

Below: This rooftop perspective shows one of two 350kw heat pumps for heating, plus return air duct work from the double facade to one of the air handler units. These were just some of the elements installed by Aquaheat.





Part of the green philosophy for Conservation House is not only setting up energy-efficient building services systems, but also ensuring they stay energy efficient. The company responsible for installing the forward-looking air conditioning solutions and efficient plumbing systems will also service them to ensure they remain in optimum, fine-tuned condition.

Aquaheat Industries is a broad building services provider, undertaking air conditioning, plumbing and service maintenance on large commercial projects. On this ground-breaking project the company installed several distinct elements that together form the heart of Conservation House's green agenda.

Aquaheat addressed the air conditioning and plumbing, with the servicing of these up-to-the-minute systems likely to be an ongoing agenda, says director Paul DeBernardo.

"The introduction of several hundred highly energy-conscious active chilled beams throughout the podium levels was central to the air conditioning fit-out," he explains. "We have installed passive chilled beams on a small project before, but the DOC fit-out entailed upscale application of active chilled beams. These have air jets expelled into the environment that pro-actively encourage the room's air movement across concealed water-carrying coils within the beam."

Passive beams rely on warm air rising, cooling on contact with the cold coils and then descending to cool the room and tend to have a fairly localised effect.

"Active chilled beams have the added advantage of being able to be situated anywhere in a room. The coils can be switched to carry hot water instead of cold, providing the DOC offices with warm air instead of cool in the colder months."

In addition, a computer-driven building management system, BMS, monitors the air conditioning in terms of time and zone control to further optimise energy saving. The BMS also controls night purges and spring and autumn cycles, where the major plant shuts down and relies on natural ventilation to control comfort levels – via motorised control windows.

Plumbing services were equally high-impact in terms of the building's energy efficiency.

"Even in material terms, this job was different," says DeBernardo. "PVC piping was eschewed in favour of Wavin AS, a recyclable material popular in Europe apartment design for its excellent acoustic properties that avoid the sound of water running through walls or across ceilings. In design terms, we installed heat pump hot water cylinders to efficiently create hot water for the building."

Aquaheat also set in place the complex reticulation system that sees storm water channelled into a basement level 65,000-litre storage tank, for use in toilets, urinals and even to water the building's rooftop gardens. When the tank is full, excess water runs away through conventional stormwater outlets. The reticulation system is also controlled via BMS intelligence.

"No detail was spared in this fit-out – we even installed tapware with in-built motion sensors to ensure precious resources aren't wasted down the plug hole."

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Above: Harding Electrical installed the cabling, electrical systems and lighting throughout the fit-out. A local distribution board has Clipsal's C-Bus controls at its base.

Facing page top: ECOsystems designed the interconnected lux-level and motion-detector systems for lighting and business management systems throughout the fit-out.



The lighting and building management systems in place at The Department of Conservation's head office form an important part of its energy-conscious agenda. Systems are interconnected with such fine tuning that lighting might register a different illumination depending on whether it is a cleaner or office worker swiping their entry card.

Harding Electrical undertook installation of the cabling and fittings, while ECOsystems designed the labyrinthine systems of lights and sensors that optimise light levels and minimise the building's pull on the national grid.

Harding Electrical's work started with demolishing the existing infrastructures to make way for the progressive new systems, says director Damian Moloney.

"A new DOC switchboard was then set in place, together with distribution boards and the extensive switching and cabling running throughout the offices and the high-tech DALI, or digital addressable lighting interfaces," he says. "It is the DALI lighting that gives Conservation House's lighting its pinpoint sensitivity."

DALI is a protocol for digital communication between lighting devices. It is a subsystem that offers add-ons and features for the practical application of lighting management systems. DALI works by providing each individual light fitting, or ballast, with its own digital address, so lights can be controlled automatically within a group or individually. Preset groups of lights can also be changed without the need for rewiring.

Harding Electrical commissioned ECOsystems to design the systems required by the engineering consultants that the electrical company would then install.

ECOsystems' focus is energy auditing, project management, energy controls and implementation and it was chosen for its experience on large commercial projects.

Director of ECOsystems Scott Martin says the brief handed to the company by Sinclair Knight Merz was to maximise energy savings through intelligent lighting control – utilising occupancy detection and daylight harvesting.



“Every desk on the office floors has a component of natural daylight and at some stage during the day, the lights in each area were to be dimmed in conjunction with the input of natural light to achieve these savings,” says Martin. “This has been achieved through DALI light fittings with C-Bus logic inter-connectivity.”

C-Bus, by Clipsal, is a microprocessor-based control and management system that controls lighting and other electrical services.

Occupancy detectors were also mapped out by ECOsystems and used in conjunction with the light level sensors throughout the building.

“We used a Clipsal C-Bus DALI gateway to talk to the DALI light fittings – this meant that each light fitting could be addressed and treated as an independent light circuit without having to run a separate cable to the switchboard,” he says. “Clipsal worked with us to design custom housings that would allow their implementation within the context of the exposed ceilings areas that resulted from the use of chilled beams throughout.”

ECOsysteMS developed a logic module within C-Bus that enabled complete control of the light fittings. This custom logic control module interfaces between the building’s lights and sensors.

“Without the use of a C-Bus logic engine there would have been no other way to achieve the degree of control that was required,” says the director.

In addition to light-level control, the C-Bus system is set up to interface with security, fire and building management systems. Based on occupancy, the C-Bus will control the air conditioning in respective areas for additional energy savings, and there is facility to extend the system to control presentation and conferencing equipment.

For further information on Harding Electrical, phone (04) 499 9003, fax (04) 499 8804. Or visit the website: [www.hardingelectrical.co.nz](http://www.hardingelectrical.co.nz).

For further information on ECOsystems, phone (04) 566 3666, fax (04) 566 0666. Or visit the website: [www.eco.co.nz](http://www.eco.co.nz).



These pages: The Laminex Group supplied several elements from its Greenfirst range for the ecologically aware fit-out. These included low-emission Lakepine MDF for the conference tables and desking.

The principles of Earth-friendly construction run through the very fabric of Conservation House. Not only are the energy systems kind to the planet, but even the material specified for the office desking has a sound, eco-friendly make-up.

The Laminex Group manufactured and supplied many of the materials for the building's interiors and furniture. The company's focus is shifting towards a green emphasis and this initiative incorporates several current products from its Greenfirst range that have achieved Environmental Choice Certification.

Many of these were specified by architect Alice Cuttance for The Department of Conservation project – with the furniture elements constructed from these materials built and supplied by Formway.

“Sustainability is essential to ensure that no damage is done in our generation that leaves the environment in a worse state than we found it,” she says. “I feel any efforts by individuals and organisations such as the NZ Green Building Council and The Laminex Group to promote and develop sustainable design and building practices are essential to fulfilling the vision of healthy living spaces for the future.”

Cuttance says the government is driving this change, with any new government building now having a green focus – using sustainable products and ensuring energy efficiency and improved indoor air quality. Clearly Conservation House stands at the vanguard of this increasingly ecology-focused initiative.

“In addition, the government is researching, advising and recommending initiatives and practices for building and design which facilitate a lesser impact on the environment in general,” she says. “Examples include the Ministry for the Environment's Sustainable Office Fitout Guide and Govt<sup>3</sup> Procurement Conferences. Under the Environmental Choice New Zealand certification scheme products that earn the Enviro-Choice tick are recommended based on their compliance with its green certification requirements.”

Many of the products within The Laminex Group Greenfirst range have already earned the Enviro-Choice tick and more products are being added.



Important aspects covered by the scheme include recyclable attributes, sustainable manufacturing practices, minimising energy consumption in production, manufacturing and end use, and also minimising emissions both in manufacturing processes and when in use in the office environment.

“On this project, sustainable products specified included zero-emission wood fibre boards, sustainable certified timber, Linoleum flooring, recyclable acoustic wall lining panels, recyclable modular carpet tiles and non-PVC screen fabrics in workstations,” she says. “The Greenfirst products, supplied by The Laminex Group, were specified for their improved environmental impact over standard or commonly used alternatives.”

The pro-active approach taken by the Government is reinforced from the other end of the production process as well. Alan Buckner is CEO of Formway, the company creating DOC head office’s workstations.

“Formway continuously looks for ways to reduce the environmental impact of our products and we appreciate working with clients that demand high environmental standards without compromising usability and performance,” says Barnes. “Our environmental, design and supply teams worked closely with suppliers such as The Laminex Group to meet the requirements of The Department of Conservation. This applied to the DOC workstations built from E0-rated MDF board, which contains substantially reduced levels of formaldehyde.”

He says an ongoing challenge for Formway is sourcing environmentally sustainable materials that are high quality, yet reliably supplied at competitive prices. To this end, Formway’s procurement and environmental management team works with suppliers to understand the environmental performance of raw materials.

“We actively encourage clients to specify this board due to the benefits of reduced formaldehyde levels – creating a sustainable future is a key component of our design philosophy.”

For details on the Greenfirst range of products, contact The Laminex Group, phone (09) 571 4444, or visit the website: [www.thelaminexgroup.co.nz](http://www.thelaminexgroup.co.nz).

Right: Without Clipsal's comprehensive C-Bus interconnectivity it would have been difficult to get motion sensors and light-level readings to combine to maximise light energy-savings.

Facing page: Conservation House aims high in its focus on an ecologically sound makeup. The glass-roofed atrium floods natural light down into the heart of the building.



Technologically diverse elements played an important part in the Department of Conservation's inroads on energy savings. Clipsal's C-Bus system was at the heart of the interconnectivity that the DALI lighting and building management system, BMS, achieved. Spokesperson for Clipsal New Zealand Paul Harris says the ability of C-Bus to talk between diverse electronic devices and protocols is its key advantage.

"A single C-Bus cable connection is able to control an almost unlimited number of devices," says Harris. "For example, the main switch panel in a typical building could contain 200 switches and 100 dimmers – yet only one C-Bus twisted-pair cable would actually be wired into the switch panel."

On a project where the scale of lighting control required was immense C-Bus was integral to Conservation House's energy responsiveness.

"While DALI ballasts in the light fittings provided an advanced lighting control option, this still had network limitations," says Harris. "To overcome this, a C-Bus DALI interface enabled C-Bus to extend the number of DALI networks to 255 – more than was actually required. This, coupled to a strong interface with the BMS, and C-Bus Schedule Plus software, allowed for comprehensive control."

Systems integrator ECOsystems loaded a PC with Clipsal's Schedule Plus management software to alter the programming of the light fittings as well as monitoring the light levels on the floors. This one central computer communicates with the various switchboards via a transmission control protocol, or TCP, network.

"It is also possible from this screen to assess whether any fluorescent tubes need replacing or if there is a fault with any DALI control gear, or ballasts."

Reallocation of space, or any form of business evolution within the DOC building can be catered for by the system without need for costly rewiring.

"C-Bus offers a transparent platform to manage everything from the building's access control through to facility to control its grey water irrigation," he says.

For further details, contact Clipsal New Zealand, phone (09) 576 3403. Website: [www.clipsal.co.nz](http://www.clipsal.co.nz).

**Location**

Conservation House – Whare  
Kaupapa Atawhai

**Client/tenant**

Department of Conservation (DOC)

**Building owner and developer**

The Wellington Company

**Property consultants**

Bogacki Property Consultants

**Architects**

Architecture+

**Project manager – tenancy fit-out**

Impact Project Management

**Project manager – base building**

Gill Consultants

**Engineering consultants**

Sinclair Knight Merz

**Main construction company**

McKee Fehl

**Construction sub-contractor**

DN Barrett Construction

**Structural steel**

Atco Steel Developments

**Mechanical plumbing services**

Aquaheat Industries

**Electrical contractors**

Harding Electrical

**Joinery**

Grimes & Browning Joinery

**Interior fit-out**

Cortech Interiors

**Surfaces**

The Laminex Group

**Film finishes**

High Performance Window Films

**Energy efficiency systems integrator**

ECOsystems

**Integrated systems**

Clipsal New Zealand

Photography by Jamie Cobeldick

