Dawdon & Horden Control Level Review; August 2012

Pumping is undertaken at Dawdon in conjunction with Horden to protect the regional groundwater aquifer. Although both Dawdon and Horden pump independently of each other they both need to be controlled at levels which cause no risk to aquifer pollution. An ideal control of 16mBOD is needed to prevent any uncontrolled discharges to the aquifer, however due to 'tidal patterns' and water level gradients between Dawdon & Horden a different approach to each individual station control level is needed. Hawthorn shaft lies inland and water levels appear have now stabilised due to pumping at the coastal sites. However, monitoring at Hawthorn must continue since if it returns to a rising trend, this would imply that additional water should be pumped.

Currently the control water level at Dawdon is a high level of 16mBOD (48.8mBGL) and a low level of 18mBOD (50.8mBGL) and currently the control water level at Horden is a high level of 8mBOD (71.3mBGL) and a low level of 10mBOD (73.3mBGL). To control the water at these levels Dawdon should be pumped at approx 100 l/s and Horden should be pumped at approx 35-40 l/s.

At Dawdon the pumped mine water is treated by an active treatment plant and the water is discharged to the North Sea; thus changes in mine water chemistry can dealt with to meet current discharge consents. Horden uses a passive treatment method of settlement ponds and reed beds; the salinity at Horden is high and if the concentrations are too high are likely to harm the reeds. Thus, to limit high levels of chloride in the water the water levels should be controlled at a higher water level than Dawdon and pumping rates should not go above 40 l/s at which higher concentrations of chloride have been measured in the past.

To overcome issues with both Dawdon and Horden having a wide tidal range (up to c4m), mean daily water levels should to assess the stations against the control levels. To get this average water level at Dawdon & Horden both sites will need water levels recorded at regular intervals (<1 hourly). This can be done be either a datalogger or telemetry system, however the latest data will be required each time an assessment is needed. With daily mean values for each site, both pumping station water levels can be compared and an average taken, this average water level would then be used to assess against an overall control level for Dawdon & Horden combined.

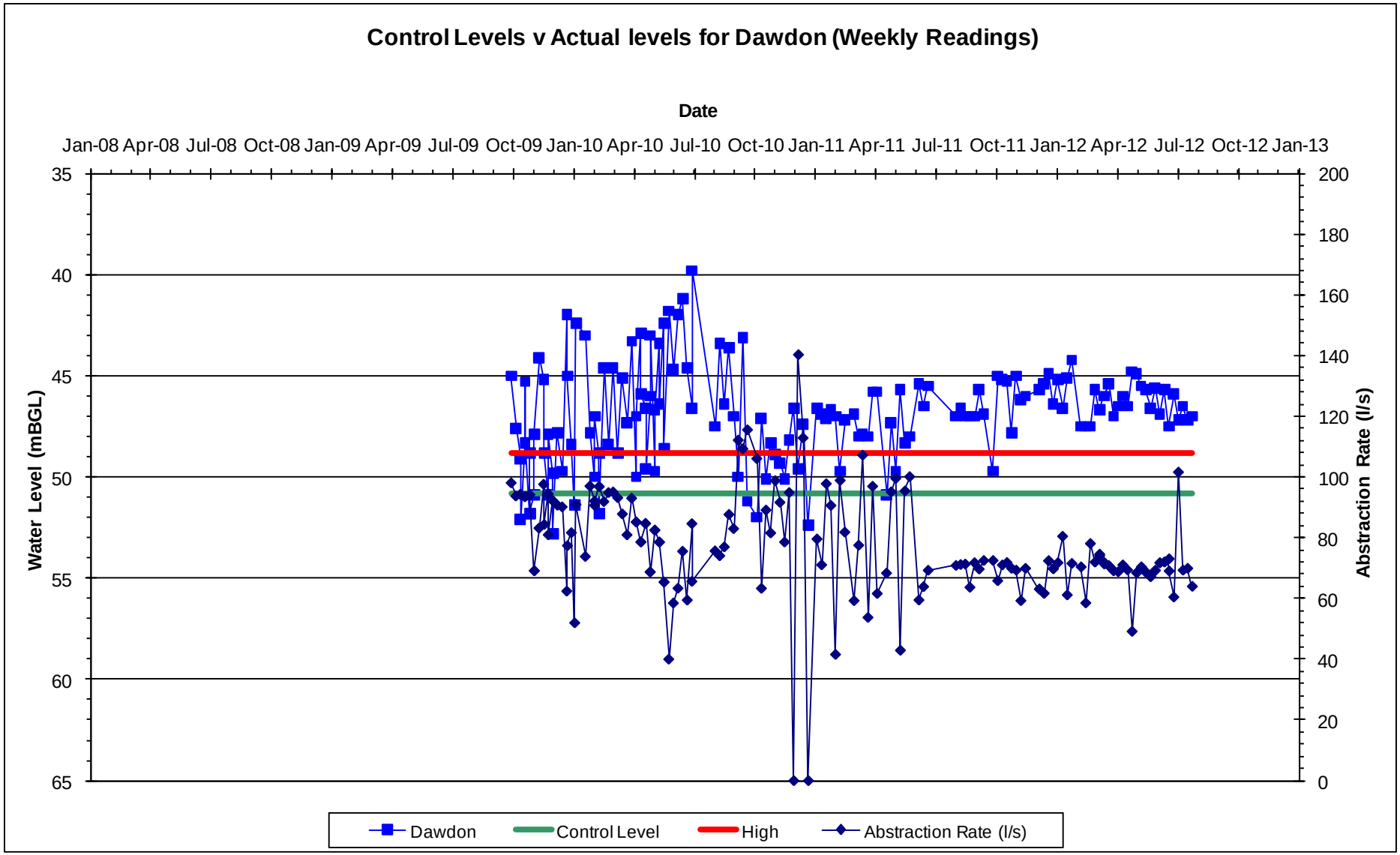
Currently we do not have telemetry data for Horden & Dawdon hence assessments can only be made retrospectively.

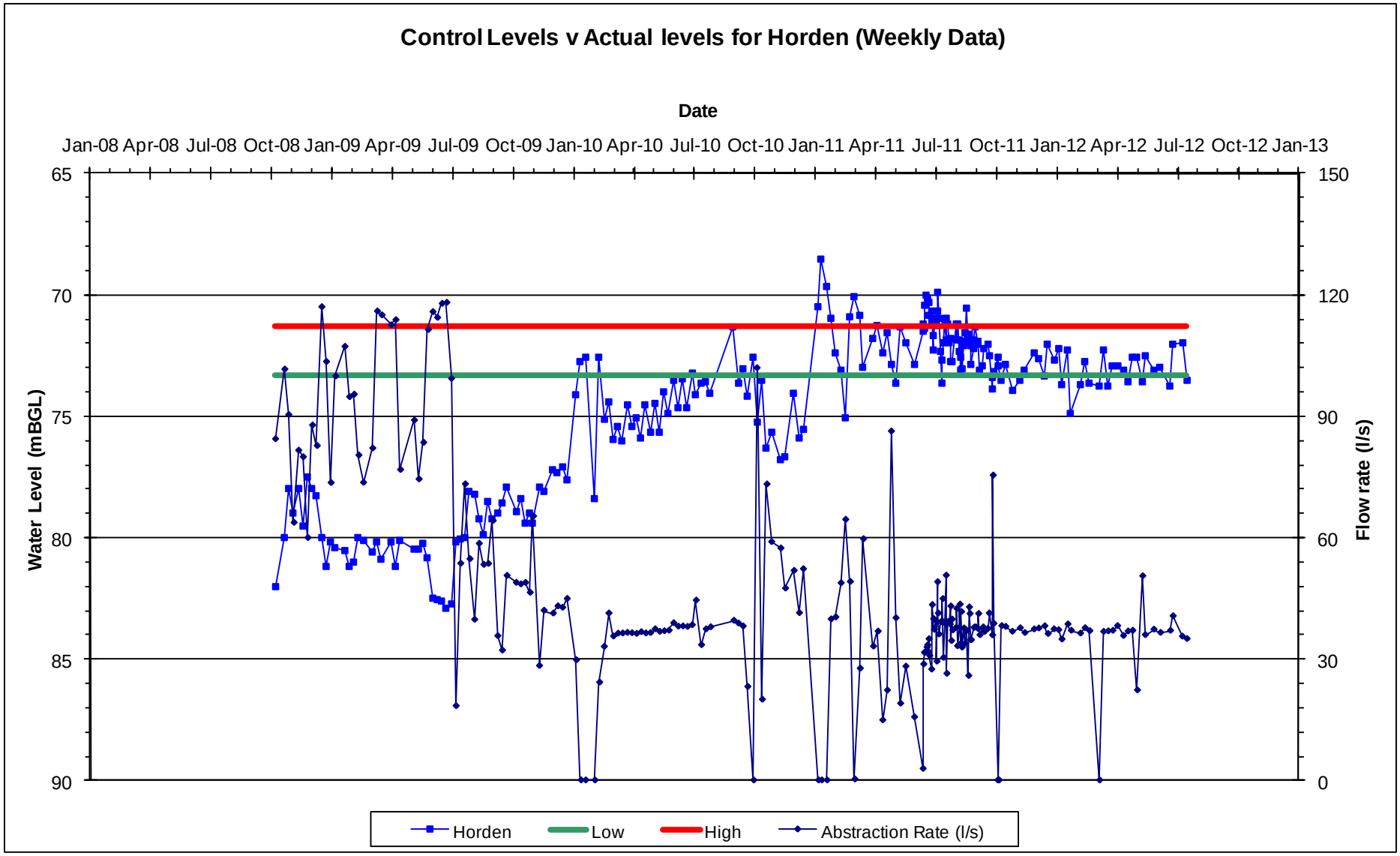
Over the past year or so Dawdon has been pumping at approx 70 to 80l/s and water levels have remained fairly static at approx 14mBOD (c47mBGL) with the level at Horden being held at approx 10mBOD (c73mBGL). With the water level at Dawdon higher than the 16-18mBOD control levels we have had no known issues, with chloride concentrations at Horden remaining fairly static at approx

9000mg/l. For these reasons the proposed control levels at Dawdon and Horden are unchanged and are as follows

High control level at Dawdon of 14mBOD (46.8mBGL) and at Horden (unchanged) of 8mBOD (71.3mBGL).

Low control level at Dawdon of 16mBOD (48.8mBGL) and at Horden (unchanged) of 10mBOD (73.3mBGL).


Control Levels v Actual levels for Dawdon (Weekly Readings)
Date
Jan-08 Apr-08 Jul-08 Oct-08 Jan-09 Apr-09 Jul-09 Oct-09 Jan-10 Apr-10 Jul-10 Oct-10 Jan-11 Apr-11 Jul-11 Oct-11 Jan-12 Apr-12 Jul-12 Oct-12 Jan-13
Water Level (mBGL)
35
40
45
50
55
60
65
Abstraction Rate (l/s)
200
180
160
140
120
100
80
60
40
20
0
Dawdon
Control Level
High
Abstraction Rate (l/s)


Control Levels v Actual levels for Horden (Weekly Data)
Date
Jan-08 Apr-08 Jul-08 Oct-08 Jan-09 Apr-09 Jul-09 Oct-09 Jan-10 Apr-10 Jul-10 Oct-10 Jan-11 Apr-11 Jul-11 Oct-11 Jan-12 Apr-12 Jul-12 Oct-12 Jan-13
Water Level (mBGL)
65
70
75
80
85
90
Flow rate (l/s)
150
120
90
60
30
0
Horden
Low
High
Abstraction Rate (l/s)