



Viking Energy Partnership

Viking Wind Farm

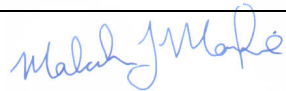
Technical Appendix 14.5 Hydrochemistry Survey

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1 INTRODUCTION

This report forms a Technical Appendix to Chapter 14 (Soil and Water) of the Environmental Statement for Viking Wind Farm (Mouchel, 2009) and should be read with reference to this chapter.

Viking Energy Partnership are currently progressing proposals for a wind farm on North Mainland in the Shetland Islands. The proposed wind farm site is located approximately 27km north of Lerwick and is roughly centred on the settlement of Voe (grid reference HU 4077 6320). The area of interest is divided into four quadrants, with two quadrants to either side of the main A970/A968 route which runs north–south across the island. The quadrants are known as; Delting, Collafirth, Kergord and Nesting. All four quadrants of the proposed 150-turbine wind farm comprise areas of open moorland used mainly for rough grazing.

During the course of the preparation of the aforementioned Environmental Statement and following discussions with local Scottish Environment Protection Agency (SEPA) staff, a programme of sampling and analysis of representative watercourses in North Mainland Shetland was developed.

2 SCOPE OF WORK

This report and the data within relates to an initial single ('spot') sampling programme, providing an indication of local water quality at the specific time when sampling is undertaken. This baseline data informs the client, SEPA and other interested parties of the current water quality at these locations.

It is recognised that this single sample approach will not take account of issues such as seasonal or land management influences that may be revealed as trends in a longer-term programme.

The results gained from this item of work would represent the initial result in a longer-term programme, with the locations identified herein proposed for an ongoing longer-term monitoring campaign, subject to planning permission being granted for the development.

3 METHODOLOGY

The Water Framework Directive came into force in December 2003 and is implemented in Scotland through the Water Environment and Water Services (Scotland) Act 2003. A key objective of this Directive is the achievement of 'good ecological status' (as a minimum) of all natural waterbodies by 2015. This involves a move towards a risk-based classification system (Scottish Environment Protection Agency, 2009). This risk-based system considers additional issues such as stream morphology and existing artificial structures. However, chemical water status for Shetland streams have yet to be established under the new system.

Up to 2006 SEPA had based their approach on a national River Water Quality Classification system, using a 5 point scale to define water quality as being 'Excellent' (A1), 'Good' (A2), 'Moderate' (B), 'Poor' (C) and 'Seriously Polluted' (D) (Scottish Environment Protection Agency 2006).

Given these alternative systems, local SEPA staff were consulted for guidance on the best approach to use for the basis of this assessment; it was agreed that the (former) 2006 water

quality classification system provided the best method to gauge local water chemistry as this included historic water chemistry data.

3.1 Parameter Determination

As the watercourse hydrochemical properties were to be compared with SEPA water quality classifications it was deemed appropriate from the outset to ensure data gathered would enable classification based on SEPA's standard method (SEPA, 2006) as provided in Appendix C. In addition, it was appropriate to provide some background data on additional chemical parameters. The parameters identified as useful for the scope of this work are provided below:

- Temperature;
- pH*;
- Suspended solids;
- Dissolved oxygen (DO)*;
- Biological oxygen demand over 5 days ('BOD5')*;
- Ammonia*;
- Iron*;
- Arsenic;
- Cadmium;
- Chromium;
- Copper;
- Mercury;
- Nickel;
- Lead;
- Zinc;
- Total oil content (also aromatic and aliphatic portions);
- Chloride
- Phosphate;
- Nitrate;

* Represents parameters listed in SEPA Annex 1 (SEPA, 2006)

A local UKAS-accredited laboratory was commissioned to undertake the above analysis, with some parameters requiring analysis via subcontracted laboratories on the Scottish mainland.

3.2 Sampling Location Determination

A catchment-based approach has been used throughout the hydrological section of the Environmental Statement (Mouchel, 2009), enabling issues within catchments to be given due consideration where wind farm development may have an influence.

With reference to 1:50,000 and 1:10,000 scale mapping (Ordnance Survey, 2003 & 2006), digital terrain models and hydrological catchment mapping, appropriate sampling locations were chosen. These locations are downstream of proposed site activity, with a greater concentration where site activities are planned.

In addition to the locations which were within site catchments with development activity, a number of 'control' locations were chosen where there are no development plans. These enable true reflection of whether site activities are the causal factor behind changes in hydrochemical status or whether there may be other reasons or phenomena involved.

Waterside Ecology (2009) conducted a Fish Survey for this site, survey locations used by this consultant were broadly comparable to those chosen for this study.

4 RESULTS

Sampling locations and SEPA classified watercourses are shown on Figure 14.15 (in Volume 3). A prefix quadrant identifier (e.g. 'DH01' is a sample location within Delting quadrant) has been applied for ease of reference.

In the area of interest the SEPA 2006 system classified a number of site watercourses as being of 'Good' chemical status (Gossawater, South Burn of Burrafirth, Burn of Pettawater, Burn of Weisdale and Burn of Grunnafirth), with a single watercourse (Burn of Laxobigging) defined as meeting the criteria for 'Excellent' chemical status.

As part of this study, samples were collected from streams in December 2008 and January 2009.

Table 1 displays the analytical results from these single samples evaluated against SEPA's 2006 system classification and also states historical watercourse classification for cross-reference purposes. Catchment identification is discussed in Chapter 14 of the Environmental Statement (Mouchel, 2009).

Table 1 Hydrochemistry Results

Catchment ID	Sampling Location ID	National Grid Coordinates	Watercourse	Official 2006 SEPA Class	2008/09 Result Equivalent to 2006 SEPA Class
1	CH02	HU 43326490	Seggie Burn		B
1	NH01	HU 43726265	Gossawater / Laxo Burn	A2	A1*
1	NH02	HU 43156258	Thomas Jamieson's Burn		B
1	NH03	HU 42426240	Easter Filla Burn		A1
2	KH02	HU 36865739	Burn of Lunklet		A1
2	KH03	HU 36765732	South Burn of Burrafirth	A2	A1
2	KH04	HU 38515591	Unnamed burn into Lamba Water		A2
3	KH05	HU 41605536	Burn of Pettawater	A2	A1
4	KH06	HU 40125472	Burn of Weisdale	A2	A1
4	KH07	HU 39455301	Burn of Weisdale	A2	A1
5	DH01	HU 42157326	Stenswall Burn		A1
5	DH02	HU 41417242	Burn of Laxobigging	A1	A1
5	DH03	HU 40087069	Burn of Laxobigging	A1	B
6	NH05	HU 45345947	Quinni Burn		A1*
6	NH06	HU 45985936	Burn of Grunnafirth	A2	A1*
7	NH09	HU 43625390	Burn of Crookadale / Catfirth		A2

Catchment ID	Sampling Location ID	National Grid Coordinates	Watercourse	Official 2006 SEPA Class	2008/09 Result Equivalent to 2006 SEPA Class
8	KH01	HU 40296243	Burn of Kirkhouse		A1
9	DH06	HU 36456697	Burn of Skelladale		A1
11	NH04	HU 41566204	Wester Fill Burn		A1
12	DH04	HU 39687267	Leegill/Berdigill Burn		A1
13	CH01	HU 41186660	Burn of Sandgarth		A1*
17	NH08	HU 44405438	Burn of Quoys		A1
20	KH08	HU 37145100	Burn of Tactigill		A1
22	DH05	HU 37916883	Burn of Valayre		A1
23	DH07	HU 37696640	Burns of Duddin		A2
24	NH07	HU 46725583	Mill Burn		A1
29	DH08	HU 39807290	Unnamed burn from West Hill of Graven		A2
30	KH09	HU 37925029	Unnamed burn at Scord of Sound		A1
Off-Catchment 'Control'	CH03c	HU 45766667	Swining Burn		A1*
Off-Catchment 'Control'	NH10c	HU 45006282	Burn of Tararet		B

*Initial results displayed high biological oxygen demand (BOD) values at these locations, re-sampling was undertaken and the class given represents re-sample BOD values incorporating original values for dissolved oxygen, ammonia, iron and pH.

Classification is based on lowest of the individual parameter classifications at any sample location. The results indicate that most streams in the local area are generally of at least 'Good' (A2) standard with the majority (22 of 30 locations) meeting the 'Excellent' (A1) criteria. There are also a small number of watercourses which display results which leads to classification as 'Fair' (B), these are discussed below.

Upland peat-draining streams tend to have naturally low (acidic) pH values. The SEPA criteria lead to watercourses with pH results of less than 5.2 being downgraded to 'Fair' (B) standard. This situation applies to the NH02 and NH10c results.

The CH02 and DH03 results are both classified as 'Fair' (B) based on high levels of 'BOD5'. This situation was also found initially at sample locations NH01, NH05, NH06, CH01 and CH03c. Re-sampling at these locations yielded considerably lower results and an 'Excellent' (A1) standard was reached. As data was collected in winter, instances of heavy rainfall may have elevated suspended solid and 'BOD5' levels from overland flow or erosion of banks caused by peak flows, although it may have been expected that the associated increased dilution factor may have alleviated this issue.

Based on the above results, and historical SEPA watercourse classification, the assumption is made that all local watercourses, being located within areas of similar land use, are, at least, 'Good' (A2) status.

This status is corroborated by the fish survey results provided in Technical Appendix 10.6 (Waterside Ecology, 2009) indicating good water quality.

4.1 Limitations

A number of SEPA water chemistry criteria are based on a statistical approach, this method essentially 'evens out' water quality data to give an overall impression and ensures that occasional outliers do not have a disproportionate impact on the data. However, when using individual results (as in this study) high or low results may skew the water quality classification which is most likely to result in a lower overall water quality classification result.

Thus, sampling on a single occasion may provide anomalous results that are not representative of the actual water quality over a longer period.

Even where there is a rigorous application of quality assurance procedures for sampling and analysis, there is the potential (albeit small) for human or equipment error to occur or for local conditions on site to temporarily move from the norm (e.g. should there be a dead animal in the watercourse upstream of the sampling point). As discussed above, there is no previous data to provide a comparison. Consequently, potential outliers cannot be mitigated using the statistical approach, unlike in an ongoing longer-term campaign.

5 RECOMMENDATIONS

Subject to planning consent for the development, the locations sampled during this initial programme of work would contribute to a longer-term monitoring strategy to ensure water quality is not adversely effected by construction activity.

Consideration can also be given to inclusion of additional sample locations and/or chemical parameters where these were identified as useful by stakeholders.

This programme should be scheduled to commence at least a calendar year in advance of construction activity relative to each sample location, thereby ensuring adequate baseline data in respect of seasonal chemical changes. Monitoring would be expected to extend to the end of construction phase and potentially into the operational phase for specific locations.

6 REFERENCES

Mouchel (2009) *Viking Wind Farm Environmental Statement - Soil and Water (Chapter 14)*

Ordnance Survey (2003), *Landranger 1:50,000 Scale Map - Sheet 3: Shetland (North Mainland)*. Published by Ordnance Survey.

Ordnance Survey (2006), *Digital Mapping at 1:10,000 Scale*. Provided under licence 100024344 by Ordnance Survey.

Scottish Environment Protection Agency (2009). *Web-based Interactive GIS* – http://www.sepa.org.uk/water/river_basin_planning.aspx (accessed January 2009).

Scottish Environment Protection Agency (2006), *Annex A: Parameters used in the classification of water quality at a monitoring point* - http://www.sepa.org.uk/water/monitoring_and_classification/previous_schemes.aspx (Accessed December 2008).

Waterside Ecology (2009) *Viking Wind Farm Environmental Statement - Ecology (Chapter 10): Technical Appendix 10.6 Fish Survey Data*

We have used our reasonable endeavours to provide information that is correct and accurate and have discussed above the reasonable conclusions that can be reached on the basis of the information available.

Appendix A

Sample Data

Individual Hydrochemistry Sample Locations:

DH01	CH01	KH01	NH01
DH02	CH02	KH02	NH02
DH03	CH03c	KH03	NH03
DH04		KH04	NH04
DH05		KH05	NH05
DH06		KH06	NH06
DH07		KH07	NH07
DH08		KH08	NH08
		KH09	NH09
			NH10c

DH01 Sample

Location

HU 42157326

Water Quality Class

Sample Reference

DH01

Date sampled

17/12/2008

Time

12:15

Lab Ref

1289822

Local Lab Results**Dissolved Oxygen (%)**

84

A1

Water temperature (°C)

4.5

pH

6.3

*A1***Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

2

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

50

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1289822

Ref 2

001-00

Arsenic (mg/l)

1.1

Cadmium (ug/l)

0.719

Chromium (ug/l)

1.24

Copper (ug/l)

4.5

Iron (ug/l)

347.7

A1

Mercury (ug/l)

0.2

Nickel (ug/l)

1.87

Lead (ug/l)

1.89

Zinc (ug/l)

6.8

Ammoniacal Nitrogen (ug/l)

15

A1

Nitrate (mg/l)

0.73

Total Oil Content (mg/l)

6

Oil Content - Aromatic Portion (mg/l)

1

Oil Content - Aliphatic Portion (mg/l)

5

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



DH02 Sample

Location

HU 41417242

Water Quality Class

Sample Reference

DH02

Date sampled

17/12/2008

Time

11:45

Lab Ref

1289821

Local Lab Results**Dissolved Oxygen (%)**

90

A1

Water temperature (°C)

4.2

pH

6.5

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

2

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

44

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1289821

Ref 2

002-00

Arsenic (mg/l)

3.2

Cadmium (ug/l)

2.618

Chromium (ug/l)

5

Copper (ug/l)

13.24

Iron (ug/l)

228.8

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

5.91

Lead (ug/l)

8.92

Zinc (ug/l)

11.1

Ammoniacal Nitrogen (ug/l)

19

A1

Nitrate (mg/l)

0.38

Total Oil Content (mg/l)

0

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

0

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



DH03 Sample

Location

HU 40087069

Water Quality Class

Sample Reference

DH03

Date sampled

09/01/2009

Time

09:40

Lab Ref

1291809

Local Lab Results**Dissolved Oxygen (%)**

89

A1

Water temperature (°C)

6

pH

6.1

*A1***Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

6

B

Suspended Solids (mg/l)

1

Chloride (mg/l)

44

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1291809

Ref 2

025-00

Arsenic (mg/l)

1.6

Cadmium (ug/l)

0.15

Chromium (ug/l)

0.59

Copper (ug/l)

<0.08

Iron (ug/l)

375.8

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.95

Lead (ug/l)

0.78

Zinc (ug/l)

3.3

Ammoniacal Nitrogen (ug/l)

9

A1

Nitrate (mg/l)

0.19

Total Oil Content (mg/l)

0

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

0

Overall B

Parameters in bold are standard parameters required by SEPA for classification



DH04 Sample

Location

HU 39687267

Water Quality Class

Sample Reference

DH04

Date sampled

17/12/2008

Time

11:15

Lab Ref

1289820

Local Lab Results**Dissolved Oxygen (%)**

87

A1

Water temperature (°C)

4.6

pH

6.1

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

2

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

50

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1289820

Ref 2

003-00

Arsenic (mg/l)

2.1

Cadmium (ug/l)

1.687

Chromium (ug/l)

3.13

Copper (ug/l)

5.35

Iron (ug/l)

371.8

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

3.41

Lead (ug/l)

4.53

Zinc (ug/l)

7.3

Ammoniacal Nitrogen (ug/l)

14

A1

Nitrate (mg/l)

0.51

Total Oil Content (mg/l)

2

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

2

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



DH05 Sample

Location

HU 37916883

Water Quality Class

Sample Reference

DH05

Date sampled

14/01/2009

Time

14:20

Lab Ref

1292199

Local Lab Results**Dissolved Oxygen (%)**

98

A1

Water temperature (°C)

2.7

pH

6.1

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

2

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

50

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1292199

Ref 2

026-00

Arsenic (mg/l)

0.8

Cadmium (ug/l)

<0.018

Chromium (ug/l)

0.51

Copper (ug/l)

<0.08

Iron (ug/l)

465.1

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.98

Lead (ug/l)

0.6

Zinc (ug/l)

6.2

Ammoniacal Nitrogen (ug/l)

23

A1

Nitrate (mg/l)

0.24

Total Oil Content (mg/l)

0

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

0

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



DH06 Sample

Location

HU 36456697

Water Quality Class

Sample Reference

DH06

Date sampled

17/12/2008

Time

10:35

Lab Ref

1289818

Local Lab Results**Dissolved Oxygen (%)**

92

A1

Water temperature (°C)

4

pH

6.5

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

2

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

50

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1289818

Ref 2

004-00

Arsenic (mg/l)

<0.4

Cadmium (ug/l)

0.187

Chromium (ug/l)

0.72

Copper (ug/l)

2.69

Iron (ug/l)

284.6

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.91

Lead (ug/l)

0.9

Zinc (ug/l)

3.5

Ammoniacal Nitrogen (ug/l)

14

A1

Nitrate (mg/l)

0.53

Total Oil Content (mg/l)

5

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

5

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



DH07 Sample

Location

HU 37696640

Water Quality Class

Sample Reference

DH07

Date sampled

09/01/2009

Time

12:25

Lab Ref

1291808

Local Lab Results**Dissolved Oxygen (%)**

90

A1

Water temperature (°C)

6

pH

6.1

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

4

A2

Suspended Solids (mg/l)

4

Chloride (mg/l)

50

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1291808

Ref 2

027-00

Arsenic (mg/l)

1.2

Cadmium (ug/l)

0.344

Chromium (ug/l)

1.24

Copper (ug/l)

<0.08

Iron (ug/l)

313.5

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

1.51

Lead (ug/l)

1.23

Zinc (ug/l)

5.5

Ammoniacal Nitrogen (ug/l)

10

A1

Nitrate (mg/l)

0.17

Total Oil Content (mg/l)

1

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

1

Overall A2

Parameters in bold are standard parameters required by SEPA for classification



DH08 Sample

Location

HU 39807290

Water Quality Class

Sample Reference

DH08

Date sampled

17/12/2008

Time

11:00

Lab Ref

1289819

Local Lab Results**Dissolved Oxygen (%)**

90

A1

Water temperature (°C)

4.7

pH

5.4

A2

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

2

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

51

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1289819

Ref 2

005-00

Arsenic (mg/l)

<0.4

Cadmium (ug/l)

0.132

Chromium (ug/l)

0.7

Copper (ug/l)

2.68

Iron (ug/l)

244.3

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.61

Lead (ug/l)

0.69

Zinc (ug/l)

5.3

Ammoniacal Nitrogen (ug/l)

13

A1

Nitrate (mg/l)

0.5

Total Oil Content (mg/l)

1

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

1

Overall A2

Parameters in bold are standard parameters required by SEPA for classification



CH01 Sample

Location

HU 41186660

Water Quality Class

Sample Reference

Date sampled

Time

Lab Ref

CH01

06/01/2009

10:30

1291553

CH01*

14/01/2009

15:20

1292200

Local Lab Results**Dissolved Oxygen (%)**

88

A1

Water temperature (°C)

3.8

pH

6.9

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

13

2*

A1*

Suspended Solids (mg/l)

6

1

Chloride (mg/l)

85.00

106.00

Phosphate (ppm)

<1

<1

Subcontracted Lab Results

Ref 1

1291553

Ref 2

006-00

Arsenic (mg/l)

3

Cadmium (ug/l)

1.21

Chromium (ug/l)

2.38

Copper (ug/l)

<0.08

Iron (ug/l)

938.1

A1

Mercury (ug/l)

0.3

Nickel (ug/l)

3.41

Lead (ug/l)

4.42

Zinc (ug/l)

8

Ammoniacal Nitrogen (ug/l)

75

A1

Nitrate (mg/l)

0.15

Total Oil Content (mg/l)

1

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

1

Overall A1*

Parameters in bold are standard parameters required by SEPA for classification

* Resample undertaken following initial high BOD5 result, classification based on original parameter results plus re-sampled BOD5



CH02 Sample

Location

HU 43326490

Water Quality Class

Sample Reference

CH02

Date sampled

09/01/2009

Time

11:20

Lab Ref

1291810

Local Lab Results**Dissolved Oxygen (%)**

93

A1

Water temperature (°C)

5.8

pH

6.6

*A1***Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

6

B

Suspended Solids (mg/l)

2

Chloride (mg/l)

46

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1291810

Ref 2

028-00

Arsenic (mg/l)

0.6

Cadmium (ug/l)

<0.018

Chromium (ug/l)

0.42

Copper (ug/l)

<0.08

Iron (ug/l)

306.1

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.3

Lead (ug/l)

0.51

Zinc (ug/l)

3.3

Ammoniacal Nitrogen (ug/l)

11

A1

Nitrate (mg/l)

0.27

Total Oil Content (mg/l)

1

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

1

Overall B

Parameters in bold are standard parameters required by SEPA for classification



CH03c Sample

Location

HU 45766667

Water Quality Class

Sample Reference

Date sampled

Time

Lab Ref

CH03c

06/01/2009

11:00

1291554

CH03c*

25/01/2009

1293011

Local Lab Results**Dissolved Oxygen (%)**

Water temperature (°C)

pH**Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

Suspended Solids (mg/l)

Chloride (mg/l)

Phosphate (ppm)

99

3.3

6.4

7

8

46

<1

A1

A1

A1*

<1*

Subcontracted Lab Results

Ref 1

Ref 2

Arsenic (mg/l)

Cadmium (ug/l)

Chromium (ug/l)

Copper (ug/l)

Iron (ug/l)

Mercury (ug/l)

Nickel (ug/l)

Lead (ug/l)

Zinc (ug/l)

Ammoniacal Nitrogen (ug/l)

Nitrate (mg/l)

Total Oil Content (mg/l)

Oil Content - Aromatic Portion (mg/l)

Oil Content - Aliphatic Portion (mg/l)

1291554

007-00

2.1

0.61

2.05

<0.08

275.6

<0.02

2.13

5.46

7.3

90

0.44

1

0

1

A1

A1

Overall A1*

Parameters in bold are standard parameters required by SEPA for classification

* Resample undertaken following initial high BOD5 result, classification based on original parameter results plus re-sampled BOD5



KH01 Sample

Location

HU 40296243

Water Quality Class

Sample Reference

KH01

Date sampled

04/01/2009

Time

09:30

Lab Ref

1291392

Local Lab Results**Dissolved Oxygen (%)**

90

A1

Water temperature (°C)

3

pH

7.2

*A1***Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

<1

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

46

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1291392

Ref 2

008-00

Arsenic (mg/l)

2.1

Cadmium (ug/l)

0.961

Chromium (ug/l)

2.6

Copper (ug/l)

<0.08

Iron (ug/l)

492.8

A1

Mercury (ug/l)

<0.02

Nickel (ug/l)

3.1

Lead (ug/l)

3.75

Zinc (ug/l)

6.9

Ammoniacal Nitrogen (ug/l)

12

A1

Nitrate (mg/l)

0.31

Total Oil Content (mg/l)

0

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

0

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



KH02 Sample

Location

HU 36865739

Water Quality Class

Sample Reference

KH02

Date sampled

04/01/2009

Time

09:55

Lab Ref

1291393

Local Lab Results**Dissolved Oxygen (%)**

92

A1

Water temperature (°C)

2.5

pH

6.1

*A1***Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

<1

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

44

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1291393

Ref 2

009-00

Arsenic (mg/l)

0.8

Cadmium (ug/l)

0.255

Chromium (ug/l)

1.08

Copper (ug/l)

<0.08

Iron (ug/l)

655.2

A1

Mercury (ug/l)

<0.02

Nickel (ug/l)

1.13

Lead (ug/l)

1.78

Zinc (ug/l)

4.5

Ammoniacal Nitrogen (ug/l)

24

A1

Nitrate (mg/l)

0.25

Total Oil Content (mg/l)

1

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

1

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



KH03 Sample

Location

HU 36765732

Water Quality Class

Sample Reference

KH03

Date sampled

04/01/2009

Time

10:05

Lab Ref

1291394

Local Lab Results**Dissolved Oxygen (%)**

92

A1

Water temperature (°C)

2.3

pH

6.2

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

<1

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

43

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1291394

Ref 2

010-00

Arsenic (mg/l)

<0.4

Cadmium (ug/l)

<0.018

Chromium (ug/l)

0.42

Copper (ug/l)

<0.08

Iron (ug/l)

557.7

A1

Mercury (ug/l)

<0.02

Nickel (ug/l)

0.27

Lead (ug/l)

0.46

Zinc (ug/l)

1.5

Ammoniacal Nitrogen (ug/l)

31

A1

Nitrate (mg/l)

0.34

Total Oil Content (mg/l)

0

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

0

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



KH04 Sample

Location

HU 38515591

Water Quality Class

Sample Reference

KH04

Date sampled

21/01/2009

Time

10:50

Lab Ref

1292707

Local Lab Results**Dissolved Oxygen (%)**

91

A1

Water temperature (°C)

3.4

pH

5.6

A2

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

1

A1

Suspended Solids (mg/l)

2

Chloride (mg/l)

48

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1292707

Ref 2

030-00

Arsenic (mg/l)

1.1

Cadmium (ug/l)

0.515

Chromium (ug/l)

1.15

Copper (ug/l)

<0.08

Iron (ug/l)

577.7

A1

Mercury (ug/l)

0.3

Nickel (ug/l)

1.19

Lead (ug/l)

1.4

Zinc (ug/l)

7.7

Ammoniacal Nitrogen (ug/l)

43

A1

Nitrate (mg/l)

0.16

Total Oil Content (mg/l)

0

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

0

Overall A2

Parameters in bold are standard parameters required by SEPA for classification



KH05 Sample

Location

HU 41605536

Water Quality Class

Sample Reference

KH05

Date sampled

04/01/2009

Time

11:50

Lab Ref

1291395

Local Lab Results**Dissolved Oxygen (%)**

90

A1

Water temperature (°C)

2.9

pH

7.2

*A1***Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

<1

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

50

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1291395

Ref 2

011-00

Arsenic (mg/l)

<0.4

Cadmium (ug/l)

<0.018

Chromium (ug/l)

0.57

Copper (ug/l)

<0.08

Iron (ug/l)

442.9

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.31

Lead (ug/l)

0.63

Zinc (ug/l)

1.9

Ammoniacal Nitrogen (ug/l)

42

A1

Nitrate (mg/l)

0.54

Total Oil Content (mg/l)

0

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

0

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



KH06 Sample

Location

HU 40125472

Water Quality Class

Sample Reference

KH06

Date sampled

04/01/2009

Time

11:35

Lab Ref

1291396

Local Lab Results**Dissolved Oxygen (%)**

92

A1

Water temperature (°C)

2.3

pH

7.3

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

<1

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

43

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1291396

Ref 2

012-00

Arsenic (mg/l)

0.5

Cadmium (ug/l)

0.102

Chromium (ug/l)

0.88

Copper (ug/l)

<0.08

Iron (ug/l)

525

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

1.08

Lead (ug/l)

0.96

Zinc (ug/l)

2.6

Ammoniacal Nitrogen (ug/l)

11

A1

Nitrate (mg/l)

0.44

Total Oil Content (mg/l)

1

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

1

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



KH07 Sample

Location

HU 39455301

Water Quality Class

Sample Reference

KH07

Date sampled

04/01/2009

Time

10:45

Lab Ref

1291397

Local Lab Results**Dissolved Oxygen (%)**

92

A1

Water temperature (°C)

3.4

pH

7

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

<1

A1

Suspended Solids (mg/l)

2

Chloride (mg/l)

43

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1291397

Ref 2

013-00

Arsenic (mg/l)

0.6

Cadmium (ug/l)

0.152

Chromium (ug/l)

0.86

Copper (ug/l)

<0.08

Iron (ug/l)

562.6

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

1.38

Lead (ug/l)

1.21

Zinc (ug/l)

2.5

Ammoniacal Nitrogen (ug/l)

20

A1

Nitrate (mg/l)

0.84

Total Oil Content (mg/l)

0

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

0

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



KH08 Sample

Location

HU 37145100

Water Quality Class

Sample Reference

KH08

Date sampled

04/01/2009

Time

10:45

Lab Ref

1291398

Local Lab Results**Dissolved Oxygen (%)**

92

A1

Water temperature (°C)

3

pH

6.2

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

<1

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

43

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1291398

Ref 2

014-00

Arsenic (mg/l)

<0.4

Cadmium (ug/l)

<0.018

Chromium (ug/l)

0.45

Copper (ug/l)

<0.08

Iron (ug/l)

370.8

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

2.36

Lead (ug/l)

0.73

Zinc (ug/l)

8.1

Ammoniacal Nitrogen (ug/l)

19

A1

Nitrate (mg/l)

0.24

Total Oil Content (mg/l)

0

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

0

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



KH09 Sample

Location

HU 37925029

Water Quality Class

Sample Reference

KH09

Date sampled

04/01/2009

Time

11:05

Lab Ref

1291399

Local Lab Results**Dissolved Oxygen (%)**

90

A1

Water temperature (°C)

2.1

pH

6.8

*A1***Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

<1

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

76

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1291399

Ref 2

015-00

Arsenic (mg/l)

1.2

Cadmium (ug/l)

0.047

Chromium (ug/l)

0.39

Copper (ug/l)

<0.08

Iron (ug/l)

218.1

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

1.25

Lead (ug/l)

0.69

Zinc (ug/l)

2.7

Ammoniacal Nitrogen (ug/l)

15

A1

Nitrate (mg/l)

0.21

Total Oil Content (mg/l)

3

Oil Content - Aromatic Portion (mg/l)

1

Oil Content - Aliphatic Portion (mg/l)

2

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



NH01 Sample

Location

HU 43726265

Water Quality Class

Sample Reference

Date sampled

Time

Lab Ref

NH01

06/01/2009

11:30

1291555

NH01*

25/01/2009

1293008

Local Lab Results**Dissolved Oxygen (%)**

Water temperature (°C)

pH**Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

Suspended Solids (mg/l)

Chloride (mg/l)

Phosphate (ppm)

99

2.6

6.1

7

10

44

<1

A1

A1

A1*

<1*

Subcontracted Lab Results

Ref 1

Ref 2

Arsenic (mg/l)

Cadmium (ug/l)

Chromium (ug/l)

Copper (ug/l)

Iron (ug/l)

Mercury (ug/l)

Nickel (ug/l)

Lead (ug/l)

Zinc (ug/l)

Ammoniacal Nitrogen (ug/l)

Nitrate (mg/l)

Total Oil Content (mg/l)

Oil Content - Aromatic Portion (mg/l)

Oil Content - Aliphatic Portion (mg/l)

1291555

016-00

1.2

0.51

1

<0.08

282

<0.2

1.14

1.69

3.6

38

0.48

1

0

1

A1

A1

Overall A1*

Parameters in bold are standard parameters required by SEPA for classification

* Resample undertaken following initial high BOD5 result, classification based on original parameter results plus re-sampled BOD5



NH02 Sample

Location

HU 43156258

Water Quality Class

Sample Reference

NH02

Date sampled

23/12/2008

Time

12:17

Lab Ref

1290346

Local Lab Results**Dissolved Oxygen (%)**

91

A1

Water temperature (°C)

6.7

pH

5

*B***Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

2

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

55

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1290346

Ref 2

017-00

Arsenic (mg/l)

0.4

Cadmium (ug/l)

0.02

Chromium (ug/l)

0.14

Copper (ug/l)

<0.08

Iron (ug/l)

228.9

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.32

Lead (ug/l)

0.63

Zinc (ug/l)

5.1

Ammoniacal Nitrogen (ug/l)

34

A1

Nitrate (mg/l)

0.34

Total Oil Content (mg/l)

1

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

1

Overall B

Parameters in bold are standard parameters required by SEPA for classification



NH03 Sample

Location

HU 42426240

Water Quality Class

Sample Reference

NH03

Date sampled

23/12/2008

Time

11:43

Lab Ref

1290347

Local Lab Results**Dissolved Oxygen (%)**

88

A1

Water temperature (°C)

6.9

pH

6.1

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

2

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

51

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1290347

Ref 2

018-00

Arsenic (mg/l)

<0.4

Cadmium (ug/l)

<0.018

Chromium (ug/l)

0.09

Copper (ug/l)

<0.08

Iron (ug/l)

298.9

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.49

Lead (ug/l)

0.52

Zinc (ug/l)

5.8

Ammoniacal Nitrogen (ug/l)

53

A1

Nitrate (mg/l)

0.4

Total Oil Content (mg/l)

2

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

2

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



NH04 Sample

Location

HU 41566204

Water Quality Class

Sample Reference

NH04

Date sampled

23/12/2008

Time

11:00

Lab Ref

1290348

Local Lab Results**Dissolved Oxygen (%)**

94

A1

Water temperature (°C)

6.8

pH

7.1

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

2

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

55

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1290348

Ref 2

019-00

Arsenic (mg/l)

0.5

Cadmium (ug/l)

0.11

Chromium (ug/l)

0.41

Copper (ug/l)

<0.08

Iron (ug/l)

230.6

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.8

Lead (ug/l)

0.85

Zinc (ug/l)

4.5

Ammoniacal Nitrogen (ug/l)

29

A1

Nitrate (mg/l)

0.41

Total Oil Content (mg/l)

2

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

2

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



NH05 Sample

Location

HU 45345947

Water Quality Class

Sample Reference

Date sampled

Time

Lab Ref

NH05

06/01/2009

12:05

1291556

NH05*

25/01/2009

1293009

Local Lab Results**Dissolved Oxygen (%)**

Water temperature (°C)

pH**Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

Suspended Solids (mg/l)

Chloride (mg/l)

Phosphate (ppm)

96

2.7

6.2

7

1

41

<1

A1

A1

A1*

<1*

Subcontracted Lab Results

Ref 1

Ref 2

Arsenic (mg/l)

Cadmium (ug/l)

Chromium (ug/l)

Copper (ug/l)

Iron (ug/l)

Mercury (ug/l)

Nickel (ug/l)

Lead (ug/l)

Zinc (ug/l)

Ammoniacal Nitrogen (ug/l)

Nitrate (mg/l)

Total Oil Content (mg/l)

Oil Content - Aromatic Portion (mg/l)

Oil Content - Aliphatic Portion (mg/l)

1291556

020-00

0.5

0.133

0.54

<0.08

263.2

<0.2

0.64

1.01

2.7

147

0.52

2

0

2

A1

A1

Overall A1*

Parameters in bold are standard parameters required by SEPA for classification

* Resample undertaken following initial high BOD5 result, classification based on original parameter results plus re-sampled BOD5



NH06 Sample

Location

HU 45985936

Water Quality Class

Sample Reference

Date sampled

Time

Lab Ref

NH06

06/01/2009

12:30

1291557

NH06*

25/01/2009

1293010

Local Lab Results**Dissolved Oxygen (%)**

Water temperature (°C)

pH**Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

Suspended Solids (mg/l)

Chloride (mg/l)

Phosphate (ppm)

98

2.9

6.3

7

1

43

<1

A1

A1

A1*

<1*

Subcontracted Lab Results

Ref 1

Ref 2

Arsenic (mg/l)

Cadmium (ug/l)

Chromium (ug/l)

Copper (ug/l)

Iron (ug/l)

Mercury (ug/l)

Nickel (ug/l)

Lead (ug/l)

Zinc (ug/l)

Ammoniacal Nitrogen (ug/l)

Nitrate (mg/l)

Total Oil Content (mg/l)

Oil Content - Aromatic Portion (mg/l)

Oil Content - Aliphatic Portion (mg/l)

1291557

021-00

<0.4

<0.018

0.13

<0.08

302.7

<0.2

0.16

0.58

3.3

38

0.45

0

0

0

A1

A1

Overall A1*

Parameters in bold are standard parameters required by SEPA for classification

* Resample undertaken following initial high BOD5 result, classification based on original parameter results plus re-sampled BOD5



NH07 Sample

Location

HU 46725583

Water Quality Class

Sample Reference

NH07

Date sampled

23/12/2008

Time

14:20

Lab Ref

1290349

Local Lab Results**Dissolved Oxygen (%)**

96

A1

Water temperature (°C)

6.3

pH

6.2

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

<1

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

50

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1290349

Ref 2

022-00

Arsenic (mg/l)

0.5

Cadmium (ug/l)

0.173

Chromium (ug/l)

0.63

Copper (ug/l)

<0.08

Iron (ug/l)

305.9

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.75

Lead (ug/l)

0.98

Zinc (ug/l)

3.7

Ammoniacal Nitrogen (ug/l)

14

A1

Nitrate (mg/l)

0.19

Total Oil Content (mg/l)

0

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

0

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



NH08 Sample

Location

HU 44405438

Water Quality Class

Sample Reference

NH08

Date sampled

23/12/2008

Time

14:45

Lab Ref

1290350

Local Lab Results**Dissolved Oxygen (%)**

96

A1

Water temperature (°C)

7.1

pH

6.5

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

<1

A1

Suspended Solids (mg/l)

1

Chloride (mg/l)

55

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1290350

Ref 2

023-00

Arsenic (mg/l)

<0.4

Cadmium (ug/l)

<0.018

Chromium (ug/l)

0.19

Copper (ug/l)

<0.08

Iron (ug/l)

306.2

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.14

Lead (ug/l)

0.33

Zinc (ug/l)

3.3

Ammoniacal Nitrogen (ug/l)

9

A1

Nitrate (mg/l)

0.17

Total Oil Content (mg/l)

0

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

0

Overall A1

Parameters in bold are standard parameters required by SEPA for classification



NH09 Sample

Location

HU 43625390

Water Quality Class

Sample Reference

NH09

Date sampled

08/01/2009

Time

14:45

Lab Ref

1291807

Local Lab Results**Dissolved Oxygen (%)**

95

A1

Water temperature (°C)

6.8

pH

6.6

A1

Biological Oxygen Demand; 5 days (BOD5) (mg/l)

4

A2

Suspended Solids (mg/l)

2

Chloride (mg/l)

46

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1291807

Ref 2

029-00

Arsenic (mg/l)

0.5

Cadmium (ug/l)

<0.018

Chromium (ug/l)

0.45

Copper (ug/l)

<0.08

Iron (ug/l)

429.2

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.4

Lead (ug/l)

0.47

Zinc (ug/l)

3.6

Ammoniacal Nitrogen (ug/l)

30

A1

Nitrate (mg/l)

0.45

Total Oil Content (mg/l)

1

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

1

Overall A2

Parameters in bold are standard parameters required by SEPA for classification



NH10c Sample

Location

HU 45006282

Water Quality Class

Sample Reference

NH10c

Date sampled

23/12/2008

Time

12:40

Lab Ref

1290351

Local Lab Results**Dissolved Oxygen (%)**

96

A1

Water temperature (°C)

6.8

pH

4.4

*B***Biological Oxygen Demand; 5 days (BOD5) (mg/l)**

<1

A1

Suspended Solids (mg/l)

2

Chloride (mg/l)

58

Phosphate (ppm)

<1

Subcontracted Lab Results

Ref 1

1290351

Ref 2

024-00

Arsenic (mg/l)

<0.4

Cadmium (ug/l)

<0.018

Chromium (ug/l)

0.17

Copper (ug/l)

<0.08

Iron (ug/l)

321.1

A1

Mercury (ug/l)

<0.2

Nickel (ug/l)

0.11

Lead (ug/l)

0.36

Zinc (ug/l)

5.2

Ammoniacal Nitrogen (ug/l)

34

A1

Nitrate (mg/l)

0.29

Total Oil Content (mg/l)

0

Oil Content - Aromatic Portion (mg/l)

0

Oil Content - Aliphatic Portion (mg/l)

0

Overall B

Parameters in bold are standard parameters required by SEPA for classification



Appendix B

SEPA Annex 1 – Parameters used in the classification of water quality at a monitoring point

Annex A: River Classification Scheme for Scotland

Class	Description	Water Chemistry ^a					Biology				Nutrients ^a	Aesthetic Condition ^d (Contaminate)	Toxic Substances	Comments
		DO (%sat) 10%ile	BOD (mg/l) 90%ile	NH ₄ -N (mg/l) 90%ile	Iron (mg/l) Mean	pH %ile	Lab Analysed ^b		Bankside ^c		SRP (µg/l) Mean			
							ASPT EQI	TAXA EQI	ASPT	Field Score				
A1	Excellent	≥ 80	≤ 2.5	0.25	≤ 1 [†]	5%ile ≥ 6 95%ile ≤ 9	≥ 1.0	≥ 0.85	≥ 6.0	≥ 85	≤ 20	No A Minor B ^e	Complies with Dangerous Substances EQS's	Sustainable salmonid fish population. Natural Ecosystem
A2	Good	≥ 70	≤ 4	0.6	≤ 1	10%ile ≥ 5.2	≥ 0.9	≥ 0.70	≥ 5.0	≥ 70	≤ 100	Trace/Occasional A or B ^f	Complies with Dangerous Substances EQS's	Sustainable salmonid fish population. Ecosystem may be modified by human activity
B	Fair	≥ 60	≤ 6	1.3	≤ 2	10%ile < 5.2	≥ 0.77	≥ 0.55	≥ 4.2	≥ 50	> 100	-	Complies with Dangerous Substances EQS's	Sustainable coarse fish population. Salmonids may be present. Impacted ecosystem.
C	Poor	≥ 20	≤ 15	9.0	> 2	-	≥ 0.50	≥ 0.30	≥ 3.0	≥ 15	-	Gross A or B ^g	> EQS for dangerous substance	Fish sporadically present. Impoverished ecosystem
D	Seriously Polluted	> 20	> 15	≥ 9.0	-	-	< 0.50	< 0.30	< 3.0	< 15	-	-	> 10 x EQS for dangerous substance	Cause of nuisance. Fauna absent or seriously restricted

Notes on next page

Notes relating to classification scheme

- a - Based on 3 years data, minimum of 12 samples, unless there has been a significant change in circumstances (eg a discharge eliminated) which justifies a 1 year assessment.
- Estimation of percentiles for more than 19 samples to be by the non-parametric Wiebull Method. Otherwise the parametric method is used, assuming DO and pH are normal distributions, and BOD and Ammonical Nitrogen are log normal.
- For pH the 5, 10 and 95 %iles must be determined from the 3 years data and compared with the class determining limits in the Classification Table. Again, where there are more than 19 samples the percentiles should be estimated by the non-parametric Wiebull Method. Otherwise, the parametric percentile estimation must be made, using the method of moments, and an assumed normal distribution.
- b - RIVPACS assessment based on data for 1 year, preferably 3 samples (Spring, Summer, Autumn), minimum of 2 (Spring and Summer).
- c - Based on 1 year's monitoring data, preferably 3 samples, minimum 2. The overall class to be determined from the mean field score and mean ASPT of the individual samples.
- d - Aesthetic conditions to be based on 1 year's monitoring data and will be assessed and recorded during biological and/or chemical visits. The points should be representative of the general quality of the watercourse reach. Aesthetic contamination to be assessed as either discharge related (List A) or general (List B).

List A contaminants

Sewage derived litter and solids, including

- faeces
- toilet paper
- contraceptives
- sanitary towels
- tampons
- cotton buds

Oils

Non natural foam, scum or colour

Sewage fungus

Sewage or oily smells

List B contaminants

General non sewage derived litter

Builders waste

Gross litter, including

- shopping trolleys
- furniture
- motor vehicles
- road cones
- bicycles/prams

- e - No List A contaminants, possibly minor List B litter present.
- f - Traces of List A and /or occasional List B contamination, especially at easy access points.
- g - List A contamination widespread and/or occasional conspicuous quantities, and/or gross amounts of List B contamination. Likely to be the cause of justified public complaints.