2 Bed width (m): 3 | Manning's n: 0.07 D | Side slope (m/m): 0.5 | Long slope (m/m): 0.0001

Step 3 Mitigation

	Brief description	Estimated effectiveness: Treatment for solubles (%)		Attenuation for solubles - restricted discharge rate (l/s)		Settlement of sediments (%)	
Existing measures		0	D	Unlimited	D	0	D
Proposed measures		0	D	Unlimited	D	0	D

Predict Impact

Show Detailed Results

Exit Tool

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Summary of predictions

Soluble - Acute Impact

Sediment - Chronic Impact

Prediction of impact		Copper	Zinc	Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene
	Step1										
	Step2										
	Step3										

DETAILED RESULTS

In Runoff

Step 1

		Copper	Zinc	Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene
		RST24		Toxicity Threshold							
Allowable Exceedances/year		1	1	1	1	1	1	1	1	1	1
No. of exceedances/year		76.50	99.20	97.40	117.50	6.10	41.50	96.30	41.50	19.20	78.90
No. of exceedances/worst year		86	107	109	138	12	51	104	51	28	88
		RST6									
Allowable Exceedances/year		1	1								
No. of exceedances/year		28.80	63.00								
No. of exceedances/worst year		43	75								
		(ug/l)	*(ug/l)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(ug/kg)*	*(ug/kg)*	*(ug/kg)*	*(ug/kg)*	*(ug/kg)*
Thresholds	***RST24***	21	92	***Toxicity*** 197	315	3.5	16770	875	2355	245	515
Thresholds	***RST6***	42	184								
Event Statistics Mean		31.55	173.85	526	2036	1	15858	2743	2632	168	742
90%ile		60.39	356.07	1084	4499	3	35481	6138	5890	376	1661
95%ile		73.53	485.30	1363	6145	3	54904	9498	9114	582	2569
99%ile		136.52	922.50	2130	8873	5	89125	15419	14795	945	4171

In River (no mitigation)

Step 2

	Copper	Zinc
	RST24	
Allowable Exceedances/year	2	2
No. of exceedances/year	0	0.1
No. of exceedances/worst year	0	1
No. of exceedances/summer	0	0.1
No. of exceedances/worst summer	0	1
	RST6	
Allowable Exceedances/year	1	1
No. of exceedances/year	0	0
No. of exceedances/worst year	0	0
No. of exceedances/summer	0	0
No. of exceedances/worst summer	0	0
Annual average concentration (ug/l)	0.06	0.39
	(ug/l)	*(ug/l)*
Thresholds	***RST24*** 21	92
Thresholds	***RST6*** 42	184
Event Statistics Mean	0.27	1.55
90%ile	0.70	3.25
95%ile	1.19	6.38
99%ile	3.41	16.75

Step 2

Velocity 0.15 m/s — **Tier 1** is used for the calculation

DI -

% settlement needed - %

In River (with mitigation)

Step 3

	Copper	Zinc
	RST24	
Allowable Exceedances/year	2	2
No. of exceedances/year	-	-
No. of exceedances/worst year	-	-
No. of exceedances/summer	-	-
No. of exceedances/worst summer	-	-
	RST6	
Allowable Exceedances/year	1	1
No. of exceedances/year	-	-
No. of exceedances/worst year	-	-
No. of exceedances/summer	-	-
No. of exceedances/worst summer	-	-
Annual average concentration (ug/l)	-	-
	(ug/l)	*(ug/l)*
Thresholds hresholds	***RST24*** 21	92
Thresholds	***RST6*** 42	184
Event Statistics Mean	-	-
90%ile	-	-
95%ile	-	-
99%ile	-	-

DI -

Details of the chosen rainfall site	
SAAR (mm)	**680**
Altitude (m)	**75**
Easting	**4248**
Northing	**5648**
Coastal distance (km)	**18**

Step 2 Whole Scheme: Downstream structure alert

HIGHWAYS AGENCY

Highways Agency Water Risk Assessment Tool version 1.0 November 2009

Annual Average Concentration	Copper	Zinc	
Step 2	0.06	0.39	ug/l
Step 3	-	-	ug/l

Soluble - Acute Impact

Copper	Zinc
Pass	Pass

Sediment - Chronic Impact

Alert. D/S Structure.

Sediment deposition for this site is judged as:

Accumulating?	No	0.15	Low flow Vel m/s
Extensive?	No	-	Deposition Index

Location Details

Road number	A1		HA Area / DBFO number		
Assessment type	Non-cumulative assessment (single outfall)				
OS grid reference of assessment point (m)	Easting	424935		Northing	558620
OS grid reference of outfall structure (m)	Easting	424935		Northing	558620
Outfall number	Whole Scheme		List of outfalls in cumulative assessment		
Receiving watercourse	River Team				
EA receiving water Detailed River Network ID			Assessor and affiliation	Beth Woolley WSP	
Date of assessment	20/04/2018		Version of assessment	V1	
Notes					

Step 1 Runoff Quality

AADT: >=100,000 | Climatic region: Colder Dry | Rainfall site: Newcastle upon tyne (SAAR 680mm)

Step 2 River Impacts

Annual 95%ile river flow (m^3/s): 0.382 (Enter zero in Annual 95%ile river flow box to assess Step 1 runoff quality only)

Impermeable road area drained (ha): 21.4 | Permeable area draining to outfall (ha): 0

Base Flow Index (BFI): 0.67 | Is the discharge in or within 1 km upstream of a protected site for conservation? No

For dissolved zinc only

Water hardness: Medium = 50-200 CaCO3/l

For sediment impact only

Is there a downstream structure, lake, pond or canal that reduces the velocity within 100m of the point of discharge? Yes

(•) Tier 1 Estimated river width (m): 6.5

( ) Tier 2 Bed width (m): 3 | Manning's n: 0.07 | Side slope (m/m): 0.5 | Long slope (m/m): 0.0001

Step 3 Mitigation

	Brief description	Estimated effectiveness: Treatment for solubles (%)		Attenuation for solubles - restricted discharge rate (l/s)		Settlement of sediments (%)	
Existing measures		0	D	Unlimited	D	0	D
Proposed measures		0	D	Unlimited	D	0	D

Predict Impact

Show Detailed Results

Exit Tool

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Summary of predictions

		Soluble - Acute Impact		Sediment - Chronic Impact							
		Copper	Zinc	Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene
Prediction of impact	Step1										
	Step2										
	Step3										

DETAILED RESULTS

In Runoff

		Step 1 Copper	Step 1 Zinc	Step 1 Copper	Step 1 Zinc	Step 1 Cadmium	Step 1 Total PAH	Step 1 Pyrene	Step 1 Fluoranthene	Step 1 Anthracene	Step 1 Phenanthrene
		RST24		Toxicity Threshold							
Allowable Exceedances/year		1	1	1	1	1	1	1	1	1	1
No. of exceedances/year		76.50	99.20	97.40	117.50	6.10	41.50	96.30	41.50	19.20	78.90
No. of exceedances/worst year		86	107	109	138	12	51	104	51	28	88
		RST6									
Allowable Exceedances/year		1	1								
No. of exceedances/year		28.80	63.00								
No. of exceedances/worst year		43	75								
		(ug/l)	(ug/l)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Thresholds	RST24	21	92	Toxicity 197	315	3.5	16770	875	2355	245	515
Thresholds	RST6	42	184								
Event Statistics Mean		31.55	173.85	526	2036	1	15858	2743	2632	168	742
90%ile		60.39	356.07	1084	4499	3	35481	6138	5890	376	1661
95%ile		73.53	485.30	1363	6145	3	54904	9498	9114	582	2569
99%ile		136.52	922.50	2130	8873	5	89125	15419	14795	945	4171

In River (no mitigation)

		Step 2 Copper	Step 2 Zinc
		RST24	
Allowable Exceedances/year		2	2
No. of exceedances/year		0	0.1
No. of exceedances/worst year		0	1
No. of exceedances/summer		0	0.1
No. of exceedances/worst summer		0	1
		RST6	
Allowable Exceedances/year		1	1
No. of exceedances/year		0	0
No. of exceedances/worst year		0	0
No. of exceedances/summer		0	0
No. of exceedances/worst summer		0	0
Annual average concentration (ug/l)		0.06	0.39
		(ug/l)	(ug/l)
Thresholds	RST24	21	92
Thresholds	RST6	42	184
Event Statistics Mean		0.27	1.55
90%ile		0.70	3.25
95%ile		1.19	6.38
99%ile		3.41	16.75

Step 2

Velocity 0.15 m/s — Tier 1 is used for the calculation

DI -

% settlement needed - %

In River (with mitigation)

		Step 3 Copper	Step 3 Zinc
		RST24	
Allowable Exceedances/year		2	2
No. of exceedances/year		-	-
No. of exceedances/worst year		-	-
No. of exceedances/summer		-	-
No. of exceedances/worst summer		-	-
		RST6	
Allowable Exceedances/year		1	1
No. of exceedances/year		-	-
No. of exceedances/worst year		-	-
No. of exceedances/summer		-	-
No. of exceedances/worst summer		-	-
Annual average concentration (ug/l)		-	-
		(ug/l)	(ug/l)
Thresholds hresholds	RST24	21	92
Thresholds	RST6	42	184
Event Statistics Mean		-	-
90%ile		-	-
95%ile		-	-
99%ile		-	-

Step 3

DI -

Details of the chosen rainfall site	
SAAR (mm)	**680**
Altitude (m)	**75**
Easting	**4248**
Northing	**5648**
Coastal distance (km)	**18**

Step 2 Whole Scheme: Q95 Sensitivity Test

HIGHWAYS AGENCY

Highways Agency Water Risk Assessment Tool version 1.0 November 2009

Soluble - Acute Impact

Annual Average Concentration

	Copper	Zinc	
Step 2	0.11	0.65	ug/l
Step 3	-	-	ug/l

Copper	Zinc
Pass	Pass

Sediment - Chronic Impact

Pass

Sediment deposition for this site is judged as:

Accumulating?	Yes	0.08	Low flow Vel m/s
Extensive?	No	89	Deposition Index

Location Details

Road number	A1		HA Area / DBFO number		
Assessment type	Non-cumulative assessment (single outfall)				
OS grid reference of assessment point (m)	Easting	424935		Northing	558620
OS grid reference of outfall structure (m)	Easting	424935		Northing	558620
Outfall number	Whole scheme		List of outfalls in cumulative assessment		
Receiving watercourse	River Team				
EA receiving water Detailed River Network ID			Assessor and affiliation		Beth woolley WSP
Date of assessment	20/04/2018		Version of assessment		V1
Notes	Sum of all outfall impermeable areas contributing.				

Step 1 Runoff Quality

AADT: >=100,000 | Climatic region: Colder Dry | Rainfall site: Newcastle upon tyne (SAAR 680mm)

Step 2 River Impacts

Annual 95%ile river flow (m^3/s): 0.222 (Enter zero in Annual 95%ile river flow box to assess Step 1 runoff quality only)

Impermeable road area drained (ha): 21.4 | Permeable area draining to outfall (ha): 0

Base Flow Index (BFI): 0.67 | Is the discharge in or within 1 km upstream of a protected site for conservation? No

For dissolved zinc only

Water hardness: Medium = 50-200 CaCO3/l

For sediment impact only

Is there a downstream structure, lake, pond or canal that reduces the velocity within 100m of the point of discharge? No

Tier 1 | Estimated river width (m): 6.5

Tier 2 | Bed width (m): 3 | Manning's n: 0.07 | Side slope (m/m): 0.5 | Long slope (m/m): 0.0001

Step 3 Mitigation

	Brief description	Estimated effectiveness: Treatment for solubles (%)	Attenuation for solubles - restricted discharge rate (l/s)	Settlement of sediments (%)
Existing measures		0	Unlimited	0
Proposed measures		0	Unlimited	0

Predict Impact

Show Detailed Results

Exit Tool

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Summary of predictions

Soluble - Acute Impact

Sediment - Chronic Impact

Prediction of impact		Copper	Zinc	Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene
	Step1										
	Step2										
	Step3										

DETAILED RESULTS

In Runoff

Step 1

		Copper	Zinc	Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene
		RST24		Toxicity Threshold							
Allowable Exceedances/year		1	1	1	1	1	1	1	1	1	1
No. of exceedances/year		76.50	99.20	97.40	117.50	6.10	41.50	96.30	41.50	19.20	78.90
No. of exceedances/worst year		86	107	109	138	12	51	104	51	28	88
		RST6									
Allowable Exceedances/year		1	1								
No. of exceedances/year		28.80	63.00								
No. of exceedances/worst year		43	75								
		(ug/l)	*(ug/l)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(ug/kg)*	*(ug/kg)*	*(ug/kg)*	*(ug/kg)*	*(ug/kg)*
Thresholds	***RST24***	21	92	***Toxicity*** 197	315	3.5	16770	875	2355	245	515
Thresholds	***RST6***	42	184								
Event Statistics Mean		31.55	173.85	526	2036	1	15858	2743	2632	168	742
90%ile		60.39	356.07	1084	4499	3	35481	6138	5890	376	1661
95%ile		73.53	485.30	1363	6145	3	54904	9498	9114	582	2569
99%ile		136.52	922.50	2130	8873	5	89125	15419	14795	945	4171

In River (no mitigation)

Step 2

	Copper	Zinc
	RST24	
Allowable Exceedances/year	2	2
No. of exceedances/year	0	0.2
No. of exceedances/worst year	0	1
No. of exceedances/summer	0	0.2
No. of exceedances/worst summer	0	1
	RST6	
Allowable Exceedances/year	1	1
No. of exceedances/year	0	0
No. of exceedances/worst year	0	0
No. of exceedances/summer	0	0
No. of exceedances/worst summer	0	0
Annual average concentration (ug/l)	0.11	0.65
	(ug/l)	*(ug/l)*
Thresholds	***RST24*** 21	92
Thresholds	***RST6*** 42	184
Event Statistics Mean	0.45	2.56
90%ile	1.18	5.53
95%ile	1.98	10.61
99%ile	5.60	27.89

Step 2

Velocity 0.08 m/s

DI 88.76

% settlement needed 0 %

Tier 1 is used for the calculation

In River (with mitigation)

Step 3

	Copper	Zinc
	RST24	
Allowable Exceedances/year	2	2
No. of exceedances/year	-	-
No. of exceedances/worst year	-	-
No. of exceedances/summer	-	-
No. of exceedances/worst summer	-	-
	RST6	
Allowable Exceedances/year	1	1
No. of exceedances/year	-	-
No. of exceedances/worst year	-	-
No. of exceedances/summer	-	-
No. of exceedances/worst summer	-	-
Annual average concentration (ug/l)	-	-
	(ug/l)	*(ug/l)*
Thresholds hresholds	***RST24*** 21	92
Thresholds	***RST6*** 42	184
Event Statistics Mean	-	-
90%ile	-	-
95%ile	-	-
99%ile	-	-

DI -

Details of the chosen rainfall site	
SAAR (mm)	**680**
Altitude (m)	**75**
Easting	**4248**
Northing	**5648**
Coastal distance (km)	**18**

Step 2 Whole Scheme: Permeable areas

HIGHWAYS AGENCY

Highways Agency Water Risk Assessment Tool version 1.0 November 2009

Annual Average Concentration

	Copper	Zinc	
Step 2	0.06	0.39	ug/l
Step 3	-	-	ug/l

Soluble - Acute Impact

Copper	Zinc
Pass	Pass

Sediment - Chronic Impact

Pass

Sediment deposition for this site is judged as:

Accumulating?	No	0.15	Low flow Vel m/s
Extensive?	No	-	Deposition Index

Location Details

Road number	A1		HA Area / DBFO number		
Assessment type	Non-cumulative assessment (single outfall)				
OS grid reference of assessment point (m)	Easting	424935		Northing	558620
OS grid reference of outfall structure (m)	Easting	424935		Northing	558620
Outfall number	Whole scheme		List of outfalls in cumulative assessment		
Receiving watercourse	River Team				
EA receiving water Detailed River Network ID			Assessor and affiliation	Beth woolley WSP	
Date of assessment	20/04/2018		Version of assessment	V1	
Notes	Sum of all outfall impermeable areas contributing.				

Step 1 Runoff Quality

AADT: >=100,000 | Climatic region: Colder Dry | Rainfall site: Newcastle upon tyne (SAAR 680mm)

Step 2 River Impacts

Annual 95%ile river flow (m^3/s): 0.382 (Enter zero in Annual 95%ile river flow box to assess Step 1 runoff quality only)

Impermeable road area drained (ha): 21.4 | Permeable area draining to outfall (ha): 4.27

Base Flow Index (BFI): 0.67 | Is the discharge in or within 1 km upstream of a protected site for conservation? No D

For dissolved zinc only — Water hardness: Medium = 50-200 CaCO3/l

For sediment impact only — Is there a downstream structure, lake, pond or canal that reduces the velocity within 100m of the point of discharge? No D

Tier 1 — Estimated river width (m): 6.5

Tier 2 — Bed width (m): 3 | Manning's n: 0.07 D | Side slope (m/m): 0.5 | Long slope (m/m): 0.0001

Step 3 Mitigation

	Brief description	Estimated effectiveness: Treatment for solubles (%)		Attenuation for solubles - restricted discharge rate (l/s)		Settlement of sediments (%)	
Existing measures		0	D	Unlimited	D	0	D
Proposed measures		0	D	Unlimited	D	0	D

Predict Impact

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Summary of predictions

Soluble - Acute Impact

Sediment - Chronic Impact

Prediction of impact		Copper	Zinc	Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene
	Step1										
	Step2										
	Step3										

DETAILED RESULTS

In Runoff

		Step 1 Copper	Zinc	*Step 1* Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene
		RST24					Toxicity Threshold				
Allowable Exceedances/year		1	1	1	1	1	1	1	1	1	1
No. of exceedances/year		**76.50**	**99.20**	**97.40**	**117.50**	**6.10**	**41.50**	**96.30**	**41.50**	**19.20**	**78.90**
No. of exceedances/worst year		86	107	109	138	12	51	104	51	28	88
		RST6									
Allowable Exceedances/year		1	1								
No. of exceedances/year		**28.80**	**63.00**								
No. of exceedances/worst year		43	75								
		(ug/l)	*(ug/l)*	*(mg/kg)*	*(mg/kg)*	*(mg/kg)*	*(ug/kg)*	*(ug/kg)*	*(ug/kg)*	*(ug/kg)*	*(ug/kg)*
Thresholds	***RST24***	21	92	***Toxicity*** 197	315	3.5	16770	875	2355	245	515
Thresholds	***RST6***	42	184								
Event Statistics Mean		31.55	173.85	526	2036	1	15858	2743	2632	168	742
90%ile		60.39	356.07	1084	4499	3	35481	6138	5890	376	1661
95%ile		73.53	485.30	1363	6145	3	54904	9498	9114	582	2569
99%ile		136.52	922.50	2130	8873	5	89125	15419	14795	945	4171

In River (no mitigation)

	Step 2 Copper	Zinc
	RST24	
Allowable Exceedances/year	2	2
No. of exceedances/year	**0**	**0.1**
No. of exceedances/worst year	0	1
No. of exceedances/summer	0	0.1
No. of exceedances/worst summer	0	1
	RST6	
Allowable Exceedances/year	1	1
No. of exceedances/year	**0**	**0**
No. of exceedances/worst year	0	0
No. of exceedances/summer	0	0
No. of exceedances/worst summer	0	0
Annual average concentration (ug/l)	0.06	0.39
	(ug/l)	*(ug/l)*
Thresholds	***RST24*** 21	92
Thresholds	***RST6*** 42	184
Event Statistics Mean	0.27	1.55
90%ile	0.70	3.25
95%ile	1.19	6.37
99%ile	3.40	16.68

Step 2

Velocity 0.15 m/s — **Tier 1** is used for the calculation

DI -

% settlement needed - %

In River (with mitigation)

	Step 3 Copper	Zinc
	RST24	
Allowable Exceedances/year	2	2
No. of exceedances/year	**-**	**-**
No. of exceedances/worst year	-	-
No. of exceedances/summer	-	-
No. of exceedances/worst summer	-	-
	RST6	
Allowable Exceedances/year	1	1
No. of exceedances/year	**-**	**-**
No. of exceedances/worst year	-	-
No. of exceedances/summer	-	-
No. of exceedances/worst summer	-	-
Annual average concentration (ug/l)	-	-
	(ug/l)	*(ug/l)*
Thresholds hresholds	***RST24*** 21	92
Thresholds	***RST6*** 42	184
Event Statistics Mean	-	-
90%ile	-	-
95%ile	-	-
99%ile	-	-

Step 3

DI -

Details of the chosen rainfall site	
SAAR (mm)	**680**
Altitude (m)	**75**
Easting	**4248**
Northing	**5648**
Coastal distance (km)	**18**

Step 2 Whole Scheme: Permeable areas Q95 Sensitivity Test

HIGHWAYS AGENCY

Highways Agency Water Risk Assessment Tool version 1.0 November 2009

Annual Average Concentration	Copper	Zinc		Soluble - Acute Impact Copper	Soluble - Acute Impact Zinc	Sediment - Chronic Impact
Step 2	0.11	0.65	ug/l	Pass	Pass	Pass
Step 3	-	-	ug/l			

Sediment deposition for this site is judged as:

Accumulating?	Yes	0.08	Low flow Vel m/s
Extensive?	No	94	Deposition Index

Location Details

Road number	A1		HA Area / DBFO number		
Assessment type	Non-cumulative assessment (single outfall)				
OS grid reference of assessment point (m)	Easting	424935		Northing	558620
OS grid reference of outfall structure (m)	Easting	424935		Northing	558620
Outfall number	Whole Scheme		List of outfalls in cumulative assessment		
Receiving watercourse	River Team				
EA receiving water Detailed River Network ID			Assessor and affiliation		Beth Woolley WSP
Date of assessment	20/04/2018		Version of assessment		V1
Notes					

Step 1 Runoff Quality

AADT: >=100,000 | Climatic region: Colder Dry | Rainfall site: Newcastle upon tyne (SAAR 680mm)

Step 2 River Impacts

Annual 95%ile river flow (m^3/s)	0.22	(Enter zero in Annual 95%ile river flow box to assess Step 1 runoff quality only)	
Impermeable road area drained (ha)	21.4	Permeable area draining to outfall (ha)	4.271
Base Flow Index (BFI)	0.67	Is the discharge in or within 1 km upstream of a protected site for conservation?	No

For dissolved zinc only — Water hardness: Medium = 50-200 CaCO3/l

For sediment impact only — Is there a downstream structure, lake, pond or canal that reduces the velocity within 100m of the point of discharge? No

Tier 1	Estimated river width (m)	6.5					
Tier 2	Bed width (m)	3	Manning's n	0.07	Side slope (m/m)	0.5	Long slope (m/m)	0.0001

Step 3 Mitigation

	Brief description	Estimated effectiveness: Treatment for solubles (%)		Attenuation for solubles - restricted discharge rate (l/s)		Settlement of sediments (%)	
Existing measures		0	D	Unlimited	D	0	D
Proposed measures		0	D	Unlimited	D	0	D

Predict Impact

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Summary of predictions

		Soluble - Acute Impact		Sediment - Chronic Impact							
		Copper	Zinc	Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene
Prediction of impact	Step1										
	Step2										
	Step3										

DETAILED RESULTS

In Runoff

		Step 1 Copper	Step 1 Zinc	Step 1 Copper	Step 1 Zinc	Step 1 Cadmium	Step 1 Total PAH	Step 1 Pyrene	Step 1 Fluoranthene	Step 1 Anthracene	Step 1 Phenanthrene
		RST24		Toxicity Threshold							
Allowable Exceedances/year		1	1	1	1	1	1	1	1	1	1
No. of exceedances/year		76.50	99.20	97.40	117.50	6.10	41.50	96.30	41.50	19.20	78.90
No. of exceedances/worst year		86	107	109	138	12	51	104	51	28	88
		RST6									
Allowable Exceedances/year		1	1								
No. of exceedances/year		28.80	63.00								
No. of exceedances/worst year		43	75								
		(ug/l)	(ug/l)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Thresholds	RST24	21	92	Toxicity 197	315	3.5	16770	875	2355	245	515
Thresholds	RST6	42	184								
Event Statistics Mean		31.55	173.85	526	2036	1	15858	2743	2632	168	742
90%ile		60.39	356.07	1084	4499	3	35481	6138	5890	376	1661
95%ile		73.53	485.30	1363	6145	3	54904	9498	9114	582	2569
99%ile		136.52	922.50	2130	8873	5	89125	15419	14795	945	4171

In River (no mitigation)

	Step 2 Copper	Step 2 Zinc
	RST24	
Allowable Exceedances/year	2	2
No. of exceedances/year	0	0.2
No. of exceedances/worst year	0	1
No. of exceedances/summer	0	0.2
No. of exceedances/worst summer	0	1
	RST6	
Allowable Exceedances/year	1	1
No. of exceedances/year	0	0
No. of exceedances/worst year	0	0
No. of exceedances/summer	0	0
No. of exceedances/worst summer	0	0
Annual average concentration (ug/l)	0.11	0.65
	(ug/l)	(ug/l)
Thresholds	RST24 21	92
Thresholds	RST6 42	184
Event Statistics Mean	0.46	2.58
90%ile	1.19	5.58
95%ile	1.99	10.68
99%ile	5.62	28.04

Step 2

Velocity 0.08 m/s — Tier 1 is used for the calculation

DI 93.57

% settlement needed 0 %

In River (with mitigation)

	Step 3 Copper	Step 3 Zinc
	RST24	
Allowable Exceedances/year	2	2
No. of exceedances/year	-	-
No. of exceedances/worst year	-	-
No. of exceedances/summer	-	-
No. of exceedances/worst summer	-	-
	RST6	
Allowable Exceedances/year	1	1
No. of exceedances/year	-	-
No. of exceedances/worst year	-	-
No. of exceedances/summer	-	-
No. of exceedances/worst summer	-	-
Annual average concentration (ug/l)	-	-
	(ug/l)	(ug/l)
Thresholds hresholds	RST24 21	92
Thresholds	RST6 42	184
Event Statistics Mean	-	-
90%ile	-	-
95%ile	-	-
99%ile	-	-

Step 3

DI -

Details of the chosen rainfall site

SAAR (mm)	680
Altitude (m)	75
Easting	4248
Northing	5648
Coastal distance (km)	18

Appendix B

Method **D** **R**esults (Spillage Risk)

Method D - Spillage Risk

OUTFALL 1

		J65 NB ON	NB (J65-66) and SB (Between Slips) (within 100m of slip road)
D1	Water body type	Surface Watercourse	Surface Watercourse
D2	Length of road draining to outfall (m)	1030	59
D3	Road Type (A-road or Motorway)	M	M
D4	If A road, is site urban or rural?	N/A	N/A
D5	Junction type	Slip	No Junction
D6	Location	<20 minutes	<20 minutes
D7	Traffic flow (AADT two way)	9,154	131,626
D8	%HGV	1.60	6.70
D9	Spillage factor (no/109 HGVkm/year)	0.43	0.43
D10	Risk of accidental spillage	0.00	0.00
D11	Probability factor	0.45	0.45
D12	Risk of pollution incident	0.0000106224	0.0000367444
D13	Is risk greater than 0.01?	NO	NO
D14	Return period without pollution reducing measures	0.0000106224	0.0000367444
D15	Exisiting measures factor	1	1
D16	Return period with pollution reducing measures	0.0000106224	0.0000367444
D17	Proposed measures factor	1	1
D18	Residual with proposed pollution reduction measures	0.0000106224	0.0000367444

	Totals for Outfall 1	Return period (years)
D14	0.0000473667	21112
D16	0.0000473667	21112
D18	0.0000473667	21112

OUTFALL 2

		J65-J66	J65 SB Slip OFF	NB (J65-66) and SB (Between Slips)	NB (J65-66) and SB (Between Slips) (100m within slip)	J65-J66 (100m within slip)	J65-J66 (100m within slip)
D1	Water body type	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse
D2	Length of road draining to outfall (m)	606	88	430	40	100	100
D3	Road Type (A-road or Motorway)	M	M	M	M	M	M
D4	If A road, is site urban or rural?	N/A	N/A	N/A	N/A	N/A	N/A
D5	Junction type	No Junction	Slip	No junction	No junction	No Junction	No Junction
D6	Location	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes
D7	Traffic flow (AADT two way)	139,214	7,588	131,626	131,626	139,214	139,214
D8	%HGV	6.49	2.84	6.70	6.70	6.49	6.49
D9	Spillage factor (no/109 HGVkm/year)	0.36	0.43	0.36	0.43	0.43	0.43
D10	Risk of accidental spillage	0.0007192970	0.0000029734	0.0004982285	0.0000553587	0.0001417756	0.0001417756
D11	Probability factor	0.45	0.45	0.45	0.45	0.45	0.45
D12	Risk of pollution incident	0.0003236837	0.0000013380	0.0002242028	0.0000249114	0.0000637990	0.0000637990
D13	Is risk greater than 0.01?	NO	NO	NO	NO	NO	NO
D14	Return period without pollution reducing measures	0.0003236837	0.0000013380	0.0002242028	0.0000249114	0.0000637990	0.0000637990
D15	Exisiting measures factor	1	1	1	1	1	1
D16	Return period with pollution reducing measures	0.0003236837	0.0000013380	0.0002242028	0.0000249114	0.0000637990	0.0000637990
D17	Proposed measures factor	1	1	1	1	1	1
D18	Residual with proposed pollution reduction measures	0.0003236837	0.0000013380	0.0002242028	0.0000249114	0.0000637990	0.0000637990

	Totals for Outfall 2	Return period (years)
D14	0.0007017340	1425
D16	0.0007017340	1425
D18	0.0007017340	1425

OUTFALL 3

		J65 SB Slip OFF	J65 SB Slip OFF (100m within Roundabout)
D1	Water body type	Surface Watercourse	Surface Watercourse
D2	Length of road draining to outfall (m)	300	70
D3	Road Type (A-road or Motorway)	M	M
D4	If A road, is site urban or rural?	N/A	N/A
D5	Junction type	Slip	Slip
D6	Location	<20 minutes	<20 minutes
D7	Traffic flow (AADT two way)	7,588	7,588
D8	%HGV	2.84	2.84
D9	Spillage factor (no/109 HGVkm/year)	0.43	5.35
D10	Risk of accidental spillage	0.0000101364	0.0000294271
D11	Probability factor	0.45	0.45
D12	Risk of pollution incident	0.0000045614	0.0000132422
D13	Is risk greater than 0.01?	NO	NO
D14	Return period without pollution reducing measures	0.0000045614	0.0000132422
D15	Exisiting measures factor	1	1
D16	Return period with pollution reducing measures	0.0000045614	0.0000132422
D17	Proposed measures factor	1	1
D18	Residual with proposed pollution reduction measures	0.0000045614	0.0000132422

	Totals for Outfall 3	Return period (years)
D14	0.0000178036	56168
D16	0.0000178036	56168
D18	0.0000178036	56168

OUTFALL 4

		J65 SB Slip OFF	J65-J66	J65-J66 (100m within Sliproad)
D1	Water body type	Surface Watercourse	Surface Watercourse	Surface Watercourse
D2	Length of road draining to outfall (m)	36	591	200
D3	Road Type (A-road or Motorway)	M	M	M
D4	If A road, is site urban or rural?	N/A	N/A	N/A
D5	Junction type	Slip	No Junction	No Junction
D6	Location	<20 minutes	<20 minutes	<20 minutes
D7	Traffic flow (AADT two way)	7,588	139,214	139,214
D8	%HGV	2.84	6.49	6.49
D9	Spillage factor (no/109 HGVkm/year)	0.43	0.36	0.43
D10	Risk of accidental spillage	0.0000012164	0.0007014926	0.0002835513
D11	Probability factor	0.45	0.45	0.45
D12	Risk of pollution incident	0.0000005474	0.0003156717	0.0001275981
D13	Is risk greater than 0.01?			
D14	Return period without pollution reducing measures	0.0000005474	0.0003156717	0.0001275981
D15	Exisiting measures factor	1	1	1
D16	Return period with pollution reducing measures	0.0000005474	0.0003156717	0.0001275981
D17	Proposed measures factor	1	1	1
D18	Residual with proposed pollution reduction measures	0.0000005474	0.0003156717	0.0001275981

	Totals for Outfall 4	Return period (years)
D14	0.0004438171	2253
D16	0.0004438171	2253
D18	0.0004438171	2253

OUTFALL 5

					Slip roads adjacent to Roundabout			**Roundabout sensitivity test**
		J66 Between Slips	J66 SB Slip ON	J66 NB Slip OFF	J66 SB Slip ON	J66 NB Slip OFF	J66 Between Slips (100m near slip road)	J66 Roundabout
D1	Water body type	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse
D2	Length of road draining to outfall (m)	399	320	250	100	100	100	360
D3	Road Type (A-road or Motorway)	M	M	M	TR	TR	M	M
D4	If A road, is site urban or rural?	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D5	Junction type	No Junction	Slip	Slip	Roundabout	Roundabout	No Junction	No Junction
D6	Location	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes
D7	Traffic flow (AADT two way)	128,482	6,679	5,655	6,679	5,655	128,482	10,000
D8	%HGV	6.67	1.33	3.49	1.33	3.49	6.67	5.00
D9	Spillage factor (no/109 HGVkm/year)	0.36	0.43	0.43	5.35	5.35	0.43	5.35
D10	Risk of accidental spillage	0.0004494673	0.0000044517	0.0000077452	0.0000173084	0.0000385459	0.0001345523	0.0003514950
D11	Probability factor	0.45	0.45	0.45	0.45	0.45	0.45	0.45
D12	Risk of pollution incident	0.0002022603	0.0000020032	0.0000034853	0.0000077888	0.0000173457	0.0000605485	0.0001581728
D13	Is risk greater than 0.01?							
D14	Return period without pollution reducing measures	0.0002022603	0.0000020032	0.0000034853	0.0000077888	0.0000173457	0.0000605485	0.0001581728
D15	Exisiting measures factor	1	1	1	1	1	1	1
D16	Return period with pollution reducing measures	0.0002022603	0.0000020032	0.0000034853	0.0000077888	0.0000173457	0.0000605485	0.0001581728
D17	Proposed measures factor	1	1	1	1	1	1	1
D18	Residual with proposed pollution reduction measures	0.0002022603	0.0000020032	0.0000034853	0.0000077888	0.0000173457	0.0000605485	0.0001581728

	Totals for Outfall 5	Return period (years)
D14	0.0004516046	2214
D16	0.0004516046	2214
D18	0.0004516046	2214

OUTFALL 7A

		J66-67	J66 Between Slips	J66 NB Slip ON	J66 SB Slip OFF	J66-67 (adjacent to slip roads)	J66 Between Slips
D1	Water body type	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse
D2	Length of road draining to outfall (m)	140.00	401	505	590	100.00	100
D3	Road Type (A-road or Motorway)	M	M	M	M	M	M
D4	If A road, is site urban or rural?	N/a	N/A	N/A	N/A	N/a	N/A
D5	Junction type	No junction	No Junction	Slip	Slip	No junction	No Junction
D6	Location	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes
D7	Traffic flow (AADT two way)	135,812	128,482	6,584	2,573	135,812	128,482
D8	%HGV	6.71	6.67	0.87	0.31	6.71	6.67
D9	Spillage factor (no/109 HGVkm/year)	0.36	0.36	0.43	0.43	0.43	0.43
D10	Risk of accidental spillage	0.0001675429	0.0004517203	0.0000045544	0.0000007466	0.0001429434	0.0001345523
D11	Probability factor	0.45	0.45	0.45	0.45	0.45	0.45
D12	Risk of pollution incident	0.0000753943	0.0002032741	0.0000020495	0.0000003360	0.0000643245	0.0000605485
D13	Is risk greater than 0.01?						
D14	Return period without pollution reducing measures	0.0000753943	0.0002032741	0.0000020495	0.0000003360	0.0000643245	0.0000605485
D15	Exisiting measures factor	1	1	1	1	1	1
D16	Return period with pollution reducing measures	0.0000753943	0.0002032741	0.0000020495	0.0000003360	0.0000643245	0.0000605485
D17	Proposed measures factor	1	1	1	1	1	1
D18	Residual with proposed pollution reduction measures	0.0000753943	0.0002032741	0.0000020495	0.0000003360	0.0000643245	0.0000605485

	Totals for Outfall 7A	Return period (years)
D14	0.0004059270	2463
D16	0.0004059270	2463
D18	0.0004059270	2463

OUTFALL 6

		J66-67
D1	Water body type	Surface Watercourse
D2	Length of road draining to outfall (m)	371.00
D3	Road Type (A-road or Motorway)	M
D4	If A road, is site urban or rural?	N/A
D5	Junction type	No junction
D6	Location	<20 minutes
D7	Traffic flow (AADT two way)	135,812
D8	%HGV	6.71
D9	Spillage factor (no/109 HGVkm/year)	0.36
D10	Risk of accidental spillage	0.0004439887
D11	Probability factor	0.45
D12	Risk of pollution incident	0.0001997949
D13	Is risk greater than 0.01?	NO
D14	Return period without pollution reducing measures	0.0001997949
D15	Exisiting measures factor	1
D16	Return period with pollution reducing measures	0.0001997949
D17	Proposed measures factor	1
D18	Residual with proposed pollution reduction measures	0.0001997949

	Totals for Outfall 6	Return period (years)
D14	0.0001997949	5005
D16	0.0001997949	5005
D18	0.0001997949	5005

OUTFALL 7

		J66-67
D1	Water body type	Surface Watercourse
D2	Length of road draining to outfall (m)	251.00
D3	Road Type (A-road or Motorway)	M
D4	If A road, is site urban or rural?	N/a
D5	Junction type	No junction
D6	Location	<20 minutes
D7	Traffic flow (AADT two way)	135,812
D8	%HGV	6.71
D9	Spillage factor (no/109 HGVkm/year)	0.36
D10	Risk of accidental spillage	0.0003003805
D11	Probability factor	0.45
D12	Risk of pollution incident	0.0001351712
D13	Is risk greater than 0.01?	
D14	Return period without pollution reducing measures	0.0001351712
D15	Exisiting measures factor	1
D16	Return period with pollution reducing measures	0.0001351712
D17	Proposed measures factor	1
D18	Residual with proposed pollution reduction measures	0.0001351712

	Totals for Outfall 7	Return period (years)
D14	0.0001351712	7398
D16	0.0001351712	7398
D18	0.0001351712	7398

OUTFALL 8

		J66-67
D1	Water body type	Surface Watercourse
D2	Length of road draining to outfall (m)	404.00
D3	Road Type (A-road or Motorway)	M
D4	If A road, is site urban or rural?	N/a
D5	Junction type	No junction
D6	Location	<20 minutes
D7	Traffic flow (AADT two way)	135,812
D8	%HGV	6.71
D9	Spillage factor (no/109 HGVkm/year)	0.36
D10	Risk of accidental spillage	0.0004834810
D11	Probability factor	0.45
D12	Risk of pollution incident	0.0002175664
D13	Is risk greater than 0.01?	
D14	Return period without pollution reducing measures	0.0002175664
D15	Exisiting measures factor	1
D16	Return period with pollution reducing measures	0.0002175664
D17	Proposed measures factor	1
D18	Residual with proposed pollution reduction measures	0.0002175664

		Totals for Outfall 8	Return period (years)
D14	0.0002175664	0.0002175664	4596
D16	0.0002175664	0.0002175664	4596
D18	0.0002175664	0.0002175664	4596

OUTFALL 9

		J67-68	J67 Between Slips	J67 SB Slip OFF	J67 SB Slip OFF - within 100m of Roundabout	J67-68 (within 100m of slip)	J67 Between Slips (within 100m of slip)	J67 Roundabout
D1	Water body type	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse
D2	Length of road draining to outfall (m)	83.00	317.00	238.00	100.00	100.00	100.00	36
D3	Road Type (A-road or Motorway)	M	M	M	TR	M	M	M
D4	If A road, is site urban or rural?	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D5	Junction type	No junction	No junction	No junction	Roundabout	No junction	No junction	No Junction
D6	Location	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes
D7	Traffic flow (AADT two way)	131,035	110,063	10,067	10,067	131,035	110,063	15,000
D8	%HGV	6.36	7.41	2.27	2.27	6.36	7.41	8.00
D9	Spillage factor (no/109 HGVkm/year)	0.36	0.36	0.43	5.35	0.43	0.43	5.35
D10	Risk of accidental spillage	0.0000909205	0.0003398886	0.0000085424	0.0000446568	0.0001308427	0.0001280688	0.0000843588
D11	Probability factor	0.45	0.45	0.45	0.45	0.45	0.45	0.45
D12	Risk of pollution incident	0.0000409142	0.0001529499	0.0000038441	0.0000200956	0.0000588792	0.0000576310	0.0000379615
D13	Is risk greater than 0.01?							
D14	Return period without pollution reducing measures	0.0000409142	0.0001529499	0.0000038441	0.0000200956	0.0000588792	0.0000576310	0.0000379615
D15	Exisiting measures factor	1	1	1	1	1	1	1
D16	Return period with pollution reducing measures	0.0000409142	0.0001529499	0.0000038441	0.0000200956	0.0000588792	0.0000576310	0.0000379615
D17	Proposed measures factor	1	1	1	1	1	1	1
D18	Residual with proposed pollution reduction measures	0.0000409142	0.0001529499	0.0000038441	0.0000200956	0.0000588792	0.0000576310	0.0000379615

	Totals for Outfall 9	Return period (years)
D14	0.0003722754	2686
D16	0.0003722754	2686
D18	0.0003722754	2686

OUTFALL 11

		J66-67	J67 Between Slips	J67 SB Slip ON	J67 SB Slip ON - Roundabout	J66-67 (100m near slip)	J67 Between Slips (100m near slip)
D1	Water body type	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse
D2	Length of road draining to outfall (m)	70.00	157.00	179.00	100.00	100.00	100.00
D3	Road Type (A-road or Motorway)	M	M	M	TR	M	M
D4	If A road, is site urban or rural?	N/a	N/A	N/A	N/A	N/a	N/A
D5	Junction type	No junction	No junction	Slip	Roundabout	No junction	No junction
D6	Location	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes
D7	Traffic flow (AADT two way)	135,812	110,063	7,872	7,872	135,812	110,063
D8	%HGV	6.71	7.41	2.85	2.85	6.71	7.41
D9	Spillage factor (no/109 HGVkm/year)	0.36	0.36	0.43	5.35	0.43	0.43
D10	Risk of accidental spillage	0.0000837715	0.0001683360	0.0000062990	0.0000437827	0.0000015011	0.0000017748
D11	Probability factor	0.45	0.45	0.45	0.45	0.45	0.45
D12	Risk of pollution incident	0.0000376972	0.0000757512	0.0000028345	0.0000197022	0.0000006755	0.0000007987
D13	Is risk greater than 0.01?						
D14	Return period without pollution reducing measures	0.0000376972	0.0000757512	0.0000028345	0.0000197022	0.0000006755	0.0000007987
D15	Exisiting measures factor	1	1	1	1	1	1
D16	Return period with pollution reducing measures	0.0000376972	0.0000757512	0.0000028345	0.0000197022	0.0000006755	0.0000007987
D17	Proposed measures factor	1	1	1	1	1	1
D18	Residual with proposed pollution reduction measures	0.0000376972	0.0000757512	0.0000028345	0.0000197022	0.0000006755	0.0000007987

	Totals for Outfall 11	Return period (years)
D14	0.0001374593	7275
D16	0.0001374593	7275
D18	0.0001374593	7275

OUTFALL 12

		J67-68	J67 Between Slips	J67 NB Slip ON	J67 NB Slip ON - within 100m of roundabout	J67-68 (within 100m of slip)	J67 Between Slips (within 100m of slip)
D1	Water body type	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse
D2	Length of road draining to outfall (m)	68.00	343.00	245.00	87.00	100.00	100.00
D3	Road Type (A-road or Motorway)	M	M	M	TR	M	M
D4	If A road, is site urban or rural?	N/A	N/A	N/A	N/A	N/A	N/A
D5	Junction type	No junction	No junction	No junction	Roundabout	No junction	No junction
D6	Location	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes
D7	Traffic flow (AADT two way)	131,035	110,063	3,880	3,880	131,035	110,063
D8	%HGV	6.36	7.41	2.79	2.79	6.36	7.41
D9	Spillage factor (no/109 HGVkm/year)	0.36	0.36	0.43	5.35	0.43	0.43
D10	Risk of accidental spillage	0.0000744891	0.0003677660	0.0000041598	0.0000183787	0.0001308427	0.0001280688
D11	Probability factor	0.45	0.45	0.45	0.45	0.45	0.45
D12	Risk of pollution incident	0.0000335201	0.0001654947	0.0000018719	0.0000082704	0.0000588792	0.0000576310
D13	Is risk greater than 0.01?						
D14	Return period without pollution reducing measures	0.0000335201	0.0001654947	0.0000018719	0.0000082704	0.0000588792	0.0000576310
D15	Exisiting measures factor	1	1	1	1	1	1
D16	Return period with pollution reducing measures	0.0000335201	0.0001654947	0.0000018719	0.0000082704	0.0000588792	0.0000576310
D17	Proposed measures factor	1	1	1	1	1	1
D18	Residual with proposed pollution reduction measures	0.0000335201	0.0001654947	0.0000018719	0.0000082704	0.0000588792	0.0000576310

	Totals for Outfall 12	Return period (years)
D14	0.0003256673	3071
D16	0.0003256673	3071
D18	0.0003256673	3071

OUTFALL 13

		J66-67	J67 Between Slips	J67 SB Slip OFF	J67 SB Slip OFF - Adjacent to the Roundabout	J66-67 (100m near slip)	J67 Between Slips (100m near slip)
D1	Water body type	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse	Surface Watercourse
D2	Length of road draining to outfall (m)	170.00	172.00	186.00	100.00	100.00	100.00
D3	Road Type (A-road or Motorway)	M	M	M	TR	M	M
D4	If A road, is site urban or rural?	N/A	N/A	N/A	N/A	N/a	N/A
D5	Junction type	No junction	No junction	No junction	Roundabout	No junction	No junction
D6	Location	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes	<20 minutes
D7	Traffic flow (AADT two way)	135,812	110,063	10,067	10,067	135,812	110,063
D8	%HGV	6.71	7.41	2.27	2.27	6.71	7.41
D9	Spillage factor (no/109 HGVkm/year)	0.36	0.36	0.43	5.35	0.43	0.43
D10	Risk of accidental spillage	0.0002034450	0.0001844191	0.0000066760	0.0000446568	0.0000015011	0.0000017748
D11	Probability factor	0.45	0.45	0.45	0.45	0.45	0.45
D12	Risk of pollution incident	0.0000915502	0.0000829886	0.0000030042	0.0000200956	0.0000006755	0.0000007987
D13	Is risk greater than 0.01?						
D14	Return period without pollution reducing measures	0.0000915502	0.0000829886	0.0000030042	0.0000200956	0.0000006755	0.0000007987
D15	Exisiting measures factor	1	1	1	1	1	1
D16	Return period with pollution reducing measures	0.0000915502	0.0000829886	0.0000030042	0.0000200956	0.0000006755	0.0000007987
D17	Proposed measures factor	1	1	1	1	1	1
D18	Residual with proposed pollution reduction measures	0.0000915502	0.0000829886	0.0000030042	0.0000200956	0.0000006755	0.0000007987

	Totals for Outfall 13	Return period (years)
D14	0.0001991127	5022
D16	0.0001991127	5022
D18	0.0001991127	5022

Sum of risk for entire scheme

	Totals for the scheme	Return period (years)
D14	0.0036553003	274
D16	0.0036553003	274
D18	0.0036553003	274

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