Technical Note

Project:	Hampshire Abstraction Inquiry	**To:**	Nigel Hepworth, Jessica Fletcher, Siobhan Mason
Subject:	Output timeseries in response to Fish Legal request	**From:**	Ben Piper, Rob Tothill
Date:	14 December 2017	**cc:**	Chris O'Grady
Version:	V1 for client approval	**Reviewed:**	Don Ross
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Approved by Southern Water for external release:			Nigel Hepworth

Purpose of this Technical Note

This Technical Note summarises the output variables from the SWS 2017 Aquator model that have been extracted from the Aquator run database in response to Fish Legal request for data.

Contents

1. Aquator database

Aquator uses an Access database which stores amongst other things daily timeseries of model inputs and all the output variables. The database is more than 300Mb.

In response to the request for data relating to Aquator model runs, timeseries of the model inflow data, and selected variables have been extracted. The data extracted are for the full simulation period, 2713 to 4799.

2. Model inflows

Daily timeseries of surface water inflows were derived by SWS from Run 163 of the Test & Itchen groundwater model. The daily inflow data have been extracted from the Aquator database. A single spreadsheet HantsInquiry_DG015_Aquator Inflows_T&I 163.xlsx comprises the following [TABS]:

- [Readme];
- [Overview schematic];
- [Test]; and
- [Itchen].

2.1. [Readme]

Cover sheet that provides QA information with the names of the source data files.

2.2. [Overview schematic]

Schematic to show the locations for which there are inflow timeseries.

2.3. [Test]

Inflow points for the River Test:

- River Test at Timsbury (AP14);
- Tadburn Lake;
- Longbridge Lakes;
- Cadnam; and
- Ower.

2.4. [Itchen]

Inflow points for the River Itchen:

- Cheriton Stream (MU1);
- River Alre (MU2);
- Candover Stream (MU3);
- River Itchen to Easton (MU4);
- River Itchen from Easton to Allbrook & Highbridge (MU5);
- River Itchen from Allbrook & Highbridge to Riverside Park (MU6); and
- Monks Brook a small right bank tributary that joins the Itchen downstream of the Riverside Park gauging station but upstream of the Tidal Limit at Woodmill Pool.

3. Outputs from selected Scenario Runs

Outputs are provided for two scenario runs:

DP0003-g which assumes the Testwood Section 52 proposed licence conditions (including a hands off flow of 355 Ml/d at the Test total flow, and the River Itchen sustainability reductions are in place. This scenario results in large deficits.

INQ010-g in which:

- Testwood has a Hands off Flow of 265 Ml/d (proposed by Southern Water) at the Test total flow which, with a drought order, is relaxed to 200 Ml/d.
- The Candover augmentation scheme is triggered when flows fall to 205 Ml/d at Allbrook and Highbridge. Abstraction is at a total rate of up to 27 Ml/d (20 Ml/d from 1 May to 31 August) limited to a total annual abstraction of 3750 Ml. Of the total abstraction, 2 Ml/d is retained for stream support via the existing 'major discharge' on the Candover Stream with the remainder being discharged directly to the River Itchen just downstream of the confluence with the Candover Stream.
- When flows fall to 194 Ml/d at Riverside Park, the Gaters Mill drought order is enabled to allow abstraction, as required to meet demand, to a flow of 150 Ml/d.
- Finally, abstraction is allowed below the hands off flow of 198 Ml/d at Allbrook and Highbridge, as required to meet demand, to a lower limit of 160 Ml/d.

Run No	Drought orders active			
	Testwood drought order	Candover drought order	Gaters Mill drought order	Lower Itchen drought order
DP0003-g	No	No	No	No
INQ0010-g	Yes (HoF 265 to 200 Ml/d)	Yes (triggered A&H@205 Ml/d)	Yes (194 to 150 Ml/d)	Yes (198 to 160 Ml/d)

For selected Scenario Runs daily timeseries have been prepared for variables under the following [TABS]:

- [Demands];
- [Abstractions]; and
- [Flows].

3.1. [Demands]

The [Demands] TAB contains daily timeseries of the following variables;

- Demands.Requested – the total demand that Aquator seeks to supply;
- Demands.Supplied – the total supply from both SWS and other sources that the model is able to access for that timestep;
- Demands.Shortfall;
- Demand saving.Level – the Drought Intervention level which can be null or if set 1, 2, or 3; and
- Demand saving.Percent – the percentage saving in demand applied to each SWS DC

3.2. [Abstractions]

The [Abstractions] TAB contains daily timeseries of the following variables – note some may not be active for all Scenario Runs;

- Testwood;
- Otterbourne - Drought Order;
- Twyford;
- Barton Stacey;
- Horsebridge;
- Timsbury;
- Totford GW;
- Easton GW;
- Candover Augmentation;
- Otterbourne (non-drought order);and
- Gaters Mill

3.3. [Flows]

The [Flows] TAB contains daily timeseries of the following variables;

- Allbrook and Highbridge GS;
- Testwood GS;
- Easton GS;
- Riverside Park GS;
- Testwood MRF;
- Blackwater;
- Conager Bridge GS;
- Broadlands GS;
- Test Tidal Limit;
- Itchen Tidal Limit;
- Great Test at Great Test Little Test split; and
- Nursling Fish Farm.