

Environmental Protection Report

MICRO LOW FLOWS AVERAGE AND
LOW FLOW ESTIMATION
IN THE SW REGION
VALIDATION OF VERSION 1.2 SOFTWARE

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Water Resources Planning

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ENVIRONMENT AGENCY



125207

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List of Symbols and Abbreviations

AAY - Average Annual Yield

ADFMAP - the natural mean daily flow at the same location as compensation flows

ADFREC - recorded daily flow at the dam or maintained flow point

AE - Actual Evaporation

C.A - Catchment Area

cumecs - metres cubed per second

COMPCODE - the compensation code categorising the type of release policy operated

FDC - flow duration curve

FFC - flow frequency curve

GHOST - Grouped Hydrology of Soil Types

HOST - Hydrology of Soil Types

HYA - Hydrometric Area

IH - Institute of Hydrology

km² - square kilometres

LID - Line Identification Number

MF - Mean Flow

MLFs - Micro Low Flows

mm - millimetres

MSDOS - MicroSoft Disk Operating System

NGR - National Grid Reference

NRA SW - National Rivers Authority South West Region

PCDOS - Personal Computer Disk Operating System

PE - Potential Evaporation

Q50(10) - 50 percentile exceedance (median) flow of 10 day duration

Q50(1) - 50 percentile exceedance (median) flow of 1 day duration

Q95(10) - 95 percentile exceedance flow of 10 day duration

Q95(1) - 95 percentile exceedance flow of 1 day duration

r - Adjustment factor for the estimation of actual evaporation

SAAR - Standard period (1941 - 1970) Average Annual Rainfall

SGL - Simple Graphics Library

SUMMARY

Micro Low Flows is a computer based software system developed by the Institute of Hydrology for estimating theoretical flow statistics for individual river reaches. A second version, Version 1.2 was installed at NRA SW on August 12th 1991 and subjected to a series of tests, designed to identify errors, limitations and possible improvements.

Several of the errors reported to the Institute of Hydrology have already been corrected in updates to Version 1.2 received during the validation period.

It is hoped that several of the recommendations outlined in section 6 of this document will be incorporated into Version 1.3.

Overall, the system is relatively easy to use and will improve the support provided by Water Resources Planning to achieve various corporate targets.

MICRO LOW FLOWS AVERAGE AND LOW FLOW ESTIMATION IN THE SW REGION

VALIDATION OF VERSION 1.2 SOFTWARE

1. Introduction.

The Micro Low Flows system (MLFs) is a PC based software package for the rapid and repeatable estimation of theoretical flow statistics for individual river reaches.

The Beta version 1.2 of the Micro Low Flows software system was supplied to NRA SW on 12/8/91. Version 1.2 contains all the facilities of Version 1.1 plus several additional features (for detailed results of testing of Version 1.1 please refer to document "Micro Low Flows Average and Low Flow Estimation in the South West Region, Validation of Version 1.1 software"). NRA SW formally undertook to test and report on Version 1.2. This report summarises the results of these tests.

Errors were reported to the Institute of Hydrology on 19/8/91 and 28/8/91. IH updated the package on 12/9/91 and 11/10/91.

2. Aim and Objectives of the Validation Study

2.1 Aim

To assess the performance of the software system, associated documentation and installation instructions and recommend developments of the software system for Release 1.3.

2.2 Objectives

- a. To determine whether the MLFs system corresponds to that described in the document entitled "Purchase, Maintenance and Development Contract for Institute of Hydrology MICRO LOW FLOWS - NETWORK (Release 1.3) Software" (January 1991).
- b. To identify errors and where possible determine their cause.
- c. To identify the limits of the software system.
- d. To determine whether Version 1.2 is an improvement upon Version 1.1 of the Micro Low Flows software system.

3. Attributes of the Micro Low Flows Software System Version 1.2.

In the "Purchase, Maintenance and Development Contract", IH undertakes to supply Micro Low Flows Version 1.2 with all the facilities present in Version 1.1 plus the following extra facilities:

- a) The ability to calculate a flow duration curve.
- b) A value of the flow for a specified exceedance percentile.
- c) A value for the exceedance percentile for a specified flow.
- d) An estimate of the confidence in the calculated values of MF, Q95 and Q50.
- e) A fuller help facility
- f) The capability to specify which combination of attributes are presented in the display panel. (This will be restricted to the deletion and printing of attributes within the display panel).

4. Validation Methodology.

Basically the testing procedure followed during the validation of Version 1.1 was repeated for Version 1.2 with some new tests to cover the extra facilities of this version. The scheduled tests are detailed in Appendix 1.

The first update was received before the completion of all the scheduled tests. Tests 5 - 10 had not been completed. One test, Test 2 was therefore repeated for another river name in each hydrometric area. Tests 5 to 10 were then completed and tests 2 and 10 were repeated again after the second update.

The user guide for Version 1.2 was checked for accuracy and then assessed as an aid for the inexperienced user, someone who had no previous experience of the system (Ruth Sainsbury).

5. Results.

The results of tests in which no errors were encountered were recorded on comment sheets and are documented separately (available on request from Water Resources Planning).

5.1 Attributes.

The system contains all the content, retrieval, output facilities, documentation and software as outlined in the Contract (available on request from Water Resources Planning).

5.2 Errors

The error classification scheme used was the same as that for Version 1.1. For example error classification A refers to problems which cause an irrecoverable failure e.g. requiring re-booting the system. Error classification B refers to problems which prevent work in a particular area, e.g. the inability to use a major facility. For more details of the error classification scheme please refer to document "Micro Low Flows Average and Low Flow Estimation in the South West Region, Validation of Version 1.1 software."

5.2.1 Data Base Content Errors.

- a) The evaporation figures in the original copy of Version 1.2 were Potential Evaporation and not Actual evaporation as displayed. These were changed to actual evaporation by the first update. See Appendix 2.
- b) The response "n.a" (not applicable/available) for Q95 when GHOST is zero should read 0.000 as in the overlay maps and tables. This was corrected by the first update. See Appendix 3.
- c) The value for Actual Evaporation for LID 12890 was given as "n.a" in the original copy of Version 1.2. This was corrected by the first update and flow figures have now been calculated for this stretch. See Appendix 4.
- d) Essentially Micro Low Flows estimates catchment area by allocating 0.25km² grid squares to the nearest river reach. Despite modifications to the methodology in Version 1.2 many of the catchment area estimates found to differ significantly from planimetered values in Version 1.1 were still in error in Version 1.2. See Appendix 5. (For more details please refer to document "Micro Low Flows Average and Low Flow Estimation in the South West Region, Validation of Version 1.1 software".)
The error, usually overestimation, is largely physically based being worst in catchments that have been impacted by extensive clay workings. In these cases it is difficult to accurately measure catchment area and the results of the planimeter and from Version 1.2 may both be incorrect.
- e) In HYA 50 there are two different sets of information relating to Vellake Gauging Station. There should only be one. See Appendix 6.

- f) One of the river names given for hydrometric area 46 is spelt wrongly. The river name should read 'South Milton' and not 'South Huton'. See Appendix 7.
- g) Several of the error estimates are given as "n.a", 0.000 or *****. These should be corrected by Version 1.3. See Appendix 8.
- h) The flow values generated from the flow duration curve using the exceedance percentile option are only given to two decimal places instead of three. This error was corrected by the second update. See Appendix 9.
- i) In some cases the value for Q95 is given as -0.000. See Appendix 10.

5.2.2 Data Base Retrieval Errors.

- a) Incorrect entry by NGR. This was also reported as an error with Version 1.1. Despite using the NGR previously supplied, MLFs identified a different river stretch. This problem appears to have been corrected by the first update. See Appendix 11.
- b) In the original copy of Version 1.2 it was not possible to enter HYAs 45 -49 using the NGR entry facility. This was corrected by the first update. See Appendix 12.

5.3 Documentation.

Four copies of the User guide were supplied by IH with the original copy of Version 1.2.

The worked example in the User Guide is useful and easy to follow. However at some points the text does not correspond with the menu tree in Figure 2.1. See Appendix 13.

For example after printing upstream reservoirs the guide states that the user is returned to menu 11b, he is actually returned to menu 8. The menu tree is very confusing and difficult for the inexperienced user to follow.

Also, when the user chooses to print stretch values there are several printing options which allow different combinations of estimates to appear on the hardcopy. This menu is not included in the menu tree or explained in the text.

5.4 Software and Hardware Standards

The required software and hardware standards were specified in the MLFs contract in sections 1.3 and 1.4 respectively. The source code, graphics language, operating system, menu handling, machine requirements and hardcopy output are the same as those described in section 5.4 of the report "Validation of Version 1.1 software".

6. General Software Recommendations.

6.1 Hardcopy Presentation.

As stated in the report on Version 1.1 of Micro Low Flows the following recommendations would improve the hardcopy presentation of statistics;

- a. highlighting different sections, either in bold or by boxing sections (for example a box around the stretch estimates and a border around the notepad)
- b. the addition of a zero in front of figures <1
- c. changing the symbol that highlights the appropriate river stretch shown in black and white printouts of networks from a * to a 'solid symbol'
- d. preventing printed information associated with one river reach being split over two pages.

6.2 Menu Structure.

An inexperienced user may have difficulty in identifying the correct way to leave the system once they have reached Menu 8. We therefore recommended that the option to "Finish Hydrometric Area" should be transferred from Menu 9a and included as an extra option in Menu 8. See Appendix 13.

6.3 Printing and Plotting.

- a. From the HP7475A plotter option in Menu 1 we would like the ability to select files and determine the order of plotting from a list of file names.
- b. When Micro Low Flows is actually used to supply theoretical flow statistics, we will need to generate plots on the laserjet without leaving

the system. We therefore recommend that the laserjet plot option is included in Menu 11b.

- c. We also recommend that an option to plot the flow duration curve is included in Menu 12b.
- d. When using the flow duration curve option it would be very useful if the box containing the exceedance percentile and flow or the flow and exceedance percentile was printed next to the hardcopy plot of the flow duration curve, underneath the low flow estimates.
- e. The printing option "Print Location Only" should be replaced with an option "Print Standard Statistics". This option would include the combination of statistics that our 'customers' usually require (i.e Easting, Northing, LID, Area, MF, Q95 and Q50).
- f. The printing option "Print No Estimates" is misleading and needs to be replaced by another title such as "Print Other Information".
- g. As they stand, the sub-catchment boundaries within the Hydrometric Area are not particularly useful. It would be better if these boundaries were based on our licensing sub-catchments.
- h. Six figure grid references are used throughout NRA SW with the appropriate two letter prefix (eg SX). The one digit prefix generated by Micro Low Flows is confusing. It would be less confusing if the one digit prefix shown on the display and on the hardcopy printout was smaller than the other numbers.

7. Conclusion

As well as the features of version 1.1, Version 1.2 contains several extra facilities as described in the document "Purchase, Maintenance and Development contract for Institute of Hydrology MICRO LOW FLOWS - NETWORK (Release 1.3) Software".

Most errors reported during the validation period, Phase 2, have already been corrected by the two updates to Version 1.2. IH have a commitment to correct any outstanding A and B errors before the release of Version 1.3.

Overall Version 1.2 was considered to be an improvement over the Beta Version 1.1.

Phase 2 of the MLFs testing is now complete. Phase 3 will begin after the release of Version 1.3 (now installed).

References

Bullock, A. and Gustard, A. (1989). "Average and Low Flow Estimation in the South West Region."

Bullock, A., Gustard, A. and Sekulin, A.E. (1990). "Supplement to Average and Low Flow Estimation in the South West Region - estimates for 14000 river stretches."

NRA SW. (1991). "Average and Low Flow Estimation in the South West Region. Validation of Version 1.1 Software."

Bullock, A. and Murdoch, N. (1991). "Purchase, Maintenance and Development Contract for Institute of Hydrology MICRO LOW FLOWS _ NETWORK (Release 1.3) software."

Institute of Hydrology. (1991). "Micro Low Flow System Beta Release Version 1.2 User Guide for the South West Region."

APPENDIX 1

SCHEDULED TESTS

INTEGRATED TESTS PHASE 1

TEST NO.	PURPOSE	TESTER	DATE
1	To familiarise the user with the system and its main features.		
COMMENT _____			

2a To test basic menu structure; river name entry, mouse and print facilities.

2b To test basic menu structure; LID entry and print facilities.

2c To test basic menu structure; NGR entry and print facilities.

Tests 2a -c are completed as a package using the same river reach. This package should be repeated for a reach in each hydrometric area.

TESTER	DATE	COMMENT	TESTER	DATE	COMMENT
2a-CHYA45	_____		2a-CHYA46	_____	
2a-CHYA47	_____		2a-CHYA48	_____	
2a-CHYA49	_____		2a-CHYA50	_____	
2a-CHYA51	_____				

3 To test data content; river name entry and the multiple print facility.

Test 3 should be repeated for a named river catchment in each hydrometric area. Compare the downloaded print with listings derived from the tables. Choose the River Tavy in hydrometric area 47 and smaller named rivers in the other areas.

TESTER	DATE	COMMENT	TESTER	DATE	COMMENT
3HYA45	_____		3HYA46	_____	
3HYA47	_____		3HYA48	_____	
3HYA49	_____		3HYA50	_____	
3HY51	_____				

- 4a To test data content; the notepad and print facilities. Use river name and mouse to identify reach.
- 4b To test notepad recall and printing facilities. Use LID to identify reach used in 4a.
- 4c To test notepad recall and printing facilities. Use NGR to identify reach used in 4a.
- 4d To test notepad editing facilities. Repeat 4b and c editing the notepad prior to printing.

Tests 4a-d are completed as a package using the same river reach. The package is completed in each hydrometric area. Are the printed notepads identical to those shown on the screen? Has the information been saved correctly?

TESTER	DATE	COMMENT	TESTER	DATE	COMMENT
4a-dHYA45	_____		4a-dHYA46	_____	
4a-dHYA47	_____		4a-dHYA48	_____	
4a-dHYA49	_____		4a-dHYA50	_____	
4a-dHYA51	_____				

- 5 To determine whether errors associated with the use of the maps and tables or Version 1.1 of Micro Low Flows are also present in Version 1.2.

LID NO	COMMENT	TESTER	DATE
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____

In most instances it should be possible to access data using the LID and the route described in test 2b.

UNIT TESTS PHASE 1

Using a route described above.

6 Do we have a complete list of river names? Check with our listings.

TESTER	DATE	COMMENT
<hr/>		

7 How much information will the notepad hold/print?

TESTER	DATE	COMMENT
<hr/>		

8 How many times can the zoom in facility be used?

TESTER	DATE	COMMENT
<hr/>		

9 What happens if a grid reference is entered that is not on a watercourse?

TESTER	DATE	COMMENT
<hr/>		

10 Do the values generated for a specified flow or exceedance percentile correspond to the flow duration curve shown? Is the flow duration curve correct?

TESTER	DATE	COMMENT
<hr/>		

MICRO LOW FLOWS ERROR REPORT

Ref. No. 2 Version No. 1.2PC No. 381m Date 21/8/91Identified during test? Yes ☒ No ☐If Yes, Test No. 3Name of tester A HIGGINS

Summary of problem

The figures given by Micro Low Flows are
POTENTIAL evaporation rather than actual evaporation.

When figures are used in manual calculation need
to change figures to actual evaporation before
calculating ANY

Impact Assessment (circle as appropriate)

A B C D E F

Reported to IoH (All A, B & C errors)

Date 28/8/1991 Mode HandSign A. L Higgins

Reply

Date 12/9/1991 Mode MailSign A. L Higgins

Please refer to accompanying notes when completing this form

MICRO LOW FLOWS ERROR REPORT

Ref. No. 3 Version No. 1.2PC No. 381m Date 23/8/91Identified during test? Yes ☒ No ☐If Yes, Test No. 5Name of tester A. HIGGINS

Summary of problem

As with version 1.1 when the ghost figure is 0.00. Q95 is given as n.a. This should have been corrected in version 1.2.

Version 1.2 also gives the response n.a for Q50, this is not correct

Impact Assessment (circle as appropriate)

A B ☒ C D E F

Reported to IoB (All A, B & C errors)

Date 28/8/1 1991 Mode HandSign A. Higgins

Reply

Date 12/9/1 1991 Mode MailSign A. L. Higgins

Please refer to accompanying notes when completing this form

MICRO LOW FLOWS ERROR REPORT

Ref. No. S Version No. 1.2PC No. 381M Date 23/8/91Identified during test? Yes ☒ No ☐If Yes, Test No. SName of tester A. HIGGINS

Summary of problem

In hydrometric area 48 LID 12890

Actual annual evaporation (which is really Potential evaporation) is given as n.a. although catchment area and rainfall and ghat values are given

Mean daily flow, Q95 and Q50 are also given as n.a

Impact Assessment (circle as appropriate)

A

☒ B

C

D

E

F

Reported to IoH (All A, B & C errors)

Date 28/8/1991Mode HandSign A. L. Higgins

Reply

Corrected by the first update of Version 1.2.

Date _____ 1991

Mode _____

Sign A. L. Higgins

Please refer to accompanying notes when completing this form

COMMENT SHEET

(To be filled in following the successful completion of a scheduled test.
Please use separate error reporting form for specific errors/problems.)

PC No. 381m MICRO LOW FLOWS VERSION No. 1.2 DATE 29/8/91

TEST No. Randan.

COMMENT

eg. Test ran smoothly.

Results shown in maps and tables incorrect.

Found the testing instructions difficult to follow.

When I called up this stretch (LID 12890)
actual evaporation (which should be potential)
was given as 560 mm/yr and not n.a as
generated on a previous occasion.

Values of mean daily flow, Q95 and Q50
were also given.

I entered Micro Low Flows by the various routes
and each time this estimate (560) was given
rather than the answer of n.a as generated
before.

SIGNATURE A. L. Higgins

Version 1.1 - testing reply of n.a

Estimates at {Easting	2126
{Northing	523
{Line ID (LID)	12890
Catchment area (sq km)	n.a.
Average annual rainfall (mm)	
Average potential evaporation (mm)	
GHOST	.000
Average daily flow (cumecs)	n.a.
Q95 (cumecs)	n.a.
Q50 (cumecs)	n.a.

Version 1.2 - testing evaporation

Estimates at {Easting	2126
{Northing	0523
{Line ID (LID)	12890
Catchment area (sq km)	2.75
SAAR (1941-1970) (mm/yr)	1003
Actual annual evaporation (mm/yr)	560
GHOST (% mean daily flow)	10.000
Mean daily flow (cumecs)	.040e= .007
Q95 (cumecs)	.004e= .002
Q50 (cumecs)	.027e= .005

MICRO LOW FLOWS ERROR REPORT

Ref. No. 6 Version No. 1.2PC No. 381m Date 23/8/91Identified during test? Yes ☒ No ☐If Yes, Test No. 5Name of tester A. HIGGINSSummary of problem Catchment Areas.

In several cases where catchment area was previously overestimated in version 1.1. the value generated by version 1.2 has not changed or the overestimation has increased. (See attached for examples).

Impact Assessment (circle as appropriate)

A B C D E F

Reported to IoH (All A, B & C errors)

Date 28/8/ 1991Mode HandSign A. Higgins

Reply

Date _____ 1991

Mode _____

Sign _____

Please refer to accompanying notes when completing this form

hya48 - incorrect catchment area

	{Easting	1557
Estimates at	{Northing	0281
	{Line ID (LID)	20925
Catchment area (sq km)		4.50
SAAR (1941-1970) (mm/yr)		920
Actual annual evaporation (mm/yr)		553
GHOST (% mean daily flow)		23.638
Mean daily flow (cumecs)	.055e=	.012
Q95 (cumecs)	.013e=	.004
Q50 (cumecs)	.038e=	.008

Originally C.A overestimated to be 3.75. - has now
increased to 4.50 km².

MICRO LOW FLOWS ERROR REPORT

Ref. No. 7 Version No. 1.2PC No. 381m Date 29/8/91Identified during test? Yes No ✓If Yes, Test No. Name of tester A. HigginsSummary of problem Vellake Gauging Station

There are two sets of data for Vellake with different station numbers and different lengths of record - there should only be one.

When choose next gauge and it says no more on this stretch and press any key, if then choose previous gauge the gauging station panel is displayed but there are no values or text shown.

Impact Assessment (circle as appropriate)

A B C (D) E F

Reported to IoH (All A, B & C errors)

Date 20/9/1991Mode MailSign A. L. Higgins

Reply

Date 21/11/1991Mode PhoneSign A. L. Higgins

Please refer to accompanying notes when completing this form

Vellake Gauging Station

	(Easting	2559
Estimates at	(Northing	0902
	(Line ID (LID)	23173
Catchment area (sq km)		13.75
SAAR (1941-1970) (mm/yr)		2192
Actual annual evaporation (mm/yr)		452
GHOST (% mean daily flow)		19.196
Mean daily flow (cumeecs)	.759e=	.037
Q95 (cumeecs)	.139e=	.031
Q50 (cumeecs)	.444e=	.031

Vellake Gauging Station

Gauging station: West Okement at Vellake
Description:

Number	50005
Easting	2557
Northing	0903
Start year of flow record	1975
End year of flow record	1987
Area (sq. km.)	13.300
Mean daily flow (cumeecs)	.679
Q95(1) (cumeecs)	
Q50(1) (cumeecs)	

Vellake Gauging Station

Gauging station: West Okement at Vellake
Description:

Number	50802
Easting	2557
Northing	0903
Start year of flow record	1976
End year of flow record	1989
Area (sq. km.)	13.300
Mean daily flow (cumeecs)	.678
Q95(1) (cumeecs)	
Q50(1) (cumeecs)	

Vellake Gauging Station

Vellake Gauging Station

Gauging station: West Okement at Vellake
Description:

Number	50005
Easting	2557
Northing	0903
Start year of flow record	1975
End year of flow record	1987
Area (sq. km.)	13.300
Mean daily flow (cumeecs)	.679
Q95(1) (cumeecs)	

MICRO LOW FLOWS ERROR REPORT

Ref. No. 9 Version No. 1.2PC No. 381m Date 2/9/91Identified during test? Yes ☒ No ☐If Yes, Test No. 6Name of tester A. HIGGINS

NRA

National Rivers Authority
South West Region

Summary of problem

In hydrometric area 46 the 5th River Name
is South Hutan - this should be South Milton

Impact Assessment (circle as appropriate)

A B C D E F

Reported to IoH (All A, B & C errors)

Date 20/9/1991 Mode MailSign A. L. Higgins

Reply

Date 21/11/1991 Mode PhoneSign A. L. Higgins

Please refer to accompanying notes when completing this form

MICRO LOW FLOWS ERROR REPORT

Ref. No. 10 Version No. 1.8.PC No. 381M Date 18/9/91Identified during test? Yes No ✓If Yes, Test No. Name of tester A. HIGGINS.

Summary of problem

The error estimates are expressed in different ways
eg sometimes 0.000, 1.0 or ~~1.000~~

Impact Assessment (circle as appropriate)

A B C (D) E F

Reported to IoH (All A, B & C errors)

Date 20/9/1991Mode MailSign A. Higgins

Reply

Date 14/10 1991Mode MailSign A. Higgins

Please refer to accompanying notes when completing this form

Testing error bands

	{Easting	2462
Estimates at	{Northing	1448
	{Line ID (LID)	15837
Catchment area (sq km)		.75
SAAR (1941-1970) (mm/yr)		1000
Actual annual evaporation (mm/yr)		519
GHOST (% mean daily flow)		10.000
Mean daily flow (cumecs)	.011e=	.002
Q95 (cumecs)	.001e=	.000
Q50 (cumecs)	.008e=	.001

Testing error bands 2

	{Easting	2890
Estimates at	{Northing	0677
	{Line ID (LID)	9409
Catchment area (sq km)		.50
SAAR (1941-1970) (mm/yr)		1023
Actual annual evaporation (mm/yr)		543
GHOST (% mean daily flow)		31.000
Mean daily flow (cumecs)	.008e=	n.a.
Q95 (cumecs)	.002e=	*****
Q50 (cumecs)	.005e=	*****

MICRO LOW FLOWS ERROR REPORT

Ref. No. 11 Version No. 1.2PC No. 381m Date 18/9/91Identified during test? Yes No ✓If Yes, Test No. Name of tester A. HIGGINS.

Summary of problem

LID 18774 - River Exe - HYA 45.

The Q95 is given as 0.007.

When using the flow duration curve facility to obtain flow for a particular exceedance, the following results were obtained.

Q97 flow = 0.01 - this is greater than
 Q96 flow = 0.01 the Q95 is not correct
 Q98 flow = 0.00

When you enter 0.01 to get exceedance from flow it is Q90.8.

Also flows are only given to two decimal places.

Impact Assessment (circle as appropriate)

A (B) C D E F

Reported to IoH (All A, B & C errors)

Date 20/9/1991Mode Mail.Sign A.L. Higgins

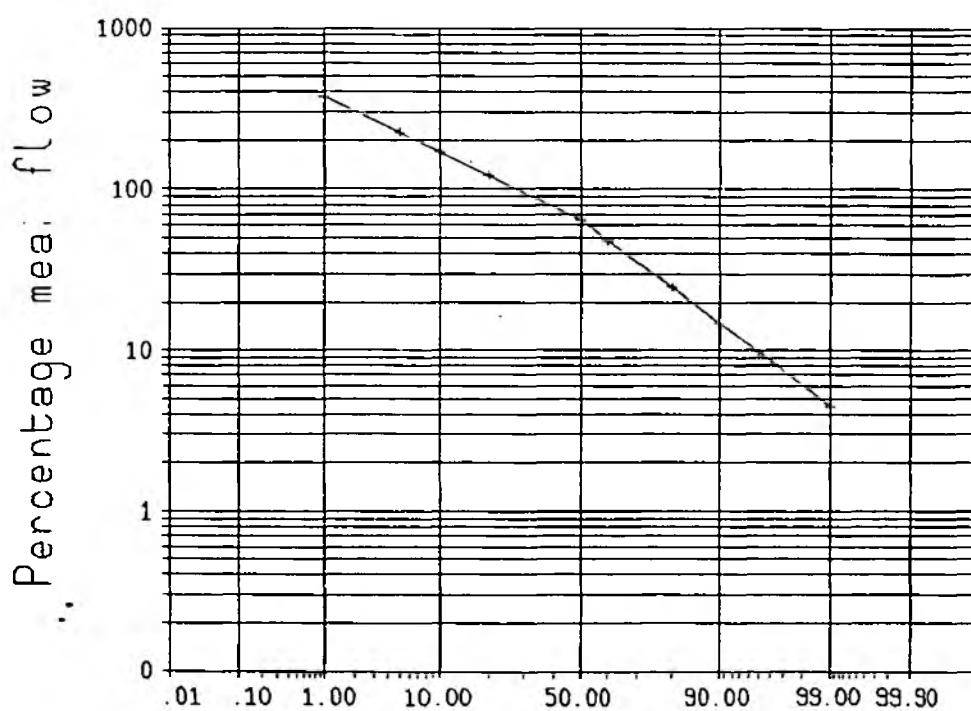
Reply

Date 14/10/1991Mode Mail.Sign A.L. Higgins

Please refer to accompanying notes when completing this form



Estimated flow duration curve



Flow Duration Curves testing

Easting	2981
Northing	1336
MF (cumecs)	.071
Q95(1) (cumecs)	.007
Q50(1) (cumecs)	.046

Percentage of time discharge exceeded

MICRO LOW FLOWS ERROR REPORT

Ref. No. 13 Version No. 1.2 Update 3PC No. 281M Date 17/10/91Identified during test? Yes No ✓If Yes, Test No. Name of tester A. HIGGINS

Summary of problem

The value given for Q95 is - 0.000.

Impact Assessment (circle as appropriate)

A B (C) D E F

Reported to IoH (All A, B & C errors)

Date 29/10/1991Mode MailSign A. L. Higgins

Reply

Date 21/11/1991Mode PhoneSign A. L. Higgins

Please refer to accompanying notes when completing this form

Negative Q95 value

Estimates at	{Easting	2002
	{Northing	0594
	{Line ID (LID)	12748
Catchment area (sq km)		1.50
SAAR (1941-1970) (mm/yr)		1390
Actual annual evaporation (mm/yr)		513
GHOST (% mean daily flow)		.000
Mean daily flow (cumecs)	.042e=	.004
Q95 (cumecs)	-.000e=	n.a.
Q50 (cumecs)	.017e=	n.a.

Negative Q95 value

Estimates at	{Easting	2464
	{Northing	0578
	{Line ID (LID)	9838
Catchment area (sq km)		1.75
SAAR (1941-1970) (mm/yr)		1042
Actual annual evaporation (mm/yr)		552
GHOST (% mean daily flow)		.000
Mean daily flow (cumecs)	.027e=	.005
Q95 (cumecs)	-.000e=	n.a.
Q50 (cumecs)	.012e=	n.a.

MICRO LOW FLOWS ERROR REPORT

Ref. No. 8 Version No. 1.2PC No. 381m Date 29/8/91Identified during test? Yes ☒ No ☐If Yes, Test No. 2Name of tester A. HIGGINS.

Summary of problem

As with version 1.1 when enter the grid reference previously supplied by Micro Low Flows for a particular stretch, the values for a different stretch are displayed.

Impact Assessment (circle as appropriate)

A B ☒ C D E F

Reported to IoH (All A, B & C errors)

Already reported for Version 1.1

Date 1991 Mode Sign A. L. Higgins

Reply

Date 12/9/1991 Mode mailSign A. L. Higgins

Please refer to accompanying notes when completing this form

MICRO LOW FLOWS ERROR REPORT

Ref. No. 1 Version No. 1.2PC No. 381M Date 19/8/91Identified during test? Yes ☒ No ☐If Yes, Test No. 2C HYA 45Name of tester A. HIGGINS

Summary of problem

Once the climb from location has been selected it is not possible to enter by NGR

The screen flashes up 'No stretch found' and returns the user to Menu 4.

This seems to be the case in all hydrometric areas 45 - 49 but works fine in areas 50 and 51

Impact Assessment (circle as appropriate)

A ☐ B ☒ C ☐ D ☐ E ☐ F ☐

Reported to IoH (All A, B & C errors)

Date 19/8/1991 Mode PhoneSign A. Higgins

Reply

Date 12/9/1991 Mode MainSign A. Higgins

Please refer to accompanying notes when completing this form

MENU TREE FOR MICRO LOW FLOWS V 1.2

