



Appendix 6
Exeter Air Quality Monitoring Continuous
Analysers 2017

Specifications

i Introduction

- i.1 Exeter City Council currently operate two roadside air quality monitoring stations, consisting of:

Exeter Roadside (Royal Albert Memorial Museum RAMM):

- Horiba 370 series NO_x analyser
- Horiba 370 series O₃ analyser
- Horiba 370 series CO analyser (not switched on currently)
- Horiba 370 series SO₂ analyser (not switched on currently)
- 1400AB TEOM
- Data logger and dial up modem
- Meteorological Station (temperature, wind speed and direction, all with a signal range of 0-20 mA)

Alphington Street:

- 1400AB TEOM
- Data logger and dial up modem

- i.2 The Exeter Roadside NO_x and O₃ analysers are affiliated to the DEFRA Automatic Urban and Rural Network (AURN).
- i.3 Exeter City Council also operates PC based software for communication with the air quality monitoring stations, to retrieve, store and display data, produce reports, diagnose faults, and remotely control the gas analysers.
- i.4 The Council is seeking to replace these two air quality monitoring stations, with equipment that meets the standard criteria listed in the specification below.

1 Specification for Supply, Installation and Commissioning

- 1.1 The table below lists the criteria to be met.
- 1.2 Successful installation and commissioning will be taken to mean initial successful calibration to the satisfaction of the AURN, successful communications and data transfer to Exeter City Council and the AURN and passed Portable Appliance Tests.
- 1.3 Any concerns raised by the AURN at subsequent audits or QA/QC visits would be expected to be rectified according to the service level agreement within the agreed service and maintenance contract.

	Criteria
Exeter Roadside (RAMM):	<p>To supply gas analysers to fit into the existing basement room, making use of the existing air intake point into the basement.</p> <p>To supply a particulate monitor to be located on the Queen Street façade of the RAMM, inside the railings (and including equipment inside the basement if required).</p> <p>All the equipment is to be set up to meet the automatic calibration and data control requirements of AURN network specification.</p> <p>The building is listed and there will be no permission for new fixings or changes to the building structure.</p>
Air Intake	To modify the existing air intake to provide reliable air circulation around the intake point, and run PTFE tubing through the current manifold.
Rack	To refurbish the existing rack or replace the rack as required.
NOx Analyser	<p>Supply an ambient NOx analyser approved against the standards listed in the following website: https://uk-air.defra.gov.uk/networks/monitoring-methods?view=eu-standards</p> <p>The analyser must be capable of performing daily internal zero and span calibrations (preferably a permeation oven).</p>
O ₃ Analyser	<p>Supply an ambient O₃ analyser approved against the standards listed in the following website: https://uk-air.defra.gov.uk/networks/monitoring-methods?view=eu-standards</p>
Particulate Analyser	Supply equipment to measure PM ₁₀ AND PM _{2.5} concentrations.
External Cabinet	<p>Supply secure external cabinet for particulate analyser, to fit between façade of museum and railings on Queen Street in the current location.</p> <p>No additional holes in the fabric of the museum building will be permitted.</p>
Electrical Safety	<p>The current equipment connects to a double 13A socket with a 16A C type breaker. If this connection will not be suitable, the tenderer must make this clear in their tender response.</p> <p>All equipment shall be earthed.</p> <p>All works to comply with Electricity at Work Regulations 1989 and BS 7671 (IET Wiring Regulations – Current Edition).</p>
Communications and Data Logging	<p>Supply a system for the storage of data from the two gas analysers and the particulate analyser, either on the analysers, or a site-based logger. It should be capable of being interrogated and the data collected by Exeter City Council and the AURN.</p> <p>The data stored should be a maximum of 15 minute averages.</p> <p>The system must be capable of storing at least 14 days of data without loss.</p> <p>Supply a system for the transfer of the data to Exeter City Council's IT systems that employs GPRS or 3G technology to allow data to be collected at zero cost by both Exeter City Council and the Data Management Unit of the AURN. All costs for the initial purchase of the communications package and any monthly rental fees should be itemised. The capacity of the GPRS or 3G SIM should be sufficient to ensure that there are no extra SIM card charges should both Exeter City Council and the CMCU of the AURN both download the data hourly. Communications packages that employ GSM technology will not be acceptable.</p> <p>The system must be capable of working with Exeter City Council's IT systems (listed below).</p>

Installation of equipment	<p>The Supplier must obtain any necessary licenses or consents to work on the pavement.</p> <p>To remove the existing equipment and install the items listed above.</p> <p>Please note that there shall be no new openings through the fabric of the RAMM building.</p> <p>Connect to existing services and the existing AURN calibration gas cylinders.</p> <p>Remove all scrap and waste arisings. Remove the TEOM but leave the disconnected CO, O₃, NO_x and SO₂ analysers at the site.</p> <p>The successful supplier will be expected to provide and install the equipment within 8 weeks from the commencement date.</p>
Commissioning	<p>Commissioning and testing of the equipment, to include agreement with the AURN of initial calibration standards, and successful collection of data by Exeter City Council and the AURN.</p> <p>All equipment to pass a Portable Appliance Test</p>
Met Data	Supply a system for capture, storage and transfer of data from existing meteorological data station.
Alphington Street	<p>To supply particulate monitor to be located on Alphington Street in the location of the current TEOM cabinet.</p> <p>All the equipment is to be set up to meet the data control requirements of AURN network specification.</p>
Particulate Analyser	Supply equipment to measure PM ₁₀ AND PM _{2.5} concentrations.
External Cabinet	Supply external cabinet for particulate analyser and rack to fit in the current location at Alphington Street.
Electrical Safety	<p>Supply a suitable circuit breaker for all connections to the mains. If any subsequent damage is caused to the equipment by the circuit breaker not being suitable, this will be expected to be repaired under the ongoing maintenance contract.</p> <p>All equipment shall be earthed.</p> <p>All works to comply with Electricity at Work Regulations 1989 and BS 7671 (IET Wiring Regulations – Current Edition).</p>
Communications and Data Logging	<p>Supply a system for the storage of data from the particulate analyser, either on the analyser, or a site-based logger. It should be capable of being interrogated and the data collected by Exeter City Council.</p> <p>The data stored should be a maximum of 15 minute averages.</p> <p>The system must be capable of storing at least 15 days of data without loss.</p> <p>Supply a system for the transfer of the data to Exeter City Council's IT systems that employs GPRS or 3G technology to allow data to be collected at zero cost by Exeter City Council. All costs for the initial purchase of the communications package and any monthly rental fees should be itemised. The capacity of the GPRS or 3G SIM should be sufficient to ensure that there are no extra SIM card charges should Exeter City Council download the data hourly. Communications packages that employ GSM technology will not be acceptable.</p> <p>The system must be capable of working with Exeter City Council's IT systems (listed below).</p>
Installation of equipment	<p>The Supplier must obtain any necessary licenses or consents to work on the pavement.</p> <p>To remove the existing equipment and install the items listed above.</p> <p>Connect to existing services.</p> <p>Remove all scrap and waste arisings. Remove the TEOM.</p>

	The supplier will be expected to provide and install the equipment within 8 weeks from the commencement date.
Commissioning	Commissioning and testing of the equipment, to include successful collection of data by Exeter City Council. All equipment to pass a Portable Appliance Test
Communications, Data Storage and Reporting	Supply a program or system by which Exeter City Council can view real-time data from any of the gas or particulate analysers, can undertake basic diagnostics and perform basic functions such as calibrations. Please provide a software brochure which describes the functionality available. Supply a program and install it on Exeter City Council's IT equipment and systems for the automatic collection, statistical analysis and presentation of data from all the equipment above. Please provide details of the query and reporting options provided by the software. The conversion or retrieval of Exeter City Council's existing historical air quality database by the new system. The system will be expected to work with Exeter City Council's IT systems (listed below)
Installation and Support	Instructions for the installation of the program above, and provision of technical support to the Council's IT Service provider during this process. The system will be expected to work with Exeter City Council's IT systems (listed below).
Commissioning	Commissioning and testing of the equipment, to include successful collection of data by Exeter City Council and the AURN.
Warranty	3 year warranty for all equipment and work
Training	Familiarisation training for two Exeter City Council staff in operating all the new equipment and programs. Operating manuals and training materials. Please include and detail any training required for Exeter City Council's IT service provider STRATA.

1.4 The system should be function within Exeter City Council's IT systems, as follows. Any problems with compliance should be explained in the tender response.

1.4.1 Exeter City Council's IT provider is Strata.

1.4.2 Servers:

Strata operates a Virtual Server environment utilising VMware VSphere, running Windows Server 2012 and above, any software must be fully supported and compatible in this environment.

1.4.3 Databases:

Any Software that makes use of a database must use SQL and have the ability to co-exist with existing databases and not require its own SQL server or instance.

1.4.4 Desktop:

Strata delivers all of its desktops via VDI technology utilising VMWare Horizon View, utilising a non persistent desktop, we then layer application in at login using VMWare AppVolumes, any client software must support this technology, and must be fully packable in VMware AppVolumes

- 1.4.5 Client software must be fully useable without Administrative permissions.

2 Specification and Service Level Agreement for ongoing Maintenance and Servicing

- 2.1 3 year inclusive service and maintenance contract for all equipment at Exeter Roadside and Alphington Street to meet the Service Level Agreement (SLA) standards set out in annex 1.
- 2.2 You must make it clear if any elements of this cannot be complied with in full.
- 2.3 The contract will be paid for in three equal annual instalments.



Exeter
City Council

Annex 1
Service Level Agreement
(SLA)

A1.1 Health and Safety

Exeter City Council has responsibilities for the Health, Safety and welfare of people working at its Air Quality Monitoring Stations. Health and Safety law requires that the risks associated with working in a potentially hazardous environment are identified and assessed, and that working conditions and practices employed are safe. Where necessary, Safe Systems of Work are required to be implemented.

Individuals working at or visiting Exeter City Council's air quality monitoring stations also have legal responsibilities to co-operate with Exeter City Council's Health and Safety officers' efforts to improve health and safety and not to undertake unsafe working practices. The supplier is responsible for ensuring that they meet UK Health and Safety legislation.

Health and safety responsibilities of the supplier are as follows:

1. Review risks and prepare a risk assessment for work carried out at each site, including transport to and from the site and the movement of gas cylinders into the site. (The risk assessment should be supplied to Exeter City Council annually starting on the date of commencement of the contract).
2. Ensure actions are taken to mitigate the risks resulting from the risk assessment (e.g. purchase of safety equipment, display of H&S information at site, staff training and communication).
3. Contact Exeter City Council before visiting the air quality monitoring sites to check safety status of the site before each visit.
4. Report all accidents and near misses to Exeter City Council.
5. Carry out a 'take two' risk assessment on arrival at the site. A 'take two' risk assessment is a short and simple visual check of the key risks to review whether it is safe to carry out work.
6. Follow the Cascade procedure (section 4 of the AURN Health and Safety Guidance) and notify Exeter City Council of any new or site specific risks.
7. Follow advice from Exeter City Council Health and Safety Officers and Royal Albert Memorial Museum staff.
8. Comply with health and safety laws and regulations (see <http://www.hse.gov.uk>) such as working at heights, electrical safety, use of compressed gases, COSHH and manual handling etc.

The supplier will be responsible for ensuring that all work undertaken on site conforms to the relevant Health and Safety standards and legislation such as, working at heights, electrical safety, use of compressed gases, COSHH and manual handling, etc. The supplier must also comply with local Health and Safety requirements within the Royal Albert Memorial Museum (RAMM). Exeter City Council will advise on Health and Safety. It is, however, the supplier's responsibility to put in place procedures for safe working, and to ensure that these are followed. National safety regulations apply, in particular the Management of Health and Safety at Work Regulations (1999) and the Health and Safety at Work etc. Act (1974). The latter applies to all persons connected with work done at the monitoring stations, whatever their organisation.

At the time of the first site service the supplier must conduct Portable Appliance (PAT) testing of all analysers and associated peripherals. The testing equipment used must be capable of storage and download of full test results for reference including production of a test certificate when requested. All equipment removed from site for investigation or repair including temporary replacement analysers must be inspected and tested before installation. Each piece of mains operated equipment

must have appropriate test labels attached. Test equipment such as the appliance tester must be calibrated annually by the manufacture or other to ensure it is within specification.

A1.2 Routine Service and Maintenance

It is a requirement of the two monitoring stations that they achieve a **minimum** data capture of **90%** for all pollutants, over the period of a calendar year. The service and maintenance procedures adopted, and the resources dedicated to them, must be **sufficient to meet** the required data capture target.

Routine servicing of all instruments and equipment at each site is to be carried out on a **6-monthly** basis. The service visits are to be conducted in co-ordination with the AURN QA/QC six-monthly audit visits, and must be completed within a timetable determined by AURN CMCU and QA/QC (typically starting January and July). A schedule of service visits must be provided to Exeter City Council and AURN CMCU and QA/QC Units in advance and be within the specified QA/QC window. The supplier must provide a schedule for site service visits to Exeter City Council and AURN QA/QC and CMCU as a minimum at least 2 weeks prior to the 6 monthly service.

Routine service visits are to include full instrument servicing according to the manufacturer's recommendations. During the service, a number of important equipment tests must be undertaken. To achieve these, the supplier must own, or have access to, the following test equipment:

- a calibrated ozone photometer able to perform a six point test of an ozone analyser in the range 0 to 250 ppb.
- a gas blender / dilution system able to perform a NOx converter test at NO2 concentrations of 300 and 500 ppb, as well as undertake a six point linearity test across the operating range of the NOx analyser.

These analyser tests must be undertaken every six months, at the scheduled service programme in accordance with the AURN QA/QC guidelines issued on release of the AURN QA/QC audit schedule. The service is carried out in following three stages:

- Pre-service analyser tests and calibration
- Equipment servicing
- Post-service analyser calibration and tests and call to AURN CMCU with relevant details

The sample manifold must be completely cleaned every 6 months. The manifold blower must also be dismantled, cleaned and lubricated. All PTFE lines which are exposed to ambient air, up to the first Sample Inlet Filter, are to be replaced annually and cleaned 6 months after replacement.

If requested by AURN CMCU, the supplier will also be required to change the PTFE lines between the calibration gas cylinders and the instruments.

Annual vacuum pump re-builds must be undertaken with flows audited prior to, and after, through the use of a flow metre certified to BSN ISO 17025: 2005 with the exception of FDMS pumps which must be rebuilt every 6 months. Where pumps cannot be refurbished they should be exchanged with a new pump on the day of the service.

The supplier must perform K₀ tests at each and every service and also during any call outs where tapered element poor performance is suspected.

All routine service visits are to be fully documented and completed in accordance with procedures described within the AURN Local Site Operator's Manual (issued by the AURN QA/QC Unit). With special emphasis on ensuring that all relevant instruments are **out of service** during maintenance/service activities and **must** be returned to the correct sampling mode upon completion of works.

Routine service visits must be fully documented and describe in detail any adjustments, modification or repairs undertaken. Results of the analyser tests performed during the service are recorded on the 'Analyser Performance Test' form provided, or with any other electronic or paper system which has previously been agreed with Exeter City Council, the AURN QA/QC and Management Units. All metadata relating to sites and analysers **must** be recorded. Any forms/templates used by the supplier must be provided to the AURN CMCU and QA/QC in advance of contract commencement for approval.

The service records, together with the pre and post-service calibration sheets, must be e-mailed to Exeter City Council and the AURN Management Unit and QA/QC Unit at the earliest opportunity and **within seven days at the latest**. Upon completion of the service any concerns with regards to the condition or age of equipment must be summarised along with recommendations for improvements, and presented to Exeter City Council and the AURN CMCU within two weeks of the completion of the service run.

A1.3 Reactive Maintenance

In the event of equipment malfunction between routine service visits, the supplier will be required to carry out emergency repairs. The emergency call-out will be issued by Exeter City Council. During normal working hours (Mon-Fri, 0830-1730 hrs) emergency call-outs will be notified by telephone and confirmed by e-mail call out pro-forma.

It is a requirement that the **supplier attends site and effects repairs within 48 hours after receiving notification from Exeter City Council**. If the faulty equipment cannot be repaired at site within the required timescale, then a replacement hot-swap unit should be fitted within **72 Hours** from the point at which the requirement for workshop repair is identified. Where a hot-swap instrument is to be installed the supplier **must** notify Exeter City Council and the AURN CMCU immediately confirming the instrument make/model and serial number and notified when the original instrument is repaired and returned to site.

All hot-swap instruments must be fully bench tested and satisfactory performance established prior to site installation.

Where instruments are returned to site for workshop repair, the units **must** be repaired and returned to site within **10 working days** and updates provided to Exeter City Council and AURN CMCU on the progress of repairs **within five working days**. Upon removal of a gaseous hot swap analyser, the supplier must carry out a calibration of the analysers prior to them being removed from site and report calibration values to AURN CMCU.

Specific procedures related to emergency call-outs shall meet the requirements detailed within the AURN Site Operator's Manuals. The 48-hour response and hot-

swap installation timescales are required for all working days of the year, excluding weekends and Public Holidays. In all cases the supplier must confirm to the Exeter City Council that they have received the call-out, and that the required response is underway. On arrival at site the engineer must notify Exeter City Council and AURN CMCU before carrying out the repair and on completion notify AURN CMCU with relevant details and complete the site log when one is present.

As a general guide, the following circumstances may give rise to an emergency call-out - **this list is not exhaustive**:

- Electronic or pneumatic instability of the instruments
- Auto-calibration checks outside of acceptable tolerances
- Instruments operating outside of manufacturers specifications
- Manual calibration checks outside of acceptable tolerances
- Malfunctions identified with the sample manifold, data logging or gas calibration systems
- Malfunction of the air conditioning unit.
- Malfunction of the communication package (modem, code activate switch etc.)

Whilst these criteria provide guidance on call-out procedures, emergency call-outs will be issued at the **sole discretion** of Exeter City Council. The supplier should note that a calibrated ozone photometer and/or NOx converter test equipment may be required during an emergency call out visit for ozone or NOx analysers respectively.

All emergency call-out visits must be fully documented and reports must describe all equipment malfunctions, repairs or replacements. In the event that instrument adjustments are necessary which affect its response, these must be agreed in advance with Exeter City Council and the AURN CMCU, and **must** be accompanied by the relevant Pre (as found) and Post-Calibration Checklists and Calibration Records. Documentation must be e-mailed to Exeter City Council, AURN CMCU and the QA/QC Unit as soon as possible, and within 7 days at latest.

Immediately before any repair, adjustment, or replacement of an analyser, it is **essential** that the instrument is calibrated (if possible) in an 'as found' state using the on-site calibration gases. In the case of ozone analysers, this calibration must be completed against a reference photometer.

It is the responsibility of the supplier to ensure that, where fitted, the daily overnight auto calibration system (autocal) are functional and any call outs relating to the autocal must be attended to within the 48 hour response time.

A1.4 Supply of consumables

The supplier will be required to provide and maintain adequate consumable supplies to cover the maintenance contract period. At the start of the maintenance contract period the supplier will issue sufficient consumables to last either a **6- month or 12-month** period and replenish stock **1 month** before each batch is nearing exhaustion.

Additional supplies of consumables may be requested at the discretion of Exeter City Council should supplies be exhausted ahead of the anticipated supply period. In such cases consumables are to be despatched to Exeter City Council, Environmental Health Services, Civic Centre, Paris Street, Exeter, EX1 1RQ within 5 working days of notification. Should consumables be lost or damaged in transit the supplier will be

expected to replace these without charge. Consumables should not be posted to the Royal Albert Memorial Museum.

The supplier will not be expected to supply calibration gases or scrubbers for the Zero Air Generators. Any consumable sent to or left at sites (especially any cleaning agents) must be in clearly marked containers stating '**For Air Quality Monitoring Site use only**'.

Provision of Permeation Tubes is to include the installation of Permeation Tubes at site as and when requested by AURN CMCU.

A1.5 Spares and Calibration Equipment, Parts Supply and Stock

Photometers are required for use within the AURN and must be provided by the supplier. Each photometer is required to be calibrated against a reference standard photometer. The supplier is required to attend a calibration exercise at AURN QA/QCs premises twice each year for this purpose.

The supplier should be aware that if a photometer is not working or the supplier does not know how to work the unit when being brought to test by AURN, the supplier will be charged for a re-test by AURN.

Availability of parts for instrumentation can have a significant impact on the operation of the air quality monitoring sites and ability to achieve high data capture. The supplier must hold sufficient stock of **all** component parts required for the operation of the monitoring sites. The supplier will be wholly responsible for ensuring that they hold the correct level of stock sufficient to prevent any data loss as a result of parts being unavailable.

The supplier will also be responsible any sample lines, critical orifices and calibration systems, where applicable, relating to the monitoring stations. Cover should also be included for all PTFE tubing and/or critical orifices to the instruments, sample inlet and cylinders.

The supplier is also expected to cover the like for like replacement of any communication equipment, modems and Code Activated Switches (CAS).

Where any difficulties which are foreseen or arise with regards to the availability of manufacturer supplies of parts, for example parts no longer being manufactured, the supplier must notify Exeter City Council immediately. The report would be in the format of a short e-mail summarising; the instruments affected, the cause of the issues identified, risks to service provision and any recommendations.

A1.6 Air Conditioning Units

Where fitted, it is the supplier's responsibility to ensure that A/C units are serviced and maintained in accordance with manufacturers recommendations. Both routine (6 monthly) servicing and emergency call-out should be provided for and must be included, where applicable. It is essential that where issues with A/C units are identified as performing poorly that the supplier attends site to investigate the cause of the fault within 48 hours after receiving notification from Exeter City Council. The 48-hour response timescale is for all working days of the year, excluding weekends and Public Holidays.

Where a fault is identified, that cannot be rectified by the supplier on site, Exeter City Council **must** be provided with an evaluation of the fault and recommendation for repair/replacement within 24 hours.

A1.7 Software support

In the event of software malfunction, the supplier will be required to provide technical support. The emergency call-out will be issued by Exeter City Council. During normal working hours (Mon-Fri, 0830-1730 hrs) emergency call-outs will be notified by telephone and confirmed by e-mail call out pro-forma.

It is a requirement that the **supplier contacts Exeter City Council's IT service provider Strata and assists them to effects repairs within 48 hours after receiving notification from Exeter City Council.**