

Llywodraeth Cymru / Welsh Government

A487 New Dyfi Bridge

Environmental Statement - Volume 3: Appendix 15.3

HAWRAT Model

Final Issue | March 2016







15.3.1 HAWRAT Model Parameters

Dyfi Bridge **HAWRAT Model Parameters** March 2016

Single Catchment Assessment

Catchment number 2 (existing baseline) Road number A487 A487 A487 A487 OS grid reference 274922 274414 274414 274422 of assessment point 302000 301311 301311 301909 OS grid reference 274922 274414 274414 274422 of outfall structure 302000 301311 301311 301909 Watercourse name Dyfi Drainage Ditch Drainage Ditch Dyfi Water body id GB11006404 N/A N/A GB1100640 48390 8390 Climate cold wet cold wet cold wet cold wet Rainfall site Colwyn Bay Colwyn Bay Colwyn Bay Colwyn Bay 95% exceedance 2.339 m3/s 0.0001 m3/s * 0.0001 m3/s * 2.339 m3/s Impermeable road 0.46 0.2 1.26 0.81 area drained (ha) Permeable road 0.29 2.37 0.62 1.19 area drained (ha) Base flow index 0.39 0.65 0.65 0.39 Protected site No No No No Water hardness Low Low Low Low River width (m) 41 34

Cumulative Catchment <u>Assessment</u>

Catchment
number
1 and 3
A487 274422
274422
301909 274422
274422
301909
301909 Dyfi
Ť
GB110064048
390
cold wet
Colwyn Bay
2.339 m3/s 2.07
2.07
2.99
0.39
No
Low
34

^{*} The Q95 for the drainage ditch has been calculated from LowFlow software of a value of 0.00083 m3/s. In accordance with HD 45/09 guidance where the value of Q95 is less than 0.0001 m3/s, a figure of 0.001 m3/s is used.

15.3.2 Proposed Routine Runoff - Outfall 1 Detailed Results

Proposed measures	Step 3 Mitigation Existing measures	For sediment impact only	For dissolved zinc only		Step 2 River Impacts	Step 1 Runoff Quality	Notes	Date of assessment	EA receiving water Detailed River Network ID	Receiving watercourse	Outfall number	OS grid reference of outfall structure (m)	OS grid reference of assessment point (m)	Assessment type	Road number	Location Details		AGENCY	HIGHWAYS
		Is there a downstream structure, lake, pond or canal that reduces the velocity within 100m of the point of discharge? Tier 1 Estimated river width (m) Tier 2 Bed width (m) 3 Manning's n 0.07 Side slope (m/m)	Water hardness	Impermeable road area drained (ha) Base Flow Index (BFI)	Annual 95%ile river flow (m³/s)	AADT >10,000 and <50,000			River Network ID			structure (m)					Step 2 0.00 Step 3 -	Annual Average Concentration	
	Brief description	ownstream structure, lake, pond Estimated river width (m) Bed width (m)	Low = <50mg CaCO3/l	e drained (ha) 0.39	оw (m³/s)	4		01/03/2016	GB1100640408390	Dyfi		Easting	Easting	Non-cumulative ass	A487		0.00 ug/l - ug/l	Soluble	encv Water Risk
	tion	d or canal that reduce		0.81	2.339 (Ent	Climatic region Cc			J			274922	274922	Non-cumulative assessment (single outfall)			Pass	Soluble - Acute Impact Copper	Highways Agency Water Risk Assessment Tool
	Treatment for solubles (%)	duces the velocity within 1 Manning's n 0.07		Permeable area draining to outfall (ha) ls the discharge in or within 1 km upstr	(Enter zero in Annual 95%ile	Colder Wet		Version of assessment	Assessor and affilia	cullulative ass	_			all)	HA Area / DBFO number		Pass	Zinc	version 1.0
Unlimited • D	effe	00m of the point of dischar		o outfall (ha) n 1 km upstream of a	ile river flow box to a	Rainfall site		sment	iliation	assessillelit	ls in	Northing	Northing		number		Pass		November 2009
	veness Settlement of sediments (%)	scharge?		utfall (ha) 0.62 km upstream of a protected site for conservation?	river flow box to assess Step 1 runoff quality only)	Colwyn Bay (SAAR 788.1mm)						302000	302000				Accumulating? Extensive?	Sediment - Chronic Impact	
Exit	Predict Show Deta	No ↓ ☐		servation?	ality only)	1mm)											Accumulating? Yes 0.04 Low flow flow 1 Deposition for this site is judged as:	c Impact	
Exit Tool	Predict Impact Show Detailed Results	0.0001		8		1								1			Low flow Vel m/s Deposition Index		

Summary of predictions

Prediction of impact Step1 Step2 Step3 Soluble - Acute Impact

Copper	Zinc

Return To Interface

Sediment - Chronic Impact										
Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene			

DETAILED RESULTS

In Runoff

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year

Thresholds
Thresholds
Event Statistics Mean

90%ile 95%ile 99%ile

Step 1			Step 1
	Copper	Zinc	
г	RS ⁻	Γ24	г
	60.10	49.70	<u> </u>
	70	0.4	

RST6						
1	1					
17.20	18.10					
25	29					
	=0					

	(ug/l)	(ug/l)
RST24	21	60
RST6	42	120
	24.83	69.60
	46.48	143.58
	56.22	190.25
	107.78	396.06

Сор	per Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene	
Toxicity Threshold								
1	1	1	1	1	1	1	1	
73.	98.70	1.40	40.60	94.50	40.60	18.60	77.30	
81	109	3	48	110	48	26	95	
	•	•						

	(mg/kg)	(mg/kg)	(mg/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Toxicity	197	315	3.5	16770	875	2355	245	515
_								
	345	1211	1	15737	2722	2612	167	736
	799	2851	1	28184	4876	4679	299	1319
	996	3882	2	35481	6138	5890	376	1661
	1414	5918	4	89125	15419	14795	945	4171

Tier 1 is used for the calculation

In River (no mitigation)

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer
No. of exceedances/worst summer

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer
No. of exceedances/worst summer

Annual average concentration (ug/l)

Thresholds Thresholds

Event Statistics Mean 90%ile 95%ile 99%ile

Step 2

Step 3

Copper	Zinc
RS	T24
2	2
0	0
0	0
0	0
0	0

1	1							
0	0							
0	0							
0	0							
0	0							
0.00	0.00							

RST6

	(ug/l)	(ug/l)
ST24	21	60
ST6	42	120
Γ	0.00	0.00
	0.00	0.01
	0.00	0.01
	0.01	0.05

In River (with mitigation)

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer
No. of exceedances/summer

Allowable Exceedances/year
No. of exceedances/worst year
No. of exceedances/worst year
No. of exceedances/summer

Annual average concentration (ug/l)

Thresholds hresholds

Thresholds
Event Statistics Mean
90%ile
95%ile
99%ile

SAAR (mm)

Altitude (m)

Northing Coastal distance (km)

Easting

Details of the chosen rainfall site

Copper RS	Zinc T24
2	2
-	-
-	-
-	-

RS	ST6
1	1
-	-
-	-
-	-
-	-
-	-

	(ug/l)	(ug/l)
ST24 RST6	21	60
RST6	42	120
	_	-
	-	-
	-	-

788.1

36

2831

3796 0.8 Step 2

Velocity	0.04	m/:
DI	1.46	

% settlement needed 0 %

DI

Detailed Results 11/03/2016 16:59

15.3.4 Proposed Routine Runoff - Outfall 2 Detailed Results

Proposed measures	Existing measures		Step 3 Mitigation		For sediment impact only	For dissolved zinc only			Step 2 River Impacts	Step 1 Runoff Quality	Notes	Date of assessment	EA receiving water Detailed River Network ID	Receiving watercourse	Outfall number	OS grid reference of outfall structure (m)	OS grid reference of assessment point (m)	Assessment type	Road number				HIGHWAYS
				Tier 2 Bed width (m)	Is there a downstrear Tier 1 Estimated	Water hardness	Base Flow Index (BFI)	Impermeable road area drained (ha)	Annual 95%ile river flow (m³/s)	AADT >10,000 and <50,000			liver Network ID			ructure (m)	nent point (m)			Н	Step 2 0.15	Annual Average Concentration	Highways Ag
		Brief description		(m)	ownstream structure, lake, pond Estimated river width (m)	Low=<50mg CaCO3/I	0.65	ea drained (ha)	ow (m³/s) [1		19/01/2017	N/A	Drainage ditch	2 - Proposed	Easting	Easting	Non-cumulative assessment	A487	11 1	0.51 ug/l	_	Highways Agency Water Risk Assessment Tool
0	0	'n		3 Manning's n	Is there a downstream structure, lake, pond or canal that reduces the velocity within 100m of the point of discharge? □ Tier 1 Estimated river width (m) 1	0		0.2 Permea	0.001 (Enter :	Climatic region Colder Wet						274414	274414	ssment (single outfall)		_	Pass	Copper Copper	Assessment Tool
	D	Treatment for solubles (%) di		0.07	the velocity within 100		ischarge in or within 1	Permeable area draining to outfall (ha)	zero in Annual 95%ile	Wet		Version of assessment	Assessor and affiliation	cumulative assessment	0				HA Area / DBFO number		Pass	Zinc	version 1.0 November 2009
Unlimited • 0	Unlimited • 0	Attenuation for solubles - restricted discharge rate (Vs)	Estimated effectiveness	□ Side slope (m/m))m of the point of disch		km upstream of a pro-	utfall (ha) 0.3	river flow box to asse	Rainfall site Cor		ent	ion	en		Northing	Northing		nber		Pass		
	╗	Settlement of sediments (%)	SS	0.5	arge?		Is the discharge in or within 1 km upstream of a protected site for conservation?		(Enter zero in Annual 95%ile river flow box to assess Step 1 runoff quality only)	Colwyn Bay(SAAR 788.1mm)			RT - Arup			301311	301311			Extensive? No	Accumulating? Yes	Sediment denosition for	
Exit Tool		Show Detailed Results	Predict Impact	Long slope (m/m) 0.0001	No C		tion?		only)	ı										40	Accumulating? Yes 0.01 Low flow Velm/s	pace	

Summary of predictions

Soluble - Acute Impact

Copper	Zinc

Sediment - Chronic Impact

	Copper	Zinc Cadmium		Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene
I								
ı								
Ι								

DETAILED RESULTS

In Runoff

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year

Thresholds Thresholds Event Statistics Mean 90%ile 95%ile 99%ile

Step 1	7	Step 1	
	Copper	Zinc	
	RS	T24	
	1	1	
	60.10	49.70	
	70	0.4	1 -

RS	ST6
1	1
17.20	18.10
25	29
25	29

	(ug/l)	(ug/l)	
RST24	21	60	
RST6	42	120	
Г	24.83	69.60	
	46.48	143.58	
	56.22	190.25	
	107.78	396.06	

	Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene
				I ox	icity Threshold			
- [1	1	1	1	1	1	1	1
- [73.30	98.70	1.40	40.60	94.50	40.60	18.60	77.30
[81	109	3	48	110	48	26	95
•								

_	(mg/kg)	(mg/kg)	(mg/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Toxicity	197	315	3.5	16770	875	2355	245	515
_								
	345	1211	1	15737	2722	2612	167	736
	799	2851	1	28184	4876	4679	299	1319
	996	3882	2	35481	6138	5890	376	1661
	1414	5918	4	89125	15419	14795	945	4171

In River (no mitigation)

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer
No. of exceedances/worst summer

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer
No. of exceedances/worst summer

Annual average concentration (ug/l)

Thresholds Thresholds

Event Statistics Mean 90%ile 95%ile 99%ile

Step 2

Copper	ZINC
RS	T24
2	2
0	0.2
0	1
0	0.2
0	1

RST6

1	1
0	0
0	0
0	0
0	0
0.15	0.51
0.10	0.01

	(ug/I)	(ug/I)	
ST24	21	60	
ST6	42	120	
	0.50	4.75	
	0.52	1.75	
	1.55	4.00	
	2.52	7.66	
	5.16	23.06	

Allowable Exceedances/year No. of exceedances/year
No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer No. of exceedances/worst summer

In River (with mitigation)

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer
No. of exceedances/worst summer

Annual average concentration (ug/l)

Thresholds hresholds Thresholds

Event Statistics Mean 90%ile 95%ile 99%ile

SAAR (mm)

Altitude (m)

Northing Coastal distance (km)

Easting

Details of the chosen rainfall site

Copper	Zinc
RS	T24
2	2
	-
-	-
	-
-	-

RST6								
1	1							
-	-							
-	-							
-	-							
-								
_	_							

	(ug/l)	(ug/l)
RST24	21	60
RST6	42	120
	-	-
	-	1-
	-	-
	-	-

788.1

36

2831

3796 0.8

Velocity	0.01
DI	40.2

Return To Interface

% settlement needed

m/s

Tier 1 is used for the calculation

Detailed Results 19/01/2017 10:28

15.3.5 Proposed Routine Runoff - Outfall 3 Detailed Results

Proposed measures	Existing measures		Step 3 Mitigation		For sediment impact only		For dissolved zinc only			Step 2 River Impacts	Step 1 Runoff Quality	Notes	Date of assessment	EA receiving water Detailed River Network ID	Receiving watercourse	Outfall number	OS grid reference of outfall structure (m)	OS grid reference of assessment point (m)	Assessment type	Road number	Location Details				AGENCY
				☐Tier 2 Bed width (m)	☐ Tier 1 Estimated		Water hardness	Base Flow Index (BFI)	Impermeable road area drained (ha)	Annual 95%ile river flow (m³/s)	AADT >10,000 and <50,000			River Network ID			structure (m)	ment point (m)				Step 2 0.00 Step 3 -	Copper	Annual Average Concentration	
		Brief description		(m)	Estimated river width (m)		Low = <50mg CaCO3/l	0.39	ea drained (ha)	ow (m³/s)	4		01/03/2016	GB110064048390	River Dyfi	3	Easting	Easting	Non-cumulative ass	A487		0.00 ug/l	Zinc		Highways Agency Water Risk Assessment Tool
		tion		3 Man	34		◆		1.26 Pern	2.339 (Ent	Climatic region Co						274422	274422	Non-cumulative assessment (single outfall)			Pass		Soluble - Acute Impact Copper	Assessment Too
0	0	Treatment for solubles (%)		Manning's n 0.07	s ne velocity within it) the collection 4		ls the discharge in or within 1	Permeable area draining to outfall (ha)	(Enter zero in Annual 95%ile	Colder Wet		Version of assessment	Assessor and affilia	cumulative asse	_			all)	HA Area / DBFO number		Pass	ı	Zinc	version 1.0
Unlimited •	Unlimited -	Attenuation for solubles - restricted discharge rate (l/s)	Estimated effectiveness	Side slope (m/m)	Tier 1 Estimated river width (m) 34				outfall (ha)	ile river flow box to as	Rainfall site		sment	liation	assessment	s in	Northing	Northing		number		Pass	ı		November 2009
0	0	Settlement of sediments (%)	eness	n/m) 0.5	olaige?			km upstream of a protected site for conservation?	37	river flow box to assess Step 1 runoff quality only)	Colwyn Bay (SAAR 788.1mm)			Stephanie Chapman			301909	301909				Accumulating? Extensive?	Sediment deposition	Sediment - Chronic Impact	
Exit Tool		Show Detailed Results	Predict Impact	Long slope (m/m)	•			ervation?		ility only)	າm)			Chapman								Yes 0.06 Low No 2 Dep	or this site is jud	Impact	
000		ed Results	mpact	0.0001				No 4			1								1			Low flow Vel m/s Deposition Index	d as:		

Summary of predictions

Prediction of impact

Soluble - Acute Impact

Copper	Zinc

Sediment - Chronic Impact

Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene

DETAILED RESULTS

In Runoff

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year

Thresholds Thresholds Mean 90%ile 95%ile 99%ile **Event Statistics**

Step 1		
	Copper	Zinc
	RS1	Γ24
	1	1
	60.10	49.70
	70	64

RST6							
1	1						
17.20	18.10						
25	29						

	(ug/l)	(ug/l)
RST24	21	60
RST6	42	120
	24.83	69.60
	46.48	143.58
	56.22	190.25
	107.78	396.06

, ,									
	Copper	Zinc	Cadmium	Total PAH	Pyrene city Threshold	Fluoranthene	Anthracene	Phenanthrene	
				TOXI	oity Throshold				
	1	1	1	1	1	1	1	1	
	73.30	98.70	1.40	40.60	94.50	40.60	18.60	77.30	
	81	109	3	48	110	48	26	95	

	(mg/kg)	(mg/kg)	(mg/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Toxicity	197	315	3.5	16770	875	2355	245	515
	345	1211	1	15737	2722	2612	167	736
	799	2851	1	28184	4876	4679	299	1319
	996	3882	2	35481	6138	5890	376	1661
	1414	5918	4	89125	15419	14795	945	4171

Tier 1 is used for the calculation

In River (no mitigation)

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer
No. of exceedances/worst summer

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer
No. of exceedances/worst summer

Annual average concentration (ug/l)

Thresholds Thresholds

Mean 90%ile 95%ile 99%ile Event Statistics

C	fo	n	2

Copper	Zinc
RS	ST24
2	2
0	0
0	0
0	0
0	0

RS	ST6
1	1
0	0
0	0
0	0
0	0
0.00	0.00

(uq/l)

RST24	21	60
RST6	42	120
	0.00	0.01
	0.00	0.01
	0.01	0.02
	0.02	0.08

(uq/l)

In River (with mitigation)

Allowable Exceedances/year No. of exceedances/year
No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer No. of exceedances/worst summer

Allowable Exceedances/year
No. of exceedances/worst year
No. of exceedances/worst year
No. of exceedances/summer

Annual average concentration (ug/l)

Thresholds hresholds Thresholds

Event Statistics Mean 90%ile 95%ile 99%ile

SAAR (mm)

Altitude (m)

Easting Northing Coastal distance (km)

Details of the chosen rainfall site

Co	pper	Zinc
	RS'	Г24
	2	2
		-
	-	-
	-	-
	-	-

RS	ST6
1	1
-	•
-	-
-	-
-	1
-	-

	(ug/l)	(ug/l)
ST24	21	60
RST6	42	120
	-	-
	-	-

788.1

36 2831

3796 0.8

Velocity	0.06	m/
DI	1.92	

Return To Interface

% settlement needed 0 %

15.3.6 Proposed Routine Runoff - Outfalls 1 & 3 Cumulative Detailed Results

Proposed measures	Existing measures		Step 3 Mitigation		For sediment impact only	For dissolved zinc only			Step 2 River Impacts	Step 1 Runoff Quality	Notes	Date of assessment	EA receiving water Detailed River Network ID	Receiving watercourse	Outfall number	OS grid reference of outfall structure (m)	OS grid reference of assessment point (m)	Assessment type	Road number	Location Details				HIGHWAYS
				☐Tier 2 Bed width (m)	Tier 1 Estimat	Water hardness	Base Flow Index (BFI)	Impermeable road area drained (ha)	Annual 95%ile river flow (m³/s)	AADT >10,000 a			River Network ID			tructure (m)	nent point (m)				Step 2 0.00 Step 3 -	Copper	Annual Average Concentration	
		Brief description		dth (m)	Estimated river width (m)	Low = <50mg CaCO3/l	3FI)	area drained (ha)	r flow (m³/s)	>10,000 and <50,000		01/03/2016	GB110064048390	River Dyfi	1 and 3	Easting	Easting	Cumulative asse	A487		0.00 ug/l			Highways Agency Water Risk Assessment Tool
		ription		3	34		0.39	2.07 F	2.339 (Climatic region			0			274422	274422	ssment including sed			Pass		Soluble - Acute Impact Copper	sk Assessment l
0	0	Treatment for solubles (%)		Manning's n	Is there a downstream structure, take, polid of callat that reduces the velocity within 100m of the point of discharge? Tier 1 Estimated river width (m) 34		ls the discharge in or within	Permeable area draining to outfall (ha)	(Enter zero in Annual 95%ile river flow box to assess Step 1 runoff quality only)	Colder Wet		Version of assessment	Assessor and affi	cumulative ass	_			Cumulative assessment including sediments (outfalls within 100m)	HA Area / DBFO		Pass		Zinc	OOI version 1.0 Novem
Unlimited	Unlimited □	Attenuation for solubles - restricted discharge rate (l/s)	Estimated effectiveness	Side slope (m/m)	Toom of the point of dis				6ile river flow box to a	Rainfall site		ssment	filiation	assessment	ills in	Northing	Northing	00m)	number		Pass			mber 2009
0	0	Settlement of sediments (%)	veness	m/m) 0.5	scharge :		1 km upstream of a protected site for conservation?	2.99	ssess Step 1 runoff qua	Colwyn Bay (SAAR 788.1mm)			Stephanie Chapman			301909	301909				Accumulating? Extensive?	Sediment deposition	Sediment - Chronic Impact	
Exit Tool		Show Detailed Results	Prodict Impact	Long slope (m/m) 0.0001	•		ervation?		lity only)	nm)			Chapman								Yes0.06Low flow Vel m/sNo3Deposition Index	Sediment deposition for this site is judged as:	Impact	

Summary of predictions

In Runoff

Prediction of impact

Soluble - Acute Impact

Copper	Zinc

Sediment - Chronic Impact

Total PAH

Cadmium

Copper	Zinc	Cadmium	Total PAH	Pyrene	Fluoranthene	Anthracene	Phenanthrene

Pyrene city Threshold

Fluoranthene

Anthracene

Phenanthrene

DETAILED RESULTS

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year

Thresholds Thresholds Mean 90%ile 95%ile 99%ile **Event Statistics**

Step 1			Step 1
	Copper	Zinc	
	1 RS	T24 1	Г
	60.10	49.70	
	70	64	

RST6			
1	1		
17.20	18.10		
25	29		

	(ug/l)	(ug/l)
RST24	21	60
RST6	42	120
	24.83	69.60
	46.48	143.58
	56.22	190.25
	107.78	396.06

Toxicity [(mg/kg)	(mg/kg)	(mg/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
	197	315	3.5	16770	875	2355	245	515
E								

Tier 1 is used for the calculation

In River (no mitigation)

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer
No. of exceedances/worst summer

Allowable Exceedances/year
No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer
No. of exceedances/worst summer

Annual average concentration (ug/l)

Thresholds Thresholds

Mean 90%ile 95%ile 99%ile Event Statistics

Step 2

R	ST24
2	2
0	0
0	0
0	0
0	0
F	RST6

Zinc

1	1			
0	0			
0	0			
0	0			
0	0			
0.00	0.00			

	(ug/l)	(ug/l)
T24	21	60
ST6	42	120
	0.00	0.01
	0.01	0.02
	0.01	0.03
	0.03	0.13

In River (with mitigation)

Allowable Exceedances/year No. of exceedances/year
No. of exceedances/worst year
No. of exceedances/summer No. of exceedances/worst summer

Allowable Exceedances/year
No. of exceedances/worst year
No. of exceedances/worst year
No. of exceedances/summer

Annual average concentration (ug/l)

Thresholds hresholds Thresholds

Event Statistics Mean 90%ile 95%ile 99%ile

Copper	Zinc
RS	T24
2	2
	-
	-
	-
-	-

RS	ST6
1	1
-	-
-	-
-	-
-	-
_	_

	(ug/l)	(ug/l)
T24 ST6	21	60
ST6	42	120
	-	-
	-	-
3	-	-

Step 2

Velocity	
DI	

Return To Interface

Copper

Zinc

% settlement needed

Details of the chosen rainfall site

SAAR (mm) 788.1 Altitude (m) 36 2831 Easting Northing Coastal distance (km) 3796 0.8