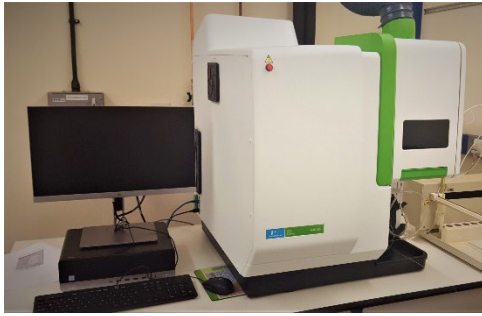


## James Hutton Limited – Water Test Network

James Hutton Limited is proud to announce the procurement of new laboratory analytical equipment on behalf of the Water Test Network. This is additional equipment to give the analytical facility access to a wide variety of analytical techniques for fulfilling the analytical requirements of the water industry and beyond.



ICP-OES. The Perkin Elmer Avio 500 Inductively Coupled Plasma – Optical Emission Spectrometer. This instrument is used for analyses of  $\mu\text{g/l}$  to percent levels of elements in water. Typical uses are for the analysis of alkali metals, alkaline earth metals, iron, manganese and aluminium or elements that are present in concentrations greater than trace levels. This instrument is installed and awaiting to be commissioned.

An obvious accompaniment to the ICP-OES is the ICP-MS. The Perkin Elmer Nexlon 2000c Inductively Coupled Plasma – Mass Spectrometer, as the name suggests has the same front end as the ICP-OES. The ICP end ionises argon gas forming a plasma that is an extremely high energy source capable of ionising most of the elements in the periodic table. In the ICP-OES, the ionised elements are measured in the form of light emission, each element emitting its own characteristic set of wavelengths of which the intensity is proportional to the concentration. The ICP-MS however uses the ion emission source to create a stream of ions that are measured by their mass/charge ratio in a mass spectrometer. This enables the instrument to measure trace elements in concentrations ranging from  $\text{ng/l}$  to  $\text{mg/l}$ . With ICP-OES and ICP-MS we are able to analyse most of the elements in the periodic table for a wide range of concentrations in water samples.



In order to comply with standard test methods (EEA/EPA) and convert recalcitrant samples, such as sludges into solutions, we have included a Perkin Elmer Titan Microwave digestion system.





GC-MS. The Perkin Elmer Clarus 690 +SQ8T MS + Turbomatrix Headspace Analyser is an instrument that combines gas chromatography with mass spectrometry. Gas chromatography separates organic compounds without decomposition by passing vaporised samples in an inert mobile phase over a stationary phase contained inside a column. The gaseous mobile phase interacts with the stationary phase causing different organic

compounds to elute at different times from the column. This is then passed on to the Mass Spectrometer where the organic molecules are broken into characteristic ionised fragments and detected using their mass/charge ratio. The GC-MS coupled with a liquid autosampler and a headspace analyser is capable of analysing a wide suite of volatile and semi-volatile organic compounds.

LC-MS/MS. The Perkin Elmer QSight UPLC-QQQ Liquid Chromatography-Mass Spectrometer/Mass Spectrometer couples liquid chromatography to two mass spectrometers in sequence. The liquid chromatography essentially does the same as the gas chromatography but with non-volatile organic compounds. Two mass spectrometers coupled together offer increased sensitivity and more structural information on the organic compound. The GC-MS with headspace/liquid autosampler and the LC-MS/MS together offer a wide range of organic analysis in water samples and other matrices.



Discrete Analysis. The Seal Analytical Discrete Analyser AQ400 is a rapid throughput, automated colorimetric instrument that employs colour intensity as a means of measuring the concentrations of compounds in water. By application of pH correction and addition of various chemicals, a colour is formed selective to the analyte of interest in the water samples that is then measured for intensity at a specific wavelength. Typically, this instrument is used for measuring the concentrations of ammonium, phosphate, alkalinity and nitrate/nitrite.

TOC/TN analyser. The Shimadzu TOC/TN analyser evaporates and combusts samples measuring the Total Organic Carbon by a non-dispersive Infrared detector (NDIR). With the addition of the TN unit, the analysis of total nitrogen is also included. The TOC/TN analyser is a rapid screening technique for organic carbon and nitrogen in water samples.



Ion Chromatography. The Dionex Aquion employs chromatography to separate and quantify inorganic anions such as the halides, sulphate and nitrate. The anions are separated on an ion-exchange column and are quantified by conductivity. Individual anions are identified by their respective retention times on the column and the conductivity is proportional to the concentration of the anions present.

The combination of the above equipment compliments our analytical arsenal and expands our capability of water analyses in order to assist Water Test Network. All the equipment will be brand new and when installed and methods will either be accredited to ISO 17025 or if not will be run in accordance with our internal quality management system. We have the capability of being able to carry out the majority of water tests and have advanced analytical techniques as well if required.