



Benbow Environmental

News Update

Autumn 2013

INSIDE THIS ISSUE:

- Sustainable energy solutions
- Noise sources localisation—Acoustic camera
- Recycling initiatives with timber
- Approval of waste to energy—St Marys
- Soil gas sampling—TCE
- Summer issue crossword answers
- Farewell Samuel Grieve

ABOUT BENBOW ENVIRONMENTAL

Benbow Environmental is a 100% Australian-owned professional environmental consultancy firm, specialising in environmental engineering, occupational health and greenhouse gas management.

We work with small, medium and large organisations in Australia, New Zealand and South-east Asia providing specialist technical expertise and delivering complete cost-effective solutions.

BE continually demonstrates environmental commitment to its industry partners through quality assurance. Our programme follows ISO 9002 methods to bring clients valuable and timely recommendations, guidance and action.

Benbow Environmental works with all clients, regardless of size as partners, and warrants that all of its services are conducted with thorough and professional competence.

We are committed to customer service excellence and employ highly qualified and experienced consultants who work closely with clients to understand their requirements and deliver the best outcomes.

Sustainable energy solutions

In an increasingly 'green-aware' society, it is often beneficial for businesses to demonstrate good sustainability practices. Reducing energy consumption where possible is a logical step that can provide many rewards.



Using less energy doesn't mean that you have to limit your operations or output. Simple changes can make huge differences on your energy bills. Insulation should be fitted on equipment such as pipes and boilers, so that thermal energy (i.e. 'heat') is not being lost to the surrounding air. Insulating buildings should also be a key priority in order to reduce the electricity requirement of air-conditioners. It is often reported that simply by adjusting the air conditioner thermostat by 1°C closer to the outside temperature, its energy consumption is reduced by up to 10%. Air conditioners are huge users of electricity, and so this 10% reduction not only helps the environment, it keeps money in your pocket and out of the electric company's.

There are many other ways to reduce the cost of energy. Attention should be paid to the operating efficiency of equipment. Pumps, for instance, have a maximum efficiency at a set speed. Varying the pump speed too far away from this optimal point means that it is running inefficiently and wasting energy. Thus it is important, when selecting pumps, to match their optimal operational speed with the intended application. Other simple changes such as minimising lengths and bends in piping or ductwork, can also reduce the electricity required

by pumps or fans. Equipment should also be well-maintained to ensure it operates at maximum efficiency.

Using energy in a sustainable manner is not only good for the environment, but can also increase revenue

through 'green marketing' of sustainable practices in your business. Demonstrating a commitment to reducing your organisation's energy expenses and impacts on the environment can attract both investors and customers. At the very least, it will show that you are planning for the long-term success of your business and have social awareness of the issues (i.e. climate change) that are becoming increasingly important in our society.

One popular 'green' energy solution for homes is rooftop electric solar power, or 'photovoltaics' (PV). Investing in a PV system is an attractive option for businesses, since most businesses operate during daylight hours and a PV system only works when the sun is shining. Despite costing several thousand dollars to install (depending on the size), a PV system will save your business a lot more money in the long term. By investing in a PV system, you can insulate your business from future electricity price rises.

By making smarter investments and simple changes to operations, your business can reap the rewards well into the future.

For more ways to reduce energy consumption in your business, please contact **Louise Temple**: LTemple@benbowenviro.com.au

Think Green

Noise sources localisation—Acoustic camera

Where does the noise come from? Finding out the exact source of a sound is a tough challenge for any acoustic engineer. Since the early 90's, a number of methods, based on microphone arrays, have been developed with a great degree of success but also with several technical limitations. In 2001, a sophisticated and pioneering technique was brought to the market as the first commercially viable system to use beamforming; it was called the Acoustic Camera.

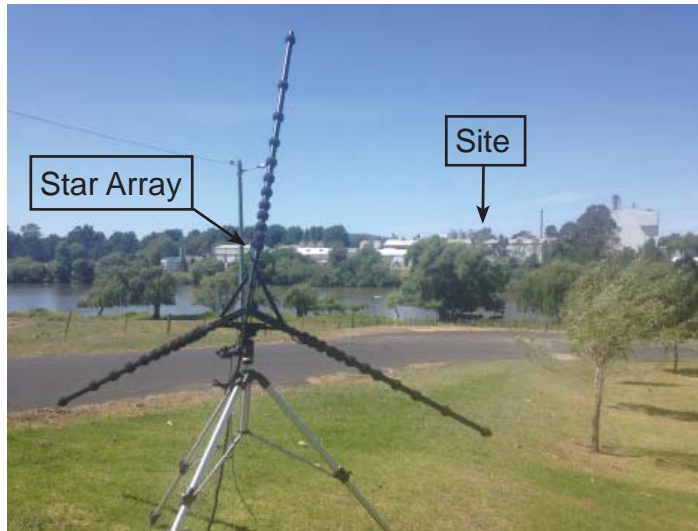


Figure 1: Noise measurements utilizing Star Array Acoustic Camera

The acoustic camera is a lightweight, modular and flexible system able to visually localize noise sources with a very low spatial resolution and high dynamic range. The base configuration consists of a microphone array of up to 72 microphones, a data-recording device, a notebook and specific software that allows for clear, precise and fast analysis of the various noise sources. Several microphone arrays can be utilized depending on particular requirements such as the frequency range of interest, the distance between the noise source and the array and the physical measurement conditions.

Some of the benefits of the Acoustic Camera are:

- Localization and identification of noise hot spots;
- Measured data displayed in colour maps and videos;
- Understanding and visualization of the acoustic energy distribution;
- Spectral analysis of the measured data; and
- Noise issues are detected and development times and costs are reduced.

The acoustic cameras applications are unlimited in the field of acoustics and is often utilized in areas such as; industrial sites; mines, quarries and manufacturing firms; specific machinery evaluations; acoustic labs; road, rail and aircraft measurements; indoor and outdoor measurements; etc.

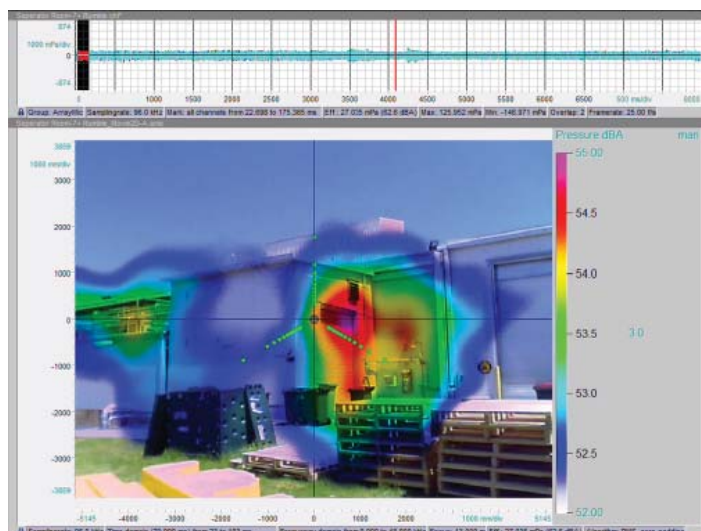


Figure 2: Snapshot for instantaneous noise level

Benbow Environmental (BE) has carried out several noise assessments across Australia utilizing the Acoustic Camera with a high degree of success. Recently, BE completed a detailed industrial noise survey in order to identify specific noise hot spots on-site and thus evaluate the most suitable noise control measures that would allow for the reduction of site noise emissions at the nearest residential receivers. Initially, noise measurements were undertaken at approximately 300 m from the industrial site in order to obtain a general idea of the location

of the primary noise sources on-site (Figure 1). In addition, subsequent noise measurements were progressively undertaken at distances closer to the industrial site for the purpose of identifying, with a much higher resolution, the primary noise hot spots on-site.

Spectral analysis of noise measurement data associated with the primary noise sources was undertaken to further characterise the noise sources. The noise survey strategy utilized throughout this assessment resulted in the identification of three key noise emission areas. More specifically, a roller shutter door to a building containing noisy equipment, several pipes transporting steam and a large boiler stack were clearly identified as the primary sources of noise impacting on the nearest residential receivers. Based on the spectral analysis, predominant quantities of acoustic energy were contained within the third octave frequency bands centred on 1,250 Hz and 400 Hz. Figure 2 shows a snapshot of the measured noise levels for a particular time frame whilst Figure 3 shows the three primary noise hot spots identified from a particular position on the site.

Noise control measures were recommended specifically for the identified noise sources which significantly reduced the time and costs incurred by the company.

For further details, contact **Felipe Torres**:
ftorres@benbowenviro.com.au.



Figure 3: Localization of main hot spots of noise

Introducing Air Space Management Australia (ASMA)

A division of Benbow Environmental

Air Space Management Australia (ASMA) provides a comprehensive solution to asbestos-related matters. The principal consultants have over 25 years' experience in managing asbestos and associated health, safety and environmental risks.

ASMA's service extends to developing strategies for remediation of contaminated land, rezoning of land for residential use (where contamination is an issue), classification of waste materials and strategies for resource recovery.

Recycling initiatives with timber



Timber is a valuable resource frequently disposed of as waste to landfill.



The major source of timber to landfill is demolition waste.

There are two initiatives that are altering this situation for the benefit of the environment and our sustainability practices.

Untreated plantation softwoods are able to be recycled into litter for use in intensive livestock industries.

Benbow Environmental has secured the development consent for an operation at Ingleburn that is successful in this endeavor.

Treated plantation softwoods require removal of the CCA chemicals to enable the shredded timber to be used as mulch for landscaping materials and to produce compost for soil conditioning.

Air Space Management Australia Pty Ltd has signed a confidentiality agreement with the Australian inventors known as the CCA Recovery Plant.

The plant is currently operating at an R & D Facility in Australia.

The timber is first shredded to a particular size and shape before entering the process. The process is automated and a plant with capacity of 5 T per hour is being designed based upon the success of the pilot process.

Timber recycling is an opportune extension of the operation of a Sustainability Recycling Park which is a future ASMA initiative.

For further information please contact

Brent Winning: brentw@airspacemanagement.net.au or

Dick Benbow: richardb@airspacemanagement.net.au



Approval of waste to energy—St Marys

Air Space Management Australia Pty Ltd will soon commence the operation of a pilot pyrolysis plant at St Marys.

Benbow Environmental has secured consent from Penrith City Council for the operation of two pyrolysis furnaces, a distillation column and condenser to enable a range of plastics and rubber to be converted into hydrocarbons for energy.

The plant has a production capacity of 2 T per day and will be used to develop the design of larger plants with capacities in the range of 50 T to 200 T per day.

The conversion of waste plastics and rubber which currently have limited recycling opportunity, will be the focus of the plant's production.

Sources of waste materials will include automotive shredder residue, side walls of tyres and various waste plastics.

The main product from the pyrolysis process will be flammable gases that would power reciprocating gas engines to produce electricity, and also carbon black which can be pulverized and used in fertilizers and as soil conditioners.

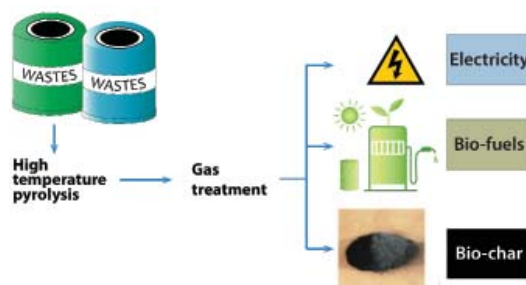


Figure 1. Flow chart of the pyrolysis process

Production of biodiesel and other liquid fuels would also be possible, however this is not the first objective of the plant.

Partners in this endeavor are CleanTech Solutions Worldwide who have a Heads of Agreement with Air Space Management Australia Pty Ltd.

The processes would be operated by Chemical Engineers and a Sustainability Engineer from Benbow Environmental.

The St Marys plant is located in the Dunheved Industrial Estate in Western Sydney. The pilot plant will initially be manually operated with the future control of the process to be automated so that larger scale plants do not incur significant labour costs.

The plant commences trials in July 2013.

For further information please contact

Brent Winning: brentw@airspacemanagement.net.au or

Dick Benbow: richardb@airspacemanagement.net.au

Soil gas sampling—TCE

The soil beneath your site could be potentially contaminated by volatile chemicals that can release harmful vapours into the atmosphere. These vapours can contain volatile organic compounds (VOCs) such as trichloroethylene (TCE) which can cause serious health effects to humans.

In a recent study, it was believed that a site in south-western Sydney was potentially contaminated with TCE due to the past uses of the chemical many years ago. Benbow Environmental was given the task of determining the locations and extent of the contamination.



Figure 1. Soil auger at work

To begin, Benbow Environmental carried out a detailed study of the site history to identify all the potential contaminants and areas of contamination on site. A number of soil and soil gas samples were then taken at various depths around the site in accordance with the Sampling Analysis Quality Plan (SAQP) prepared using the relevant guidelines. The soil samples were taken at various depths (0.3–4 metres) using a soil

auger (see Figure 1), while the soil gas was sampled at depths of 1–2 metres using a Soil Vapour Monitoring Kit.

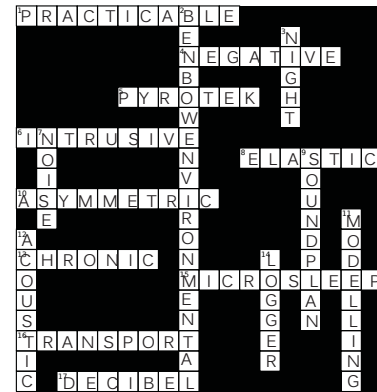
The samples were initially analysed on site using a Photo Ionisation Detector (PID) to determine preliminary concentrations of VOC's in the soil and soil gas. The samples were then delivered to National Association of Testing Authorities Australia (NATA) laboratories for analysis.

The results revealed highly contaminated soils at the area where TCE was previously stored and minor contaminations at other areas around the site. Further soil sampling was undertaken to determine the extent and size of the contaminated areas. Due to the soil mobility of the contaminants of concern and the possibility for groundwater contamination, a detailed groundwater assessment was also carried out.

The results of the study allowed the site to determine the extent of the contaminated areas on site to enable an efficient remedial action plan to be prepared and undertaken.

For further details, contact **Jenny Bo**:
jbo@benbowenviro.com.au

Answers to the Benbow Environmental Summer 2013 Newsletter crossword:



Clues

Across

- 1 Feasible and useable
- 4 Noise can cause these type of health impacts
- 5 A high performance, flexible mass-loaded vinyl noise barrier
- 6 Noise criteria for impacts over the short term
- 8 Type of transparent layer that joins glass panels in laminated glazing
- 10 A type of acoustic window treatment
- 13 A condition of this type has long lasting effects
- 15 Sleep deprivation can cause this
- 16 Benbow Environmental specialise in this type of noise
- 17 A measure of sound based on human hearing

Down

- 2 Environmental consultants with experience in acoustic design
- 3 Noise exposure throughout this period can involve a series of health issues related to sleep disturbance
- 7 Unwanted sound
- 9 Sound Propagation Modelling Software
- 11 Concawe, Soundplan, ENM and TNOISE are this type of noise program
- 12 The sense of hearing, or the science of sound
- 14 Equipment used to monitor long term noise

Farewell to Samuel Grieve

Readers will be saddened to learn that Samuel Grieve, Acoustical Engineer with Benbow Environmental since September 2010, has left the company and moved to Queensland to be closer to family.

Staff held a farewell BBQ for Sam, who can be seen in the photograph below.



Benbow
ENVIRONMENTAL

Benbow Environmental

Engineering a Sustainable Future for Our Environment

Head Office:

13 Daking Street, North Parramatta NSW 2151
PO Box 687, Parramatta NSW 2124
www.benbowenviro.com.au

Regional Offices:

Wollongong, Taree and Brisbane
Freecall: 1800 635 509
Freefax: 1800 689 138

Freecall: 1800 635 509

Freefax: 1800 689 138

Email: admin@benbowenviro.com.au