**INSTRUMENTATION with measuring limits and accuracy**

About eight different sizes of the drains are installed in fields. Differences in sizes vary because of the differences in the predicted runoff from each field; flow is measured in metres cubed per 15 minute timeslot. Runoff flow is measured at a V-notch ceramic weir with through signal transmission to a Teledyne ISCO 4230 bubbler flow meter.

**Isco 4230 Bubbler Flow Meter**

Flow: Isco 4230 Bubbler Flow Meter - uses an internal air compressor to force a metered amount of air through a bubble line submerged in the flow channel. By measuring the pressure needed to force air bubbles out of the line, the flow level is accurately determined. See link [http://www.isco.com/products/products3.asp?PL=2023030](http://www.isco.com/products/products3.asp?PL=2023030" \t "_blank)

**Multi-parameter water quality sonde (6600 V2 model)**

Temperature: limits -5 to +50°C; accuracy ±0.15oC

Conductivity: lower limit 0. upper limit not known but can be above 1500 mS/cm; accuracy ±0.5% of reading + 0.001 mS/cm

Turbidity: limits 0 to 1000NTU;

accuracy ±2% of reading or 0.3 NTU, whichever is greater

Dissolved oxygen  instrumentation : YSI 6150 ROX Optical Dissolved Oxygen Sensor, Range: 0 to 500%. Accuracy: 0 to 200%: ±1% of reading or 1% air saturation, whichever is greater; 200 to 500%: ±15% of reading, relative to calibration gases. See bottom of page on this link:    <http://www.ysi.com/media/pdfs/E32-6150-ROX-DO-Sensor.pdf>

Ammonium: limits 0 to 200mg/l; accuracy ±10% of reading or 2 mg/l, whichever is greater

**Nitratax plus sc**

Nitrate: 0.1 – 48.9 mg/l NO2 and NO3–N. Accuracy: ± 3 % of measured value +0.5 mg/l (with standard solutions)

**ProPS-UV process (photometer Zeiss, Germany)**

DOC - Dissolved organic carbon: ±2% of measured value +0.5 mg/l

**6883 Ammonium/Ammonia ISE Specifications**Dissolved ammonia: Range: 0 to 200 mg/L-N. Accuracy: ±10% of reading or 2 mg/L, whichever is greater

**YSI 6589 pH Sensor**

pH: Range 0 to 14, accuracy ±0.2. See link <http://www.ysi.com/media/pdfs/E62-6589-Fast-Response-pH-Sensor.pdf>

**Adcon SM1 model soil moisture and temperature sensor**

Rainfall: measured with a tipping bucket rain gauge. Soil temperature and moisture: measured by an Adcon SM1 model soil moisture and temperature sensor.

**Adcon advantage Pro 6.1 software**

All the farm monitoring components are linked remotely by Adcon advantage Pro 6.1 software. The Adcon Advantage software is a sensor-based technology which requires conventional radio transmitters (Adcon, 2004). All the instruments are checked for malfunctions and calibrations problems weekly by a dedicated member of the North Wyke Farm Platform (Mr Bruce Griffiths). Data are subjected to the quality assurance with an in-house program, DATASHEPHERD-FLUMES. The soil moisture, rainfall and soil temperature data were also treated with DATASHEPHERD-PROBES, an in-house quality assurance program (Dr Anita Shepherd).