

# PROTECTING NEW ZEALAND'S HEALTH AND WELLBEING

ESR 2012 Annual Report



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# Our purpose and role

**Our purpose is to protect and enhance the nation's health and wellbeing by addressing challenges that require science-based innovations in health and disease, justice and security, food safety and integrity, and environmental health and hazards.**

**We provide independent scientific advice and services to a range of clients so they can deliver evidence-based policy, and sound operational outcomes. Our Statement of Core Purpose outlines the outcomes we're aiming for in more detail.**

**We have nationally and internationally recognised capabilities in infectious diseases, forensic science and science-based services. We are recognised and valued as an authoritative advisor on critical national reference science in health and forensics, and have a unique role in protecting and defending New Zealand.**

## **JUSTICE, DEFENCE AND COMMUNITY SAFETY**

We are the sole source provider of forensic services to the New Zealand Police, offering them unique capabilities that are highly cost-effective and efficient. Our services contribute to more effective justice sector operations and judicial outcomes, as well as more efficient justice sector processes. Our forensic expertise is increasingly being recognised internationally.

## **HEALTH AND DISEASE RISK PROTECTION**

We safeguard the health of New Zealanders by working with others to improve the management of human biosecurity and public health threats. We are the principal science advisor to the Ministry of Health, undertaking

many activities that underpin and inform Government responses, and decision- and policy-making.

Our work includes the surveillance of human pathogens and zoonotic disease, as well as advice on the impacts of the environment on human health, including radiation, groundwater, freshwater and drinking-water quality, and safe biowaste use. We help reduce the harm and costs involved with illness and lost productivity.

## **FOOD SAFETY AND INTEGRITY**

We help protect the New Zealand economy and grow the country's competitive advantage in overseas markets. We do this by helping improve the management of issues in domestic and export food production systems. We also help maintain access to key export markets, in partnership with the Ministry for Primary Industries and New Zealand food manufacturers, processors and distributors.

## **OUR APPROACH**

As well as our work supporting government agencies to improve their services and operations, we work with clients in central and local government, industry organisations and the private sector.

We take a project-based approach, bringing together the best team to tackle tasks, whether they involve research, stakeholder engagement, service delivery or evidence for policy. We both lead and participate in teams drawn from across ESR, and from external collaborators and stakeholder organisations in New Zealand and overseas.

We value our reputation for engagement and collaboration with Māori, particularly on health- and water-related research projects with social impacts.



**19,203**

**CASES OF NOTIFIABLE DISEASES**



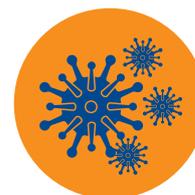
**65%**

**CHANCE OF LINKING A PERSON TO A CRIME THROUGH DNA**



**6.5%**

**RETURN ON EQUITY TO SHAREHOLDERS**



**542**

**INFLUENZA VIRUSES WERE ANTIGENICALLY TYPED AND SUBTYPED**

ESR is a Crown research institute (CRI). It was incorporated in July 1992 and is wholly owned by the New Zealand Government. The two shareholding ministers appoint a board of directors to govern the organisation. ESR has scientific facilities in Auckland, Wellington (Porirua and Wallaceville) and Christchurch.

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*He aha te mea nui o te ao?*

*He tāngata!*

*He tāngata!*

*He tāngata!*

*What is the most important  
thing in the world?*

*It is people!*

*It is people!*

*It is people!*

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# Chair's report

This year our shareholding ministers presented a challenge to the science community to double the value of science to New Zealand. The Board and management of ESR have embraced this opportunity to ensure that ESR's science and research services address New Zealand's most pressing science and innovation issues, and contribute to enhanced economic outcomes.

While continuing to fulfil our unique role in protecting and defending New Zealand's health and wellbeing, we have also been working on a strategic plan for the future. We recognise that this is not something we can do alone – it can only be achieved with effective engagement and support from our many stakeholders.

Our new strategy will grow our business and increase our ability to meet the challenge we've been set. We will use our scientific knowledge to develop smart intelligence for the health and justice sectors. We are determined for ESR to fully deliver on its potential and work has already begun on putting this strategy into action. The successful acquisition of the National Radiation Laboratory (NRL) from the Ministry of Health this year is a major first step in our longer-term growth strategy.

One of our strategic priorities is to diversify our income base. Our collaborative and world-leading work on the Southern Hemisphere Influenza Vaccine Effectiveness Research and Surveillance (SHIVERS) project has

attracted much attention. That a major foreign agency, USA's Centers for Disease Control and Prevention, is prepared to invest in a project managed by ESR reflects the high regard with which our work is held internationally.

Our financial results for 2011/12 reflect the continued fiscal restraint of our government clients, the current phase of our development and the positive impact of the acquisition of NRL. Net profit of \$2.4 million was \$0.5 million down on budget, and revenue of \$58.6 million was \$4.3 million below budget but up \$4.5 million on the previous year.

The past year has seen some major achievements. As well as some brilliant science, we've built on our relationships in the health and justice sectors, and extended our reach into other areas, including communities and businesses. As recommended by the CRI Taskforce, we have established a team of international experts to advise us on how we can keep our research and science at the leading edge. The Strategic Science Advisory Panel (SSAP) met twice this year and we have welcomed the international collaboration as well as the significant insights that have informed both our strategy and our science.

The work with the Kaikōura community, that you will read about in this report, shows the collaborative and engaging way that we can work at a local level. This approach could be of value elsewhere in New Zealand

as regional authorities throughout the country meet new requirements to manage their biowaste and water quality. The new online drug intelligence project is another excellent example of what collaboration with government agencies, in this case Customs, can achieve.

For us, as for those who live in Canterbury, the effects of the 2011 earthquakes are far from over. We are continuing our groundbreaking work on the effects of liquefaction silt on water quality.

We are starting to see the fruits of our investment in revamping our information technology and communications systems. This is improving productivity with benefits for us, as well as our clients.

We have successfully made the transition to a new chief executive, with Graham Smith now on board. We thank Dr Fiona Thomson-Carter for her work as acting CEO after Dr John Hay's departure. ESR's management and the talented and committed teams did outstanding work again this year. I thank the Board for its ongoing support and guidance, and acknowledge departing Board member Elizabeth Hickey for her significant contribution over the last three years.



Susan Macken  
Chair



Susan Macken, Chair

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# Chief executive's report

This was my first year as CEO of ESR. It has been exciting to build a greater understanding of the depth and complexity of ESR's work. I've enjoyed getting to know the team of dedicated and respected professionals, and seeing the impact of their work at the leading edge of science and research on the wider community. I have also enjoyed meeting the many stakeholders and partners whose work is supported and enhanced by ESR's skills and knowledge.

ESR is New Zealand's 'human-focused' Crown research institute. Our work protects the health and wellbeing of New Zealanders and makes their lives better. It ensures they are free to get on with their lives and their work. Investment in science innovation in health and forensics contributes to New Zealand's first-world infrastructure. Having a healthy population and a well-supported justice system is the bedrock of a healthy economy.

A great deal of work by both ESR and its partners in the health and justice sectors goes into prevention. Together, we reduce the risks and impacts of catastrophic and expensive events – both in terms of human life and money.

We continue to lead New Zealand's progress in forensics and infectious diseases, food safety, and water and environmental science as outlined by our Statement of Core Purpose. You will read about innovations in all these areas in this report. We've continued to deliver what our sector partners need

on a daily basis, as well as staying at the forefront of international science research so we can anticipate their needs in the future.

This year has also provided more evidence that our work furthers the country's reputation for science innovation – see the pieces in this report on our world leadership in forensic and health science, and research with the SHIVERS project and future crime scenes – and we ensure the reputation and value of our food exports remain intact. What are these things worth to the New Zealand economy?

The year has also been a turning point, as we have closely examined our operation and purpose so that we can continue to protect New Zealand's interests with specialist scientific and research services. While staying within the scope of our role agreed with Government, we have done some intense work planning for the future, which has resulted in a refreshed Statement of Corporate Intent. Our role has evolved to helping New Zealand grow and increase its productivity. We also continued to look for ways to increase our income from other sources while staying true to our purpose and our mandate.

ESR's planning for the future has focused on how we can dramatically accelerate our abilities. We believe we're the best team for tackling the grand challenges of science for the health and justice sectors. We have

national capability that benefits the country and are in the unique position of being able to work in partnership with a range of local and national agencies, universities and international partners. As well as being the power behind many of the outcomes that are delivered by police and health agencies, we provide important services to other government agencies, including the Department of Corrections and the Customs Service, as well as an increasing number of primary sector industries such as the meat export sector.

One of our strengths is the way we bring together multidisciplinary teams, involving people from outside agencies as well as ESR experts. Another strength is the standard of our laboratories. They are accredited to rigorous international requirements ensuring the highest standards of scientific testing and advice for our clients.

Projects have begun this year that are looking for ways to provide key sectors with even more intelligence – bringing together existing data and science knowledge, analysing it and interpreting it to help the work of our sector partners. You will read more about these initiatives in this report.

We continue to upgrade our assets so that we can meet our mandate and the needs of our sector partners. Improvements to the Mount Albert Science Centre have commenced. We are also replacing the information

management system used by our specialised labs around the country.

We celebrated the acquisition of the National Radiation Laboratory (NRL) from the Ministry of Health in 2011. NRL is now part of our stable of 'national treasures' – assets we manage for the country's benefit: the National Influenza, Polio and SARS laboratories; the DNA Profile Databank; National Vaccine Services; and the New Zealand Reference Culture Collection (medical section).

The work of Christchurch-based NRL spans all of our outcome areas as well as serving the needs of multiple government agencies and industries. NRL is a good example of how we can offer an enriching home to operational science units. We believe this delivers efficiencies, as well as better and faster services for our stakeholders.

We continue to be a trusted agency that can provide fast, scientifically robust answers when nobody else can. If someone needs to know whether the white powder on their desk contains anthrax spores or whether mutton birds migrating from Japan carry radiation risks, ESR is the only agency that can provide a timely answer.



**Graham Smith**  
Chief Executive



# Health

**We help safeguard the health of New Zealanders through improvements in the management of human biosecurity and threats to public health.**

**Our contracts with central government provide health services to key government health and biosecurity agencies. At a local level, we also provide key health science services to district health boards and local government.**

**Over the last three years we've invested and built on our abilities to provide these critical health services. Three innovations of which we are particularly proud are the work we've done to improve New Zealand's ability to respond to human health crises, monitor antimicrobial resistance and increase our ability to detect and characterise Shiga-toxigenic *E. coli* (STEC).**

## **LEADING THE WORLD IN HUMAN HEALTH**

In 2008 we invested five million dollars in the National Centre for Biosecurity and Infectious Disease (NCBID) so that New Zealand can better respond to human health crises. We recognised the country's need to be able to manage human health crises as effectively as it has been able to manage animal health crises for some time.

NCBID was in full operation just before the 2009 influenza ('flu) pandemic. Led by Dr Sue Huang, a nominee in the science and technology category for Wellingtonian of the year in 2011, the ESR team at the NCBID-based World Health Organization (WHO) National Influenza Centre (NIC) made New Zealand's response to the pandemic

one of the best in the world. Through their work, Dr Huang and her team developed an international reputation as leaders in the field.

After the pandemic, our national seroprevalence study, funded by the Ministry of Health, investigated the level of New Zealanders' immunity to the H1N1 influenza strain. We advocated for the H1N1 strain to be included in the composition of the southern hemisphere influenza vaccine for 2010. By avoiding a separate vaccine for H1N1, the Ministry of Health saved many millions of dollars.

Our expertise in influenza diagnostics, reference and epidemiology was further recognised in 2011. We led a successful international bid for a five-year, United States seven million dollar project to comprehensively investigate influenza epidemiology, aetiology, immunology and vaccine effectiveness.

The team includes Auckland and Otago universities and the Auckland and Counties Manukau district health boards. Funded by the United States Centers for Disease Control and Prevention (CDC), the SHIVERS (Southern Hemisphere Influenza Vaccine Effectiveness Research and Surveillance) project will set up hospital and community-based surveillance for 'flu and determine the effectiveness of vaccination in the population and potentially different sub-groups as well.

With this surveillance we will act as a sentinel for the northern hemisphere.

The SHIVERS research enhances New Zealand's reputation as a leader in scientific research and human health.

## **TRACKING ANTIMICROBIAL RESISTANCE**

Over the last three years we have received dedicated funding from the Ministry of Health to increase the testing and surveillance of antimicrobial-resistant bacteria. Antimicrobial resistance is increasing in New Zealand, as it is around the world, and has been described as a 'crisis' by the World Health Organization. Some common and life-threatening infections are now very difficult and even impossible to treat. Resistant organisms result in longer hospital stays, time off work, more expensive drugs, increased control measures and more deaths.

Our monitoring of changes in resistance patterns is a key contributor to programmes that reduce these impacts on the New Zealand health system, society and the economy. We have increased the range of tests we do to include the identification of new types of antimicrobial resistance genes, as well as finding new methods to characterise *Clostridium difficile*, *E. coli* and *Klebsiella spp.*, important nosocomial pathogens associated with antimicrobial resistance. Antimicrobial resistance testing has so far increased by 26 percent as a result of the new funding.

One of the resistant bacteria causing worldwide concern is MRSA (methicillin-resistant *Staphylococcus*

*aureus*). Initially MRSA was considered a 'hospital bug', but over the last decade this bacterium has been increasingly associated with infections in the community. Our surveillance shows that in New Zealand MRSA increased nearly 40 percent between 2010 and 2011. Most of the increase here in recent years has been due to the spread of a particular strain that is associated with community infections.

In the last year we have also given valuable information to public health authorities to define and implement measures to manage the spread of a new, resistant strain of gonorrhoea, New Zealand's second most prevalent bacterial sexually transmitted infection.

“During the 2009 swine flu pandemic we got a glimpse of just how good our New Zealand science teams are. They are now being recognised internationally for their work and, working collaboratively, are helping improve world health through their efforts.”

**Tony Ryall, Minister of Health**





**19,203**

CASES OF NOTIFIABLE DISEASES



**4,346**

SUPERBUGS TESTED IN THE ANTIBIOTIC REFERENCE LABORATORY



**1,080,005**

DOSES OF VACCINE DISTRIBUTED FOR NATIONAL IMMUNISATION PROGRAMME



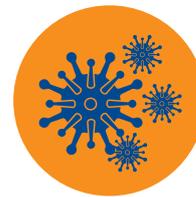
**4,583**

BACTERIA AND FUNGI STRAINS HELD IN THE NZ REFERENCE CULTURE COLLECTION



**97,047**

PERSONAL DOSEMETERS ISSUED FOR RADIATION WORKPLACE HEALTH AND SAFETY



**542**

INFLUENZA VIRUSES WERE ANTIGENICALLY TYPED AND SUBTYPED

We are working closely with the Ministry of Health to help solve the antimicrobial resistance puzzle and reduce its impact in New Zealand.

**INCREASED E. COLI VIGILANCE DELIVERS MULTIPLE OUTCOMES**

We play an important role in protecting the New Zealand population and export trade from Shiga toxin-producing *E. coli* (STEC), also known as Verocytotoxigenic *E. coli* (VTEC). These food- or water-borne pathogens are highly toxic to humans and can lead to renal failure and death, particularly in children. We are doing important and innovative work in STEC management in both the health and food safety areas.

Early diagnosis is important in managing and preventing large outbreaks of STEC infections. The costs of not being prepared were shown in the O104:H4 STEC outbreak in Germany in 2011, which resulted in 941 confirmed cases in the European Union and 46 deaths. The outbreak also caused the loss of millions of euros as various food imports came under suspicion before the source was eventually found. At the time, we ensured that New Zealand people and trade were protected from O104:H4 STEC by being prepared to detect this pathogen in food samples and in people. Our specialist knowledge, expertise and vigilance allow us to respond quickly should new strains or new outbreaks threaten our shores.

The team at our Enteric Reference Laboratory (ERL) ensures the surveillance testing they do is at the leading edge of what is available around the world. Reference laboratories like ERL play a central role in detection, monitoring and outbreak response, as well as providing scientific evidence to prevent and control infectious diseases. New Zealand depends on this strong reference capacity to respond quickly and effectively. ERL achieves this by collaborating with agencies, including the Statens Serum Institute (Denmark, WHO Collaborating Centre for Reference and Research on *Escherichia* and *Klebsiella*), the Institute Pasteur (Paris, *Salmonella* WHO Reference Laboratory), and the European Centre for Disease Control (ECDC). Working with international leaders helps us keep up with progress in surveillance testing for enteric pathogens such as STEC.

There is more detail in the food safety outcome section on STEC testing innovations to protect New Zealand's export trade.

“The strength of ESR’s proposal for SHIVERS was not just the inter-sector collaboration – two hospitals and two universities working with New Zealand’s leading scientists – but the international collaboration with St Jude’s Children Research Hospital, US, Victorian Infectious Diseases Reference Laboratory, Australia and us at US-CDC. This sort of collaboration is hard to achieve and bringing it together requires skill. However, looking at a problem from many perspectives – laboratory, epidemiology, clinical and statistical – is worth the challenges.

“We really feel we are dealing with the best people and resources New Zealand has to offer.

“As well as the benefits SHIVERS will deliver to the US and the international community, there will be important benefits at home. The work will help New Zealand health agencies understand and prevent the flu, especially in vulnerable groups. The project is also doing some advanced and impressive science that will gain attention and respect internationally.”

**Marc-Alain Widdowson, Lead, International Epidemiology and Research Team, Influenza Division at Centers for Disease Control, United States Department of Health**

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#### LEADING THE HIT SQUAD

Graham Mackereth leads ESR's Health Intelligence Team (HIT). Like any crack detective unit, the team monitors and manages ever-changing risks – both the known and the emerging – to New Zealand's health.

Using both research and health surveillance techniques HIT is able to identify, describe and predict disease events. This protects New Zealanders so they can get on with their lives and work.

"It's great to live in a country where the food is safe, children are protected from disease and our health agencies are ready to respond to threats," says Graham. "But none of this is by accident. Working with the Ministry of Health we make sure we are able to stay on top of potential pathogens and pandemics that put us at risk."

As well as the satisfaction of making a difference to people's health, Graham enjoys the challenge of gathering strands of information from different sources and bringing them together with some of the best scientific expertise in the world. "I've always been interested in how science fits in the big picture."

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Graham Mackereth with team members  
Ange Bissielo and Ruth Seeds

# Forensic science

## We increase the effectiveness of safety, security and justice investigation processes through forensic science.

**Our forensic science services are important partners to the New Zealand justice system. The contracts we have with key government agencies help the sector meet its outcomes.**

**We help the New Zealand Police meet its key forensic priorities and many other outcomes. The Department of Corrections uses our services to help reduce prison inmate drug use. We provide the Courts service of the Ministry of Justice with scientific evidence to inform the criminal justice process. And we support the New Zealand Customs Service in border-control activities, particularly with information on drug seizures.**

**Over the last three years we've made some major advances in forensic science and are recognised as world leaders in a number of fields. Standout progress includes investigating future crime scene technologies and developing an online drug intelligence solution for government agencies.**

### THE FUTURE CRIME SCENE

We're looking to the future with our Technologies for Efficient and Effective Forensics (TEEF) project, which is evaluating the potential of new crime scene technologies. A wide and increasing range of miniaturised, high-tech instruments allows rapid transfer of data, enhanced evidence detection, rapid crime scene recording and field analysis of substances.

Our research has identified three technologies that stand out as having potential for advancing our crime scene services: recording and showing the crime scene using new scanning technologies; transmitting information from the crime scene in real time; and using new devices for field testing at the crime scene.

Some of this technology could benefit the justice system in the future with both new crime scene techniques and visual tools to speed up and simplify court processes. We tried some of the new technologies at a recent homicide trial in Rotorua. Jurors were able to take a virtual walk-through of the crime scene using panoramic photography and virtual tour technology. Feedback from the Crown Solicitor on the homicide case was very enthusiastic.

The two-year TEEF project is funded from the Capability Fund. If the technologies are effective and useful to our clients we plan to work with New Zealand companies with 3D graphic and digital capabilities to further develop them.

### REDUCING THE CRIME RATE

We have invested in improvements to the DNA Profile Databank, one of the important national assets we maintain. With over 135,000 individuals in the Databank, it is a valuable intelligence tool with a 65 percent chance of linking a profile from a crime scene sample to a known individual.

Combined with our rapid DNA testing procedures, the Databank is helping police catch repeat offenders sooner and reduce the level of reported crime. A pilot project this year proved that by reducing DNA turnarounds from an average of 28 days to five days or less, police could stop repeat offenders before they could commit more crimes. The project is now being rolled out across the country.

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### CSI: NEW ZEALAND

Jo Bright has multiple roles at ESR. As well as being the deputy technical leader for the forensic biology group, she is the project manager for the team and is also a science leader, specialising in the area of DNA interpretation.

Jo's expertise in DNA interpretation is the subject of her PhD. "Applied science like this is very satisfying because you get results, matching profiles with the database with an almost instant outcome," says Jo.

"Until now, DNA interpretation has been very hands-on and can be quite a slow process. But things are changing. I've been working closely with my colleagues from our crime scene laboratories and business development on collaborations with companies in the US and UK who are developing 'DNA at the crime scene' technology.

"We're recognised as world leaders in DNA interpretation, largely through the work of Dr John Buckleton, which is why these companies have chosen to work with us to create the expert systems for their new hardware.

"DNA at the scene will involve taking a portable device, about the size of a suitcase, to the crime scene for profiling samples. By combining this cutting-edge technology with our expertise we'll have a completely automated sample-to-result solution in only a few hours. Resulting profiles will be compared with the New Zealand DNA database instantly, identifying people of interest to the Police. That's truly CSI: New Zealand stuff!"

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Jo Bright





**135,000**  
INDIVIDUALS ON  
DNA PROFILE  
DATABANK



**3,655**  
CORONIAL CASE  
SAMPLES



**7,953**  
SAMPLES TESTED  
FOR ALCOHOL



**35,000+**  
WORKPLACE DRUG  
TESTING SAMPLES



**65%**  
SUCCESS AT LINKING  
A PERSON TO A CRIME  
THROUGH DNA



**30%**  
SUCCESS AT  
LINKING A CRIME  
TO ANOTHER CRIME  
THROUGH DNA

### TURNING DATA INTO INTELLIGENCE

In partnership with New Zealand Customs we're investigating the potential for bringing together data about drug seizure and drug use from multiple sources. Many agencies collect raw data in isolation. We believe that when separate data sets are brought together they could become useful intelligence that agencies could use to plan their response to illicit drug importation, production, sale, movement and use.

The scoping phase of this project is assessing the quality and compatibility of the data sets held by Customs, ESR and other relevant government agencies. We can then determine whether existing data can be collected, collated and mapped geographically, and then used to produce timely intelligence information.

If the findings of the project are positive we plan to use the surveillance infrastructure (SurvINZ), which we use for public health surveillance, to design a small prototype system.

### SCIENCE CENTRE UPGRADE TO IMPROVE SERVICES

Construction has begun on the \$5 million upgrade of the Mount Albert Science Centre. As well as improving our service delivery to the Police it will also increase our research capabilities and support ongoing science excellence.

The new firearms testing facilities will give us space for a full range of testing and research required by the Police, including bloodstain pattern analysis, interpretation and research.

The Forensic Service Centre garage will be improved to include an enhanced forensic inspection area.

We are also continuing our significant investment in automation in the forensic DNA facility with the replacement of liquid handling robots.

Upgraded facilities and equipment will ensure we can maintain the efficient and high-quality service delivery needed by the Police. These investments will also support our goal, in partnership with the Police, of improved turnaround times, including a five-day service for volume crime samples.

Our forensic laboratories are accredited by ASCLD/LAB (the American Society of Crime Laboratory Directors/Laboratory Accreditation Board) and were subject to an extensive audit in December 2011.



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“Since the Department of Corrections introduced drug testing in 2008, the number of prisoners testing positive for illicit drugs has dropped from 28 percent to seven percent. However, our relationship with ESR is more than just the numbers. In addition to the services ESR provides us, we also work together to solve problems and build our own knowledge and skills.

*“Introducing a new initiative for drug testing, like hair analysis, can be challenging, but collaborating with ESR gave us comfort in the process. The team helped us build the necessary stakeholder understanding and support, in addition to advising on the implementation of robust systems.*

*“We are always looking for ways to educate Corrections staff about drug use and drug environments and we’ve recently brought ESR in to help with this too.”*

**John Munro**  
Assistant National Intelligence Manager  
Department of Corrections

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John Munro



# Food safety

## We help protect New Zealand's food-based economy by managing food safety risks at home and for export.

**New Zealand's economy depends on trade, especially the food trade. To protect that trade we must continue to meet and exceed food safety standards set by importers of New Zealand products. This depends on leading-edge science. Our major food safety client is the Ministry for Primary Industries, which relies on our internationally acclaimed science services to inform and help deliver its risk management framework.**

**We also help assure New Zealanders about the safety of the food they eat. We've continued to deliver the New Zealand Total Diet Study and invested heavily in both the biocontrol programme for foodborne pathogens for exported food, as well as developing new rapid identification and diagnostic techniques for these pathogens.**

### **TOTAL DIET STUDY TESTS SAFETY AND NUTRITION OF OUR FOOD**

The New Zealand Total Diet Study (NZTDS) is an important public health tool that allows regulatory bodies to make informed decisions about how to manage dietary risks to New Zealanders' health. The NZTDS has been done every five to six years for the Ministry for Primary Industries and its predecessors. It is a major undertaking and investment for ESR and the Ministry.

The last study started in 2009 and involved the collection, preparation and analysis of over 1.4 tonnes of food. This study was the seventh, so trends are becoming more significant and useful.

The NZTDS is unique from other chemical surveillance studies in that the foods are analysed in the same state they are eaten, by experts in the field of food science. This is the best way to assess the actual dose of chemicals we're exposed to in our diets, and therefore the risk. Levels of chemicals we find in the food we test are multiplied by average consumption of that food in the diet. This gives an idea of the total exposure of different age/gender groups of New Zealanders to over 240 harmful and beneficial substances including agricultural chemical residues, contaminants and nutrients.

Each study takes around three years from collection to report. The time between studies is used to carefully review the last study and plan the next. While the NZTDS approach is well established, we're continually working on innovations, including increasing our ability to more clearly define the range of a population's exposure to a chemical. This will also give regulators an even better understanding of the significance of trends in our diet.

The decision to apply mandatory fortification of most breads with iodine from iodised salt, as of September 2009, was initiated by the NZTDS, which revealed New Zealanders' declining iodine intake. The study has also triggered regulators to require the elimination of lead solder use in both locally produced and imported cans, as well as removal of lead additives from retail petrol.

As well as contributing to public health, assuring consumers and informing regulators, the study also helps protect New Zealand's overseas trade. Previous studies have revealed hazardous concentrations of contaminants in food for export that could then be traced back and the issue resolved.

The NZTDS can also identify parts of the country that may have higher than expected levels of chemicals in the soil, or deficiencies in soil nutrients. This means that remedies can be prioritised and targeted.

The Total Diet Study is recognised as a model for developing countries and our lead scientist in this area, Dr Richard Vannoort, has been contracted by the World Health Organization to lead numerous international training workshops around the world.

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### **AN INTERNATIONAL REPUTATION**

The leader of ESR's food programme, Dr Stephen On, is one of those lucky people who always knew what his life's work would be. He was determined to make science his life.

Stephen's career has taken him from Britain to Denmark and, since 2005, New Zealand. With over 120 published research papers and an impressive track record in health research fundraising he could have had his pick of jobs. He chose ESR, which has reaped the benefits of his international reputation, knowledge and contacts.

"I wanted to be part of a large and diversely skilled scientific team," he says. "Working with such extraordinarily talented, innovative and industrious scientists is an honour. The things that make ESR special for me include the collaborative spirit embedded in the organisation, the range of national and international stakeholders we work with, and our direct support for people's health and business.

"New Zealand's future is invested in the biological economy. My team protects both public health and the country's export markets."

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Stephen On with team members  
Dr Rob Lake and Wan-jing Lee



**1.4**

TONNES OF FOOD ANALYSED FOR TOTAL DIET STUDY



**NZ\$2b**

VALUE OF MEAT EXPORTS TO US PROTECTED BY STEC/VTEC TESTING



**205**

FOOD FORENSIC INVESTIGATIONS



**1,063**

RADIATION-FREE CERTIFICATES ISSUED FOR FOOD EXPORTS



**109**

FOODBORNE OUTBREAKS REPORTED



**>1m**

CASES OF FOODBORNE ILLNESS ESTIMATED

**INVESTMENT IN OUR BIOCONTROL PROGRAMME TO PROTECT EXPORTS**

Over the last three years, projects funded through co-investment by the Public Good Science Fund, industry and ESR have focused on ways to control Shiga toxin-producing *E. coli* (STEC) in New Zealand meat products. Work has centred on the use of bacteriophages (phages), which are natural killers of bacteria, to reduce concentrations of STEC of the serogroup O157 on the hides of animals and the meat derived from them. Studies carried out at our Christchurch site have shown significant reductions of STEC on the surface of both meat and hides.

We are working with industry to increase the number of STEC serotypes that can be controlled, optimise the production of phages and pave the way for a further, and larger, industrial trial. We are investigating the potential to turn phage preparations into a product for use by New Zealand industry.

**NEW RAPID IDENTIFICATION AND DIAGNOSIS FOR FOODBORNE PATHOGENS**

Our role in the meat export market is critical, assisting with the clearance of meat exported to the United States. To retain New Zealand's access to the multi-billion-dollar meat market in the United States, our meat has to be tested and cleared for a range of pathogens. The United States has now added six new STEC serogroups, the Super-6, to the one they have already classified as an adulterant to beef products – creating a Super-7 group of adulterants that can cause meat to be rejected and suspicion cast over the safety of the source for the future.

A team of molecular biologists from across ESR has developed a new type of testing system to efficiently identify the Super-7, and their key virulence traits, in one pass.

We have applied for a patent for the new test, which uses Multiplex

Ligation-dependent Probe Amplification (MLPA®). The test is being considered for use in the testing of New Zealand beef for export to the United States and is being compared against commercially available kits from major international biotechnology companies. The new test is also part of an application to the Australian Meat Processors Corporation, which is seeking a rapid method for the detection of STEC Super-7. We have been collaborating with MRC-Holland, the pioneers and patent holder for MLPA®, to achieve these goals.

We have also developed a MLPA® test for the rapid and cost effective subtyping of *Campylobacter*. We have again collaborated with MRC-Holland to create a format that is versatile enough to be attractive to both laboratories with extensive molecular biology capabilities as well as those with only basic equipment and experience. The test is in the validation stage and should be available in 2013.

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“Food safety is a non-negotiable for the meat industry for both international and domestic markets. As well as the health of New Zealanders through the local market, our annual eight billion dollar meat export industry depends on it.

“ESR provides a range of research services to the New Zealand meat industry. It also works collaboratively with other Crown research institutes and universities on new technologies to keep up with changing market requirements.

“The work ESR does is hard to quantify financially, but it is critical to our industry retaining its markets. Losing any trade because of food safety issues would have a massive impact on the country.”

**Richard McColl**  
Innovation programme manager  
Meat Industry Association

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**Richard McColl**

# Water and the environment

## We improve the safety of freshwater and groundwater resources for human use, as well as improving biowaste management.

**We support the many organisations in New Zealand that are responsible for environmental health. Our major clients in this outcome area are the Ministry of Health and the Ministry of Business, Innovation and Employment (MBIE). We deliver advice, analysis and research to inform their policies on a range of critical environmental health issues.**

**We also have an important role in making connections and coordinating research and information across the many agencies that participate in environment and health. We lead groundwater research in collaboration with other CRIs and universities, and help integrate freshwater research in partnership with Māori.**

**Examples of our recent work include innovative, locally owned solutions to waste; understanding the impact of untreated sewage discharge on water quality and sediments in the Avon River; and supporting Pacific Islands in improving drinking water quality and sanitation standards.**

### FINDING SOLUTIONS TO WASTE

We're working with others to bring together leading-edge biophysical science and social science approaches to help reduce and recycle the wastes we produce as a society.

The \$1.84 million Biowaste Programme involves a multidisciplinary team of our scientists working with the Cawthron Institute, Scion, Plant and Food Research, Landcare Research, Lincoln University, Te Rūnanga o Kaikōura, and Whenua.biz. The combined expertise in environmental microbiology and toxicology, soil science, molecular biology, social sciences, and kaupapa Māori will address the key Government strategy of sustainable waste management.

The programme is aiming to reduce the 3.2 million tonnes of waste sent to New Zealand landfills each year and find practical uses for carbon and nutrient-rich organic wastes (biowastes) that are acceptable to communities, regulators and producers.

Using biowastes, such as sewage sludge, rather than landfilling it, could help reduce our dependence on costly artificial fertilisers and bolster soil carbon reserves, especially in degraded environments. Landfilling biosolids results in methane production and environmentally toxic leachates. However, alternative solutions are not straightforward and have challenged regulatory agencies worldwide.

There are many parts to the programme, which has also spawned other projects to take a total approach to waste. Using case studies in Kaikōura and Taupō, and working with these communities, Māori, district and regional councils, the team is testing ways for communities to manage a range of wastes. Ultimately, our research will inform national policy, which will enable guidelines or standards for sustainable waste management throughout New Zealand.

In parallel with the Biowaste Programme is another innovative approach that involves a group of our programme collaborators partnering with a local school and the rūnanga in Kaikōura. The project is led by the Cawthron Institute and funded by the Ministry for the Environment's Waste Minimisation Fund. It goes back 'up the pipe' to involve community members in a research project to better understand and reduce the waste that goes down our drains. The information will help develop solutions the community can use to reduce its waste and improve its waste management.

We lead the social science component of this project and are also working with local high school students to raise awareness of the environmental risks associated with toxicants in commonly used household products. Success with the Up the Pipe project could mean we will be able to find funding to extend it to other parts of the country.

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### **SOCIAL SCIENCE MEETS BIOSCIENCE**

There is a problem with how we deal with our waste in New Zealand and Jacqui Horswell's team is working towards an answer that would solve another problem as well – what to do about our declining soil fertility.

Jacqui, who has a PhD in soil microbiology from the University of Aberdeen, leads the Ministry of Business, Innovation and Employment-funded Biowaste Programme. "There are around 30 people on the team," says Jacqui. "We have some amazing expertise working on this challenge.

"What is unique about this work is that we're using 'live' case studies from the real world, ensuring the science research is relevant and meaningful.

"This is removing the roadblocks to recycling biosolids to land, as we've seen in work with the community in Kaikōura. We're raising awareness about what is in their waste and involving them in the decision-making about what happens to their waste.

"We're also working with high school students in another research project. They're making their own cleaning products and learning about the impact of chemicals on themselves and the environment.

"I love seeing how science can change the way people think, including the scientists themselves! By involving people in solving big challenges and supporting them to take responsibility for their own wastes we're having a big impact."

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Jacqui Horswell





**2,328**

REGISTERED  
DRINKING WATER  
PRODUCERS IN NZ



**37,330**

VISITORS TO WATER  
INFORMATION  
WEBSITES



**5**

PROJECTS  
INVESTIGATING  
RESULTS OF  
CANTERBURY  
EARTHQUAKES



**38**

WELLS DRILLED  
TO RESEARCH  
GROUNDWATER



**932**

TESTS IDENTIFYING  
WATER  
CONTAMINATION  
SOURCES



**7,000**

WELLS IN NZ THAT  
SUPPLY DATA FOR  
ESR ANALYSIS

**AVON RIVER PROJECT CONTRIBUTES TO KNOWLEDGE**

Canterbury's earthquakes have contributed to world knowledge about the impact of untreated sewage discharge on water quality and sediments. Our Avon River Project set out to understand the relationship between the concentration of indicator bacteria, pathogen levels and the environmental fate of these in rivers, the coastal environment, and groundwater.

We prepared the Avon River Report for Environment Canterbury, which funded it along with Canterbury District Health Board, Christchurch City Council, the Ministry of Health and the Ministry for the Environment.

For the project we collected and analysed water and sediment samples and interpreted data about the impact of post-earthquake discharges of sewage on both the river water and sediment. As well as informing agencies' decisions about the Avon River, the report provides new scientific evidence of the relationships between indicator organisms, such as *E. coli*, and pathogens in the river water and sediment following the sustained discharge of untreated sewage into waterways.

While water quality can improve once discharge stops, our investigation looked at the potential accumulation of contaminants in the river sediment. These could remain long after the

water quality has improved, potentially exposing people to pathogens in the sediment when it is stirred back up into the water or dries and is blown by the wind.

The Avon River Project was just one of several projects we've done following the Canterbury earthquakes, another of which looked at the size and concentrations of airborne liquefaction silt. Projects such as these have provided valuable advice to decision-makers as the city rebuilds. They have also contributed to scientific knowledge that will have practical uses in the future.

**BUILDING RESILIENCE IN THE PACIFIC ISLANDS**

Over the last three years we've extended our work in the Pacific region with 11 more projects, worth over \$270,000 to ESR. Our work helps Pacific governments make progress in achieving the drinking water and sanitation United Nations Millennium Development Goal (MDG) and United Nations Human Rights obligations for access to safe drinking water and adequate sanitation.

During 2011/12 we provided drinking water quality management advice and training to government departments and commenced an enteric virus detection project. We also contributed to planning and implementing a regional consultation project funded by the French government to revise the three existing regional water and sanitation frameworks for action into a single forward-looking Pacific Framework for Water, Sanitation and Climate.

As well as contributing to local health and therefore the productivity of developing nations, safe drinking water is a necessity for viable and resilient tourism industries and the health of visitors. As well as helping New Zealand fulfil its responsibilities in the Pacific region, this work also provides a chance to monitor what is happening beyond New Zealand's border and prepare a response swiftly should challenges come onshore here.

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“The Kaikōura biowaste project is collaborative science in action. It’s a good example of bringing together the science of biosolids management; the right group of advisors and members of the community.

*“I’ve been impressed by the scientists’ ability to present very complex and often conflicting science to the community. This means the community can understand the various options and make an informed decision on its preference for how biosolids are managed locally.*

*“The community will present its preferred option to the district council, who will make the final decision knowing that the community’s opinion is soundly based.”*

**Chrissie Williams**  
Biosolids Project advisory group member and  
science advisor earthquake response  
Te Rūnanga o Ngāi Tahu

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**Chrissie Williams**

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# Human resources

The work we do is critical to New Zealand and could not be achieved without a talented and stable workforce. We are proud of our reputation as a good employer. It is this reputation, as well as worldwide recognition of the quality of our science, that attracts some of New Zealand's, and the world's, best science brains to work here.

## **WORKFORCE PROFILE**

Our workforce is balanced, diverse and stable. Women are well represented at all levels in our organisation. Eighty percent of our employees are engaged in science or science support roles; of this, 66 percent are women. Our age profile supports succession and workforce planning with 44 percent of our employees under the age of 41; seven percent are over 61. We have a stable workforce with turnover at 11.7 percent for the year ending 30 June 2012, down from the previous year.

## **LEADERSHIP, ACCOUNTABILITY AND CULTURE**

We are committed to being a good employer. As well as ensuring that all employees are treated properly and fairly, our leadership team believes strongly in involving employees in decision-making at every opportunity. For example, this year many were involved in the strategic planning process and employees are currently involved in working groups to design the new performance management system. A high percentage of employees attend the chief executive's regular updates.

Building a high-performance culture is one of our priorities. To achieve this we recognise the importance of demonstrating leadership and accountability in all areas of the employment relationship, including a commitment to equal employment opportunities (EEO).

## **RECRUITMENT, SELECTION AND INDUCTION**

We have a sound and inclusive approach to recruitment and selection. Our tools to support selection decision-making include behavioural and skills-based assessments through the interview process; psychometric assessment where appropriate; and detailed reference checking.

## **EMPLOYEE DEVELOPMENT, PROMOTION AND EXIT**

Our future success depends on growing our capabilities in a range of scientific areas. To help achieve this, our people attend international and national science conferences. We have strong relationships with universities – working on projects together and providing a career path for graduates.

We provide developmental support, including coaching and mentoring. Where possible, we try to promote from within and we actively seek opportunities for our people to experience new positions and roles.

Our approach to workforce planning and talent management emphasises diversity, as this is what will help us deliver our strategic direction. Building our overall leadership and management capability is another priority.

We are currently developing a new performance measurement and appraisal process that is both transparent and fair, and which recognises performance regardless of gender, ethnicity or age.

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### **FUTURE SCIENTIST**

Graduate student Eletra Williams is an Auckland University student working towards her PhD at ESR.

"I always knew I would work in science but I wanted it to have a real-world application and directly help people as well. My dad is in the Police so I've grown up interested in his work. Forensic science was my opportunity to combine those two interests. My goal is to be a research scientist in the field of forensics."

As well as completing her qualification, Eletra's research work is contributing to forensic knowledge. For the master's degree she completed in 2011, based at ESR's Mt Albert Science Centre, Eletra's project investigated whether time since death could be determined by the decay rate of DNA and RNA in fingernails. Her project was funded by the United States National Institute of Justice.

Eletra is now starting her PhD working at ESR. "It's a really great opportunity for forensic students to experience a working science facility and for us to be around people doing the work we want to do. Forensic work is pretty different from the impressions that people have from watching TV. It's not as glamorous, but just as exciting."

Eletra is supported by an Auckland University supervisor and one at ESR. There are 11 PhD students and 12 master's students working at ESR forensic laboratories around the country. Two of these are international students attracted by ESR's reputation for forensic science.

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Eletra Williams





**66%**  
OF STAFF ARE  
WOMEN



**11.7%**  
WORKFORCE  
TURNOVER



**80%**  
OF STAFF ENGAGED  
IN SCIENCE



**370**  
FTE STAFF ACROSS  
FOUR SITES



**<1**  
HEALTH AND SAFETY  
INCIDENTS PER  
100 FTES



**48**  
STAFF RECOGNISED  
WITH EXCELLENCE  
AWARDS

### FLEXIBILITY AND WORK DESIGN

We actively support flexible working arrangements with our flexible hours, extended flexitime and other flexible working arrangement policies, which are promoted in the Employee Handbook. These policies provide options for all employees so they can balance their work- and home-life.

We support parents returning to work by offering part-time and gradual return to full-time work arrangements. Nineteen percent of our employees work part-time.

### REMUNERATION, RECOGNITION AND CONDITIONS

Our terms and conditions of employment reflect our good employer philosophy. We offer a range of benefits valued by our employees. We have begun work on a new approach to remuneration and rewards to even more fairly and equitably reward people on the basis of performance, regardless of gender, age and ethnicity.

### HARASSMENT AND BULLYING PREVENTION

Our Acceptable Behaviour Policy, put in place in 2007, sets out the standards of behaviour expected of all our people. New employees are introduced to this policy and given training as part of their induction.

### HEALTH AND SAFETY

All our employees are given comprehensive training, guidelines, mentoring and supervision to ensure everyone's safety, health and wellbeing at work. We have a strong health and safety culture. Employees and the PSA (New Zealand Public Service Association) provide regular input through site health and safety committees.

We are proud to have kept our tertiary status in the ACC Work Safety Management programme, reflecting our commitment to a culture of continuous improvement.

*ESR provides information about compliance with our obligations to be a good employer, including our Equal Employment Opportunities Programme, and required in Section 118 of the Crown Entities Act (2004).*



# Non-financial performance measures

## SCIENCE AND RESEARCH

Peer-reviewed scientific publications and joint publications with other New Zealand and international research institutions	Total publications	67
	Joint publications	52
International awards for published papers, invitations to participate on international committees and editorial boards	International awards (Australia/NZ awards)	2
	International committees/editorial boards	24
Percentage of published papers in the top 25 relevant journals of international quality	Percent	26
Average citations per ESR published paper	Scopus without self-citation, years 2004 to 2011	6.14
Patents	Applications	1
Access to ESR's publicly available culture collection of medically important bacteria and fungi	Requests and enquiries	1,867

## CRI STAKEHOLDER EXPERIENCE SURVEY

The CRIs' shareholding ministers are interested in how the performance of a CRI changes over time, and in how a CRI can improve its performance. The CRI Taskforce recommended that each CRI be monitored against key performance indicators. Engagement with stakeholders is vital, as that is how we develop and deliver maximum value from our science research.

The Ministry of Business, Innovation and Employment commissioned Colmar Brunton to survey stakeholders on end-user collaboration; research collaboration; technology and knowledge transfer; and overall satisfaction.

We will use this information, as well as ongoing stakeholder engagement, as we put our new strategic research priorities in place.

General indicator	Survey indicator	Result %
End-user collaboration	Satisfied with the way ESR sets research priorities	67
	Have an effective relationship with ESR	85
Research collaboration	Confident that ESR has the ability to put together the most appropriate research teams	80
Technology and knowledge transfer	Have adopted knowledge or technology from ESR in the past 3 years	92
	Satisfied with their experience of accessing knowledge or technology from ESR	88
Overall satisfaction	Respondents who have interacted with ESR in the past years and are satisfied with the overall quality of their experience	87

## RESEARCH STAKEHOLDERS

A Strategic Science Advisory Panel (SSAP) of internationally respected academic experts was established to provide us with high-level strategic science advice. SSAP members are Dr Ian Elsum, Australian National University, (chair); Professor Bruce Weir, University of Washington; Professor John Mackenzie, Curtin University. The SSAP visited us twice, in November 2011 and April 2012. Following these visits, the Panel prepared two reports with recommendations and observations. An action plan has been developed to respond to the recommendations of the SSAP reports aligning with our strategic initiatives. This action plan will be implemented in FY13 and has six themes. These are:

- 
- capability
  - communication
  - research
  - science leadership
  - links to universities and key institutions
  - technology and infrastructure.

#### **STAKEHOLDER ENGAGEMENT**

Throughout the year, we continued to work with all our major customers as well as the end-users of our scientific services, both strategically and operationally. Examples of the many contacts we had with them included end-user strategy sessions to even better understand their longer-term issues and needs and how we can add value. In a changing public sector, we engaged strategically with the Ministry of Health and the Ministry for Primary Industries to strengthen relationships.

Every two years we survey all our clients to determine their satisfaction of our applied science services. These surveys are independently coordinated and audited by International Accreditation New Zealand (IANZ) and other accreditation bodies. We use the results of these surveys to improve our services.

#### **TECHNOLOGY TRANSFER AND INITIATIVES**

Our staff participated in **70 knowledge transfer seminars and training events** with sector stakeholder organisations involving about 1,400 people. One example was an ESR-hosted, specialist Controlled Drug Analogues Workshop, held 20–21 May at ESR's Mt Albert Science Centre site. This involved Professor Randall Clark (visiting ESR International Fellow) and Andrew Camilleri (Forensic Science South Australia) for a specialist audience including Police and Customs representatives.

**Progress was made on collaborations with private sector businesses** to commercialise our food sector technology. This includes a partnership with a European biotechnology manufacturer for rapid identification of the 'Super-7' group of bacterial contaminants to protect our NZ\$2 billion beef export trade to the United States. We continue to investigate international business opportunities with potential Asian and Middle East partners. Discussions continue with United States-based organisations to trial **new rapid DNA technologies** and collaborate to advance solutions for statistical DNA interpretation.

**A three-way agreement between the Ministry of Business, Innovation and Employment, ESR, and the United States National Institute of Justice (NIJ)** was signed in Washington DC in June 2012. The agreement provides better access for ESR and other New Zealand research organisations to NIJ forensic research funding and technology transfer. It also allows us, and others, to provide consultancy and training services to United States-based forensic organisations.

We signed a memorandum of agreement with the University of Canterbury in February 2012 to foster **research collaboration and scientific exchange**, for example radiological research and development after our acquisition of the National Radiation Laboratory.

A **technology audit** ensured our internal commercialisation processes align with current and future business growth initiatives.

#### **CORE FUNDING INVESTMENT**

Because of delays caused by the Christchurch earthquakes the contestable process was changed from a two-stage to a one-stage process. Projects were scored on science merit, strategic fit and commercial relevance.

The proportion of projects allocated to short-term (one to two years), medium-term (two to three years) and long-term funding (three to five years) was 30:40:30. We invested \$5.5 million in a total of 21 projects in our four outcome areas as outlined in our Statement of Core Purpose.

Examples of the importance of this funding to us include a project that provided the background research for a rapid diagnostic solution for foodborne pathogens that is now being commercialised to protect the NZ\$2 billion beef export trade to the United States; and a project that helped one of our researchers gain a Health Research Council (HRC) Emerging Researcher grant. Some of the forensic research projects have enabled us to partner with United States organisations in applications for National Institute of Justice funding.

#### EXAMPLES OF CORE FUNDING PROJECTS

##### OUTCOME 1: Safeguard the health of New Zealanders through improvements in the management of human biosecurity and threats to public health

Project	Description	Achievement
Development of a Special Pathogens Group	The development of new methodologies to rapidly identify new and emerging pathogens that affect human health so the health system can respond more effectively and efficiently	Supporting New Zealand's response to infectious disease outbreaks through establishing capability to identify novel, emerging, pathogens  The research is being applied to aid Massey University's investigation of diseases of unknown aetiology in freezing works staff
Public health informatics	Developed new, smart strategies and systems to share information	Improved public health surveillance for New Zealand from enhanced infectious disease reporting, primary care informatics and laboratory informatics  Better stakeholder engagement and service

##### OUTCOME 2: Increase the effectiveness of forensic science services applied to safety, security and justice investigations and processes

Project	Description	Achievement
Understanding and modelling blood spatter mechanisms	Test the limits of the 'cast-off' spatter patterns for added scene interpretation, test latest theories on ballistic back spatter, and explore the complex interactions between blood drops and textile fibres	Improved crime scene reconstruction for presenting evidence in New Zealand courtrooms through the development of new models to simulate blood spatter from blunt force trauma and ballistic injury
LCN expert system	Develop a software expert system, and submit papers for international peer review and acceptance, to assess the strength of low copy number (LCN) DNA evidence	Improvement in forensic case work turnaround times through faster interpretation of 'trace' DNA samples and improved ability to resolve complex mixtures

**OUTCOME 3: Enhance protection of New Zealand's food-based economy through the management of food safety risks associated with traded goods**

Project	Description	Achievement
Quantitative risk assessment	Develop quantitative risk modelling to quickly identify infection sources in food chains and assess the effectiveness of solutions	Enhanced surveillance and control of foodborne pathogens from the development of food chain modelling for norovirus and attribution of foodborne illness caused by <i>Yersinia</i>  Provision of robust risk assessment intelligence for regulatory purposes
Quorum quenching	Screen for quorum sensing agents to reduce <i>Campylobacter jejuni</i> pathogenicity	Potential to develop a new, novel bacterial control solution for <i>Campylobacter jejuni</i> using inhibitor compounds identified

**OUTCOME 4: Improve the safety of freshwater and groundwater resources for human use and the safer use of biowastes**

Project	Description	Achievement
Investigating risks in greywater use	Study greywater quality in New Zealand, the public health risk potential of microbial contaminants in soils, irrigation system impacts, how other communities balance risks and benefits	We are promoting safer use of greywater by providing technical information to regulators (e.g. councils) to incorporate into water management strategies
Complex microbial community analyses	Develop new microbiological analysis technologies to define complex microbial communities present in surface waters, groundwater, reticulated water and water treatment systems	Implemented second generation large scale sequencing strategy for concurrently determining identity of thousands of bacteria in a sample

## KEY FINANCIAL PERFORMANCE MEASURES

	Year ended 30 June 2012	Target	Year ended 30 June 2011
Revenue, \$m	58.6	62.9	54.1
Operating margin, %	13.0	16.1	15.9
Return (NPAT*) on equity, %	6.5	8.0	9.5
Return (EBIT**) on assets, %	4.6	8.4	6.8
Acid test, ratio	1.5	1.3	1.7
Equity ratio	65.2	77.0	64.0
Gearing	1.2	–	0.8
Interest cover	–	–	–
Annualised operating margin per FTE, \$'000s (including casual staff)	20.6	25.6	24.9

\* Net profit (surplus) after taxation

\*\* Earnings (surplus) before interest and taxation

## STATEMENT OF RESPONSIBILITY

We certify that ESR, the Company, has operated in accordance with the principles of the Crown Research Institutes Act 1992 and Companies Act 1993. The Company has also complied with all statutory environmental obligations.

We acknowledge responsibility for the preparation of these financial statements and for the judgements used therein.

Internal control procedures are considered to be sufficient to provide a reasonable assurance as to the integrity and reliability of the financial reports.

In our opinion these financial statements fairly reflect the financial position and operations of the Institute of Environmental Science and Research Limited (ESR) for the year ended 30 June 2012.



**Dr Susan Macken**  
Chair



**Ross Peat**  
Deputy Chair

# Report of the directors

The directors present the Annual Report and audited financial statements of the Institute of Environmental Science and Research (ESR) for the year ended 30 June 2012.

The Auditor-General is the statutory auditor pursuant to section 21 of the Crown Research Institutes Act 1992. The Auditor-General has appointed PricewaterhouseCoopers to audit the financial statements and to express an opinion on them. Their report is on page 36 and 37.

## PRINCIPAL ACTIVITY

ESR is a Crown research institute that provides specialist scientific services and research, particularly to the health and justice sectors. Its purpose is to deliver enhanced scientific and research services to the public health, food safety, security and justice systems and the environmental sector to improve the safety and contribute to the economic, environmental and social wellbeing of people and communities in New Zealand.

## DIVIDENDS

No dividends have been declared or paid in respect of the 2012 financial year.

## DIRECTORS' INDEMNITY

ESR has arranged for directors and officers insurance for any act or omission in their capacity as a director of the Company.

## DIRECTORS' USE OF INFORMATION

No member of the Board of ESR, or any subsidiary, issued a notice requesting to use information received in their capacity as directors that would not otherwise have been available to them.

## DONATIONS

No donations were made during the year.

## BOARD COMPOSITION

Elizabeth Hickey retired from the Board on 30 June 2012. Marian Cowden was appointed to the Board on 1 July 2012.

## REMUNERATION OF DIRECTORS

The directors who held office in the period of this report and their total remuneration and other benefits were as follows:

Dr Susan Macken	\$46,000
Ross Peat	\$28,750
Elizabeth Hickey	\$23,250
Tahu Leslie Potiki	\$23,000
Professor Bill Denny	\$23,000
Dr Judith Johnston	\$23,000
Patricia Schnauer	\$23,000
	<hr/>
	\$190,000

## DISCLOSURE OF INTERESTS BY DIRECTORS

As at 30 June 2012 the following directors had made the following general disclosures:

### Dr Susan Macken (chair)

Independent non-executive director, Bank of New Zealand

Director, Fertility Associates Limited

Managing director, STG Limited

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Director, Blossom Bear Limited  
Non-executive director, the New Zealand Treasury  
Director, Ultimate Care Group

**Ross Peat (deputy chair)**

Director, HealthSoft Limited  
Director, HealthSoft Australia Limited  
Director, Kinopta Limited  
Director, YuVu Limited  
Director, KlickEx Trading Limited  
Director, KlickEx Pacific Limited  
Director, KlickEx Corporation Limited  
Member, University of Otago Business School Advisory Board  
Trustee, Hi Tech Trust

**Dr Judith Johnston**

Director, Petone Medical Centre Limited  
Shareholder, Judith Johnston Limited  
Clients of Judith Johnston Limited  
Ministry of Education  
Maritime New Zealand  
State Services Commission  
IRD Risk and Assurance Committee  
Parliamentary Counsel Office Risk and Audit Committee  
New Zealand Qualifications Authority  
IPANZ Gen-i chief judge, Public Sector Excellence Awards  
Department of Internal Affairs  
Ministry of Transport  
Commissioner, Tertiary Education Commission

**Elizabeth Hickey**

Director, Southern Cross Medical Care Society  
Trustee, Southern Cross Health Trust  
Vice president, New Zealand Institute of Chartered Accountants  
Co-opted member of Audit and Risk Committee, ASB Community Trust  
Director, Diabetes New Zealand Incorporated

**Tahu Leslie Potiki**

Board member, Southern District Health Board  
Councillor, New Zealand Council for Educational Research  
Director, Māori Television Service  
Elected representative, Te Rūnanga o Ngāi Tahu  
Trustee, Ngāi Tahu Charitable Trust  
Board member, Relationships Aotearoa  
Director, Arataki Associates Limited

**Patricia Schnauer**

Trustee, The North Shore Domain and North Harbour Stadium Trust Board  
Director, Millife Trustee Limited

**Professor William (Bill) Denny**

Director, Auckland Cancer Society Research Centre, University of Auckland  
Head, Scientific Advisory Committee, Australian Cancer Research Foundation Drug Discovery Centre, Sydney  
Member, Scientific Advisory Group, Australian Cooperative Research Centre for Cancer Therapeutics, Melbourne  
Member, Ministry of Health/Health Research Council Steering Committee for Cancer Research Partnership  
Member, Management Group, Maurice Wilkins Centre for Molecular Bioscience, University of Auckland  
Member, senior management team, Cancer Society Auckland  
Shareholder, Proacta Incorporated, San Diego  
Shareholder, Pathway Therapeutics Ltd, San Francisco

**DIRECTORS' INTERESTS**

No director held any interest in the shares of the Institute. The Institute has funding contracts with the Marsden Fund and the Ministry of Science and Innovation, which are negotiated at arm's length with appropriate directors' interests being declared. Except for these contracts no material contracts involving directors' interests were entered into during, or subsequent to, the period covered by this report.

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## EMPLOYEE REMUNERATION

Total remuneration in respect of employees paid above \$100,000 was as follows:

Remuneration range	No. of staff
\$100,000 – \$109,999	14
\$110,000 – \$119,999	9
\$120,000 – \$129,999	2
\$130,000 – \$139,999	6
\$140,000 – \$149,999	2
\$150,000 – \$159,999	2
\$170,000 – \$179,999	1
\$180,000 – \$189,999	1
\$240,000 – \$249,999	1
\$270,000 – \$279,999	1
\$280,000 – \$289,999	1
\$310,000 – \$319,999	1

## EVENTS SUBSEQUENT TO BALANCE DATE

The directors are not aware of any matter or circumstance since the end of the financial year that has significantly affected, or may significantly affect, the operation of the Institute.



**Dr Susan Macken**  
Chair



**Ross Peat**  
Deputy Chair



# Independent auditor's report

To the readers of the Institute of Environmental Science and Research Limited's financial statements for the year ended 30 June 2012

The Auditor-General is the auditor of the Institute of Environmental Science and Research Limited (the 'Institute') and the Group, comprising the Institute and its dormant subsidiaries. The Auditor-General has appointed me, Chris Barber, using the staff and resources of PricewaterhouseCoopers, to carry out an audit of the financial statements of the Institute and Group on her behalf.

We have audited the financial statements of the Institute and Group on pages 38 to 64, that comprise the statement of financial position as at 30 June 2012, the statement of comprehensive income, statement of changes in equity and statement of cash flows for the year ended on that date; and a summary of significant accounting policies and other explanatory information.

## **OPINION ON THE FINANCIAL STATEMENTS**

In our opinion, the financial statements of the Institute and Group on pages 38 to 64:

- comply with generally accepted accounting practice in New Zealand;
- comply with International Financial Reporting Standards; and
- give a true and fair view of the Institute and Group's:
  - financial position as at 30 June 2012; and
  - financial performance and cash flows for the year ended on that date.

## **OPINION ON OTHER LEGAL REQUIREMENTS**

In accordance with the Financial Reporting Act 1993 we report that, in our opinion, proper accounting records have been kept by the Institute and Group as far as appears from an examination of those records.

Our audit was completed on 30 August 2012, and is the date at which our opinion is expressed.

The basis of our opinion is explained below. In addition, we outline the responsibilities of the Board of Directors and our responsibilities, and we explain our independence.

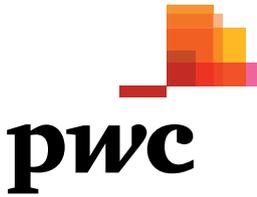
## **BASIS OF OPINION**

We carried out our audit in accordance with the Auditor-General's Auditing Standards, which incorporate the International Standards on Auditing (New Zealand). Those standards require that we comply with ethical requirements and plan and carry out our audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

Material misstatements are differences or omissions of amounts and disclosures that would affect a reader's overall understanding of the financial statements. If we had found material misstatements that were not corrected, we would have referred to them in our opinion.

An audit involves carrying out procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on our judgement, including our assessment of risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments we consider internal control relevant to the entity's preparation of the financial statements that give a true and fair view of the matters to which they

.....  
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relate. We consider internal control in order to design audit procedures that are appropriate in the circumstances but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control.

An audit also involves evaluating:

- the appropriateness of accounting policies used and whether they have been consistently applied;
- the reasonableness of the significant accounting estimates and judgements made by the Board of Directors;
- the adequacy of all disclosures in the financial statements; and
- the overall presentation of the financial statements.

We did not examine every transaction, nor do we guarantee complete accuracy of the financial statements. In accordance with the Financial Reporting Act 1993 we report that we have obtained all the information and explanations we have required. We believe we have obtained sufficient and appropriate audit evidence to provide a basis for our audit opinion.

#### **RESPONSIBILITIES OF THE BOARD OF DIRECTORS**

The Board of Directors is responsible for preparing financial statements that:

- comply with generally accepted accounting practice in New Zealand; and
- give a true and fair view of the Institute and Group's financial position, financial performance and cash flows.

The Board of Directors is also responsible for such internal control as it determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

The Board of Directors' responsibilities arise from the Financial Reporting Act 1993 and the Crown Research Institutes Act 1992.

#### **RESPONSIBILITIES OF THE AUDITOR**

We are responsible for expressing an independent opinion on the financial statements and reporting that opinion to you based on our audit. Our responsibility arises from section 15 of the Public Audit Act 2001 and the Crown Research Institutes Act 1992.

#### **INDEPENDENCE**

When carrying out the audit, we followed the independence requirements of the Auditor-General, which incorporate the independence requirements of the New Zealand Institute of Chartered Accountants.

In addition to the audit, we have carried out assignments in the areas of taxation compliance and advice, accounting advice and other advisory services, which are compatible with those independence requirements. Other than the audit and these assignments, we have no relationship with, or interests in, the Institute or any of its subsidiaries.

A handwritten signature in black ink that reads 'Chris Barber'.

Chris Barber on behalf of the Auditor-General Wellington, New Zealand

The PricewaterhouseCoopers logo, featuring the company name in a stylized, handwritten-style font.

PricewaterhouseCoopers

#### **Matters relating to the electronic presentation of the audited financial statements**

*This audit report relates to the financial statements of the Company for the year ended 30 June 2012 included on the Company's website. The Company's Board of Directors is responsible for the maintenance and integrity of the Company's website. We have not been engaged to report on the integrity of the Company's website. We accept no responsibility for any changes that may have occurred to the financial statements since they were initially presented on the website.*

*The audit report refers only to the financial statements named above. It does not provide an opinion on any other information which may have been hyperlinked to or from the financial statements. If readers of this report are concerned with the inherent risks arising from electronic data communication they should refer to the published hard copy of the audited financial statements and the related audit report dated 30 August 2012 to confirm the information included in the audited financial statements presented on this website. Legislation in New Zealand governing the preparation and dissemination of financial information may differ from legislation in other jurisdictions.*

# Statement of comprehensive income

FOR THE YEAR ENDED 30 JUNE 2012

	Note	Group actual year ended 30 June 2012 audited \$'000s	Group budget year ended 30 June 2012 unaudited \$'000s	Group actual year ended 30 June 2011 audited \$'000s
<b>OPERATING REVENUE</b>				
Revenue from rendering of services		53,016	56,913	48,232
Core funding		5,534	6,000	5,835
		<b>58,550</b>	<b>62,913</b>	<b>54,067</b>
<b>OPERATING EXPENSES</b>				
Scientific materials and subcontracting expenses		(11,411)	(12,342)	(10,005)
Employee benefit expense		(28,104)	(30,536)	(26,587)
Depreciation and amortisation expense	4/5	(4,993)	(5,737)	(4,539)
Other expenses	2	(11,429)	(10,335)	(9,319)
		<b>(55,937)</b>	<b>(58,950)</b>	<b>(50,450)</b>
<b>OPERATING PROFIT</b>				
		<b>2,613</b>	<b>3,963</b>	<b>3,617</b>
Finance income – interest income		271	116	339
Finance expense – finance lease interest		(11)	(25)	(28)
<b>NET FINANCE INCOME / (EXPENSE)</b>		<b>260</b>	<b>91</b>	<b>311</b>
<b>PROFIT BEFORE INCOME TAX EXPENSE</b>				
		<b>2,873</b>	<b>4,054</b>	<b>3,928</b>
Income tax expense	3	(1,077)	(1,135)	(1,285)
Income tax expense due to change in tax legislation	3	580	–	579
<b>PROFIT FOR THE PERIOD ATTRIBUTABLE TO THE INSTITUTE'S SHAREHOLDER</b>				
		<b>2,376</b>	<b>2,919</b>	<b>3,222</b>
Other comprehensive income		–	–	–
<b>TOTAL COMPREHENSIVE INCOME FOR THE PERIOD ATTRIBUTABLE TO THE INSTITUTE'S SHAREHOLDER</b>				
		<b>2,376</b>	<b>2,919</b>	<b>3,222</b>

The accompanying notes form an integral part of these financial statements.

# Statement of changes in equity

FOR THE YEAR ENDED 30 JUNE 2012

	Group actual audited share capital \$'000s	Group actual audited retained earnings \$'000s	Group actual audited total \$'000s
<b>BALANCE AT 1 JULY 2010</b>	<b>8,494</b>	<b>23,764</b>	<b>32,258</b>
Profit for the period	–	3,222	3,222
Other comprehensive income	–	–	–
<b>TOTAL COMPREHENSIVE INCOME</b>	<b>–</b>	<b>3,222</b>	<b>3,222</b>
<b>TRANSACTIONS WITH OWNERS:</b>			
Dividend	–	–	–
<b>BALANCE AT 30 JUNE 2011</b>	<b>8,494</b>	<b>26,986</b>	<b>35,480</b>
Profit for the period	–	2,376	2,376
Other comprehensive income	–	–	–
<b>TOTAL COMPREHENSIVE INCOME</b>	<b>–</b>	<b>2,376</b>	<b>2,376</b>
<b>TRANSACTIONS WITH OWNERS:</b>			
Dividend	–	–	–
<b>BALANCE AT 30 JUNE 2012</b>	<b>8,494</b>	<b>29,362</b>	<b>37,856</b>

The accompanying notes form an integral part of these financial statements.

# Statement of financial position

AS AT 30 JUNE 2012

	Note	Group actual 30 June 2012 audited \$'000s	Group budget 30 June 2012 unaudited \$'000s	Group actual 30 June 2011 audited \$'000s
<b>NON-CURRENT ASSETS</b>				
Property, plant and equipment	4	31,070	37,560	30,207
Intangible assets	5/6	6,500	3,702	4,375
		<b>37,570</b>	<b>41,262</b>	<b>34,582</b>
<b>CURRENT ASSETS</b>				
Cash and cash equivalents	8	7,232	2,280	7,501
Trade and other receivables	9	12,956	4,730	10,381
Derivative financial instruments	10	84	–	–
Inventories – scientific materials and consumables		1,238	944	1,001
		<b>21,510</b>	<b>7,954</b>	<b>18,883</b>
<b>CURRENT LIABILITIES</b>				
Trade and other payables	11	13,347	4,099	10,758
Employee benefits	12	2,739	1,805	2,343
Finance lease liabilities	13	217	–	164
Income tax payable / (receivable)	14	325	117	(249)
		<b>16,628</b>	<b>6,021</b>	<b>13,016</b>
<b>Net current assets / (liabilities)</b>		<b>4,882</b>	<b>1,933</b>	<b>5,867</b>
<b>NON-CURRENT LIABILITIES</b>				
Employee benefits	12	1,098	–	800
Finance lease liabilities	13	243	–	129
Deferred taxation	7	3,255	5,335	4,040
		<b>4,596</b>	<b>5,335</b>	<b>4,969</b>
<b>NET ASSETS</b>		<b>37,856</b>	<b>37,860</b>	<b>35,480</b>
<b>EQUITY</b>				
Share capital	16	8,494	8,494	8,494
Retained earnings		29,362	29,366	26,986
<b>TOTAL EQUITY</b>		<b>37,856</b>	<b>37,860</b>	<b>35,480</b>

The Board of Directors of the Institute of Environmental Science and Research Limited authorised these financial statements for issue on 30 August 2012.

On behalf of the Board:



**Dr Susan Macken**  
Chair



**Ross Peat**  
Deputy Chair

*The accompanying notes form an integral part of these financial statements.*

# Statement of cash flows

FOR THE YEAR ENDED 30 JUNE 2012

Note	Group actual year ended 30 June 2012 audited \$'000s	Group budget year ended 30 June 2012 unaudited \$'000s	Group actual year ended 30 June 2011 audited \$'000s
<b>CASH FLOWS FROM / (USED IN) OPERATING ACTIVITIES</b>			
<i>Cash was provided from:</i>			
Customers	57,599	60,002	54,514
Interest received	280	116	312
	<b>57,879</b>	<b>60,118</b>	<b>54,826</b>
<i>Cash was applied to:</i>			
Suppliers and employees	(49,453)	(51,231)	(46,053)
Interest paid	(11)	(25)	(28)
Income tax paid	(708)	(1,135)	(1,485)
14	(50,172)	(52,391)	(47,566)
<b>NET CASH INFLOW FROM OPERATING ACTIVITIES</b>	<b>7,707</b>	<b>7,727</b>	<b>7,260</b>
<b>CASH FLOWS FROM / (USED IN) INVESTING ACTIVITIES</b>			
<i>Cash was provided from:</i>			
Proceeds from sale of property, plant and equipment	19	–	–
	19	–	–
<i>Cash was applied to:</i>			
Purchase of property, plant and equipment	(4,118)	(8,953)	(3,505)
Purchase of intangible assets	(1,701)	–	(2,989)
Acquisition of business	(2,000)	(1,300)	–
	(7,819)	(10,253)	(6,494)
<b>NET CASH OUTFLOW FROM INVESTING ACTIVITIES</b>	<b>(7,800)</b>	<b>(10,253)</b>	<b>(6,494)</b>
<b>CASH FLOWS FROM / (USED IN) FINANCING ACTIVITIES</b>			
<i>Cash was provided from / (applied to):</i>			
Dividends paid	–	–	–
Repayment of finance lease liabilities	(176)	–	(203)
<b>NET CASH (OUTFLOW) / INFLOW FROM FINANCING ACTIVITIES</b>	<b>(176)</b>	<b>–</b>	<b>(203)</b>
<b>NET (DECREASE) / INCREASE IN CASH HELD</b>	<b>(269)</b>	<b>(2,526)</b>	<b>563</b>
Cash and cash equivalents at the beginning of the period	7,501	4,806	6,938
<b>CASH AND CASH EQUIVALENTS AT THE END OF THE PERIOD</b>	<b>7,232</b>	<b>2,280</b>	<b>7,501</b>

The accompanying notes form an integral part of these financial statements.

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# Notes to the financial statements

## 1. STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES

### Reporting entity

These financial statements of the Institute of Environmental Science and Research Limited and its subsidiaries ('ESR' and the 'Group') are for the year ended 30 June 2012.

ESR is a Crown entity incorporated and based in New Zealand. Its registered office is 34 Kenepuru Drive, Porirua.

ESR is a Crown research institute that provides specialist scientific services and research, particularly to the health and justice sectors. Its purpose is to deliver enhanced scientific and research services to the public health, food safety, security and justice systems, and the environmental sector to improve the safety and contribute to the economic, environmental and social wellbeing of people and communities in New Zealand.

These financial statements have been approved for issue by the ESR Board on 30 August 2012.

### Basis of preparation

The financial statements are Parent (ESR) and Group financial statements. The two subsidiaries of ESR are dormant non-trading entities; consequently there is no difference between the financial statements of the Group and those of the Parent.

The financial statements have been prepared in accordance with the requirements of the Crown Entities Act 2004, the Crown Research Institutes Act 1992, the Companies Act 1993 and the Financial Reporting Act 1993.

The financial statements are prepared on the basis of historical cost, except for financial instruments as identified in the specific accounting policies and accompanying notes.

The financial statements are presented in New Zealand dollars and all values are rounded to the nearest thousand dollars (\$'000).

### Changes in accounting policies

Accounting policies have been applied on a basis consistent with the prior year.

Where necessary, comparative figures have been reclassified for consistency with current year disclosures.

### Statement of compliance

These financial statements have been prepared in accordance with New Zealand Generally Accepted Accounting Practice (NZ GAAP). They comply with New Zealand equivalents to the International Financial Reporting Standards (NZ IFRS) and other applicable financial reporting standards, as appropriate for profit-oriented entities. These consolidated financial statements comply with International Financial Reporting Standards (IFRS).

### Adoption status of relevant new financial reporting standards and interpretations

The Group has adopted FRS 44 'New Zealand Additional Disclosures' effective from 1 July 2011. This sets out New Zealand specific disclosures for entities that apply NZ IFRSs. These disclosures have been relocated from NZ IFRSs to clarify that these disclosures are additional to those required by IFRS.

The Group has elected not to early adopt any of the new standards and amendments to existing standards which have been issued as at 30 June 2012 but not yet effective. A review of these standards has been completed. The changes to these standards will not significantly impact the financial statements of the Group.

### Accounting estimates and judgements

The preparation of financial statements in conformity with NZ IFRS requires judgements, estimates and assumptions that affect the application of policies and reported amounts of assets and liabilities, income and expenses. The estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under the circumstances. Actual results may differ from these estimates.

Management judgements that have the most significant effect on amounts recognised in the financial statements are found in Revenue, Employee Benefits, and Taxation.

### Revenue

The Group uses the stage of completion method in accounting for its fixed price contracts to deliver scientific services. The use of stage of completion method requires the Group to estimate the services performed to date as a proportion of the total services to be performed. Stage of completion is calculated and reviewed monthly, and significant variances are investigated to ensure that the

stage of completion estimate is reasonable in line with the overall project plan, estimated completion date and prior measurements of progress.

### **Taxation**

In May 2010 the Government announced a change to the depreciable nature of buildings. Up until the 2011 income tax year, depreciation on buildings up to two percent per annum was eligible as a tax deduction. Post 2011, buildings cease to attract tax depreciation. In recognition of the fact that some entities had not fully split fit-out related assets from building assets, the IRD agreed that an entity on a building-by-building basis could claim either of the following as a future tax deduction:

1. Two percent of 15 percent of the net book value (NBV) of the building commencing from the 2012 income tax year; OR
2. If the entity can split the fit-out element from the building and provide support for the appropriateness of the split, they could claim depreciation at the relevant tax rates upon these assets.

ESR has completed an exercise to identify and separate the fit-out components of buildings from the building structure. ESR has recognised a total adjustment to deferred tax of \$1,159,000, of which \$580,000 was recognised in the current year and \$579,000 recognised in the prior period (based upon the first option of 15 percent of NBV of buildings).

### **Principles of consolidation**

#### **Subsidiaries**

The consolidated financial statements incorporate the assets and liabilities of all subsidiaries of ESR as at 30 June 2012 and the results of the operations of all subsidiaries for the year then ended.

Subsidiaries are those entities controlled, directly or indirectly, by the Parent. Subsidiaries are consolidated from the date on which control is transferred to ESR. They are de-consolidated from the date that control ceases.

The acquisition method of accounting is used to account for the acquisition of businesses by the Group. The cost of an acquisition is measured as the fair value of the assets given, equity instruments issued and liabilities incurred or assumed at the date of exchange. Identifiable assets acquired and

liabilities and contingent liabilities assumed in a business combination are measured initially at their fair values at the acquisition date, irrespective of the extent of any non-controlling interest. The excess of the cost over the fair value of the Group's share of the identifiable net assets acquired is recorded as goodwill. If the cost of acquisition is less than the Group's share of the fair value of the identifiable net assets of the subsidiary acquired, the difference is recognised directly in the statement of comprehensive income.

Intercompany transactions, balances and unrealised gains on transactions between subsidiary companies are eliminated. Unrealised losses are also eliminated unless the transaction provides evidence of the impairment of the asset transferred. Accounting policies of subsidiaries are consistent with those policies adopted by the Group.

### **Property, plant and equipment**

Items of property, plant and equipment are initially recorded at cost, and subsequently at cost less accumulated depreciation and impairment. The cost of property, plant and equipment includes the value of consideration given to acquire the assets and the value of other directly attributable costs that have been incurred in bringing the assets to the location and condition necessary for their intended use.

The carrying amounts of plant, property and equipment are reviewed at least annually to determine if there is any indication of impairment. Where an asset's recoverable amount is less than its carrying amount, it will be reported at its recoverable amount and an impairment loss will be recognised. Losses resulting from impairment are reported in the statement of comprehensive income.

Realised gains and losses arising from the disposal of property, plant and equipment are recognised in the statement of comprehensive income in the periods in which the transactions occur.

Depreciation is charged on a straight-line basis at rates calculated to allocate the cost of an item of property, plant and equipment, less any estimated residual value, over its estimated useful life, as follows:

<b>Type of asset</b>	<b>Estimated useful life</b>
Land	Not depreciated
Freehold buildings	20 – 50 years
Leasehold improvements	10 years
Plant, equipment and vehicles	3 – 10 years
IT equipment and internal software	3 years

## **Intangible assets**

### **Computer software**

Items of computer software that do not comprise an integral part of the related hardware are treated as intangible assets with finite lives. Intangible assets with finite lives are recorded at cost, and subsequently recorded at cost less any accumulated amortisation and impairment losses. Amortisation is charged to the statement of comprehensive income on a straight-line basis over the useful life of the asset (between three and seven years).

### **Customer contracts**

The intangible asset 'customer contracts' represents the excess paid over net assets acquired under business combinations. Initial recognition of the intangible asset is stated at fair value. Subsequent to initial recognition, acquired intangible assets are stated at initially recognised amounts less accumulated amortisation and any impairment. Amortisation of acquired intangible assets is made according to the straight-line method over their estimated useful life, not exceeding 10 years.

### **Research and development costs – internally generated intangible assets**

Expenditure on research is expensed when it is incurred.

Development expenditure incurred on an individual project is capitalised if the process is technically and commercially feasible, future economic benefits are probable, and ESR intends to and has sufficient resources to complete the development and to use or sell the asset.

Any expenditure capitalised is amortised over the period of expected future sales from the related project from the point the asset is ready for use.

### **Impairment of non-financial assets**

Assets that are subject to amortisation are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs to sell and value in use. For the purposes of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash flows (cash-generating units).

## **Taxation**

The income tax expense for the period is the tax payable on the current period's taxable income based on the national income tax rate for each jurisdiction. This is then adjusted by changes in deferred tax assets and liabilities attributable to temporary differences between the tax bases of assets and liabilities and their carrying amounts in the financial statements, and unused tax losses.

Deferred tax assets and liabilities are recognised for temporary differences at the tax rates expected to apply when the assets are recovered or liabilities settle. The relevant tax rates are applied to the cumulative amount of deductible and taxable temporary differences to measure the deferred tax asset or liability. An exception is made for certain temporary differences arising from the initial recognition of an asset or a liability. No deferred tax asset or liability is recognised in relation to temporary differences if they arose in a transaction, other than a business combination, and at the time of the transaction did not affect either accounting profit, or taxable profit or loss.

Deferred tax assets are recognised for deductible temporary differences and unused tax losses only if it is probable that future taxable amounts will be available to utilise those temporary differences and losses.

Deferred income tax assets are recognised to the extent that it is probable that future taxable profit will be available against which the temporary differences can be utilised.

## **Cash and cash equivalents**

Cash means cash on hand, demand deposits and other highly liquid investments in which ESR has invested as part of its day-to-day cash management. The following definitions are used in the statement of cash flows:

- Investing activities are those activities relating to the acquisition, holding and disposal of fixed assets and investments.
- Financing activities are those activities that result in changes in the size and composition of the capital structure of ESR, and this includes both equity and debt not falling within the definition of cash. Dividends paid in relation to the capital structure are included in financing activities.

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- Operating activities are the principal revenue-producing activities and other activities that are not investing or financing activities.

#### **Trade and other receivables**

Trade receivables are stated at their estimated realisable value after providing against debts where collection is doubtful. An estimate of the value of doubtful debts is made based on a review of debts at year end. Bad debts are written off in the period in which they are identified.

#### **Inventories**

Stocks of consumables and work in progress are stated at the lower of cost and net realisable value. Cost is determined on a first in, first out basis.

#### **Trade and other payables**

These amounts represent the best estimate of the expenditure required to settle an obligation arising from goods or services provided to ESR prior to period end. These amounts are unsecured and are usually paid within 30 days of recognition. Liabilities and provisions to be settled beyond 12 months are recorded at their present value.

#### **Employee benefits**

##### ***Wages, salaries and annual leave***

Liabilities for wages and salaries, including annual leave that is expected to be settled within 12 months of the reporting date, are recognised in respect of employees' services up to the reporting date and are measured at the amounts expected to be paid when the liabilities are settled.

Obligations for contributions to defined contribution retirement plans are recognised in the statement of comprehensive income as they fall due.

##### ***Long service leave, retirement leave and development leave***

The liability for long service leave, retirement leave and development leave is recognised as an employee benefit liability and measured as the present value of expected future payments to be made in respect of services provided by employees up to the reporting date. Consideration is given to the expected future salary levels, experience of employee departures and periods of service. Expected future payments are discounted using market yields at the reporting date for Government bonds with terms to maturity and currency

that match, as closely as possible, the estimated future cash outflows.

#### **Leases**

Finance leases transfer to ESR, as lessee, substantially all the risks and rewards incidental to ownership of a leased asset. Initial recognition of a finance lease results in an asset and liability being recognised at amounts equal to the lower of the fair value of the leased asset or the present value of the minimum lease payments. Each lease payment is allocated between the liability and finance charges so as to achieve a constant rate of finance charge over the term of the lease. Property, plant and equipment acquired under a finance lease are depreciated over the shorter of the assets' useful lives and lease terms.

Leases in which a significant portion of the risks and rewards of ownership are retained by the lessor are classified as operating leases. Payments made under operating leases (net of any incentives received from the lessor) are charged to the statement of comprehensive income on a straight-line basis over the period of the lease.

#### **Borrowings**

Borrowings are initially recognised at fair value, net of costs incurred. Borrowings are subsequently measured at amortised cost. Any differences between the proceeds (net of transaction costs) and the redemption amount is recognised in the statement of comprehensive income over the period of the borrowing using the effective interest method.

Borrowings are classified as current liabilities unless ESR has an unconditional right to defer settlement of the liability for at least 12 months after the balance date.

#### **Share capital**

Ordinary shares are classified as equity. Incremental costs directly attributable to the issue of new shares or options are shown as appropriate in equity as a deduction, net of tax, from the proceeds.

#### **Revenue**

##### ***Sales of goods and services***

Revenue is earned by ESR in exchange for the provision of outputs (services) to third parties.

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Revenue from the supply of services is measured at the fair value of consideration received. Revenue from the supply of services is recognised in the accounting period in which the services are rendered, by reference to the stage of completion of the specific transaction assessed on the basis of the actual service provided as a proportion of the total services to be provided. Any revenue for which services have not been supplied as at the reporting date but for which payment has been received is deferred within the statement of financial position as revenue in advance.

#### **Core funding**

ESR receives core funding from the Government in order to perform scientific research activities. Core funding (Government grants) are recognised in the statement of comprehensive income when the requirements under the grant agreement have been met. Any grants for which the requirements have not been completed are carried as liabilities until all conditions have been fulfilled.

#### **Interest income**

Interest income is recognised in the statement of comprehensive income on a time proportion basis, using the effective interest rate method.

#### **Vaccine revenue**

ESR purchases vaccines on behalf of the Ministry of Health (MoH). MoH maintains the risks and rewards related to the inventory and as such no inventory is recognised within ESR's statement of financial position. ESR receives and recognises commission revenue only in relation to the services performed.

#### **Foreign currency**

Items included in the financial statements of each of the Group's entities are measured using the currency of the primary economic environment in which the entity operates. The Group financial statements are presented in New Zealand dollars, which is ESR's functional and presentation currency.

Foreign currencies transactions are recorded at the foreign exchange rates in effect at the dates of the transactions. Monetary assets and monetary liabilities denominated in foreign currencies are translated at the rates of exchange ruling at the end of each reporting period. Non-monetary assets and non-monetary liabilities denominated in foreign currencies that are measured at fair value are translated to

the functional currency at the exchange rate at the date that the fair value was determined.

#### **Goods and Services Tax**

Items in the statement of comprehensive income and statement of cash flows are disclosed net of Goods and Services Tax (GST). All items in the statement of financial position are stated net of GST with the exception of receivables and payables, which include GST invoiced.

#### **Dividends**

A provision is made for the amount of any dividend declared on or before the end of the financial year but not distributed at balance date.

#### **Financial instruments**

The designation of financial assets and financial liabilities by ESR into instrument categories is determined by the business purposes of the financial instruments, policies and practices of management, the relationship with other instruments, and the reporting costs and benefits associated with each designation. The designations applied by ESR are reflected in the financial statements.

#### **Financial assets**

The Group classifies its financial assets as loans and receivables. Management determines the classification of its financial assets at initial recognition.

Loans and receivables are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market. They are included in current assets, except for maturities greater than 12 months after the reporting date. These are classified as non-current assets. ESR's loans and receivables comprise 'trade and other receivables' and 'cash and cash equivalents' in the statement of financial position.

Regular purchases and sales of financial assets are recognised on the trade-date – the date on which the Group commits to purchase or sells the asset. Investments are initially recognised at fair value plus transaction costs for all financial assets not carried at fair value through profit or loss. Financial assets are derecognised when the rights to receive cash flows from the investments have expired or have been transferred and the Group has transferred substantially all risks and rewards of ownership. Loans and receivables are carried at amortised cost using the effective interest method.

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The Group assesses at each reporting date whether there is objective evidence that a financial asset, or a group of financial assets, is impaired.

**Financial liabilities**

Financial liabilities held by ESR include trade and other payables.

Such financial liabilities are recognised initially at fair value less transaction costs and subsequently measured at amortised cost using the effective interest rate method. Financial liabilities entered into with durations less than 12 months are recognised at their nominal value.

**Derivatives**

Derivative financial instruments are recognised both initially and subsequently at fair value. They are reported as either assets or liabilities depending on whether the derivative is in a net gain or net loss position. ESR does not use hedge accounting, and as such derivatives are classified as held-for-

trading financial instruments with fair value gains or losses recognised in the statement of comprehensive income. Such derivatives are entered into for risk management purposes.

**Provisions**

Provisions are recognised when: ESR has a present legal or constructive obligation as a result of past events; it is probable that an outflow of resources will be required to settle the obligation; and the amount can be reliably estimated. Restructuring provisions comprise employee termination payments. Provisions are not recognised for future operating losses.

Provisions are measured at the present value of the expenditures expected to be required to settle the obligation using a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the obligation. The increase in the provision due to the passage of time is recognised as an interest expense.

## 2. OTHER EXPENSES INCLUDE THE FOLLOWING SPECIFIC ITEMS:

	Note	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Fees paid to PricewaterhouseCoopers for:			
– the audit of the statutory financial statements		95	83
<b>Total audit-related fees paid to the auditors</b>		<b>95</b>	<b>83</b>
– non audit-related services – taxation compliance		24	35
– non audit-related services – taxation advisory		15	–
– non audit-related services – accounting advice		15	–
– non audit-related services – finance function review		27	–
<b>TOTAL FEES PAID TO AUDITORS</b>		<b>176</b>	<b>118</b>
Defined contribution plan expense		180	197
Directors' fees	20	190	190
Donations		3	4
Bad debts written off		9	21
Communications		822	736
IT systems maintenance and licence costs		1,110	761
Consultancy fees		1,712	1,045
Impairment of intangible assets		88	–
Foreign exchange losses		34	15
Fair value gain on forward exchange contract		(84)	–
Loss on sale of fixed assets		20	10
Marketing and advertising		167	150
Office and administration		1,237	1,139
Occupancy		2,132	1,933
Rental and operating lease costs		824	439
Training and conferences		244	309
Travel		1,488	1,347
Business acquisition costs		88	214

Given the nature of ESR's principal business activities, research comprises part of ESR's everyday business operations. As such, expenses relating to research are not separately identified. The cost of research to ESR is distributed between the relevant expense items, for example employee benefits and scientific materials used.

Fees paid to auditors for taxation advisory work relate to advice on the interpretation and application of tax legislation, and guidance.

During the year ESR incurred costs of \$88,000 (2011:\$214,000) related to the acquisition of the National Radiation Laboratory. The costs principally relate to financial and legal due diligence costs.

### 3. TAXATION

Note	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
The taxation charge has been calculated as follows:		
<b>PROFIT BEFORE INCOME TAX EXPENSE</b>	<b>2,873</b>	<b>3,928</b>
Prima facie taxation at 28% (2011:30%)	804	1,178
<i>Plus taxation effect of:</i>		
Net prior years under / (over) estimation	200	21
Impact of change in tax legislation – building depreciation	(580)	(579)
Impact of change in corporate income tax rate	–	25
Non-deductible / (assessable) items	73	61
<b>TAX EXPENSE FOR THE YEAR</b>	<b>497</b>	<b>706</b>
<i>The tax expense for the year is represented by:</i>		
Current taxation	1,282	1,087
Deferred taxation	7	(381)
	<b>497</b>	<b>706</b>

As a result of the change in tax legislation that was enacted on 27 May 2010, effective for the 2012 income year, the tax depreciation rate on buildings with an estimated useful life of 50 years or more was reduced to 0%.

As at 30 June 2011, ESR made an initial assessment that 15 percent of buildings were depreciable. This was in line with guidance provided by the Inland Revenue Department. As a result, a credit of \$579,000 was recognised in tax expense in the year ended 30 June 2011. ESR conducted a review in the 2011/12 year to assess the division of its buildings between depreciable and non-depreciable components for tax purposes. As a result of this review, a credit of \$580,000 has been recognised in tax expense in the year 30 June 2012.

#### 4. PROPERTY, PLANT AND EQUIPMENT

Group	Freehold land \$'000s	Buildings and leasehold improvements \$'000s	IT equipment and software \$'000s	Plant, equipment and vehicles \$'000s	Assets under construction \$'000s	Total \$'000s
<b>AT 1 JULY 2010</b>						
Cost	476	23,006	9,752	23,897	946	58,077
Accumulated depreciation	–	(4,115)	(8,147)	(15,316)	–	(27,578)
Net book value at the beginning of the year	476	18,891	1,605	8,581	946	30,499
<b>YEAR ENDED 30 JUNE 2011</b>						
Net book value at the beginning of the year	476	18,891	1,605	8,581	946	30,499
Additions	–	718	608	1,912	267	3,505
Transfers from assets under construction	–	652	39	250	(941)	–
Disposals	–	(7)	–	(4)	–	(11)
Depreciation for the year	–	(495)	(1,019)	(2,272)	–	(3,786)
<b>NET BOOK VALUE AT THE END OF THE YEAR</b>	<b>476</b>	<b>19,759</b>	<b>1,233</b>	<b>8,467</b>	<b>272</b>	<b>30,207</b>
<b>AT 30 JUNE 2011</b>						
Cost	476	24,367	8,519	25,948	272	59,582
Accumulated depreciation	–	(4,608)	(7,286)	(17,481)	–	(29,375)
<b>NET BOOK VALUE AT THE END OF THE YEAR</b>	<b>476</b>	<b>19,759</b>	<b>1,233</b>	<b>8,467</b>	<b>272</b>	<b>30,207</b>
<b>YEAR ENDED 30 JUNE 2012</b>						
Net book value at the beginning of the year	476	19,759	1,233	8,467	272	30,207
Additions	–	371	1,397	2,307	854	4,929
Transfers from assets under construction	–	149	–	8	(157)	–
Disposals	–	(6)	–	(14)	–	(20)
Depreciation for the year	–	(552)	(1,018)	(2,476)	–	(4,046)
<b>NET BOOK VALUE AT THE END OF THE YEAR</b>	<b>476</b>	<b>19,721</b>	<b>1,612</b>	<b>8,292</b>	<b>969</b>	<b>31,070</b>
<b>AT 30 JUNE 2012</b>						
Cost	476	24,882	9,894	27,708	969	63,929
Accumulated depreciation	–	(5,161)	(8,282)	(19,416)	–	(32,859)
<b>NET BOOK VALUE AT THE END OF THE YEAR</b>	<b>476</b>	<b>19,721</b>	<b>1,612</b>	<b>8,292</b>	<b>969</b>	<b>31,070</b>

IT equipment recognised under finance leases (where ESR is a lessee) included in the above table, has the following values.

Group	30 June 2012 \$'000s	30 June 2011 \$'000s
Cost – capitalised finance lease assets	1,074	686
Accumulated depreciation	(693)	(520)
<b>NET BOOK VALUE AT THE END OF THE YEAR</b>	<b>381</b>	<b>166</b>

ESR does not have any property, plant and equipment used as security for liabilities.

#### *Restriction on title:*

In relation to the transfer of land owned by the Company shareholding, ministers shall have regard to the principles of the Treaty of Waitangi in accordance with section 10 of the Crown Research Institutes Act 1992. Properties owned by the Company in Christchurch, Wellington and Auckland have caveats on the land as required by section 31 of the Crown Research Institutes Act 1992, which maintains the general provisions of the Public Works Act 1981. The Company complies with section 31 of the Crown Research Institutes Act 1992.

## 5. INTANGIBLE ASSETS

Group	Computer software – externally purchased \$'000s	Computer software – internally generated \$'000s	Customer contracts \$'000s	Assets under construction \$'000s	Total \$'000s
<b>AT 1 JULY 2010</b>					
Cost	3,113	1,599	–	857	5,569
Accumulated amortisation	(2,149)	(1,249)	–	–	(3,398)
<b>NET BOOK VALUE AT THE END OF THE YEAR</b>	<b>964</b>	<b>350</b>	<b>–</b>	<b>857</b>	<b>2,171</b>
<b>YEAR ENDED 30 JUNE 2011</b>					
Net book value at the beginning of the year	964	350	–	857	2,171
Additions	103	–	–	2,854	2,957
Amortisation for the year	(589)	(164)	–	–	(753)
<b>NET BOOK VALUE AT THE END OF THE YEAR</b>	<b>478</b>	<b>186</b>	<b>–</b>	<b>3,711</b>	<b>4,375</b>
<b>AT 30 JUNE 2011</b>					
Cost	2,224	2,183	–	3,711	8,118
Accumulated amortisation and impairment losses	(1,746)	(1,997)	–	–	(3,743)
<b>NET BOOK VALUE AT THE END OF THE YEAR</b>	<b>478</b>	<b>186</b>	<b>–</b>	<b>3,711</b>	<b>4,375</b>
<b>YEAR ENDED 30 JUNE 2012</b>					
Net book value at the beginning of the year	478	186	–	3,711	4,375
Additions	365	463	1,338	994	3,160
Transfers from assets under construction	522	379	–	(901)	–
Disposals	–	–	–	–	–
Impairment losses	–	(88)	–	–	(88)
Amortisation for the year	(603)	(218)	(126)	–	(947)
<b>NET BOOK VALUE AT THE END OF THE YEAR</b>	<b>762</b>	<b>722</b>	<b>1,212</b>	<b>3,804</b>	<b>6,500</b>
<b>AT 30 JUNE 2012</b>					
Cost	3,108	2,908	1,338	3,804	11,158
Accumulated amortisation and impairment losses	(2,346)	(2,186)	(126)	–	(4,658)
<b>NET BOOK VALUE AT THE END OF THE YEAR</b>	<b>762</b>	<b>722</b>	<b>1,212</b>	<b>3,804</b>	<b>6,500</b>

ESR does not have any intangible assets whose title is restricted or used as security for liabilities.

Assets under construction relates to the development of a new operational system. Individual laboratories are being implemented in a phased approach over the next 12 months with the final laboratory expecting to go live in June 2013.

## 6. BUSINESS COMBINATIONS

On 1 December 2011, ESR acquired the business and net assets of the National Radiation Laboratory (NRL). NRL performs radiation monitoring services for local and international customers. The acquisition is expected to increase ESR's commercially generated revenue, provide additional profits to ESR and reduce cost through economies of scale. The excess consideration paid over the fair value of net tangible assets acquired of \$1,338,000 is attributable to the acquired customer base and the expectation of future profits from these contracts.

	30 June 2012 \$'000s
Total purchase consideration – cash paid	2,000
– additional consideration payable	204
	2,204
<b>RECOGNISED AMOUNTS OF IDENTIFIABLE NET ASSETS ACQUIRED AND LIABILITIES ASSUMED</b>	
Property, plant and equipment	811
Accounts receivable	181
Revenue in advance	(295)
Inventories	371
Employment benefit liabilities	(202)
Total identifiable net assets	866
Customer contracts and other identifiable intangible assets	1,338
<b>TOTAL</b>	<b>2,204</b>

### Acquisition-related costs

Acquisition-related costs totalling \$88,000 have been charged to administration expenses and are included in the statement of comprehensive income.

### Revenue and profit contribution

The acquired business has contributed revenues of \$3,182,000 since 1 December 2011. The business also contributed a profit before income tax of \$401,000 in the same period. If the acquisition had occurred on 1 July 2011, consolidated revenue and consolidated profit before income tax for the year ended 30 June 2012 would have been \$58,134,000 and \$3,157,000 respectively.

There were no business combinations in the prior period.

## 7. DEFERRED TAXATION

Deferred tax assets and liabilities are attributed to the following:

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Balance at the beginning of the year	(4,040)	(4,421)
Statement of comprehensive income charge	785	381
<b>BALANCE AT THE END OF THE YEAR</b>	<b>(3,255)</b>	<b>(4,040)</b>

	Accelerated tax depreciation \$'000s	Employee benefits and provisions \$'000s	Total \$'000s
<b>YEAR ENDED 30 JUNE 2011</b>			
Balance at the beginning of the year	(5,284)	863	(4,421)
(Under) / over provision in prior year	(4)	214	210
Deferred tax liability adjustment	–	(25)	(25)
Impact of change in tax legislation – building depreciation	579	–	579
Charged / (credited) to statement of comprehensive income	(189)	(194)	(383)
<b>BALANCE AT THE END OF THE YEAR</b>	<b>(4,898)</b>	<b>858</b>	<b>(4,040)</b>

<b>YEAR ENDED 30 JUNE 2012</b>			
Balance at the beginning of the year	(4,898)	858	(4,040)
(Under) / over provision in prior year	–	14	14
Impact of change in tax legislation – building depreciation	580	–	580
Charged / (credited) to statement of comprehensive income	(34)	225	191
<b>BALANCE AT THE END OF THE YEAR</b>	<b>(4,352)</b>	<b>1,097</b>	<b>(3,255)</b>

There are no unrecognised deferred tax assets or liabilities.

Deferred tax liabilities expected to be settled within 12 months total \$226,000 (2011: \$367,000).

## 8. CASH AND CASH EQUIVALENTS

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Cash at bank and on hand	14	128
Short-term deposits (maturity within six months)	7,218	7,373
	<b>7,232</b>	<b>7,501</b>

## 9. TRADE AND OTHER RECEIVABLES

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Trade debtors	11,809	9,640
Provision for doubtful debts	(20)	(20)
	11,789	9,620
Prepayments	1,167	761
	<b>12,956</b>	<b>10,381</b>

Movements on ESR's provision for impairment of trade receivables are as follows:

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
As at 1 July	20	29
Provision for doubtful debts	9	12
Receivable written off during the year as uncollectable	(9)	(21)
	<b>20</b>	<b>20</b>

As at 30 June 2012, trade receivables of \$20,000 (2011: \$20,000) were impaired and provided for. The individually impaired receivables mainly relate to customers that are in unexpectedly difficult economic situations. The ageing of these receivables is as follows:

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Past due 1 – 30 days	–	–
Past due 31 – 60 days	–	–
Past due > 61 days	20	20
	<b>20</b>	<b>20</b>

As at 30 June 2012, trade receivables of \$516,000 (2011: \$211,000) were past due but not impaired. These relate to a number of customers for whom there is no recent history of default. The ageing analysis of these trade receivables is as follows:

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Past due 1 – 30 days	268	57
Past due 31 – 60 days	151	33
Past due > 61 days	97	121
	<b>516</b>	<b>211</b>

## 10. DERIVATIVE FINANCIAL INSTRUMENTS

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Forward exchange contract – fair value through profit or loss	84	–
	<b>84</b>	<b>–</b>

The notional principal amount of the outstanding forward exchange contract at 30 June 2012 was \$1,251,000 (2011:nil).

## 11. TRADE AND OTHER PAYABLES

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Accrued expenses	817	468
Payroll and GST accruals	1,184	1,064
Revenue in advance	1,732	1,234
Trade payables	9,614	7,992
	<b>13,347</b>	<b>10,758</b>

## 12. EMPLOYEE BENEFITS

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Annual leave accrual	2,418	2,048
Personal development leave accrual	302	255
Other	19	40
<b>CURRENT LIABILITIES</b>	<b>2,739</b>	<b>2,343</b>
Personal development leave accrual	888	690
Retirement leave accrual	198	104
Other	12	6
<b>NON-CURRENT LIABILITIES</b>	<b>1,098</b>	<b>800</b>

### 13. FINANCE LEASE LIABILITIES

Future minimum lease payments are as follows:

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Not later than one year	222	178
Later than one year and not later than five years	258	137
Later than five years	–	–
<b>TOTAL MINIMUM LEASE PAYMENTS</b>	<b>480</b>	<b>315</b>
Future finance charges on finance leases	(20)	(22)
<b>PRESENT VALUE OF FINANCE LEASE LIABILITIES</b>	<b>460</b>	<b>293</b>

The finance leases relate to IT equipment. Upon termination of the initial lease period, ESR can either choose to extend the term further, or return the leased assets to the lessor. There is no option to purchase the leased assets upon termination of the lease.

The present value of finance lease liabilities are as follows:

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Not later than one year	217	164
Later than one year and not later than five years	243	129
Later than five years	–	–
	<b>460</b>	<b>293</b>

### 14. INCOME TAX PAYABLE / (RECEIVABLE)

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Balance at the beginning of the year	(249)	150
Current year charge	1,068	1,083
Prior period adjustment	214	3
Provisional taxation payments	(708)	(1,485)
<b>BALANCE AT THE END OF THE YEAR</b>	<b>325</b>	<b>(249)</b>

### 15. BORROWINGS

ESR holds a multi-option credit facility with Westpac Banking Corporation for \$6,000,000 (2011: \$6,000,000), which is provided subject to ESR meeting an equity ratio covenant specified by the bank. The facility expires in March 2014, and as at 30 June 2012 no borrowings have been drawn down under this facility (30 June 2011: nil).

There were no breaches of the equity ratio covenant during the year.

## 16. EQUITY

### Share capital

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
<b>8,494,000 ORDINARY \$1 SHARES (ISSUED AND FULLY PAID)</b>	<b>8,494</b>	<b>8,494</b>

All ordinary shares rank equally with one vote attached to each fully paid ordinary share. Ordinary shares have no par value. No dividends were proposed or declared for the 30 June 2012 year (2011: nil).

## 17. RECONCILIATION OF PROFIT / (LOSS) AFTER TAXATION TO CASH FLOWS FROM OPERATING ACTIVITIES

	Note	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
<b>PROFIT / (LOSS) FOR THE YEAR AFTER TAXATION</b>		<b>2,376</b>	<b>3,222</b>
<b>NON-CASH ITEMS:</b>			
Depreciation and amortisation expense	4/5	4,993	4,539
Impairment of intangible assets	5	88	–
Bad debts written off	2	9	21
Deferred tax charged to the income statement	7	(785)	(381)
Foreign exchange losses	2	34	12
Fair value gain on derivatives	2	(84)	–
		<b>4,255</b>	<b>4,191</b>
<b>IMPACT OF CHANGES IN INVESTING ACTIVITIES:</b>			
Loss on sale of assets	2	20	10
		<b>20</b>	<b>10</b>
<b>FINANCING</b>			
Finance charge on leases		11	203
		<b>11</b>	<b>203</b>
<b>CHANGES IN WORKING CAPITAL:</b>			
(Increase) / decrease in trade and other receivables		(2,575)	1,116
Increase / (decrease) in income tax payable		574	(399)
(Increase) / decrease in inventories		(237)	50
(Decrease) / increase in provisions		–	(548)
Increase / (decrease) in employment benefits		694	226
Increase / (decrease) in financial liabilities		–	(3)
Increase / (decrease) in trade and other payables		2,589	(808)
		<b>1,045</b>	<b>(366)</b>
<b>NET CASH INFLOW / (OUTFLOW) FROM OPERATING ACTIVITIES</b>		<b>7,707</b>	<b>7,260</b>

## 18. INVESTMENTS

### SUBSIDIARY COMPANIES

ESR has two wholly owned, non-trading, subsidiary companies:

NAME	BALANCE DATE	COUNTRY OF INCORPORATION
ESR Limited	30 June	New Zealand
The Institute of Environmental Science and Research Limited	30 June	Australia

All subsidiaries have remained non-trading during the period.

At balance date the investment in these subsidiaries had a nil carrying value.

## 19. COMMITMENTS

### CAPITAL COMMITMENTS

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Property, plant and equipment	3,286	212
<b>TOTAL CAPITAL COMMITMENTS</b>	<b>3,286</b>	<b>212</b>

Included in the above table as at 30 June 2012 is an amount of \$2,915,000 (30 June 2011: nil) which relates to the re-development of the Mount Albert Science Centre (MASC).

### OPERATING LEASE COMMITMENTS

The future aggregate minimum lease payments under non-cancellable operating leases are as follows:

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Not later than one year	646	333
Later than one year and not later than five years	1,704	1,200
Later than five years	–	–
<b>TOTAL OPERATING COMMITMENTS</b>	<b>2,350</b>	<b>1,533</b>

ESR leases land, a building, equipment and vehicles. There is a renewal option in respect of the land and building lease. There are no renewal options or options to purchase in respect of vehicles held under operating leases.

ESR has a number of standard operational agreements for the purchase of materials and consumables that have both fixed and variable components, some of which extend beyond one year.

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## 20. RELATED PARTY TRANSACTIONS AND KEY MANAGEMENT PERSONNEL

### Related party transactions

ESR is a wholly owned entity of the Crown. ESR enters into transactions with other Crown entities and government departments.

Related parties include the subsidiary entities disclosed in note 18. There have been no transactions with these related parties in the year ended 30 June 2012 (30 June 2011: nil).

The following transactions were carried out with related parties:

- There are close family members of key management personnel employed by ESR. The terms and conditions of those arrangements are no more favourable than those ESR would have adopted if there were no relationship with key management personnel.
- Fees paid to directors during the year were \$190,000 (30 June 2011: \$190,000), with no balances outstanding at balance date (30 June 2011: Nil).

No provision has been required, nor any expense recognised, for impairment of receivables from related parties.

### Key management personnel compensation

Key management personnel comprise the chief executive officer, members of the senior leadership team and the directors. Key management personnel compensation is disclosed below.

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Salaries and other short-term employee benefits	1,803	1,840
Termination benefits	272	–
Other long-term employee benefits	56	78
Directors' fees	190	190
<b>TOTAL KEY MANAGEMENT PERSONNEL COMPENSATION</b>	<b>2,321</b>	<b>2,108</b>

## 21. FINANCIAL INSTRUMENTS BY CATEGORY

	Fair value through profit or loss \$'000s	Loans and receivables \$'000s	Total \$'000s
<b>30 JUNE 2011</b>			
<b>ASSETS AS PER BALANCE SHEET</b>			
Trade and other receivables excluding prepayments	–	9,620	9,620
Cash and cash equivalents	–	7,501	7,501
<b>TOTAL</b>	<b>–</b>	<b>17,121</b>	<b>17,121</b>
			Financial liabilities at amortised cost \$'000s
Liabilities as per balance sheet			
Finance lease liabilities			293
Trade and other payables			8,460
<b>TOTAL</b>			<b>8,753</b>
	Fair value through profit or loss \$'000s	Loans and receivables \$'000s	Total \$'000s
<b>30 JUNE 2012</b>			
<b>ASSETS AS PER BALANCE SHEET</b>			
Trade and other receivables excluding prepayments	–	11,789	11,789
Derivative financial instruments	84	–	84
Cash and cash equivalents	–	7,232	7,232
<b>TOTAL</b>	<b>84</b>	<b>19,021</b>	<b>19,105</b>
			Financial liabilities at amortised cost \$'000s
<b>LIABILITIES AS PER BALANCE SHEET</b>			
Finance lease liabilities			460
Trade and other payables			10,431
<b>TOTAL</b>			<b>10,891</b>

## 22. FINANCIAL RISK MANAGEMENT

ESR's activities are exposed to a variety of financial risks: market risk, credit risk, liquidity risk, cash flow risk and fair value interest-rate risk. ESR's overall risk management programme focuses on the unpredictability of financial markets and seeks to minimise potential adverse effects on ESR's financial performance. The policies approved and financial instruments being utilised at balance date are outlined below.

### a) Market risk

In accordance with its Treasury Management Policy, ESR uses derivative financial instruments to economically hedge its exposure to foreign exchange risks from its operational, financing and investment activities. These derivatives are classified at fair value through profit or loss, and gains and losses are recognised in the statement of comprehensive income.

### ***i) Foreign exchange risk***

Foreign exchange risk occurs as a result of transactions denominated in a currency other than ESR's functional currency of New Zealand dollars. Currencies commonly transacted in, and giving rise to foreign exchange risk, include the United States dollar, Australian dollar and the pound sterling. ESR is subject to foreign currency risk through its trade receivables and trade payables balances.

Where a material foreign currency balance is entered into (exposures equivalent to greater than NZ \$100,000), ESR is required by the Treasury Management Policy to hedge its exposure to the currency through the use of forward exchange contracts.

ESR held one forward exchange contract of US \$922,000 at 30 June 2012 (30 June 2011: nil).

The carrying amounts of the Group's trade and other receivables are denominated in the following currencies:

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Australian dollar	276	31
Euro	67	16
United States dollar	425	34
Other	3	–
	<b>771</b>	<b>81</b>

The carrying amounts of the Group's trade and other payables are denominated in the following currencies:

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
Australian dollar	49	58
Canadian dollar	–	9
United States dollar	3	8
Other	6	10
	<b>58</b>	<b>85</b>

### ***ii) Interest rate risk***

As at reporting date, ESR is subject to interest rate risk through the holding of cash and cash equivalents. ESR uses a mixture of call and short-term deposit investment accounts to hold excess funds. Available interest rates are monitored to ensure the best return on cash.

When ESR is required to draw down its credit facilities, interest rate risk is managed by entering into a predetermined mixture of floating- and fixed-rate borrowings, depending on the level of borrowings entered into. ESR does not have any borrowings as at 30 June 2012 (30 June 2011: nil).

### iii) Market risk sensitivity analysis

ESR is exposed to market risk through the holding of the following financial instruments: cash, trade receivables and trade payables. ESR management has analysed the below sensitivities in market risk factors over a 12 month period:

- proportional foreign exchange rate movement of -10% (depreciation of New Zealand dollar) and +10% (appreciation of New Zealand dollar) against the foreign currencies; and
- a parallel shift of +1% / -1% in market interest rates in New Zealand.

If these movements were to occur (all other variables held constant), the impact on ESR's reported profit before income tax expense and equity at balance date is presented below.

Group 30 June 2011	Carrying amount \$'000s	Interest rate				Foreign exchange			
		-100 Profit	100 Equity	+100 Profit	100 Equity	-10% Profit	10% Equity	+10% Profit	10% Equity
<b>FINANCIAL ASSETS</b>									
Cash and cash equivalents	7,501	(75)	(75)	75	75	-	-	-	-
Trade receivables	81	-	-	-	-	8	8	(7)	(7)
<b>FINANCIAL LIABILITIES</b>									
Trade payables	85	-	-	-	-	(8)	(8)	8	8
<b>TOTAL (DECREASE) / INCREASE</b>		<b>(75)</b>	<b>(75)</b>	<b>75</b>	<b>75</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>1</b>

Group 30 June 2012	Carrying amount \$'000s	Interest rate				Foreign exchange			
		-100bp Profit	100bp Equity	+100bp Profit	100bp Equity	-10% Profit	10% Equity	+10% Profit	10% Equity
<b>FINANCIAL ASSETS</b>									
Cash and cash equivalents	7,232	(72)	(72)	72	72	-	-	-	-
Trade receivables	771	-	-	-	-	77	77	(70)	(70)
<b>FINANCIAL LIABILITIES</b>									
Trade payables	58	-	-	-	-	(6)	(6)	5	5
<b>TOTAL (DECREASE) / INCREASE</b>		<b>(72)</b>	<b>(72)</b>	<b>72</b>	<b>72</b>	<b>71</b>	<b>71</b>	<b>(65)</b>	<b>(65)</b>

### b) Credit risk

Credit risk refers to the risk that a counterparty will default on its contractual obligations, resulting in financial loss to ESR. The financial instruments, which expose ESR to credit risk, are principally cash and cash equivalents, and trade receivables.

Bank balances and short-term investments (comprising cash and cash equivalents) are held with New Zealand registered banks in accordance with ESR's Treasury Management Policy. The majority of high value trade receivables comprise government entities and therefore the potential risk of default is low. ESR has a Contracts Policy, which requires assessment of credit worthiness of potential clients, where the value of the contract is material as defined in the policy.

A provision for doubtful debts is maintained in respect of trade receivables and this is reassessed on a regular basis. No collateral is held by ESR in respect of cash and cash equivalents, and trade receivables as at 30 June 2012 (30 June 2011: nil).

The carrying amount of financial assets recognised in the statement of financial position best represents ESR's maximum exposure to credit risk at the reporting date.

As at 30 June 2012 the trade receivables balance included \$9,365,000 (30 June 2011: \$8,573,000) owed by entities within, or owned by, the New Zealand Government. It is not believed that there is any material risk of loss with these receivables.

### c) Liquidity risk

Prudent liquidity risk management implies the availability of funding through adequate levels of committed credit facilities. Liquidity risk is monitored through the forecasting of cash flows, and ensuring that the committed credit lines in place remain adequate for requirements.

Contractual undiscounted maturity analysis of financial liabilities is presented below:

Group	30 June 2012					30 June 2011				
	Carrying value \$'000s	Less than 1 year \$'000s	1–2 years \$'000s	2–5 years \$'000s	Greater than 5 years \$'000s	Carrying value \$'000s	Less than 1 year \$'000s	1–2 years \$'000s	2–5 years \$'000s	Greater than 5 years \$'000s
Trade payables	10,431	10,431	–	–	–	8,460	8,460	–	–	–
Finance lease liabilities	460	218	171	71	–	293	178	90	47	–
	<b>10,891</b>	<b>10,649</b>	<b>171</b>	<b>71</b>	<b>–</b>	<b>8,753</b>	<b>8,638</b>	<b>90</b>	<b>47</b>	<b>–</b>

### d) Fair values

The carrying value of financial assets and liabilities recorded in the financial statements approximate their fair values.

Fair value is generally based on the contracted amount payable / receivable of financial assets and financial liabilities, being the amount for which the financial instrument is to be exchanged. Fair value includes the impact of any assessed impairment of the financial instruments – please refer to the statement of significant accounting policies for details of each financial instrument and their recognition criteria.

### e) Capital risk management

ESR's objectives when managing capital are to maintain financial stability, achieve sustainable growth, and to realise its strategic goals and targets, all within the risk appetite of its shareholder and management.

In line with Government requirements, ESR monitors its capital structure through the return on equity and gearing ratios. Government provides ESR with guideline targets with the expectation that an appropriate average return is achieved over time, rather than requiring that ESR meet the specified targets annually. At reporting date, the Government provided that guideline targets are 9 percent for the return on equity, and 30 percent for the gearing ratio (2011: same).

Each year ESR internally sets return on equity and gearing ratio targets, bearing in mind the overall results expected by Government. The ratios are reported in the Statement of Corporate Intent.

The return on equity and gearing ratios as at 30 June 2012, and 30 June 2011 were as follows, along with the relevant annual targets set by ESR.

The return on equity ratio was affected by the change in tax legislation enacted on 27 May 2010, which eliminated tax depreciation on buildings.

	Group 30 June 2012 \$'000s	Group 30 June 2011 \$'000s
<b>RETURN ON EQUITY RATIO</b>		
Profit / (loss) for the year	2,376	3,222
Average equity	36,668	33,869
<b>ACTUAL RATIO</b>	<b>6.5%</b>	<b>9.5%</b>
<b>TARGET RATIO</b>	<b>8.0%</b>	<b>8.0%</b>
<b>GEARING RATIO</b>		
<b>NET DEBT</b>		
Finance lease liabilities – current	217	164
Finance lease liabilities – non-current	243	129
	<b>460</b>	<b>293</b>
<b>EQUITY</b>	<b>37,856</b>	<b>35,480</b>
<b>ACTUAL RATIO</b>	<b>1.2%</b>	<b>0.8%</b>
<b>TARGET RATIO</b>	<b>0.0%</b>	<b>0.0%</b>

### 23. CONTINGENT LIABILITIES

The directors are satisfied that there are no claims outstanding that would have a material impact on ESR's financial position, as at 30 June 2012 (30 June 2011: nil).

### 24. SUBSEQUENT EVENTS

There were no events subsequent to reporting date that require disclosure in the financial statements.

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# Directory

## **ESR BOARD OF DIRECTORS (AS AT 30 JUNE 2012)**

Dr Susan Macken – Chair  
Ross Peat – Deputy Chair  
Professor Bill Denny  
Elizabeth Hickey  
Dr Judith Johnston  
Tahu Leslie Potiki  
Patricia Schnauer

## **ESR STRATEGIC LEADERSHIP TEAM**

Graham Smith – Chief Executive  
Dr Keith Bedford – General Manager, Forensic  
Esther Livingston – General Manager, Human Resources  
Nishaka Ranaweera – Acting Chief Information Officer  
Dr Fiona Thomson-Carter – General Manager, Environmental Health  
Nigel Thomson – Acting General Manager, Finance  
David Talbot – General Manager, Business Development and Marketing

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Chris Barber of PricewaterhouseCoopers on behalf of the Auditor-General

## **BANKER**

The National Bank of New Zealand Limited

## **SOLICITOR**

Buddle Findlay

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