green, but not wacky

The Landcare Research Building designed by Chow:Hill Architects is intended to be an exemplar of Ecologically Sustainable Design. Is it? And what of the architecture? Comments by John Sutherland and David Turner. Photographs by Patrick Reynolds.

CLIENT STATEMENT

When it came to consider a new building for its Auckland staff, Landcare Research decided it wanted a building which would be at the forefront of sustainable design in New Zealand. It also wanted a sound functional building which would be suitable for the various activities staff carry out, and which would provide a pleasant working environment. Landcare agreed with the University of Auckland to move to the Tamaki campus to facilitate collaboration with university staff.

The building had to provide accommodation for:

- The National Insect Collections of 6.5 million insects, one million of them mounted with pins, in a state-of-the-art collection facility.
- The National Fungal Collection of 600,000 specimens.
- Containment facilities within laboratories to meet PC2 standards.
- Containment and propagation glasshouses.
- Sixty Landcare Research staff, 25 MAF staff and numerous university collaborators.

It was also necessary to ensure that the building could be monitored as part of ongoing urban research.

As an organisation there were also some key goals relating to sustainability:

- The building had to be designed for sustainability.
- Construction costs were not to be increased because the building was sustainable.
- Projected energy operating costs should be around 60-70% less than those of a conventional building.
- The building would make minimal use of municipal water, stormwater and sewage systems.

Part of the brief to Chow:Hill Architects, the principal design consultants for the building, was to demonstrate that a “green building” could be constructed at a cost comparable to that of an ordinary building. As project director Maurice Kiely explains, the building has a relatively conventional outward appearance, with features that can be used easily on other sites and building types. “It is proof positive that a building does not have to be ‘strange’ or ‘wacky’ to be green,” Kiely says. The design team had some assistance from Robert Vale of Auckland University’s Architecture School. The results of staff consultation workshops to support scoping requirements were combined with internal ideas about what a sustainable building should incorporate. The 18-month design and build process was completed by Easter 2004.

Pressure did come on the cost-plan and the original size of the building was scaled back. Nevertheless, Landcare Research is very pleased with what has been achieved. The key features that added to the sustainability of the building are described below.

Energy

The goal was to maximise passive climate control, keeping warmth in but excess heat or cold out so that the buildings would provide pleasant working conditions, irrespective of weather. Over a year, inside temperatures are expected to range from 17-25° for offices and laboratories when external temperatures will be between 6-27°. We deliberately did not aim for a smaller temperature range that would have required more active climate control and intervention.

The energy consumption target is 100 kW hrs/m^2/yr averaged over offices, collection spaces and laboratories (the latter being notoriously energy intensive). A conventional office building would consume approximately 200 kW hrs/m^2/yr; a building with laboratories would use closer to 300 kW hrs/m^2/yr. Limiting energy consumption will be achieved through design features that reduce the need for heating and cooling (minimising direct energy consumption), and by recovering and reusing waste heat. In addition to environmental saving, good energy management will save up to $70,000 a year. Design features helping achieve that include:

Building materials The external shell of the building is multi-layered to limit heat gains from or losses to the outside. The innermost layer is concrete block wall (keeping the thermal mass on the inside), then a thick layer of rigid fibreglass insulation, a ventilated cavity, a vapour seal layer, and finally exterior timber or metal cladding. Internally, exposed concrete has been used extensively to increase the building’s thermal storage capacity. Innovative energy modelling software was used to optimise placement of windows and window shades and the building fabric options. The software assessed natural lighting, heating and ventilation for various times of the day, every day of the year.

Insulated walls and roof Expenditure and performance has been focussed on areas where it is needed most:

- High-performance insulation has been used for the roof, walls and floors around the collections – the outer metal cladding, then R4 fibreglass batts in walls and floors with R5 in the roof, then the innermost precast or block concrete walls, floors and ceilings.
- Mid-level insulation – fibreglass batts rated R4, several times that recommended in EECA guidelines – has been used around the atrium and office façades.
- Low-level insulation has been used internally between air-conditioned and non air-conditioned areas. (A typical office loses 28-30 watts of heat per m^2 of uninsulated wall. Insulated walls reduce this to 8 watts.)

Windows Windows are double-glazed with opening frames for fresh air. Windows will need to be closed at night and during temperature extremes to help maintain the reasonably constant inside temperatures. (A typical office loses 100W of heat per m^2 of

Opening photograph: The front (west) elevation of the Landcare Building. Right: Front entrance; internal courtyard; rear entrance. Opposite page: the building from the north-east.

window; with double-glazing, this drops to 56W.)

Heat recovery 'Eco-Air units' which incorporate heat exchangers recover waste from the refrigerator/freezer systems, air-conditioning/dehumidifying systems, and some fume cupboards. The building has 11 fume cupboards; the energy associated with their operation (including replacing the air they suck out) is the greatest single energy use for the whole building. The refrigeration system serving the freezers and the dehumidification system for the collections space provide heat to a skirting radiator system throughout the offices. A gas-fired booster system supplements, if necessary, the recovered heat and solar heating systems.

Solar panels Two solar panels on the roof provide the energy for hot water throughout the laboratory systems. The cafeteria has a separate solar hot water storage system, independent of the laboratory systems.

Wind powered generator A small (400W) wind-powered generator by the glasshouses provides sufficient power to pump rainwater from the storage tanks (by the glasshouses) back up to the roof tanks which supply water for flushing urinals and ground floor toilets. Incorporating a windmill generator contributes to the sustainability of on-site stormwater management and further reduces energy consumption from the national grid.

Sewage

The goal was to minimise the load that 90 staff, visitors and laboratory usage places on the sewer and wastewater system, by using low-impact alternatives that meet all health and waste discharge requirements.

Composting toilets Using waste materials as a resource is fundamental to natural or ecological systems. Human waste, once composted, is a rich source of carbon and nitrogen that can be added to soil to enrich its productive and filtering capacity. Composting toilets are frequently used in rural areas as alternatives to septic tanks. There is, however, no reason why they cannot be considered in a built-up area. There may be occasions when they simply are not practical; many times they will be. Putting composting toilets in this building was one of the more controversial aspects of the project, and it must be admitted the feature still has its sceptics amongst the building occupants.

The first and second floors in the building have composting toilets with seven toilets feeding two large Clivus Multrum units. These toilets are located against the north wall to help keep the composting tanks warm for optimal functioning. Cleaning requires bio- friendly products similar to those used in a septic tank system. It is expected the tanks will need emptying about once every six months; the tank area has external access to make servicing easier.

The system conforms to the Australian standard for composting toilets, and the New Zealand standard for on-site wastewater disposal. This means compost can go onto the surrounding gardens. Liquid toilet waste drains to the sewer system, as do the urinals and washbasin wastewater. Wastewater from laboratories goes through local sediment/dilution traps to the sewer via a 1000 litre detention/dilution tank, and then into the sewer system. There is insufficient land area available for soakage pits for 'grey water' disposal.

Ground floor conventional toilets For the ground floor, low water-use flush toilets have been installed. Rainwater (collected and stored on site) is used for flushing these toilets and the urinals on all floors. Composting toilets were not suitable for the ground floor because the hole that would have had to be excavated for their collection units would have been below flood level. This, plus the additional costs of extra pumping, tanking and ventilation made composting toilets impracticable and uneconomic for the ground floor. Overall, the goal has been achieved by ensuring that the load being placed on the sewer system is markedly smaller than for a conventional building of similar size and function.

Water and wastewater management

The goal here was to reduce both the amount of water purchased and the amount of water entering the stormwater system. By harvesting rainwater and using it on site, the need for mains water is reduced, as is the infrastructure needed to supply it and remove stormwater.

Rainwater harvesting Instead of rainwater running into the stormwater system, as much as possible is collected and stored on site for use in all (manual flushing) urinals and ground floor toilets, and for irrigating gardens and glasshouses. Rainwater harvesting for water reuse is an obvious way of limiting the demand on water supplies but it is only applied in rural areas. It is one relatively simple change that could be applied to a significant percentage of our urban infrastructure.

Auckland's rainfall is 1100mm/per year with typical rainfall events contributing about 25mm. Given the Landcare building's total roof area of $2200m^2$, and allowing for spillage and overflow, about $325m^3$ could be collected in the average rainstorm. Enough water to meet about a month's demand for water is stored on site. A mains backup will be available during dry spells. Water running off all the roofing areas is gravity-fed to a 25,000-litre tank near the glasshouses. Water is pumped from the main storage tank back up to the roof header tank using electricity supplied by a small wind turbine. Two additional 25,000-litre tanks detain stormwater overflow from the main tank. Overflow from the detention system (e.g., during a big storm when the tanks are already mostly full) will overflow into the yet-to-be-constructed rain garden.

A soak pit, which penetrates the basalt rock layer, allows approximately 10 litres per second to drain way. Any excess will still enter the municipal stormwater system through the normal curbing channels and drains, but compared to sites lacking collection and detention centres the volumes will be drastically reduced. The cost of the tanks and wind turbine generator were offset by not needing to run downpipes to the ground and connecting them to underground stormwater systems, and by savings in water charges. Mains water is used for basins and for drinking. Although hand basins use mains water they have low-volume water-saving taps to prevent unnecessary wastage of water, including the hot water heated by solar panels.

Purified water for laboratories Reverse osmosis or hyper-filtration, the finest filtration known, is used to provide pure water to the laboratories with specialist requirements for slide preparation and uncontaminated glassware. A reverse osmosis machine is a large consumer of water as only a small proportion of the water (maximum 30%) flowing through the machine actually passes through the filter. The system has been configured so that reject water can be collected for re-use in urinals and for garden irrigation. Either rainwater off the roof or mains water may be used in the reverse osmosis machine. However, using recovered rainwater may extend the life of the reverse osmosis resin filter because rainwater probably has less dissolved salts than tap water.

Runoff from the car park and roads The carpark has a pervious gravel surface allowing rainwater to infiltrate the surface. During storms, excess water beyond what the soil can normally retain will flow through the soil down a gentle gradient to an area to be developed as a rain garden. Collected in a stormwater pipe the water will be taken under the building foyer to the front of the building where it will be released into soil and a wetland area. Any excess water will flow through the soil into the stormwater network. The overall water volume will have been significantly reduced and contaminants filtered out.

Other Features

As limiting resource use was a key goal, we limited the inclusion of excess materials where possible. Many areas are without a false ceiling; exposed ceiling trays carry pipes and wiring below the concrete upper floors or roof. Most of the office and corridor floors are concrete which acts as a heat sink. Carpet tiles from Interface Carpets – off-cuts forming an interesting pattern – are used in meeting rooms and admin offices. When they need to be replaced they will be extensively recycled. Laboratory coverings are marmoleum, a vinyl look-alike made from jute and natural resins. It may be composted after its 25-year lifetime. Organic solvents in paints and varnishes were minimised. Light fittings are low energy usage.

Where to from here?

The building has already fulfilled its purpose in a number of ways, but the hope is that it will exemplify some or all of the features others may wish to consider when they come to build. Landcare Research will incorporate the monitoring and management of the building into its mainstream urban research, and will make public its performance and suggest further improvements.

Factors to consider when going down the sustainable building path include:

- Having a design team that is really committed to the goal and has in it some experience in sustainable design.
- Remembering that sustainable design does not have to stand out like a sore thumb, especially if that adds to the costs.
- Having a client and design team prepared to take some (at least perceived) risk in moving away from the status quo.
- Having end-users who are prepared to accept a building that they may need to actively manage (e.g., open and close windows) and who can accept a wider climate comfort range than normal.
- Choosing a framework for decision making (several are available), and spending the necessary time considering the trade-offs in terms of sustainable features.

In the longer-term there will need to be more fundamental changes in the construction industry:

- Major suppliers of materials should be aiming to procure only certified sustainable products. There needs to be better traceability so that customers know the source of materials.
- More robust and accepted financial systems should take account of the reduced operating costs of a sustainable building and, as is often the case, the longer building lifetime in considering depreciation.
- There will need to be a move away from working to the minimal building code and compliance standards, or those standards will need to change to encourage more sustainable behaviour.
- There was less concern encountered from our local Council than anticipated. However, if sustainable design is to become mainstream, councils need to actively promote the approach, and coordinate between their planning and consent departments to give a consistent message.

There was more time and effort involved in achieving this building but it was a rewarding process, one well worth the effort. We hope it will encourage others and, through some of the learning gained, make it easier for them to follow suit.

Dr Maggie Lawton, Landcare Research

ARCHITECT'S STATEMENT

Landcare Research wanted its new Auckland facility to be "a world-class example of sustainable design". The building is a complex of research laboratories, museum-standard collection spaces for insect and fungi collections, greenhouse propagation spaces, academic offices, and social and administrative spaces, all on a constrained site within Auckland University's Tamaki campus. The design of spaces for the Ministry of Agriculture and Fisheries' (MAF) National Plant Pest Reference Laboratory, and the need to respond to the University's expectations for design quality, were also important factors in the evolution of the design. The collaborative design process involved our practice team, design partners, client, and contractor.

The outward expression of the building is a simple one: a tripartite division of metal, timber, and glass – metal for the laboratories and collection spaces, timber for social and administrative functions and glass for propagation areas. The collection spaces are expressed as a precious resource wrapped within a protective outer shell or basket.

The plan is predicated on a narrow footprint, organised around open courtyards or pedestrian spaces, allowing for maximum natural light and ventilation. Contained laboratories or areas requiring mechanical ventilation or air conditioning are nearest the road where they act as acoustic and solar barriers to office spaces. Collection areas are in upper level concrete chambers with rigorously controlled temperature and humidity. It is intended that linking areas between various building blocks will function as social and display areas.

Significant research was carried out on

SITE PLAN

building systems with respect to embodied energy, constructability and cost-in-use, rather than consideration of isolated elements or materials. As a result, materials are used extensively in their least processed form. Concrete, timber and steel are left in exposed state, and fulfil other functions beyond structural or weathering roles. Much building services work follows a similar philosophy. The challenge was to reduce rather than add, and also to express solutions in an elegant fashion.

In parts the building, which incorporates composting toilets, solar water heaters, syphonic water harvesting and storage, and wind turbine, overtly demonstrates its philosophy. The tuning and balancing of the building's active and passive systems is being achieved as it moves through its initial seasonal cycle. Similarly, landscape design and planting will be realised over time as part of ongoing site development by Landcare Research staff. These elements of sustainable design reflect a building technology and attitude to time-scale and cost which stand to one side of most current practice, but which are increasingly becoming the norm. We are confident the facility provides a sustainable environment, both for scientific endeavour and human interaction.

Maurice Kiely, Chow:Hill Architects

COMMENT: JOHN SUTHERLAND

Last issue (*Architecture New Zealand*, July/August 2004) I was grumbling about the "soft" and PoMo nature of the Centennial Block at Diocesan School and contemplating how the schools' "modern young women" would ever approach twenty-first century architecture and design. Nothing would prepare any of them, having become scientists, for the shock of working in the Spartan conditions of the Landcare Research Building at Glenn Innes.

This is the building Dr Maggie Lawton (Operations and Science Manager, Landcare Research) got when she pursued her objective of an Ecologically Sustainable Design (ESD) building at a cost no greater than that of a conventionally similar building – an ESD building where success would be marked by energy operating costs 60-70% less than those of a conventional building and minimal use of municipal water, stormwater and sewage systems.

To achieve this Landcare assembled a 'dream team' around Auckland University's Dr Robert Vale as its sustainable architecture consultant (he now works part-time for Landcare). Architects were Chow:Hill Architects (with Dr Peter Diprose as their sustainable consultant), with Connell Mott MacDonald the building services consultants. RDT Pacific was the initial project manager with cost control responsibilities but, faced with 'fixing' the cost of an ever-moving target, didn't last the course. Hawkins Construction was brought into the design team early by RDT because design and construction were to proceed somewhat in parallel and a bit 'on the hoof'. Such a procurement method is difficult on a normal building. On Landcare's 'experimental' one it proved terminal for its proposer.

Hawkins appears in the circumstances to have put together a complex, multi-layered, heavily serviced piece of work to an excellent standard. This is important news for us all: a mainstream contractor has wrestled with complexities added by ESD and come out on top, hopefully with margin intact. We might hope this also applies to others involved in the project, because it would be unreasonable for the design team to wear the client's ESD risk.

The result of one interaction or another, including the late introduction of MAF as tenant, is this "tough" building. The exterior essentially juxtaposes various profiled zincalume steel claddings, naturally weathering cedar weatherboards (beautifully copper soakered), mill-finish aluminium window frames (with glass and mill-finish aluminium flat panels), and perforated sunscreens. The administration block (west) is mainly cedar clad; the scientific block (east) is mainly zincalume steel. The balance about the entrance/reception lobby/circulation spine – which recognises the equal importance of the car-park side as "main" entrance – is satisfying and creates the logic of the building. The interior is characterised by polished concrete slabs, painted blockwork, nude PC concrete walls, plasterboard in a limited range of paint colours, marmoleum in the labs, the judicious use of nylon re-cyclable carpet tiles and expressed, exposed overhead services.

We can only speculate whether Dr Lawton realised the architectural severity that would result from her stricture that there should be no budget premium for ESD (there usually is, to be recouped by low maintenance and operating costs). Or that some briefed accommodation would have to be left behind for another time. The building is, though, entirely appropriate as a working environment for scientists and their associated bureaucracy. While the natural ventilation to all spaces other than labs is likely to make it a "healthy" building, the early addition of carpet tiles and the capacity to personalise offices probably enhances already high levels of satisfaction with the new environment. Other staff facilities seem to be of a good standard. That this is an ESD building does not really disclose itself, apparently deliberately.

Maurice Kiely of Chow:Hill is quoted by Dr Lawton as saying the Landcare building "is proof positive that a building does not have to be 'strange' or 'wacky' to be green" – which may be a shame when some more extroverted international exemplars are considered, particularly when they show up in the very considered organisation of laboratory servicing and external cladding. So while we have a touch of 'sustainability by stealth' in the aesthetics, Robert Vale asserts it is also there, and much more importantly, 'by measurement' (not just 'by assertion'), in the performance of the building as a whole. The assertion can be supported because the energy use performance of the site may be monitored on an ongoing, 24/7, basis.

Aesthetically the building is unashamedly mainstream and economic, and suffers as others do from the somewhat clunky trim detailing that characterises horizontal profiled steel, and from the problems of representing thick (and thickened) projecting elevation-framing walls. The latter is common to both steel and timber book-end solutions on the north and south elevations; the difficulty is that this is the main elevational ploy at work on these facades.

Some of this thickness is created by a building envelope multi-layered to limit heat gains and losses. External walls achieve R4, and the roof R5 values by the use of thick insulation. The perimeter walls consist of structural blockwork between concrete columns, with a thick layer of rigid fibreglass externally, a ventilated cavity and the steel or timber cladding. The walls surrounding the atrium achieve R4 but on a timber frame within a concrete frame. Windows are all double-glazed within aluminium frames which, without the thermal break one would expect in Europe, may be the weak spots in the envelope. The colder south side presents a blank, curved wrap-up-and-over, chequer-board-patterned metal cladding that expresses two levels of un-windowed air-conditioned collection rooms. On the two N/NW faces, projecting inclined and perforated aluminium sunscreens reduce solar gain on the glass – with one exception.

On the much trafficked Morrin Road façade there is something uncomfortable about both the size and length of the sunscreen hangers. Internally, the current absence of an air- conditioned boardroom has created either traffic noise or lack-of-fresh-air problems. The timber-clad projecting boardroom is also, strangely, not provided with the same sun control as the labs on the same face. Nor is the N/NE face

Previous page: Internal courtyard area.
Left: Reception area.

to all three floors of labs; curving overhanging spandrels and internal blinds (no vertical louvres) are left to do the business and help reduce the air-conditioning load. The west elevation has appropriate vertical louvres to much smaller windows which, on the ground floor, double as security devices.

Beyond the book-ends no hint of the thickness occurs on the exterior as all windows are face fixed, but because of it, delightful window reveals modulate daylight internally in the atrium offices. However, detailing interest seems to have collapsed on those curved, projecting spandrels on the N/NE façade. One might presume the spandrels contain lab ductwork, but they don't – they are an architectural device. The spandrels are capped untidily and uncharacteristically with a green-chip-topped membrane; the otherwise consistent metallic idiom just got lost here.

The building has a dramatic, though not architecturally well-organised silhouette (visible from both up and down Morrin Road), perhaps as befits a laboratory. Flues, stacks, solar hot water units and much other services paraphernalia clutter the roof, confusing the otherwise subdued roof-line.

Fundamental to the briefed ESD design was "rainwater harvesting", first to reduce the amount of water purchased, and also to reduce the amount of surface water entering the stormwater system, and waste water and re-usable waste material entering the sewage system. This requirement produced some of the building's more ground-breaking features: composting toilets on the first and second floors; and syphonic rain water collection off the roof for diversion into on-site tanks prior to use as grey water for the ground floor conventional water closets and for urinals on all floors. The other use for the stored water is irrigating gardens and glasshouses. The brief has been achieved and all surface water has been carefully planned and dealt with beneficially; ultimately the surface water ends up in a bouldered rain garden under the front entry bridge. Only the last drops of unused surface water go into the stormwater network.

The completeness of the ESD consideration on the Landcare Research building means there is much to contemplate. From an ESD perspective it is probably without peer at present (it meets Australian NABERS standards). But, does it also stand as well conceived twenty-first century architecture? I stand back and leave David Turner to tackle that one.

COMMENT: DAVID TURNER

We do not have the habit of critically discussing the architecture of a building in terms of its Ecologically Sustainable Design: its environmental performance; response; its sustainable characteristics; its ecological identity. Such a platform for a design critique is, by our own conventions, irrelevant, unless the building explicitly invites it. Proof lies in the commentaries, albeit compressed, attached to the 2004 crop of NZIA Awards. The environmental dimension is not mentioned in a single summary.

This may be because all we get from buildings such as the Landcare Research headquarters (that is, buildings presented as environmentally "good"), is building. Gift-wrapped in numbers, ESD architecture is usually trapped in the technology of building physics, the catalogue of heat not lost, of energy not embodied, of materials certified and approved, waste minimised, and the rather unpleasant idea of grey water.

And buildings with the ESD tag sometimes register a sort of architectonic righteousness, perhaps associated with the "good" image of green design – a self-conscious expression of worthiness separating them from their rivals by some unstated but implicitly ethical claim to being a *better way* to make buildings. American web sites are full of examples. The car-makers who abandoned the gas-guzzling monsters of the 1960s in favour of compact and fuel-efficient models, promoted on a sales pitch of safety, recyclability, and low exhaust emissions, none of which held the slightest interest to consumers a decade earlier, enjoy a similarly virtuous place in the sun.

And the truth is both the cars and these buildings have a point.

By leaving the "wacky" behind, as Chow Hill Architects puts it, the Landcare building, which is green architecture without the smug messages, moves into the mainstream. In doing so it exposes itself to the full complexity of contemporary critique. Comparison and comment is invited on a level-ish playing field, and not in a parallel universe where other rules apply.

The problem at this point is that the architecture of ESD continues to be an enigmatic influence, unresponsive to the idea that architecture, like poetry, "contains forces that do not pass through the circuits of knowledge". ESD is always ready to fall back, for defence, on its own technological agenda. In this sense it is stuck fast in the modernist- functionalist critique, uncomfortable with an aesthetic debate, and reluctant to participate in the abstractions of contemporary theory.

Of recent examples in New Zealand (discounting private houses, which have no excuse not to be green) a few stand out. The Waitakere Library at Massey (DPRB Architects) is inventive, intelligent, and purposely informative. It is a repository of materials, devices, and strategies to make buildings work better, create better working spaces, and use less energy. It does all these things brilliantly well, and it will be interesting to see if Waitakere City can repeat the success with other new libraries designed by different architects.

The AUT Administration Building at Akoranga campus (Jasmax and NDY) is a successful venture into ESD; the MSCS Building at Canterbury University (Architectus and Arup), suggests some of the possibilities of the richer language of ESD, making connections to context, taking delight in the unexpected, and suppressing visible evidence of its own low energy objectives (which it seems to meet, comfortably).

All these buildings paved the way for Landcare Research. But Landcare is satisfied with a ho-hum solution, an indifferent industrial aesthetic. This may be justified by context, but expresses no separate purpose, or the real significance of the new building's owner: who wants to identify with the metal-bashers and plastic pot-makers of Morrin Road? The building seems to disregard the challenge of location (it commands a major entrance to Auckland University's Tamaki Campus).

Instead, the Landcare building passes up the architectural opportunity of its own title: "Land", the essence of its existence (and ours) – through a material aesthetic the project might have explored the concepts of permanence and attachment; and "landcare", caring about the land and finding a way of communicating something about this in the external form. Roll-formed metal, fashionable as it is, will never communicate anything more profound than the pragmatic nature of agriculture.

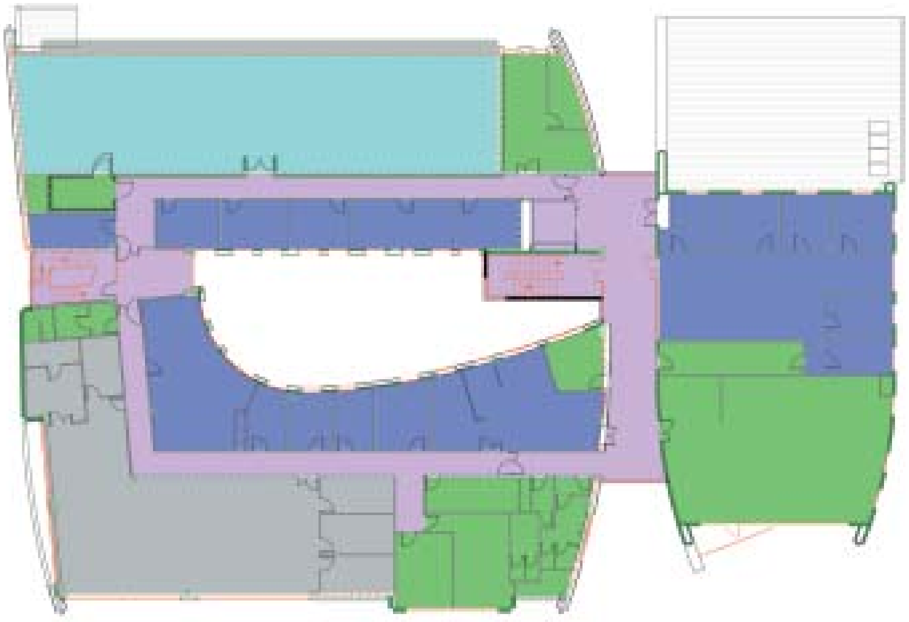
In a functionalist-determinist critique – essentially the mid-twentieth century modernist position – the Landcare Research building would invite and receive warm praise for nearly every aspect of its design and its agenda. It is modest, not self-conscious and, mercifully, not smug. It has no rainwater pipes (they disappear back into the structure just beneath the gutters), which tells us something. At the back, the building is surrounded by stone soak-aways, like dry river beds, which are bridged by light timber footpaths at the entrances, and we can read this device as an element of the water-conserving regime, as well as the articulation of building to ground. Inside, the bare concrete spine walls are warm to the touch, and ensures thermally stable conditions. We know the building is on target for low energy consumption, at less than 100kWhrs/m^2/year (under half the norm in

SECOND FLOOR

such a building, including new ones) – a "remarkable achievement" according to Robert Vale.

It was Reyner Banham who pointed out that the new technology of the twentieth century made it possible, for the first time in the history of architecture, for buildings to be "climate exclusive". Apparently unlimited energy resources and environmental technology encouraged the modern movement to think of architecture without reference to the immediate environmental context; it just didn't form part of the equation. Now it does.

One is entitled to ask, in the rhetoric of green architecture: "What client would refuse a design that costs the same to build but operates on half the energy"? The question will be redundant when the green agenda is not the issue but the assumption – when this architecture integrates with everything else that architecture can be, when it is able to move, to compel, and to challenge. And still be smart, like Landcare. ☐



FIRST FLOOR

PROJECT CREDITS

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MAIN CONTRACTOR HAWKINS CONSTRUCTION
For a list of suppliers and subcontractors see page 114

GROUND FLOOR