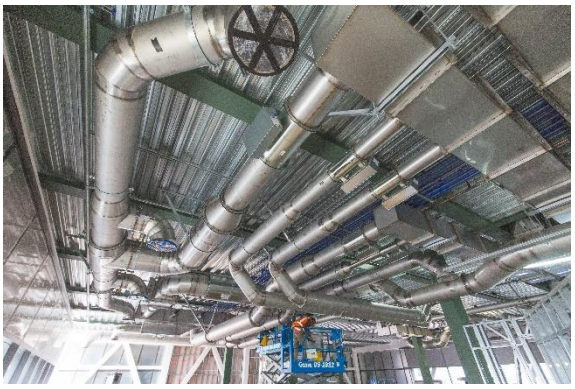
NBL News
News from theNational Biocontainment Laboratory
Ministry for Primary Industries
Manatū Ahu Matua

Kia ora

Since the last issue of NBL News the project has seen significant change, with the building envelope nearing its final stages and now being close to weathertight. Construction progress inside the new build continues to accelerate with installation of wall framing and services providing a visible impression of the interior.

In this issue we provide an update on how the R&D (Mock-Up) facility is being used to inform installation methodology and techniques, catch up with the NBL Project Director Joseph O'Keefe and share another milestone in the build progress with the installation of the rooftop chiller units.

Internal steel wall frames are being installed giving the first physical view of how the laboratory floor space will look.



Complex ductwork and pipework is being connected to the various plant, suspended in what will eventually become the interfloor spaces.

Large pieces of plant such as air handlers and pumps are arriving on site and being installed on custom made plinths on the upper floors.

Profile – Joseph O'Keefe

National Biocontainment Laboratory Project Director

Joseph originally graduated as a veterinarian from Massey University in Wellington and spent several years in clinical practice before returning to university to complete a PhD in molecular virology, followed by post-doctoral studies at the University of Pennsylvania. In 1998 Joseph joined MPI as a virologist at the veterinary reference laboratory in Upper Hutt. During his career with MPI Joseph has worked at all levels of the laboratory, culminating in his appointment to Animal Health Laboratory Manager. Joseph has developed a comprehensive understanding of how the laboratory operates, including how the world-class science and research undertaken by MPI both protects and contributes to New Zealand's ongoing prosperity. In 2012 Joseph was asked to lead the NBL project as Project Director. In this role Joseph is also the primary client representative, providing technical and specialist biocontainment input and advice to the design and construction teams.

Q. Over several years, you have visited a range of containment laboratories to inform work on this project. What was the biggest take-home message?

A. Biocontainment laboratories around the world vary in function and design according to the risks they mitigate. All have active environmental systems and are therefore more akin to large machines than buildings. A multi-disciplinary approach is required if the project is to succeed. This might involve unique engineering or architectural skills, expert project management or a thorough scientific knowledge of microorganisms. Many of these people talk a different language and often see problems through a different lens. A collaborative, solutions-focussed approach and a positive, no-blame culture is the only way to make this work. In the end, it is the people that are the most important factor. With representatives from the design, construction and subcontractor teams co-located at the Wallaceville site alongside the MPI project team, the project has developed a highly collaborative mindset across the multiple disciplines.

Q. Building a containment lab in a seismically active area must be a challenge. What drove this decision?

A. Although it's true the Wellington area is subject to earthquakes, it is hard to find a location in NZ that is not subject to seismic or other geological risks such as volcanic eruptions. With input from geologists, cutting edge engineering and international design expertise we have features - such as base isolators – that mean the lab will be robust enough to survive a once in 2,500 year earthquake. However, a big factor in the decision to build at Wallaceville is the history of science at this site. The site has been operating as the NZ reference laboratory for high impact animal diseases for over a century and has become a centre for scientific expertise, attracting high calibre technical and scientific staff, many of whom live in the Upper Hutt area. Over the decades we have developed an ongoing relationship with the local community - the value and importance of this cannot be underestimated.

Q. When you're not directing the NBL Project, what are you most likely to be doing?

A. When I'm not at work I'm a keen cyclist. As well as having cycled around Lake Taupo 8 times, I have cycled from Wellington to Auckland, around the Coromandel Peninsula, the Bay of Plenty, Wairarapa and parts of Hawke's Bay. Further afield I have ridden across Austria along the Danube. Fortunately, I don't do this competitively because no matter what I try, I can't escape genetics and I never seem to get any faster. But whatever challenge the road throws at me, I always finish.

Research and Development (R&D) Facility Put to the Test

Given the unique challenges and complexity of the laboratory build and systems, meeting the stringent certification requirements is critical. The R&D Facility – or 'Mock-up' as it's known on site – is a dedicated area adjacent to the building site where contractors have the opportunity to evaluate construction and installation methods and materials before applying them to the new building. The primary mock-up space is based on one laboratory suite with some additional features and equipment incorporated for testing and training purposes. The mock-up will also be used for staff training in the future.

Some notable features of the mock-up include:

- *Arcoplast wall and ceiling material*
- *Air-pressure-resistant (APR) doors*
- *HEPA filters and housing*
- *Shower suite*
- *Services installation*

At the start of the year, specialist Arcoplast installer Grant Gilblane flew in from the US to train an NZ team on Arcoplast installation. The product is a trademarked wall system which is impervious to chemicals and resists fungal or microbial growth – making it an ideal material for biocontainment labs.

The mock-up was recently pressure tested and found to exceed air-tightness requirements. It has been inspected on a recent site visit by the project Certifier.

Not every installation in the mock-up has worked as anticipated. For example, when installing the laboratory ceiling, props must be used to hold the large and heavy Arcoplast sheets in place for four hours until the special adhesive has cured. Determining the sequence of installation was found to be critical so as to maintain access to the room and allow other fit-out work to continue.

These scenarios provide the project with a valuable learning tool. Identifying efficiencies or alternative methods at this stage will pay dividends further down the track where any re-work could result in both cost and delays.

Feeling the Chill on the Roof

The NBL has three new skyline additions with the successful installation of the rooftop chillers in February. The three air-to-water heat pumps, weighing in at nearly four tonnes apiece (similar to an African elephant) sit on custom made steel plinths over the plant room - their distinctive fans are easily seen from ground level.

This installation was quite a logistical challenge involving the site crane and four workmen on the roof to guide each unit into the precise position for mounting.

The chillers will provide both cooling and heating to the new laboratory, achieved by extracting energy from the outside air using vapour compression - much like your fridge at home. This energy is used to heat or cool water which is then pumped into the building.

Given the large spaces and exacting requirements of the new laboratory the three machines are both grunty and robust, with the 8 fans on each chiller being able to shift more than a 20ft shipping container of air every second. Control of environmental conditions within the laboratory spaces is essential in maintaining containment.