



Minerals Research Institute of Western Australia

Annual Report 2016 / 2017

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Contents

Statement of Compliance	5
Overview	6
Executive Summary.....	6
Performance Highlights.....	6
Operational Structure	7
Responsible Minister.....	7
Enabling and Administered Legislation	7
Other Key Legislation Impacting on the Institute’s Activities.....	11
Performance Management Framework	11
Outcome Based Management Framework	11
Changes to Outcome Based Management Framework.....	11
Shared Responsibilities with Other Agencies	12
Objective.....	12
Research Priority Plan	12
Agency Performance.....	14
Chair’s Report	14
Operations Report.....	16
MRIWA Strategy.....	17
Research investments	18
Finances.....	20
MRIWA Outcome-Based Management Structure: Key Performance Indicators	22
Other Functions.....	22
Administration.....	22
Research.....	24
Advisory Committee Chair’s Report.....	24
Research Project Investments	26
Research Reports Finalised	35
MRIWA Scholarship Program.....	36
MRIWA’s Partnerships	39
MRIWA Sponsorships	40
Research Partners	42
Company Partners.....	42
Significant Issues Impacting the Agency	43
Audit and Risk Committee	44
Disclosures and Legal Compliance	45
Financial Statements.....	45
Certification of Financial Statements.....	45

Opinion of the Auditor General	46
Opinion of the Auditor General	47
Opinion of the Auditor General	49
Statement of Comprehensive Income	50
Statement of Financial Position	51
Statement of Changes in Equity	52
Statement of Cash Flows	53
Notes to Financial Statements	54
Notes to Financial Statements	55
Notes to Financial Statements	56
Notes to Financial Statements	58
Notes to Financial Statements	59
Notes to Financial Statements	60
Notes to Financial Statements	61
Notes to Financial Statements	62
Notes to Financial Statements	63
Notes to Financial Statements	64
Notes to Financial Statements	65
Notes to Financial Statements	66
Notes to Financial Statements	67
Notes to Financial Statements	68
Notes to Financial Statements	69
Notes to Financial Statements	70
Notes to Financial Statements	71
Notes to Financial Statements	72
Notes to Financial Statements	73
Notes to Financial Statements	74
Notes to Financial Statements	75
Notes to Financial Statements	76
Notes to Financial Statements	77
Notes to Financial Statements	78
Notes to Financial Statements	79
Notes to Financial Statements	80
Notes to Financial Statements	81
Notes to Financial Statements	82
Notes to Financial Statements	83
Notes to Financial Statements	84
Notes to Financial Statements	85

Notes to Financial Statements	86
Certification of Key Performance Indicators	87
Key Performance Indicators	88
Key Performance Indicators	89
Key Performance Indicators	90
Ministerial Directives	91
Governance Disclosures	91
Board and Committee Remuneration.....	91
Other Legal Requirements	93
Legislation Impacting on the Institute's Activities.....	94
Annual Estimates 2017/18.....	95

Statement of Compliance

For year ended 30 June 2017

**HON BILL JOHNSTON MLA
MINISTER FOR MINES AND PETROLEUM**

In accordance with section 63 of the Financial Management Act 2006, we hereby submit for your information and presentation to Parliament, the Annual Report of the Minerals Research Institute of Western Australia for the reporting period ended 30 June 2017.

The Annual Report has been prepared in accordance with the provisions of the Financial Management Act 2006.

MRIWA's objective is to promote research for the development of the minerals industries in this State. The Board is satisfied with the performance of the Minerals Research Institute of Western Australia in achieving its objective.

On behalf of the MRIWA Board, we acknowledge the valuable support given to the Institute during the reporting period by your office, by the Department of Mines and Petroleum and by the members of the MRIWA advisory committees.



Dr Peter Lilly
CHAIRMAN
BOARD OF DIRECTORS

Date: 3 August, 2017



Ms Helen Cook
MEMBER
BOARD OF DIRECTORS

Date: 3 August, 2017

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Overview

Executive Summary

Performance Highlights

The *Minerals Research Institute of Western Australia Act 2013* (the Act) establishes the Minerals Research Institute of Western Australia (MRIWA) as a statutory corporation to foster and promote minerals research for the benefit of Western Australia.

Whilst the Minister has ultimate control over the operations of the Institute, the leadership and management of the Institute are vested in the MRIWA Board.

In line with the general increase in minerals commodity prices in 2016/17, it is pleasing to report that 2016/17 is the most successful year for MRIWA.

The Institute approved investment of \$4.7 million of its funds for research projects, including three PhD Scholarships. This investment is \$1.9 million (68%) higher than for 2015/16. MRIWA's scholarships for 12 PhD students and awards for undergraduate students, are now valued at \$1.3 million. The Institute's portfolio of research projects was valued at \$30 million at end 2016/17, of which \$17 million is co-investment by other parties.

Of note for the reporting period are:

- The Institute's commitment of a record new \$4.7 million investment in minerals research comprising \$4.4 million in twenty new collaborative research projects and \$0.3 million in scholarships for PhD studies.
- The financial leverage on MRIWA's investments in research (i.e. the level of co-investment by other parties) increased to \$1.60 for every \$1 invested by MRIWA, which is a significant increase on the 2015/16 result of \$1.10 invested by other parties for every \$1 invested by MRIWA.
- \$1 million of MRIWA funds committed to the Bid for the new MinEx Cooperative Research Centre. The total value of the bid for the CRC is \$182 million, comprising cash investments by government agencies and industry of \$36 million, in-kind commitments of \$96 million and \$50 million requested from the CRC Programme.
- The Institute continued to implement a contemporary business strategy that includes extending MRIWA's position and influence in Australia's minerals innovation system; developing the research portfolio from 'enabling research' to 'enabling research and its commercialisation'; establishing a financing strategy and investment model appropriate for changing scale and scope of MRIWA activities, and sources of funds; and, creating balanced relationships that deliver to the State's long-term needs whilst also delivering to industry requirements.
- MRIWA has made significant progress in engaging with, and becoming a recognised voice in, the Australian minerals innovation system; being the agency that aligns the State's interests in minerals research with the State's goals to create jobs and provide financial strength. MRIWA is an active member of Austmine, the association for the mining equipment, technology and services sector in Australia and is closely engaged with METS Ignited, the Federal Government's Industry Growth Centre for the mining, engineering, technology and services sector.
- The Institute completed further work to improve its administration systems, particularly for financial and project management. The Institute reports an administration cost of 4.4% of the total value of the portfolio of research projects under management during the year.

In summary, MRIWA is now a valued partner in innovation for the State's minerals industry and is an effective agent for enhancing collaboration between researchers and industry, founded on the objective of delivering commercial returns and economic benefits for the State.

Operational Structure

Responsible Minister

Hon. Bill Johnston MLA, Minister for Mines and Petroleum.

Enabling and Administered Legislation

The Institute administers only the *Minerals Research Institute of Western Australia Act 2013*.

The Act encapsulates a number of key design principles for the Institute, namely:

- Funding for minerals research projects is on a competitive basis that directs State funds directly to specific research projects.
- All investment decisions made by the Institute are guided by a comprehensive Research Priority Plan (a technology roadmap of the needs of the Western Australian minerals industry).
- State funds for research projects are directed to the requirements of the Western Australian minerals endowment, as identified in the Research Priority Plan.
- State funds are not available exclusively to Western Australian research organisations: the intention is to ensure scarce funds are not wasted by replicating accessible research capability and capacity that resides elsewhere.
- The Institute is to seek to optimise industry co-investment in its research activities through a leveraged grant model: State investment is to be an incentive for industry investment.
- The Institute adopts a portfolio approach to managing its research investments across research needs and through the research-development spectrum.
- The Institute seeks to engage constructively with the challenges that face the many Small to Medium Enterprise businesses that participate in the State's exploration and mining, equipment, technology and services sectors.
- The Institute will adopt contemporary best practice principles of grant administration.

The Act provides that MRIWA's Board is its governing body, provides for appointment of its seven members by the Minister, and sets out requirements regarding its constitution and procedures.

The functions granted to MRIWA in the Act are for the specific purpose of fostering and promoting minerals research for the benefit of the State.

MRIWA's functions are to:

- Undertake, procure or manage minerals research projects;
- Provide funding to individuals or corporations to enable them to undertake or participate in minerals research or other associated activities, or to engage other persons to do so;
- Keep records about minerals research projects it undertakes, procures, manages or funds;
- Work with other people, authorities and institutions about minerals research;
- Maintain current knowledge of minerals research being undertaken;
- Promote public awareness and interest in minerals research;
- Foster academic activities related to minerals research; and
- Advise the Minister about minerals research.

The Act also has scope for regulations to be made to give additional functions to MRIWA.

(Refer <http://www.mriwa.wa.gov.au/> *Minerals Research Institute of Western Australia Act 2013*, Division 2 for a full description of the MRIWA functions).

Governance and Management Structure

Organisation

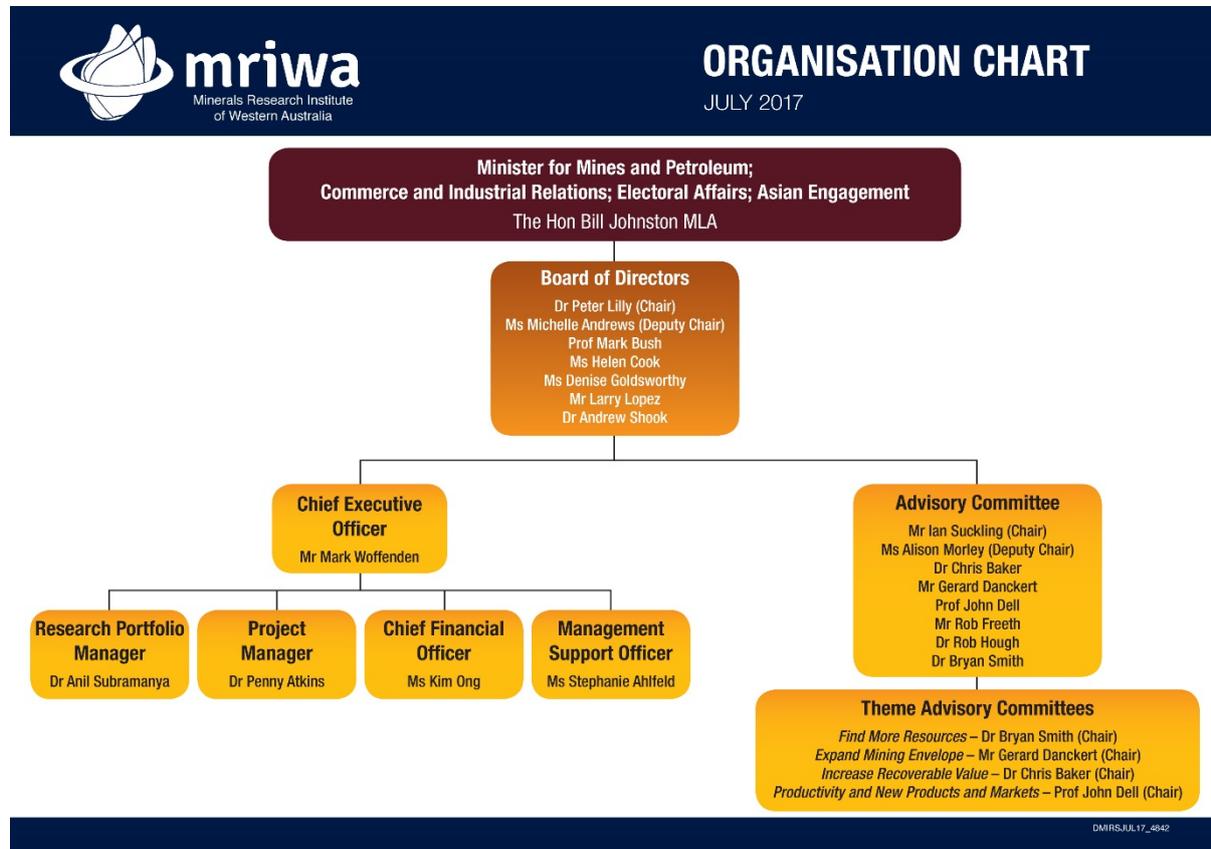


Figure 1. MRIWA Organisation Chart

Please note that Ms Michelle Andrews and Mr Andrew Shook both resigned from the Board in May 2017. As at 30 June 2017, these positions remain vacant.

Board

The Act provides for a seven-member Board for MRIWA. Board members are appointed for a three-year period by the Minister for Mines and Petroleum. Members are appointed according to their expertise and experience in areas relevant to the Institute's activities.

Details of the members of the Board for the reporting period are provided below:

	<p>Dr Peter Lilly became a professional director at the end of 2015 after 40 years' experience. Approximately half of this was in universities and industrial research organisations where he held management positions that included Head of Department, Head of School, Chief of Division, Director and Executive Director. The remaining half was in industry where he worked on mining and civil engineering projects in 15 countries and held a range of technical, management and executive roles up to and including Executive Director.</p> <p>Peter is currently Chairman of the Minerals Research Institute of Western Australia, a Non-Executive Director of METS Ignited Australia Ltd, a Director and Trustee of the Australasian Institute of Mining & Metallurgy Education Endowment Fund, a Director of the Industry Mentoring Network in STEM, a member of CSIRO's Mineral Resources Advisory Council, a Member of the Accreditation Council of the Australian Research Management Society, and Chairman of the Inductees Selection Committee for the Australian Prospectors & Miners Hall of Fame.</p> <p>He is a past President of the Australasian Institute of Mining and Metallurgy, and was elected to the Australian Academy of Technology and Engineering in 2007.</p>
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	<p>Ms Michelle Andrews was appointed Deputy Director General Strategic Policy at the Department of Mines and Petroleum in July 2011.</p> <p>Michelle has over 20 years' experience in the State Government and has developed an extensive network of contacts with a track record of negotiating outcomes with industry and peak bodies, contributing to major project approvals, reforming approval processes, establishing the Office of the Environmental Protection Authority and providing policy advice to several Environment Ministers.</p> <p>In her role, Michelle is focused on ensuring Western Australia's resources sector continues to be an attractive destination for international investment. Michelle is also improving the way the department works with other government agencies, industry and community groups, and is leading fundamental changes in the department's policy development and stakeholder engagement activities.</p> <p>In May 2017, Michelle accepted a role within the Western Australian Department of Premier and Cabinet and resigned from the MRIWA Board. We wish to thank Michelle for her contribution to MRIWA during her term.</p>
	<p>Prof Mark Bush has 36 years of experience in research, research leadership, grant assessment and grant administration, while holding various academic and leadership positions with UWA.</p> <p>Mark brings with him a broad knowledge of Engineering. He is currently Emeritus Professor with UWA, and has served in the past as Head of Department of Mechanical and Materials Engineering; Dean of Faculty of Engineering, Computing and Mathematics; and Director of Animal Research Services.</p> <p>He is an Honorary Fellow of Engineers Australia (Hon FIEAust) and Chartered Professional Engineer (CPEng), and Fellow of the Academy of Technological Sciences of Engineering (FTSE), and has served in various leadership positions in both organisations.</p>
	<p>Ms Helen Cook has close to 20 years of Board experience across a range of sectors including energy and natural resources, arts and culture, training and finance. This has included high-profile government agency boards where she has delivered independent governance guidance and established sound relationships with Ministers and understanding of government protocols and issues.</p> <p>Prior to joining the MRIWA Board, Helen was the National Partner in charge of KPMG's Energy and Natural Resources Group. This role has required a deep understanding of the key opportunities and challenges faced by the mining and energy sector across Australia across all commodities, markets and up and down the supply chain.</p> <p>Helen's other current board positions are: Deputy Chair, Fremantle Port; Non-Executive Director RAC Holdings Pty Ltd, RAC Finance Ltd; UWA Mining Energy and Natural Resources Law Advisory Board; Major Performing Arts Panel, Australia Council; Chair, Chamber of Arts & Culture WA; Director, Cruthers Foundation; National Gallery of Australia Council. Helen is also a WA Councillor of the Australian Institute of Company Directors.</p>
	<p>Ms Denise Goldsworthy Following 17 years at BHP Steel and 14 years in Mining (iron ore and minerals), including roles as Managing Director Dampier Salt, Managing Director Hismelt and Chief Commercial Officer Autonomous Haul Trucks (Rio Tinto), Denise has successfully transitioned to the third phase of her career as a Non-Executive Director and advisor on research, technology and innovation through the company Alternate Futures, of which she is the owner and Managing Principal. Among Denise's honours is being named the 2010 Telstra Australian Business Woman of the Year. A member of Chief Executive Women (CEW), she was inducted into the WA Women's Hall of Fame in 2011. Denise is a member of the Judging Panel for the Prime Minister's Science Awards.</p> <p>Denise's other current board positions are Chair, ChemCentre WA; Non-Executive Director, Arrium; Non-Executive Director, Export Finance and Insurance Commission (EFIC); Member of Council and Chair Quality, Audit and Risk Committee at Edith Cowan University; Member of Commercialisation Advisory Board, Curtin University; Fellow of ATSE and Chair of ATSE's Resources Forum; and Trustee for the Navy Clearance Diver's Trust Council.</p>

	<p>Mr Larry Lopez is the Director of the Commonwealth’s Accelerating Commercialisation Program. He is responsible for leading the Government’s efforts to identify and help businesses, entrepreneurs and researchers commercialise novel products, processes and services with significant market potential. Larry is a Partner at Perth based Australian Venture Consultants (AVC). AVC enables their clients’ decision-making processes through fact-based analytics informed by research and the insights it has acquired through almost 30 years of hands-on experience and engagements across the innovation and technology start-up ecosystem.</p> <p>Prior to moving to Australia in 2006, Larry spent 17 years at Silicon Valley Bank. During his tenure at SVB he held various senior and executive positions, and played a key role in growing the company from a local community bank to a global leader in providing financial services for knowledge-based companies and investors. He was the founder and Managing Director of the Bank’s International Venture Capital Group and was an active investor in Israel, Australia and Europe.</p> <p>Larry is a Director of several IT-related private companies and sits on several not-for-profit boards. He has also been a partner or director of several venture capital funds in the US and Europe and is currently a director of Jolimont Global Mining Systems, a global venture capital fund focused on the investing in technology that enables the mining sector.</p>
	<p>Dr Andrew Shook has held a wide variety of different positions in the mining and processing industries over the past 25 years, with experience in copper smelting, iron and steel, rare earths and titanium.</p> <p>Andrew also brings experience with technical and research development, plant production analysis and operational improvements. Formerly Chief Technology and Information Management Officer with BHP Billiton Uranium, he is currently General Manager, Future Business Technology at Rio Tinto Iron Ore.</p> <p>In May 2017, Andrew accepted an interstate position and resigned from the MRIWA Board. We thank Andrew for his contribution to MRIWA during his term.</p>

Senior Officer

Mr Mark Woffenden (Chief Executive Officer)

Mr Woffenden has forty years’ experience in the minerals industry, notably in leading research and business operations units, change management and process and technology improvement.

Mr Woffenden took up the role of CEO of MRIWA in March 2013. Prior to joining MRIWA, Mark was Executive Director of the Resources and Chemistry Precinct at Curtin University, and prior to that CEO of the Parker Cooperative Research Centre for Integrated Hydrometallurgy Solutions: during which time Mark was also Deputy Chair of the CRC Association Committee (2005 to 2008).

Mark previously held senior management positions with Rio Tinto businesses, including Hamersley Iron and Comalco.

Mark is a Graduate of the Australian Institute of Company Directors, a Member the Australasian Institute of Mining and Metallurgy and was a member of the Premier’s Science and Innovation Council of Western Australia (2007- 2009).

Advisory Committees

The Act (section 60) enables the Board of MRIWA to appoint any advisory committee it requires to advise it in relation to its functions, and to appoint the members and determine the functions of such a committee. Appointment of committee members is on merit, not affiliation.

Advisory committees are subject to the reasonable directions of MRIWA and are able to determine their own procedures. The only statutory procedural requirement is that an advisory committee is to keep minutes of its meetings and to provide MRIWA with a copy.

The MRIWA Board is required to consider advice provided by an advisory committee but is not required to act on the advice, or to delay action pending its receipt.

To ensure that applications, for research grants in particular, are subject to appropriate consideration (given the breadth of the science and technology that the Institute's remit covers), the Board has appointed four Theme Advisory Committees (refer Figure 1) to bring discipline-specific expertise to the consideration of Applications for research grants.

The Board has also appointed an Advisory Committee, which considers the advice of the Theme Advisory Committees in its assessment of each Grant Application from a wider perspective.

Other Key Legislation Impacting on the Institute's Activities

In the performance of its functions, the Institute complies with other relevant written laws including:

- Auditor General Act 2006;
- Disability Services Act 1993;
- Equal Opportunity Act 1984;
- Financial Management Act 2006;
- Freedom of Information Act 1992;
- Industrial Relations Act 1979;
- Occupational Safety and Health Act 1984;
- Public Sector Management Act 1994;
- Salaries and Allowances Act 1975;
- State Records Act 2000; and
- State Supply Commission Act 1991.

Performance Management Framework

Outcome Based Management Framework

The Outcome-Based Management Structure and Key Performance Indicators (KPI) for the Institute were approved by the Department of Treasury in March 2015, to apply from the 2014/15 annual reporting period.

MRIWA's activities contribute to the over-arching Government goal of responsibly managing the State's finances through effective and efficient delivery of services, encouraging economic activity and reducing the regulatory burdens on the private sector.

The performance of the Institute will be measured over the longer term by the economic benefit derived by Western Australia from the Institute's activities and, ultimately, the impact these have on optimising the minerals royalties paid to the State.

The KPIs, revised from those applying for the predecessor Minerals and Energy Research Institute of Western Australia, are:

- Key Effectiveness Indicator: the ratio of total cash investments in research projects to total approved MRIWA cash investment in those research projects.
- Key Effectiveness Indicator: total administration cost for the year as a percentage of the total cash value of research projects and the education program under management during the year.

The full KPI report is provided at page 87.

Changes to Outcome Based Management Framework

The Institute's Outcome Based Management Framework did not change during 2016/17.

Shared Responsibilities with Other Agencies

The Institute did not share any responsibilities with any other agencies in 2016-17.

Objective

The objective of the Minerals Research Institute of Western Australian is to stimulate minerals research that enables industry to continue to invest in, and operate, globally competitive minerals exploration, mining, processing and export enterprises in Western Australia, and in doing so ensure that royalties paid to the State are optimised in terms of quantum and duration so that industry will continue to provide a range of economic and social benefits to the State well into the future.

From a fiscal perspective, the State Government investment in minerals research is part of the strategy to ensure that the State's mining operations are competitive with operations in lower cost jurisdictions, nationally and internationally. The State's co-investment in minerals research contributes to securing the significant revenues generated for the State by the minerals industry.

MRIWA represents a strategic model for minerals research in Western Australia. It provides an efficiency gain for the State with research for the minerals industry being better managed, coordinated and strategically targeted than would otherwise be the case.

Research Priority Plan

Under the MRIWA Act (Division 4), the Institute is required to have a Research Priority Plan (RPP) that identifies and prioritises the medium- to long-term knowledge and technology needs of the State's minerals industry. The first edition of the RPP was completed in 2013. The Act requires that the Institute must have regard to its Research Priority Plan, as revised from time to time, when performing its functions. The timing for a review of the RPP is at the discretion of the MRIWA Board.

The current RPP provides for five Themes to guide MRIWA's investments in research (refer Figure 2).



Figure 2. Themes of the Research Priority Plan

To provide greater clarity for stakeholders, Themes 1, 2 and 3 are further defined by a number of sub-Themes.

Theme		Sub-Themes
1	Find More Resources	1.1 Mapping of the depth and character of cover progressing from shallow to deeper cover. 1.2 Distal footprints research. 1.3 Development and deployment of tools that provide improved understanding of the sub-regolith geology in Western Australia. 1.4 Advanced analysis and correlation of existing geological and geophysical datasets.
2	Expand the Mining Envelope	2.1 Deep extraction systems. 2.2 Engineering in highly stressed and complex rock masses. 2.3 Productive and safe deep in-mine environments.
3	Increase Recoverable Value	3.1 Modelling and simulation of processing circuits. 3.2 Accelerated technology development frameworks.
4	Improve productivity	No sub-themes defined.
5	Develop new products and markets	No sub-themes defined.

Table 1. MRIWA Research Themes and sub-Themes

The broad relationship between Theme 1 - Find More Resources, Theme 2 - Expand the Mining Envelope, and Theme 3 - Increase Recoverable Value is illustrated schematically in Figure 3. The Research Priority Plan guides MRIWA to contribute to:

- Positioning Western Australia for more effective exploration in the vast areas of the State covered by weathered material that ‘blinds’ current exploration technologies;
- Extending the reach of ‘conventional’ mining practice and technology, both open-pit and underground; and
- Developing the science and technology necessary to exploit mineralisation at great depth.

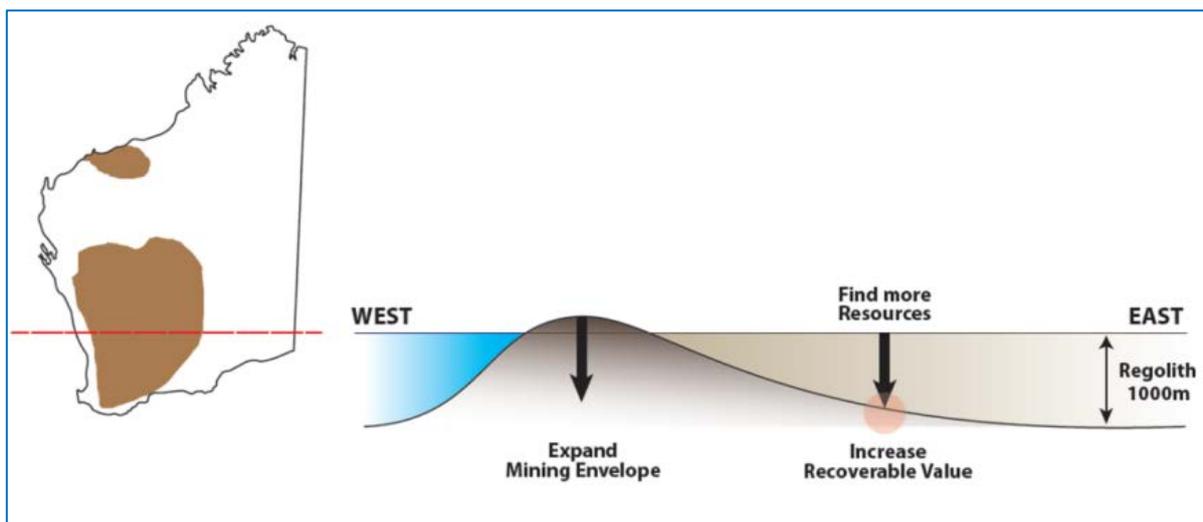


Figure 3. Schematic of the relationship between MRIWA's Research Themes and the Yilgarn and Pilbara cratons (shaded areas) that are dominant features of Western Australia's geology

Agency Performance

Chair's Report

Outcomes

During its third full financial year, our Institute continued to exist in a challenging environment. Our key partners in R&D - the exploration, mining, mineral processing and mining equipment, technology and services (METS) companies - continued to have a strong focus on cash conservation and associated short-term planning and survival horizons. Consequently, their appetite to fund collaborative R&D projects remained somewhat limited.

Notwithstanding these difficulties over most of the past year, the Board of MRIWA has continued to invest in high-quality, strategically-relevant collaborative R&D projects that will continue to sustain the critically-important minerals sector well beyond the current cycle. During 2016-2017, the new MRIWA investment approved by the Board was \$4.4 million matched by sponsors' cash support of \$6.8 million. In addition, a further \$0.3 million of MRIWA funds were invested in new PhD research projects. These figures bring our total R&D investment portfolio of new and on-going projects to \$30.0 million during the financial year.

A key and pleasing feature of this portfolio is its diversity. We anticipate that by the end of 2017 investment will spread approximately evenly across projects aimed at finding more mineral resources, expanding the mining envelope and increasing recoverable value. However, we are increasingly seeing investment in projects aimed at improving productivity, and developing new products and markets.

The Institute continues to be a highly proactive member of the national minerals innovation system. This includes identifying our stakeholder's needs and opportunities, identifying suppliers of resources and capabilities, and encouraging proposals from leading research organisations that align with our priorities. MRIWA was also active in promoting Western Australia as a prime location for major new programs in industry-driven R&D, such as the MinEx CRC proposal.

We have continued to actively engage with the METS sector as part of our strategy albeit at a time when those same METS companies are often struggling for survival. However, it is often these companies that will take R&D outcomes and turn them into innovations that the exploration and mining companies will use to improve sustainability and shareholder value. This is a key part of MRIWA strategy which will remain a focus for the foreseeable future, including engagement with METS Ignited Australia Ltd, the industry growth centre, and Austmine Ltd.

As most West Australians will know, the Government changed in March 2017 with a concurrent change in some areas of policy. We are working with the Minister of Mines and Petroleum to support key areas of interest for him and his colleagues, such as regional development, greater engagement with Asia and inter-agency collaboration.

Outlook

Unfortunately, much of the influential work that MRIWA might continue to do is under threat as the funding envelope provided by the State Government steadily declines (although MRIWA has made a submission for additional funding in the current budget round). To put this into perspective, over the three-year period ending 2015/2016, the State invested in MRIWA \$2 million, \$2.5 million and \$3 million, respectively. However, the currently-approved amounts for the three-year period ending 2018/2019 are currently \$3 million, \$2 million and \$1 million, respectively.

Whilst the Board and management of MRIWA are cognisant of the challenges facing the State budget and are appreciative of this proposed investment, the substantial decline slated for future years means that total (leveraged) funding will also decline. This in turn means that the ability of MRIWA to make a difference to the positive future of the Western Australian minerals sector will reduce accordingly. Also, the State's ability to attract high-profile R&D enterprises, such as Cooperative

Research Centres that carry large amounts of Commonwealth and industry funding, will also deteriorate sharply. This is likely to come at a time when the minerals cycle starts its upward trend.

The Board of MRIWA, and our partners in industry and the research community, can only encourage the State Government to continue to provide the quantum of funding needed to maintain MRIWA as a relevant, positive force in State, National and International R&D for the benefit of Western Australia. There is no doubt that MRIWA is a significant asset for the State, providing an excellent return on investment at low cost.

Acknowledgements

During the past financial year, two members of the Board retired: Ms Michelle Andrews and Dr Andrew Shook. Both provided their prodigious skills and experience to our deliberations and decision-making processes over a sustained period, and I thank them for their selfless service.

The process to appoint 2 new directors was well advanced as at 30 June 2017.

I am most grateful to all my past and current Board colleagues as they exercise their responsibilities with enthusiasm and commitment. As I have noted in past reports, such a talented group of professionals makes the role of Chair a relatively uncomplicated one.

I continue to express my sincere thanks to the CEO and his small but dedicated team for successfully managing MRIWA through these challenging times. The staff continues to improve for the better the way the Institute engages with its three key stakeholder groups: State Government, Industry and the Research Community.

The members of the Advisory Committee and associated Theme Committees continue to provide indispensable advice to the Board on matters of research project investment and priority. These extraordinary people contribute generously of their time and intellect to the decision-making processes and I express my deep appreciation for their vital contribution.

The Director General and staff of the Department of Mines and Petroleum have always been and continue to be a great source of support and I thank them for their enthusiasm.

Finally, I wish to thank our Minister for much of 2016-2017, The Honourable Sean L'Estrange MLA, for his engagement, and I look forward to working with our new Minister, The Honourable Bill Johnston MLA who, in a relatively short period of time, has already demonstrated his interest in MRIWA.



Dr Peter Lilly

Chair
Board of Directors

Date: 5 August, 2017

Operations Report

This is the second full-year Annual Report for the Minerals Research Institute of Western Australia. The Institute commenced on 1 February 2014, after the *Minerals Research Institute of Western Australia Bill 2013* received royal assent on 18 December 2013.

There are welcome signs of changes in the Institute's external context during 2016/17. Of note are:

- Increases in mineral commodity prices from the lows of the previous year.
- Producers focusing on innovation to improve business performance, especially on using data and data analytics to improve operation of control systems and decision making.
- Producers acknowledging the value that companies in the mining, equipment, technology and services (METS) sector bring to increasing the scope and pace of innovation, where innovation is now widely recognised as the process of translating an idea or invention into a goods or service that creates value, or for which customers will pay.

The Australian mining industry is now focused on innovation, in notable contrast to the focus only a year or so ago on the narrower objective of improving productivity. Whilst commodity prices have generally increased during the reporting period, the broad challenges remain of higher energy costs, declining ore grades, and securing and retaining 'social licence to operate'.

Governments in Australia are increasingly recognising the potential of the small to medium enterprises (SMEs) and the METS companies as vital contributors to delivering innovation in the Australian minerals sector. Companies such as these are not only often innovative by nature but they have a potent capability to incorporate research into new or enhanced products or services that are required by the operating companies to achieve their improvement objectives. These companies have, and can increase, an important role as 'channels to market' for inputs to innovation by the operating mining companies.

The federal government has acknowledged this role in its program of Industry Growth Centres (ICG), which has the objective to enable national action on key issues such as deregulation, skills, collaboration and commercialisation.

MRIWA has established a close working relationship with the now well-established METS Ignited, the IGC for the METS sector.

Advances in enabling technology platforms for the minerals industry are converging at an ever-increasing rate to provide synergies that are already turbo-charging innovation. New sensors, vastly improved electronic communications and computing technologies, and capabilities to model and create visualisations of complex relationships from the macro- to the nano-scale are all being integrated to deliver technologies barely imaginable a decade ago.

The Institute recognises the importance of these changes to the research necessary for the Western Australian minerals industry of the future. Accordingly, the Institute has commenced reviewing the Research Priority Plan that guides its investment decision. It is expected that the review will be completed in late 2017.

In Western Australia, the state government recognised the value of increasing its investment in innovation, or the commercialisation of new science and technology, for the minerals industry some six years ago, with the commitment to establishing and funding MRIWA. This commitment was reinforced with the allocation in the 2016/17 State Budget of \$6 million of new funds to the Institute for the period 2016/17 to 2018/19. A submission was made to the 2017 Budget process (delayed from March by the State election) for further new funding for the Institute: the Budget will be announced in September 2017.

The state government’s view is that without a central coordinating research body, minerals research in Western Australia has no focal point: there are both potential unidentified research gaps and likely overlaps in mineral research.

The Institute is well-placed to contribute to the new government’s objectives to:

- Establish Western Australia as the ‘go-to’ place to find solutions to the difficult challenges facing the minerals industry.
- Achieve growth in regional areas of the State.
- Promote and develop engagement with selected economies in Asia.

The advancement and application of science for the minerals sector assist the State to grow and broaden the economy, create a new generation of jobs and expand relationships with the services sector of overseas economies, especially those in Asia.

The Institute’s strategy aligns with the developments in the broader minerals industry: particularly to increase its engagement with the companies providing technologies and services to the industry producers and to invest in research in the “demonstration and commercialisation” element of the innovation value chain (sometimes referred to as the ‘valley of death’ for product development) whilst still continuing to invest in early-stage research. The expectation is that this broader investment will lead to increased market uptake of research outputs. It is pleasing to report that MRIWA has achieved significant successes in 2016/17. In summary, the Institute has: further improved its external engagement; become a recognised voice in national minerals innovation; maintained its alignment with State goals; responded through its research investments to the industry cycle; and, further strengthened its governance.

The Institute’s plan for 2015/16 focused on:

- Maintaining a portfolio of research projects that aligns strongly with MRIWA’s objectives, the Research Priority Plan and the business strategy. Essential to achieving this is establishing a strong ‘pipeline’ of opportunities for research grants and a flow of applications to the Board.
- Maintaining the momentum of the tertiary scholarships and awards program.
- Marketing the Institute in the Western Australian and national mining, equipment and technology services (METS) sector and securing research projects with co-investors from the sector.
- Enhancing organisational capability to deliver to the requirements of the Act and the increased funds allocated to the new Institute.

These objectives have been achieved.

MRIWA Strategy

The Board approved the MRIWA strategy in September 2014. The strategy is founded on a revised business model for the Institute (refer Figure 4), which illustrates the new focus on the contribution that MRIWA looks to make to moving the results of research projects into use in the operating mining industry.

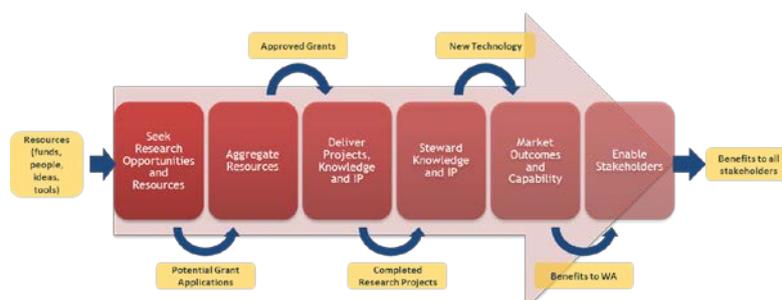


Figure 4. The MRIWA business model

To achieve its vision of promoting minerals research to optimise economic outcomes for Western Australia, MRIWA has identified and adopted several strategic goals. Two of particular note are:

- ***Become an influential stakeholder in the national minerals innovation system***

The minerals research community is a complex ‘ecosystem’ involving many participants from small private enterprises, international corporations, university institutions and government agencies (refer Figure 5).

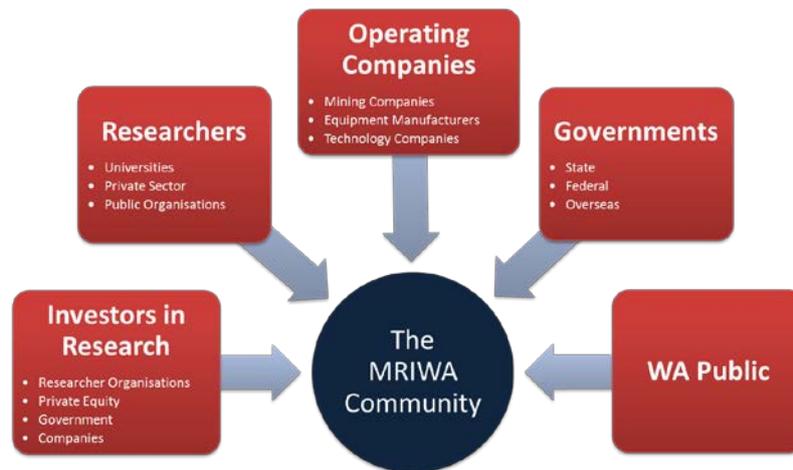


Figure 5. Schematic of the community served by MRIWA

By understanding this community and building strong relationships with the members, MRIWA aims to be an influential body, positively impacting the focus and direction of research to the benefit of our minerals industry.

- ***Extend from ‘enabling research’ to ‘enabling research and commercialisation’***

To have a real impact on industry success, research must progress from its origins in fundamental research to the commercialisation and implementation of new equipment or processes. As technology or concepts progress along this pathway, the financial investment required increases significantly, which can slow down or ultimately prevent their implementation.

MRIWA can assist this difficult transition from fundamental research to commercial application by judicious co-investment in research linked to operational testing, demonstrations or by assisting with the commercialisation and marketing process.

The other elements of the MRIWA strategy are to:

- Diversify its financing strategy beyond current government funding;
- Balance the varying needs of both government and industry stakeholders; and
- Identify and strengthen MRIWA’s core competencies.

Research investments

It is especially pleasing to report that the Board has approved \$11.2 million of Grants for minerals research projects, comprising \$4.4 million of MRIWA funds and \$6.8 million of other investors’ funds. (It is noted that this refers to investments approved by the Board during the reporting period, not to investments for which legally binding contracts were completed during the reporting period, as is required for reporting in the Financial Statements). The investments in research projects approved by the Board are summarised in Table 2, below.

Project Number	Project Title	RPP Theme	MRIWA (\$)	Co-investors (\$)	Total project (\$)
M479	Solution purification and valuable by-products formation during the production of battery-grade lithium from micas	3	\$95,632	\$100,000	\$195,632
M482	Development and Evaluation of Fume Free Explosives for Underground Blasting Applications	4	\$84,000	\$84,000	\$168,000
M488	Understanding fluid-rock interactions and lixiviant/oxidant behaviour for the in-situ recovery of metals from deep ore bodies	3	\$100,500	\$138,864	\$239,364
M489	Probabilistic Stope Design	2	\$85,000	\$290,000	\$375,000
M487	Hard rock disc cutting technologies: Fundamentals of cutter/rock interaction and rock failure mechanism	2	\$200,000	\$350,000	\$550,000
M492	Understanding uranium deposit behaviour to progress in-situ recovery implementation in Western Australia	3	\$125,000	\$185,000	\$310,000
M478	Mine Pit Lakes – Their Characterisation, Assessment, Management and Value as Potential Lead Indicators for In-Situ Metal Recovery Opportunities	4	\$220,000	\$330,000	\$550,000
M493	Don't Bury Western Australia's Geophysical Data: Uncovering Prospective Mineral Terrains with Regional Potential Field, Seismic and MT transects through cooperative inversion	1	\$125,300	\$132,600	\$257,900
M494	Mapping chemical architecture of gold camps	1	\$410,000	\$610,000	\$1,020,000
M495	A Study of Nano Diesel Particulate Matter (nDPM) Behaviour and Physico-chemical Changes in Underground Hard Rock Mines of Western Australia	4	\$166,120	\$350,000	\$516,120
M497	Ground Support Systems Optimisation - Phase 2: Extension to M431	2	\$671,250	\$1,260,000	\$1,931,250
M500	CRC-ORE (M441) On-belt Gamma Activation Analysis (GAA) Sensing for Gold: Phase 2 - Buildable Prototype Design and Laboratory Testing of Components	4	\$75,000 ¹	\$497,000	\$572,000
M468	Predicting grade distribution of comminuted particles to determine optimal grind size	3	\$102,500	\$111,300	\$213,800
M499	Establishing the in-situ rock bolt behaviour underground in order to model and design improved rock bolt support systems	2	\$400,000	\$870,000	\$1,270,000
M503	CRC-ORE (M441) Integration of Enhanced Grade Engineering Grade by Size Gangue Liberation and More Energy Efficient Comminution.	2	\$75,000 ²	\$901,748	\$976,748
M498	Wearable Technologies for Safety	4	\$25,000	\$25,000	\$50,000
M505	Glycine Heap Leaching	3	\$300,000	\$400,000	\$700,000
M507	QA4UAV - A standard workflow to quality assure UAV products	4	\$75,000	\$300,000	\$375,000
M509	MinEx CRC	1	\$1,000,000	\$4,000,000 ³	\$5,000,000

Table 2. Summary of MRIWA research project investments in the reporting period

^{1,2}Deemed allocation of MRIWA subscription to CRC ORE, ³Estimated co-investment if MinEx CRC bid is approved

An additional investment in research is provided by MRIWA through the PhD Scholarship Program. The new scholarships for 2016/17 are summarised in Table 2a.

Project Number	Project Title	RPP Theme	MRIWA (\$)	Co-investors (\$)	Total project (\$)
M501	Director's Scholarship – Yihao Fu	6	\$104,006	\$0	\$104,006
M502	MRIWA PhD Scholarship – Zela Ichlas	6	\$105,000	\$0	\$105,000
M504	MRIWA PhD Scholarship – Charles Spath	6	\$105,000	\$0	\$105,000
M508	ARC Industrial Transformation Training Centre (ITTC) in Resources Data Analytics (PhD scholarships x 2)	6	\$240,000	\$1,000,000	\$1,240,000

Table 2a. Summary of MRIWA educational program investments in the reporting period

A feature of the Research Grants approved for 2016/17 is the increased proportion directed to Productivity Improvement and New Materials and Markets (refer Research Priority Plan) when compared to earlier years.

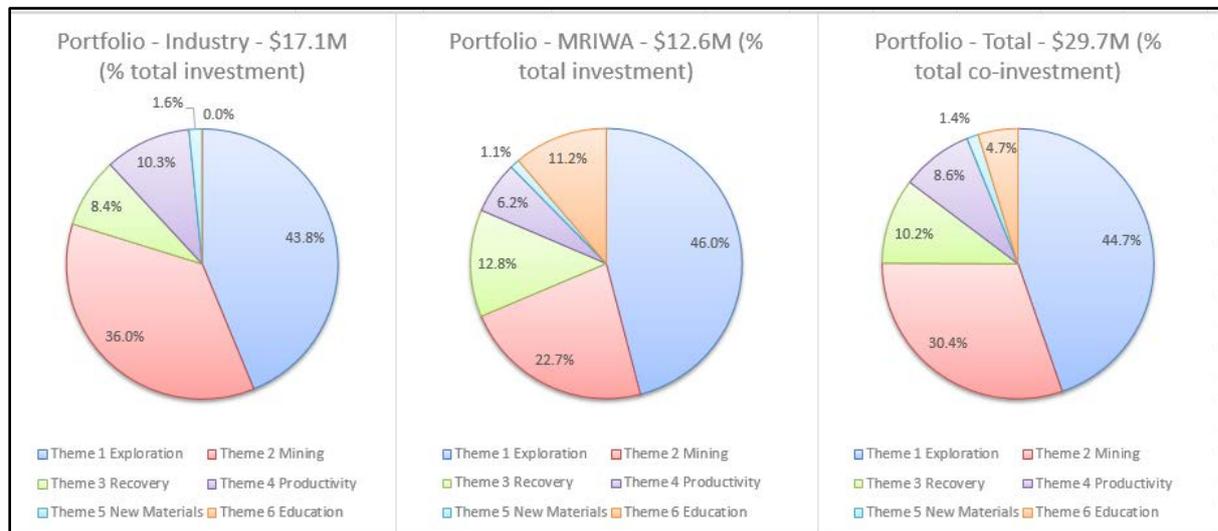


Figure 6. The distribution of new investments in 2016/17 and the investments in the entire MRIWA portfolio of research projects and education at 30 June 2017

It is also pleasing to report that the 'pipeline' of opportunities for future applications is strong and is characterised by: i) the wider spread across the Research Priority Plan themes; ii) the growing interstate participation; and, iii) the larger scale of projects - both financially and with regard to the collaborations of researchers and end-users.

Finances

MRIWA was in a sound position financially at the end of the reporting period. Results from the Financial Statements are provided in Table 3.

Item	\$ 000's
Accumulated funds opening balance at 1 July 2016	8,330
Plus income from State Government (Year ended 30 June 2017)	4,182
Less, net cost of services (Year ended 30 June 2017)	3,066
Accumulated funds as at 30 June 2017	9,445

Table 3. Summary of MRIWA's financial results for the reporting period for minerals research

The Institute's summary statistics for 2016/17 are provided in Table 4.

Factors	1 July 2016 to 30 June 2017
Projects	
Applications received ⁽¹⁾	18
Applications approved	19
Projects in progress ⁽²⁾	29
Projects completed ⁽³⁾	2
Technology Transfer	
Reports published	2
	(\$'000)
Funds Received (excluding Industry Sponsorship)	
Budget appropriation - Consolidated Revenue Fund	3,784
Budget appropriation - Exploration Incentive Scheme	350
Interest	205
Total Funds Received	4,339
Less administration costs (excl. depreciation)	981
Funds available to support research	3,358
MRIWA Grants approved during period	
For research projects	4,437
For scholarships	314
Total grants	4,751
Industry Sponsorship for approved new projects	6,859

Note 1: Defined as being given a project number.

Note 2: Projects in progress includes those approved by the Board (Conditions of Grant may not be finalised) to approval of the final report by the MRIWA Chair. Does not include projects in the education program.

Note 3: Projects completed to sign-off of the final report: release of the report may be delayed for up to 2 years by agreement with the Sponsor(s).

Table 4. Summary of MRIWA results for the reporting period

The full Financial Statements for MRIWA for the reporting period are provided at page 45.

The total financial commitments included in the Financial Statements in this Report represent only projects with completed contractual liabilities in place. MRIWA has committed additional monies to research projects during this period. The contracts for these projects are still to be finalised. These monies have not been included in the amounts shown in the Financial Statements, refer Note 22.

MRIWA Outcome-Based Management Structure: Key Performance Indicators

The Outcome-Based Management Structure and Key Performance Indicators (KPI) for the Institute were approved by the Department of Treasury in March 2015, to apply from the 2014/15 annual reporting period.

The KPIs are:

- Key Effectiveness Indicator: the ratio of total cash investments in research projects to total approved MRIWA cash investment in those research projects.
- Key Effectiveness Indicator: total administration cost for the year as a percentage of the total cash value of research projects and the education program under management during the year.

The full KPI report is provided at page 87.

Other Functions

In addition to the work to provide and manage research grants, MRIWA has progressed initiatives in its other functions during the reporting period. In summary:

- *Keep records about minerals research projects it undertakes, procures, manages or funds.* The Institute makes copies of reports from all completed research projects available through a searchable facility on the Institute's website. A new facility was commissioned during the reporting period that links report search to the Geological Survey Map released by the Geological Survey of Western Australia. The support of the Department of Mines and Petroleum in establishing and maintaining these facilities is gratefully acknowledged.
- *Work with other people, authorities and institutions about minerals research.* The Institute has adopted a strong 'outward-facing' approach to enhancing its networks and associations. Work has progressed with other WA government agencies, local and inter-State universities, CSIRO, industry peak bodies and associations, METS Ignited (the Federal Government's Industry Growth Centre for the resources sector) and local entities supporting early-stage innovation.
- *Maintain current knowledge of minerals research being undertaken.* The Institute has enhanced its capacity to develop and maintain its knowledge base by forging closer links with the Mining Engineering and Technology Services (METS), and the consulting and the early-stage innovation sectors of the minerals industry.
- *Promote public awareness and interest in minerals research.* The Institute substantially enhanced its partnership activities during the reporting period. (Refer to MRIWA's Partnerships (page 38) for the full report.)
- *Foster academic activities related to minerals research.* In addition to the strong investment in research projects, the Institute has invested a total in the last three years of \$1.3 million in its tertiary scholarships program. (Refer to MRIWA Scholarship Program (page 35) for full details.)
- *Advise the Minister about minerals research.* The Institute has briefed the Minister as appropriate. MRIWA gratefully acknowledges the contributions of both Minister L'Estrange and Minister Johnston to the Institute's activities during the reporting period.

Administration

The Institute completed a comprehensive review of the functionality of the system used to support managing the Institute's research projects. The scope of work for the revision includes:

- Establishing the database on SQL instead of Access.
- Redesigning the database to accommodate a range of project circumstances not envisaged when the current functionality was established and that have arisen because of the Institute's expanded activities.
- Providing for linking the database data to third-party reporting tools to provide ad hoc and customisable reports.

- Enhancing the capability to view historical information.
- Providing the basis for future functionality for digital transfer of data from applications for research projects submitted on-line directly into the project management system.

The revised system is scheduled to be in operation in late 2017.

A review of the Grant Application Form and associated Guidelines was substantially completed during the reporting period. The intent is to:

- Align the Grant Application Form with the enhanced assessment criteria being used by the Board;
- Lay the foundation for on-line completion and submission of the Form; and
- Provide for digital transfer of relevant information directly to the Institute's project management system.

The new Application Form will be introduced in the fourth quarter 2017.

The Institute extends thanks to Ms Michelle Andrews and Dr Andrew Shook, who both completed their work with the MRIWA Board during the reporting period, for their much-appreciated contributions to the Institute.

Research

Advisory Committee Chair's Report

Pleasingly, it has been a very busy year for the Advisory Committee, as it has been for all involved in assembling, assessing and approving the research grant applications. The committee has reviewed an unprecedented number of proposals, the range and variety of which is remarkable. The January meeting, for example, considered nine applications, the objectives of which ranged across the spectrum of the industry from conceptual exploration to sophisticated approaches to safety improvement; with proposals being submitted by technology start-up companies alongside proposals from established research groups.

The Advisory Committee receives the applications after they have been through a process of vetting, assessment, comment, feedback and improvement. This process is guided by MRIWA's CEO, Mark Woffenden; Research Portfolio Manager, Anil Subramanya; and Project Manager, Penny Atkins, who seek to ensure that they conform with MRIWA's standards and are consistent with MRIWA's objectives. The process includes the researchers submitting their proposals for external assessment plus expert review by the relevant Theme Committee (or Committees), the members of which are respected industry professionals and academics. Following modification and, where necessary, resubmission, proposals are put to the Advisory Committee. The Advisory Committee, in turn, discusses the merits of each proposal and considers the assessment and advice of the Theme Committees.

The Advisory Committee also pays due attention to the need to husband the limited resources available to MRIWA for distribution. Further detail is frequently sought of the grantees' intended application of the grant monies in order to satisfy the committee that grants will be prudently disbursed towards key research activities. Further, the Committee seeks to stretch the funds by insisting on external sponsorship that provides adequate financial leverage to the grants.

Industry funding is preferred both for the welcome source of external finance, for the vote of confidence in the research that this represents, and for the consequent greater likelihood that the outcomes of the research will find practical, commercial application. The industry has continued to provide substantial financial and in-kind support for the projects that MRIWA sponsors.

The assessment and approval process is designed to provide continuity. MRIWA's CEO and his staff have carriage of the projects along their complete journey from pre-submission to project completion and reporting. This is complemented by the Chairs of the Theme Committees who, as members of the Advisory Committee, overlap with my work as the Chair of the Advisory Committee before I, in turn, provide a conduit between Advisory Committee and the Board.

To this end, I, as the Chair of the Advisory Committee, attend meetings of the MRIWA Board, explaining the Advisory Committee's views of the merits of the various research proposals under consideration.

Researchers frequently acknowledge the benefits of having their proposals examined by the MRIWA staff and the various committees with their collective knowledge and wealth of experience. The process generally results in submissions being improved, and frequently results in the projects themselves being modified to positive effect. The outcome is a high success rate for proposals that are presented to the Board for approval. Although it is not uncommon for Board, in its wisdom, to reject a proposal, resubmission of an improved proposal frequently results in both a better project and success in obtaining sponsorship from MRIWA and others.

I would like to thank the members of the committees for giving generously of their time, energy and insight. I'd also like to thank the MRIWA staff, led by Mark Woffenden for their dedicated and professional work, and for striving their hardest to make the workings of the committees smooth and efficient.



Everyone involved with MRIWA can take pride in the increasing demand for MRIWA's sponsorship of research, and in the respect it attracts for its role in fostering work that benefits the minerals industry of Western Australia.

A handwritten signature in black ink, appearing to read "Ian Suckling".

Mr Ian Suckling

Chair
MRIWA Advisory Committee

Date: 3 August, 2017

Research Project Investments

Investments in 19 research projects were approved by the Board during the reporting period. The projects covered three exploration topics (finding more resources), five mining topics (expanding the mining envelope), five processing topics (increasing recoverable value) and six topics looking at productivity and developing new products and markets.

Details of each of these investments are provided below.

M468 – Predicting grade distribution of comminuted particles to determine optimal grind size

The project will establish the distribution of mineral grains within the host rock by evaluating the underlying probability distributions through measurements on sections of the parent rock using image analysis techniques on a sound scientific basis.

The project contributes to MRIWA's strategic positioning by virtue of:

- The potential contribution to improving productivity in the mining industry.
- Having co-investment by several mining companies.
- Further increase the productive relationship between MRIWA and CRC ORE.

M478 – Mine Pit Lakes – Their characterisation, assessment, management and value as potential lead indicators for In-situ metal recovery opportunities

Research is required to i) better assess and predict the leaching potential and environmental impact of mineralised waste rocks and pit wall rocks pertinent to mine pit lake water quality and ii) to inform the development of laboratory-based decision support tools that will inform environmental impact assessment, mine waste management options and ultimately facilitate mine site closure approval. Research is also required to determine whether anomalies can be detected from an analysis of mine pit lake and surrounding borehole samples, to determine whether such information could provide any preliminary indication of an ore body that may be suited to in-situ recovery.

The project contributes to MRIWA's strategic positioning by virtue of:

- The potential contribution to improving productivity in the mining industry.
- Participation of several WA state government regulators.
- Informs the regulators on better guidelines to industry about mine closures.
- Being an example of the collaboration opportunities fostered by MRIWA – in this case between ChemCentre and CSIRO.
- Providing an impetus to the study of the viability of in-situ recovery of metals.

M479 – Solution purification and valuable by-products formation during the production of battery-grade lithium from micas

Lithium Australia is sponsoring the development of a hydrometallurgical process to extract valuable by-products from the process for extracting high-grade Lithium carbonate from micas. Micas have generally not been used as a source mineral for Lithium

The project contributes to MRIWA's strategic positioning by virtue of:

- Contributing to MRIWA's Theme 5 – New products from new materials.
- Bringing together two industrial partners – a mining company and a METS company.
- Promoting the possibility of opening new resources for Li in WA.

M482 – Development and Evaluation of Fume-Free Explosives for Underground Blasting applications

An industry-led project that has potential application in underground mines in WA as well as globally. It aims to evaluate the application of NO_x free explosives in underground mines with the aim to reduce negative impacts to health as well as to reduce entry times. Sponsors of this project will be leveraging a substantial amount of resources from the development of this new technology over the last two years, including a method for on-site manufacturing of the HP-based explosive product.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 4 – Improve productivity.
- Enabling research that will allow the exploitation of new mines and ore streams faster.
- Bringing multiple mining companies together to collaborate on research being carried out by Mining3.

M487 – Hard rock disc cutting technologies: Fundamentals of cutter/rock interaction and rock failure mechanism

The aim of this study, to be carried out by Mining3, is to study the mechanics of the hard rock failure, taking into account the kinematics of the undercutting tools, the tool/rock interaction and the rock properties. Using advanced numerical and mathematical modelling techniques along with carefully designed experimentation program, the project will investigate the boundary condition at the cutter/rock interface to study its effect on the consequential mode of failure.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 2 – Expanding the mining envelope.
- Having the support of major mining equipment suppliers.
- The potential to develop safer and more efficient underground mining technology.

M488 – Understanding fluid-rock interactions and lixiviant/oxidant behavior for the in-situ recovery of metals from deep ore bodies

This project will involve a co-supervised PhD student working at both the Curtin and CSIRO facilities to develop knowledge and fundamental information critical to the application of a new approach to the exploitation of mineral resources located at depth, and which has the potential to contribute to a significant upturn in investment and related projects. Quarterly progress/research review meetings will be held between the PhD student, CSIRO, Curtin University, BASF and MRIWA to ensure full contribution and involvement of all the interested organisations.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 3 – Increase recoverable value.
- Fostering collaboration between research organisations.
- Having the involvement and support of a major chemicals supplier.

M489 – Probabilistic Slope Design

The vast majority of underground mines in Australia (including WA) use some form of open stope mining method. The profitability of open stope mining is intimately linked to the accuracy of the stope design and the execution of the mining process. The performance and value creation from mining a stope is largely influenced by the amount of overbreak (OB) and underbreak (UB) achieved. This proposal focusses on the development of reconciliation methods for OB and UB, and how this reconciliation could be fed back into future designs to achieve the optimum value from open stope mining.

The aim of this project is to develop, and implement at 7 sponsor sites, a method and associated tools to enable probabilistic approach to slope design by informing designers on the probability of overbreak and underbreak outcomes from different design scenarios.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Themes 2 & 4 – Expanding the mining envelope and Improving productivity.
- Bringing together 7 national and international mining companies working in collaboration with a specialist research organisation.
- Having the potential to develop safer and more efficient mining technology.

M492 – Understanding uranium deposit behavior to progress in-situ recovery implementation in Western Australia

Cauldron Energy have plans to conduct appropriate field trials (pump tests, push-pull tests, recirculating load tests and uranium recovery tests) for uranium recovery from the sandstone-hosted Bennet Well deposit in Western Australia. As an essential and critical sub-component of the field leach trials, research is required to better understand:

- The deposit chemistry, mineralogy and leach behaviour at fine and coarse particle sizes to provide an indication of likely in situ uranium recoveries, rates of recovery and lixiviant consumption.
- Gangue dissolution behaviour, impurity deportment and likely pregnant leach solution compositions for downstream processing.
- The accessibility of solution to valuable minerals and develop hydrogeological and reactive transport models to provide an understanding of behaviour.

The results from the research activity will feed into the thinking, design and execution of the field trials and the outcomes and learnings from each stage of the field trials will feed into the progression of the research and the development of fundamental understanding.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 3 – Increase recoverable value.
- Progressing research into in-situ recovery of metals.
- Creating the potential for deposits not amenable to conventional mining to be exploited.

M493 – Don't bury Western Australia's geophysical data: Uncovering prospective mineral terrains with regional Potential Field, Seismic and MT transects through cooperative inversion

This project aims to uncover prospective mineral terrains with Regional Potential Field, Seismic and MT transects through cooperative inversion. As the search for future mineral deposits goes deeper under cover, advances in geophysical techniques to identify and study these deposits become critical to successful exploration. Using a combination of techniques and data analysis, the prime objective is to create and trial cooperative inversion technologies for recovering rock properties from depth.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 1 – Find more resources.
- The potential for the METS sector to provide better technologies for exploration.
- Having collaboration between private and government (DET CRC) agencies.
- Adding value to pre-existing pre-competitive datasets.

M494 – Mapping chemical architecture of gold camps

The aim of the project is to provide the minerals industry with a practical template for mapping Au systems and targeting high grade Au resources leveraging off high impact research of the last two decades, much of it supported by MRIWA/MERIWA (M358, M377, M400, M410, M411, M452) and the legacy of the AGCRC (Australian Geodynamics CRC; 1993-2000) and the pmd*²CRC (Predictive Mineral Deposits CRC; 2002-2008). This previous research has provided the conceptual framework, identified the architectural elements that are important at the camp scale, established a common structural evolution of Au systems in the late Archean and identified the chemical gradients (redox, pH and activity of H₂O) that need to be mapped onto the architecture.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 1 – Find more resources.
- Bringing collaboration between 5 gold mining companies in WA.
- Improving the ability to explore on a camp-scale leading to new discoveries.

M495 – A study of nano Diesel Particulate Matter (nDPM) behavior and physico-chemical changes in underground hard rock mines

The use of diesel-powered equipment has been continuously increasing in underground metal/non-metal mines. This extensive utilisation of diesel-powered equipment generates the potential for exposure of underground miners to diesel particulate matter (DPM), including nano-diesel particulate matter (nDPM). The majority (by numbers) of the diesel particles are in the nano-size range, hence the term nDPM. In 2012, the International Agency for Research on Cancer (IARC) classified DPM as carcinogenic to humans (Group 1). There are critical gaps of knowledge on the character of DPM, its behaviour and size.

This project aims to be the definitive study of nDPM in Western Australian Mines.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 4 – Improve productivity.
- Helping Western Australian regulatory bodies formulate better policy and guidelines.
- Establishing a collaboration between multiple government bodies and universities and active participation by the mining industry.

M497 – Ground Support Systems Optimisation – Phase 2: Extension to M431

The overall Objectives of GSSO Phase 2 will be to develop new tools and guidelines for ground support design in extreme ground conditions (more specifically in rockbursting and squeezing ground) and advancing the use of probabilistic approaches in mining geomechanics. These objectives are reflected in the two main research themes proposed: Ground support in extreme ground conditions and ground support optimisation and the use of probabilistic approaches

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 2 – Expanding the mining envelope.
- Bringing together 5 national and international mining companies working in collaboration with a specialist research organisation.
- Having the potential to develop safer and more efficient mining technology.

M498 – Wearable technologies for safety

Back and muscle injuries are the most prevalent injury within Mining company workforces, costing \$8,400 annually for every employee (not just those injured). 25% of this cost comes from rehabilitation, with the remaining 75% made up of employee replacement and lost productivity.

This project helps employees and organizations to reduce their injury frequency by using wearable technologies to track body movements and communicate injury risk. This allows the organization to be more productive as there is less disruption to their production process. It also allows every employee to return home after a swing, healthy and ready to enjoy their R&R with their families and friends and have a positive impact on their communities.

This project contributes to MRIWA’s strategic position by:

- Contributing to MRIWA’s Theme 4 – Improve productivity.
- Having the support of a major mining company.
- Focusing on a research area of developing interest to the minerals sector – data analytics.

M499 – Establishing the in-situ rock bolt behaviour underground in order to model and design improved rock bolt support

This proposal is concerned with developing an instrumentation technology to understand the combined loading conditions to rock bolts, caused by axial, shear and bending loads. All of these occur on rock bolts in situ. This is unlike previous instruments where the shear direction could only be estimated in one direction - this could effectively measure the shear and bending direction relative to the cross-section of the rock bolt.

This research will provide meaningful understanding of the actual loading mechanisms and effectiveness of rock bolts under conditions of strain which will improve future support designs and rock-related safety.

This project contributes to MRIWA’s strategic position by:

- Contributing to MRIWA’s Theme 2 – Expanding the mining envelope.
- Providing collaboration between Mining 3 and Curtin University.
- Having the potential to commercialise new technology via the METS sector.

M500 – CRC-ORE (M441) On-belt Gamma Activation Analysis (GAA) Sensing for Gold: Phase 2 – Buildable prototype design and laboratory testing of components

Bulk gold ore sorting (GOS) is an opportunity to make a large impact in a significant sector of the Australian and world-wide mining industry by using an integrated technology solution. Gold deposits have low head grade compared to base metal deposits and high grade heterogeneity, this provides a large opportunity for bulk sorting if the fundamental problem of measuring the low levels of gold can be overcome.

This past year CSIRO has undertaken a feasibility study into gamma activation analysis (GAA) in CRC ORE centre funded project (“Validation of gamma activation analysis for rapid on-belt sensing”) that has shown very prospective results of projected sensitivity for gold in bulk. This proposal follows on from that success.

The goal of the new project is to produce a buildable, costed design for a 60tph GAA gold ore sorting pilot facility that is validated by direct performance measurement of components and extensive

modelling, and whose principal components (Linac high power X-ray source), detector array, radiation conveyor, and main shield) could directly translate to an on plant trial or production system. As a part of this project industry outreach would commence with potential end users for sample provision and potential on site trials at mine sites.

The principal technical challenges are validating the modelled sensitivities, constructing an appropriate detector system and designing a shieldable, practical system. To do this a completely functioning belt detector system will be constructed in the project (one of the two units to be deployed above and below the measurement belt) and measurements made with real ore samples at a Linac facility.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 4 – Improve productivity.
- Being backed by a cohort of industry participants in CRC ORE.
- Having the potential to increase the efficiency and productivity of the gold mining industry.

M503 – CRC-ORE (M441) Integration of enhanced Grade Engineering by size gangue liberation and more energy efficient comminution

Extensive work by CRC ORE to-date has shown that natural grade by size department during coarse rock breakage and screening is a key lever for generating high-value coarse separation in Grade Engineering applications.

Next generation Vertical Shaft Impactor (VSI) breakage devices and well controlled abrasion have been identified from previous JKMRC research as capable of delivering the required selective and high-efficiency breakage and preferential liberation outcomes which can be exploited in the context of Grade Engineering and whole of system optimisation. This project aims to undertake extensive laboratory-based research into enhancing coarse liberation through controlled energy application using next generation VSI technologies for a range of selected ores and operations. Outcomes will be fundamental knowledge; new laboratory ore characterisation protocols for VSI amenability; benchmarking against current screening-based Grade Engineering practice and outcomes; cost integrated modelling of improved comminution energy efficiencies linked to coarse separation; and provision of key inputs into a parallel industry-funded Implementation Council project to design and manufacture prototype next-generation VSI-based comminution devices.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 2 – Expanding the mining envelope.
- Being backed by a cohort of industry participants in CRC ORE.
- Having the potential to increase the efficiency and productivity of the mining industry.

M505 – Glycine heap leaching

Glycine Heap Leaching is an emerging metallurgical technology with the potential to unlock substantial mineral resources in Western Australia and beyond. This proposal is to research the application of glycine leach technology to the treatment of copper and gold ores via heap leaching.

For gold ores, glycine can either replace or greatly reduce cyanide consumption. Ores containing both gold and copper, incompatible in conventional leach processes, may now be co-extracted by a combined glycine-cyanide solution. As well as the process advantages, glycine is environmentally benign and very safe to work with. It is recycled within the process, leading to low operating cost and no special disposal issues.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 3 – Increase recoverable value.
- Bringing collaboration between 5 mining companies and a METS provider.
- Enhancing application of technology invented in WA which has the potential to provide improvements in efficiency for the mineral processing industry.

M507 – QA4UAV – A standard workflow to quality assure UAV products

This project will establish a set of standard specifications based on the partners' stakeholders needs, then develop a workflow for end users for acquiring and running QA checks on UAV imagery based products. The aim is to leverage already developed modules from QA4LiDAR and QA4MOBILE to build a third tool in the "QA4" suite through a workflow tailored to end users who have less technical expertise than suppliers.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 4 – Improve productivity.
- Helping bring CRC SI's spatial science expertise and capability to bear on the minerals industry.
- Improving the productivity and efficiency of a new technology by bringing in standards across the industry.

M508 – ARC Industrial Transformation Training Centre (ITTC) in Resources Data Analytics

Establishing an ITTC in Resources Data Analytics in WA will enable participating companies to build a data science savvy workforce, whilst at the same time implement new techniques to improve their own value chain.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Theme 6 – Education.
- Encouraging new talent in an area of research interest for MRIWA and the minerals industry – the science of Data Analytics – an emerging area of importance in the future of the mining industry.

M509 – MinEx CRC

The MinEX CRC is a bid to continue on from the DET CRC and ensure that the technologies that were developed in the DET CRC can be developed and applied to the search for deeper deposits. It aims to drive collaboration between mining companies, METS suppliers, Geological Surveys and research organisations nationally. It will take the coiled tubing drill rig developed by the DET CRC and apply it to remote exploration with the aim of slashing the cost of drilling in addition to bringing important safety and environmental benefits and delivers to the National Drilling Initiative.

This project contributes to MRIWA's strategic position by:

- Contributing to MRIWA's Themes 1 and 4 – Find more resources and Improve productivity.

No.	Project Title	Applicants	Institute	Term (yrs)	RPP Theme	MRIWA (\$)	Total (\$)
M431	Ground Support Systems Optimisation	Prof Y Potvin	ACG	3.5	2	240,000	1,560,000
M432	Validation & Standardisation of Sequential Leaching Tests to Better Predict the Impact of Mining On Ground & Surface Water Quality	Dr N Rothnie Dr S Black	ChemCentre	2	4	85,360	216,360
M436	Distal Footprints of Giant Ore Systems: Capricorn WA Case Study	Dr R Hough	CSIRO	3	1	2,580,000	7,580,000
M441	CRC ORE II	Dr S Walters	CRC ORE	5	3	600,000	6,600,000
M446	4D Evolution of WA Ore Systems (WA4D): Re-Os Sulphide Geochemistry	Prof N McNaughton	Curtin	3	1	175,000	341,650
M448	4D Evolution of WA Ore Systems (WA4D): Rutile - Pathfinder to Ores	Prof N McNaughton	Curtin	3	1	263,113	489,763
M449	Drop Probe System – RC LWD (Reverse Circulation Log-While-Drilling)	Mr G Stewart	Globaltech Corporation Pty Ltd	0.75	4	150,000	300,000
M450	Feasibility of Electrokinetic In-Situ Leaching	Prof A Fourie	UWA	3	4	50,000	50,000
M451	Establishing Leaching Environmental Impact Assessment Tools in The Development of A WA Framework for By-Product Re-Use and Classification	Dr S Black	ChemCentre	2	5	144,130	414,130
M452	Pathways to High Grade Gold: 3D Gradient Mapping of Mineral Systems	Dr J Walshe	CSIRO	1	1	395,000	595,000
M458	A Novel Direct Leach Approach to Extract Platinum Group Metals (PGM) From The Panton Sill PGM Deposit in The Kimberley Region of WA	Prof J Eksteen	Curtin	3.5	3	200,000	510,860
M459	Magmatic sulfide mineral potential in the East Kimberley	Dr Steve Barnes	CSIRO	1	1	61,320	101,320
M462	Multi-Scaled Near Surface Exploration Using Ultrafine Soils	Dr R Noble	CSIRO	2	1	149,500	387,000
M464	Rock properties to predict rockburst vulnerability in three dimensions	Dr Phil Dight	ACG	4	2	1,100,000	1,980,000

No.	Project Title	Applicants	Institute	Term (yrs)	RPP Theme	MRIWA (\$)	Total (\$)
M465	Deep Crustal-Scale Structure, Geological Evolution and Multi-Commodity Prospectivity Analysis in The Halls Creek Orogen, Kimberley Region, Western Australia	Dr S Occhipinti	CET	3	1	33,445	45,945
M467	Mineralogical and Lithological Controls on REE Distribution in The Argyle Diamond Deposit	Dr L O'Connor	Curtin	2	1	30,000	60,000
M470	Mineral Systems On the Margin of Cratons: Albany-Fraser Orogen / Eucla Basement Case Study	Dr C Kirkland	Curtin	3	1	250,288	765,288
M476	An Integrated Multi-Scale Study of Crustal Structure and Prospectivity of the Eastern Yilgarn Craton and Adjacent Albany-Fraser Orogen	Dr M Dentith	CET	2.5	1	312,948	652,948
M477	Molten Salt Mineral Processing Technology	Dr Frank Bruno	University of South Australia	2	3	246,000	580,000
M479	Solution purification and valuable by-products formation during the production of battery-grade lithium from micas	Dr Aleks Nikoloski	Murdoch University	0.75	3	95,632	195,632
M482	Development and Evaluation of Fume Free Explosives for Underground Blasting Applications	Dr Italo Onederra	Mining3	1	4	84,000	210,000
M484	M459 Extension- Magmatic Sulphide Mineral Potential in The East Kimberley	Dr M Levailant	CSIRO	0.75	1	45,140	75,140
M485	GE.VIEW.WA - Developing New Tools and Resources for Benchmarking Grade Engineering® Opportunity for the WA Gold Mining Industry	Jonathon Rutter	CRC-ORE	1	2	74,000	146,000
M487	Hard rock disc cutting technologies: Fundamentals of cutter/rock interaction and rock failure mechanism	Dr Sevda Dehkhoda	Mining3	3	2	200,000	550,000
M488	Understanding fluid-rock interactions and lixiviant/oxidant behaviour for the in-situ recovery of	Laura Kuhar	CSIRO	3	3	100,500	139,364

No.	Project Title	Applicants	Institute	Term (yrs)	RPP Theme	MRIWA (\$)	Total (\$)
M492	Understanding uranium deposit behaviour to progress in-situ recovery implementation in Western Australia	Laura Kuhar	CSIRO	0.25	3	125,000	310,000
M493	Don't Bury Western Australia's Geophysical Data: Uncovering Prospective Mineral Terrains with Regional Potential Field, Seismic and MT transects through cooperative inversion	Brett Harris	Curtin University	1.5	1	125,300	257,900
M495	A Study of Nano Diesel Particulate Matter (nDPM) Behaviour and Physico-chemical Changes in Underground Hard Rock Mines of Western Australia	Dr Silvia Black	ChemCentre	1	4	166,120	516,120

Table 5. MRIWA research project portfolio at 30 June 2017

Research Reports Finalised

A summary of each of the research project reports finalised and released during the reporting period is provided below. Two projects were completed in the reporting period.

M434 Selective Biomining of Rare Earth Phosphate Ores and Minerals

Report No. 316

Grantee: Curtin University
Applicant: Drs Jacques Eksteen & Elizabeth Watkin
Grant Amount: \$191,770
Duration: 1.5 years
Commenced: November 2014
Sponsors: One industry sponsor

Rare Earth Elements (REEs) are an essential component in most modern technologies. A decrease in global supply provides WA an opportunity to become a player in this industry.

The aim of this project was to propose a biomining approach to recovering Rare Earth phosphate ores to avoid the high cost and dangerous processing of waste conventionally. The project studied phosphate solubilising microorganisms, ideal growth conditions for these PSMs. This data was complemented by biogeochemical process data.

M437 Bayer Precipitation & Alumina Quality

Report No. 317

Grantee: CSIRO
Applicant: Dr Iztok Livk
Grant Amount: \$600,000
Duration: 3 years

Commenced: July 2014
Sponsors: Subsidiary of AMIRA project

The primary objective of the current project was to quantify the impact of a high shear environment, as may be applied in the precipitation circuits, on the strength of hydrate. Investigating the linkage between slurry shearing and breakage of hydrate particles provided crucial information on separate roles of precipitation conditions and slurry shearing on the strength of gibbsite particles. To investigate the potential impact of slurry shearing on product strength, an extensive experimental program was put together that connects laboratory precipitation with slurry shearing and hydrate strength. The experimental campaign made use of refinery hydrate samples, featuring a range of different internal structure characteristics, provided to the project by sponsoring companies.

MRIWA Scholarship Program

MRIWA has committed a total of \$1.3 million to tertiary student scholarships since commencement of the Institute on 1 February 2014.

There are two streams to the scholarship program: i) stipends for PhD candidates for up to three and one half years of their research studies and, ii) the Odwyn Jones Awards for undergraduate Honours and fourth year Engineering students.

The design principles for the MRIWA PhD scholarships focus on two criteria: i) to make a significant contribution to MRIWA's objectives; and, ii) to attract applicants with exceptional academic capability.

The Institute's commitment of \$1.3 million to the Scholarship Program over 2014-17 has been allocated to:

- 3 Directors' PhD scholarships.
- 9 MRIWA PhD scholarships.
- 22 Odwyn Jones Honours Awards.
- 3 Best Thesis prizes, of \$3,000 each, for Odwyn Jones awardees.

The Institute gratefully acknowledges the generous donation by Directors of their Board sitting fees to substantially fund three of the PhD scholarships – known as the Directors' PhD Scholarships. The first Directors' PhD scholarship was awarded in 2015. The Board wished to direct these scholarships to research in the fields of minerals data analytics, *in-situ* leaching and/or the fundamentals of scale-up. The 2015 Directors' scholar is researching the feasibility of electrokinetic *in situ* leaching; the 2016 Directors' scholar's topic is Quantifying the Role of Exploration Upside in Mineral Project Evaluations: The Missing Link in Project Value Determination?; the 2017 Directors' Scholar's topic is Characterization of Ore and Bulk solid systems by use of multivariate image analysis and deep learning neural networks.

Nineteen eligible applications for the PhD scholarships were received for the 2017 scholarships, 10 from Curtin University, 5 from Murdoch University and 4 from The University of Western Australia.

MRIWA is delighted to have awarded the 2017 PhD scholarships to the students shown in Table 6.

Scholar	Scholarship	Topic
Yihao Fu Curtin University	Directors' PhD	Characterization of Ore and Bulk solid systems by use of multivariate image analysis and deep learning neural networks
Zela Tanlega Ichlas Curtin University	MRIWA PhD	Development of an Industrially applicable electrostatic solvent extraction column for process metallurgy
Charles Spath (The University of Western Australia)	MRIWA PhD	Unlocking the Ni-Cu-PGE potential of the Musgraves region of Western Australia

Table 6. Winners of the 2017 PhD Scholarships.

The Honours Award was named to recognise Professor Odwyn Jones who maintained a career-long advocacy for strong mining education programs and engagement of students with the mining industry. Professor Jones also chaired MERIWA's Advisory Committee from 1999 -2013.

The Institute gratefully acknowledges the generous donation by members of the advisory committees of their Committee sitting fees to substantially fund the Odwyn Jones Awards.

In 2017, MRIWA awarded 5 Odwyn Jones Awards of \$5,000 each to students David Fox, Katie Marshall, Brandon Rego and Warrick Turner (all Curtin University students), and David Wise (Murdoch University student).

Scholar	Topic
David Fox	The mineralogy and geochemistry of Tumblagooda Sandstone reduction spheroids
Katie Marshall	Technical assessment of flocculant addition strategies and technologies within the red mud separation circuit of the Bayer process
Brandon Rego	Tropicana Gold Mine's raw water treatment using nano-filtration and evaluation of the impact thereof on gold ore leaching kinetics
Warrick Turner	Investigate the controls on the distribution and nature of the residual and transported cover, to improve exploration through cover in the Southern Yamarna Belt (Supported by Gold Road Resources Ltd)
David Wise	Processing Hard Rock Lithium

Table 7. Winners of the 2017 Odwyn Jones Awards.

The author of the best thesis of the 2016 Odwyn Jones cohort was Thomas Pilote, who was awarded a prize of \$3,000.



2017 Odwyn Jones Awards Winners

Back Row (L-R): Dr Peter Lilly (MRIWA Chairman), Mr David Wise, Hon Bill Johnston MLA (Minister for Mines and Petroleum), Mr Brandon Rego.

Front Row (L-R): Mr David Fox, Mr Warrick Tunner, Ms Katie Marshall, Mr Mark Woffenden (MRIWA CEO).

MRIWA's Partnerships

Austmine

"Austmine is Australia's leading association of the Australian Mining, Equipment, Technology and Services sector (METS)". This sector comprises firms that provide specialist services to the mining and minerals industry.

MRIWA is a member of Austmine to allow the Institute to better connect with this vital sector the minerals industry, to promote opportunities for further collaborative research to benefit the Western Australian economy, and, to advance the Institute's strategic objective of contributing more to enabling the commercialisation of the outputs from research projects.

The Institute participated in Austmine's first Collaboration Laboratory (Co-Lab) in Perth in June 2016, on the topic of Next Generation Mineral Extraction. The Institute is a lead contributor to the Co-Lab Working Group: Real-time Orebody Modelling, which was established at the initial Co-Lab. It is pleasing to note that an Application for an MRIWA research Grant was received in June 2017 for the project *The 'System-Optimised Mine' Stage 1 – Near Real-time tracking*, which is a direct outcome of the Co-Lab initiative.

Early-stage Innovation – CORE and Uearthed

MRIWA has established relationships with Perth-based organisation Uearthed and CORE that are actively contributing to the rapidly developing early-stage innovation community associated with the resources sector.

METS Ignited

As part of the Australian Government's Growth Centres Initiative, METS Ignited is tasked with developing, and delivering to, a competitiveness plan for the Australian METS sector. MRIWA contributed to the METS Ignited Sector Competitiveness Plan for METS and both parties are collaborating in areas of common interest, with a high priority on co-investment in research and development projects for the minerals sector.

Co-operative Research Centres

The scale and reach of CRCs affords MRIWA an effective means to put Western Australia's minerals research interests in the national arena. Involvement with CRCs provides MRIWA with valuable access to stakeholder communities and provides the opportunity to attract greater research investment to Western Australia than might otherwise occur.

In addition to the formal relationship with CRC Optimisation of Resource Extraction II, MRIWA is working with CRC Spatial Information to promote research into the application of spatial information in the minerals industry. MRIWA is also a partner in the bid for the new MinEx CRC.

International Centre for Radio Astronomy Research

MRIWA has a long-standing relationship with ICRAR founded on a shared interest to promote research and industry development in Western Australia.

MRIWA Sponsorships

The Institute has an active sponsorship program designed to contribute to its functions (MRIWA Act S11) to promote public awareness of, and interest in, minerals research and to foster academic activities relevant to the Institute's functions.

Unearthed Shield-X hardware hackathon

Unearthed and partners, BHP Billiton, Barrick Gold and MRIWA, sponsored the first international hardware challenge arranged by Unearthed called Shield-X. The event called on engineers, designers, developers and innovators from around the globe to join the Shield-X competition to design a safety-stop device that could communicate to any piece of autonomous equipment, regardless of the brand.

13th International Nickel-Copper-PGE Symposium, Perth, 2016

Held in September 2016 at Fremantle, the themes for the Conference included:

- Geodynamics and architecture of magmatic Ni-Cu-PGE systems;
- Geophysical and geochemical imaging of ore forming processes;
- Physical processes of intrusion emplacement, magma flow, sulfide liquid transport, deposition, migration and deformation;
- New discoveries and exploration technologies; and
- Non-conventional polymetallic Ni +/- Cu, PGE ores including sedimentary-hydrothermal settings.

Earth Sciences Western Australia

The MRIWA Board continues sponsorship of \$30,000 over 3 years to the ESWA initiative for regional outreach in Kalgoorlie and surrounds. The Institute gratefully acknowledges the generous donation of their sitting fees by members of the MRIWA advisory committees, which has made this sponsorship possible.



Image credit: Joanne Watkins, CEO of Earth Sciences Western Australia (ESWA)

Two students using loupes to carefully examine a rock sample. These loupes are given out to each student in the program, who can then use them outside of school for further geological examinations.

The objectives of the regional outreach program include:

- i) Delivery of hands-on incursions by ESWA staff targeted at year groups from Kindergarten to Year 10 and professional development to teaching staff (using the WASP and PALMS materials); and,
- ii) Support throughout the school years for teachers and donation of physical resources (which could include rocks, minerals and/or hand lenses, the specifics of which will be decided via an initial survey of schools to ascertain their requirements).

Austmine Conference - 2017

The Austmine 2017 Mining Innovation Conference and Exhibition was held in Perth in May 2017. The Conference theme was Mining's Innovation Imperative: "The future of the mining industry, both here in Australia and all around the world, depends on the sector's ability embrace new technologies, to better utilise and fully integrate the systems and technologies we already have and to share ideas and opportunities more transparently." (<http://www.austmine.com.au>)

MRIWA was a co-sponsor of the Conference, in conjunction with the Department of Mines and Petroleum, the Department of State Development and the City of Perth.

TIGeR

MRIWA provided a sponsorship for The Institute for Geoscience Research (TIGeR) 2016 Conference on *Rock alteration in the upper Crust: Element mobility and concentration* at Curtin University. The Institute has committed to sponsor the 2017 Conference on *Timescales of Geological Processes*.

In-Situ Recovery Workshop

The Institute was a co-sponsor of the *In-Situ Recovery Symposium 2017, In-Situ Recovery – a 50-year old technology coming of age*, organised by CSIRO Minerals Processing Group and held in Perth in June 2017. The symposium brought together over 90 delegates from industry, the research community and the South Australian and Western Australian Government.

Mathematics in Geosciences

The Institute has committed sponsorship to the Young Scientists' Course at the International Association for Mathematical Geosciences Annual Conference in Perth (September 2017). The organisers note that, "the aim of the Course is two-fold: (1) to provide the early-career researchers and students with basic courses that help them build up the required interpersonal skills; (2) to help the early-career researchers learn the soft-computing techniques and methods for data analysis, which is rather critical in geoscience-related topics."

Tech Talks

To promote public awareness of, and interest in, matters relating to minerals research, MRIWA initiated a Tech Talk series in 2016 where experts in diverse fields were invited to speak about their specialisation to diverse audiences drawn from across MRIWA's community.

Three Tech Talks were presented during the reporting period:

Dynamical organisation of gold and alteration mineralogy in hydrothermal systems: Quantitative analysis using wavelets, presented by Dr Mark Munro, Centre for Exploration Targeting, July 2016.

Making Sense of Data: using data to make the best use of technologies, presented by Rob Freeth, MRIWA Advisory Committee, August 2016.

VoxelNET A volumetric data management system, presented by Dr Charlotte Sennersten, February 2017.

MRIWA gratefully acknowledges the contributions of the speakers and the Department of Mines and Petroleum for providing the venue.

Research Partners

The following organisations undertook research in the reporting period for MRIWA projects in progress:

Australian Centre for Geomechanics, University of Western Australia.

ChemCentre (WA).

CSIRO Mineral Resources.

Curtin University.

Curtin University (WA School of Mines).

Mining3.

Murdoch University.

University of South Australia

Company Partners

The following companies and organisations provided financial sponsorship in the period for research projects in progress. The Board of Directors thanks these entities for their sponsorship and support.

Agnico Eagle Mines Limited	Hecla Limited
Alcoa World Alumina	Independence Group NL
Argyle Diamonds	Lynas Corporation
Barrick Gold Corporation	Mining3
BASF Australia	MMG Limited
BHP Billiton Iron Ore	Newmont
Boart Longyear	Northern Star Resources Limited
CSIRO	Panoramic Resources
CRC CARE	Panton Sill Pty Limited
Curtin University of Technology	Ponton Resources
Deep Exploration Technologies CRC	Ramelius Resources Limited
Evolution Mining	Sandfire Resources
Excelsior Gold Limited	Saracen Gold Mines Pty Limited
Geological Survey of Western Australia	Thermo Fisher Scientific
Gold Road Resources	University of South Australia
Glencore Xstrata Mount Isa Mines	Water Corporation WA

Globaltech Corporation Pty Limited

Xstrata Zinc Mount Isa Mines Limited

Gold Fields Australia

University of South Australia

Significant Issues Impacting the Agency

The Institute faces two significant financial issues.

Attracting industry co-investments in minerals research was noted in last year's Annual Report as being a significant challenge for the foreseeable future. Whilst the co-investment achieved for 2016/17 is pleasing (\$1.60 of other investors' money for every \$1 MRIWA committed, just below the target of \$2 for every \$1 MRIWA commits), it would be premature to anticipate that this will not continue to be a challenge for the Institute in 2017/18.

There is some evidence that the difficult financial circumstances of the minerals industry during the last few years are improving and that corporate interest to invest in research is increasing. However, the fact remains that MRIWA's role to support research with longer term outcomes is potentially at odds with industry's requirement to generate a return in the shorter-term from these investments.

The second significant financial issue is the allocation of State Government funds for MRIWA to invest. MRIWA was allocated \$3 million for 2015/16. In the 2016 State Budget MRIWA was allocated \$2 million for 2017-18 and \$1 million for 2018-19, with no new funds for the out years.

The significant challenges facing the State Government in framing the 2017 Budget inevitably limit the capacity to invest in research: MRIWA is not immune to these circumstances.

A statutory review of the MRIWA's operations is required from February 2019. It is important to acknowledge that delaying a decision on additional funds for the Institute until the 2020/21 Budget will have significant adverse consequences for the Institute. It will:

- Halve the Institute's investments in mineral research in 2018/19 and effectively halt investments during 2019/20.
- Impose a hiatus on the Institute's capacity to negotiate for long lead-time research initiatives (for example, Cooperative Research Centres) for at least 2018 and 2019.
- Diminish MRIWA's reputation and standing as a significant research investor in the Australian minerals industry.

It is encouraging that the Federal Government has committed significant funds to the CRC-Project Program as part of the wider and long-established CRC Program and also to the Industry Growth Centres Program. Both initiatives have the potential to provide valuable co-investment partners for MRIWA.

The interest of industry companies in research to assist improving productivity of their investments in capital infrastructure and labour, noted in last year's report, has continued and the focus on collaborative research, especially where this involves smaller companies providing technology and services to the operating industry, has expanded.

MRIWA will seek to work and invest with its stakeholders to amplify these opportunities for Western Australia.

Audit and Risk Committee

The Audit and Risk Committee continued to progress on the now established foundations for the governance and management of risk and financials for MRIWA. The particular focus for the reporting period was on areas in our risk management and controls that are adapting as the organisation matures its processes.

The role of oversight of the financial statements, audit process and governance of risk management of the organisation was enhanced with several initiatives for this financial year. These projects aim at continuing improvement for our operations and risk management and aligning with changes in risk arising from introducing new technology.

- Further work on the review of the Conditions of Grant contract and establishing an MRIWA Grants Policy Statement and MRIWA Policy on Financial Leverage for Research Grants.
- Revision and updates of the Application for Research Grants form and undertaking a Grants Administration Audit.
- Continuation of IT disaster recovery testing as part of our now established programme.
- Finalisation of the policy review and gap analysis to ensure MRIWA has up to date policies covering major areas such as Grants processes, Health and Safety and IT. This will now be done on a yearly basis.
- Review of our data classification protocols in line with government requirements.
- Attention to emerging matters such as IT and cyber security and our limited exposure to cloud computing.
- Oversight of upgrades to the financial and project management systems being re-designed to meet new forms of MRIWA investments (such as projects within CRC ORE and other extension projects) and to deliver management efficiencies whilst ensuring necessary controls are not compromised.
- Review of the statement of appetite for risk of the Board which was commenced in the previous year.

I would like to again acknowledge the work of my Committee members Larry Lopez and Mark Bush and thank them for their continued contribution. I also wish to acknowledge the diligent work of Mark Woffenden, Anil Subramanya and Kim Ong from KPMG who have supported the work of the Committee with great dedication and focus again this year.



Helen Cook
Chair
MRIWA Audit and Risk Committee

Date: 2 August, 2017

Disclosures and Legal Compliance

Financial Statements

Certification of Financial Statements

For the year ended 30 June 2017

The accompanying financial statements of the Minerals Research Institute of Western Australia ('MRIWA') have been prepared in compliance with the provisions of the Financial Management Act 2006 from proper accounts and records to present fairly the financial transactions for the financial year ended 30 June 2017 and the financial position as at 30 June 2017.

At the date of signing we are not aware of any circumstances which would render the particulars included in the financial statements misleading or inaccurate.



Dr P Lilly
Chairman of the Board
Date: 3/8/17



Ms H Cook
Member of the Board
Date: 3/8/17



Ms K Ong
Chief Finance Officer
Date: 4/8/17



Auditor General

INDEPENDENT AUDITOR'S REPORT

To the Parliament of Western Australia

MINERALS RESEARCH INSTITUTE OF WESTERN AUSTRALIA

Report on the Financial Statements

Opinion

I have audited the financial statements of the Minerals Research Institute of Western Australia which comprise the Statement of Financial Position as at 30 June 2017, the Statement of Comprehensive Income, Statement of Changes in Equity, Statement of Cash Flows for the year then ended, and Notes comprising a summary of significant accounting policies and other explanatory information.

In my opinion, the financial statements are based on proper accounts and present fairly, in all material respects, the operating results and cash flows of the Minerals Research Institute of Western Australia for the year ended 30 June 2017 and the financial position at the end of that period. They are in accordance with Australian Accounting Standards, the *Financial Management Act 2006* and the Treasurer's Instructions.

Basis for Opinion

I conducted my audit in accordance with the Australian Auditing Standards. My responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Statements* section of my report. I am independent of the Institute in accordance with the *Auditor General Act 2006* and the relevant ethical requirements of the Accounting Professional and Ethical Standards Board's APES 110 *Code of Ethics for Professional Accountants* (the Code) that are relevant to my audit of the financial statements. I have also fulfilled my other ethical responsibilities in accordance with the Code. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Responsibility of the Board for the Financial Statements

The Board is responsible for keeping proper accounts, and the preparation and fair presentation of the financial statements in accordance with Australian Accounting Standards, the *Financial Management Act 2006* and the Treasurer's Instructions, and for such internal control as the Board determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Board is responsible for assessing the agency's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Western Australian Government has made policy or funding decisions affecting the continued existence of the Institute.

Auditor's Responsibility for the Audit of the Financial Statements

As required by the *Auditor General Act 2006*, my responsibility is to express an opinion on the financial statements. The objectives of my audit are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Australian Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

As part of an audit in accordance with Australian Auditing Standards, I exercise professional judgment and maintain professional scepticism throughout the audit. I also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit 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 agency's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Board.
- Conclude on the appropriateness of the Board's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the agency's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify my opinion. My conclusions are based on the audit evidence obtained up to the date of my auditor's report.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

I communicate with the Board regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

Report on Controls

Opinion

I have undertaken a reasonable assurance engagement on the design and implementation of controls exercised by the Minerals Research Institute of Western Australia. The controls exercised by the Institute are those policies and procedures established by the Board to ensure that the receipt, expenditure and investment of money, the acquisition and disposal of property, and the incurring of liabilities have been in accordance with legislative provisions (the overall control objectives).

My opinion has been formed on the basis of the matters outlined in this report.

In my opinion, in all material respects, the controls exercised by the Minerals Research Institute of Western Australia are sufficiently adequate to provide reasonable assurance that the receipt, expenditure and investment of money, the acquisition and disposal of property and the incurring of liabilities have been in accordance with legislative provisions during the year ended 30 June 2017.

The Board's Responsibilities

The Board is responsible for designing, implementing and maintaining controls to ensure that the receipt, expenditure and investment of money, the acquisition and disposal of property, and the incurring of liabilities are in accordance with the *Financial Management Act 2006*, the Treasurer's Instructions and other relevant written law.

Auditor General's Responsibilities

As required by the *Auditor General Act 2006*, my responsibility as an assurance practitioner is to express an opinion on the suitability of the design of the controls to achieve the overall control objectives and the implementation of the controls as designed. I conducted my engagement in accordance with Standard on Assurance Engagements ASAE 3150 *Assurance Engagements on Controls* issued by the Australian Auditing and Assurance Standards Board. That standard requires that I comply with relevant ethical requirements and plan and perform my procedures to obtain reasonable assurance about whether, in all material respects, the controls are suitably designed to achieve the overall control objectives and the controls, necessary to achieve the overall control objectives, were implemented as designed.

An assurance engagement to report on the design and implementation of controls involves performing procedures to obtain evidence about the suitability of the design of controls to achieve the overall control objectives and the implementation of those controls. The procedures selected depend on my judgement, including the assessment of the risks that controls are not suitably designed or implemented as designed. My procedures included testing the implementation of those controls that I consider necessary to achieve the overall control objectives.

I believe that the evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Limitations of Controls

Because of the inherent limitations of any internal control structure it is possible that, even if the controls are suitably designed and implemented as designed, once the controls are in operation, the overall control objectives may not be achieved so that fraud, error, or noncompliance with laws and regulations may occur and not be detected. Any projection of the outcome of the evaluation of the suitability of the design of controls to future periods is subject to the risk that the controls may become unsuitable because of changes in conditions.

Report on the Key Performance Indicators

Opinion

I have undertaken a reasonable assurance engagement on the key performance indicators of the Minerals Research Institute of Western Australia for the year ended 30 June 2017. The key performance indicators are the key effectiveness indicators and the key efficiency indicators that provide performance information about achieving outcomes and delivering services.

In my opinion, in all material respects, the key performance indicators of the Minerals Research Institute of Western Australia are relevant and appropriate to assist users to assess the Institute's performance and fairly represent indicated performance for the year ended 30 June 2017.

The Board's Responsibility for the Key Performance Indicators

The Board is responsible for the preparation and fair presentation of the key performance indicators in accordance with the *Financial Management Act 2006* and the Treasurer's Instructions and for such internal control as the Board determines necessary to enable the preparation of key performance indicators that are free from material misstatement, whether due to fraud or error.

In preparing the key performance indicators, the Board is responsible for identifying key performance indicators that are relevant and appropriate having regard to their purpose in accordance with Treasurer's Instruction 904 *Key Performance Indicators*.

Auditor General's Responsibility

As required by the *Auditor General Act 2006*, my responsibility as an assurance practitioner is to express an opinion on the key performance indicators. The objectives of my engagement are to obtain reasonable assurance about whether the key performance indicators are relevant and appropriate to assist users to assess the agency's performance and whether the key performance indicators are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion.

I conducted my engagement in accordance with Standard on Assurance Engagements ASAE 3000 *Assurance Engagements Other than Audits or Reviews of Historical Financial Information* issued by the Australian Auditing and Assurance Standards Board. That standard requires that I comply with relevant ethical requirements relating to assurance engagements.

An assurance engagement involves performing procedures to obtain evidence about the amounts and disclosures in the key performance indicators. It also involves evaluating the relevance and appropriateness of the key performance indicators against the criteria and guidance in Treasurer's Instruction 904 for measuring the extent of outcome achievement and the efficiency of service delivery. The procedures selected depend on my judgement, including the assessment of the risks of material misstatement of the key performance indicators. In making these risk assessments I obtain an understanding of internal control relevant to the engagement in order to design procedures that are appropriate in the circumstances.

I believe that the evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

My Independence and Quality Control Relating to the Reports on Controls and Key Performance Indicators

I have complied with the independence requirements of the *Auditor General Act 2006* and the relevant ethical requirements relating to assurance engagements. In accordance with ASQC 1 *Quality Control for Firms that Perform Audits and Reviews of Financial Reports and Other Financial Information, and Other Assurance Engagements*, the Office of the Auditor General maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Matters Relating to the Electronic Publication of the Audited Financial Statements and Key Performance Indicators

This auditor's report relates to the financial statements and key performance indicators of the Minerals Research Institute of Western Australia for the year ended 30 June 2017 included on the Institute's website. The Institute's management is responsible for the integrity of the Institute's website. This audit does not provide assurance on the integrity of the Institute's website. The auditor's report refers only to the financial statements and key performance indicators described above. It does not provide an opinion on any other information which may have been hyperlinked to/from these financial statements or key performance indicators. If users of the financial statements and key performance indicators are concerned with the inherent risks arising from publication on a website, they are advised to refer to the hard copy of the audited financial statements and key performance indicators to confirm the information contained in this website version of the financial statements and key performance indicators.



DON CUNNINGHAME
ACTING DEPUTY AUDITOR GENERAL
Delegate of the Auditor General for Western Australia
Perth, Western Australia
8 August 2017

Statement of Comprehensive Income

For the year ended 30 June 2017

	Notes	2017 \$	2016 \$
COST OF SERVICES			
Expenses			
Research grants		3,573,888	3,218,990
Scholarships		264,006	201,574
Employee benefits expense	6	530,639	471,398
Institute Contractor fees		100,808	153,602
Board and committee fees and costs	8	96,657	110,027
Supplies and services	9	201,317	234,196
Other expenses	10	19,186	18,010
Accommodation expense		47,250	47,250
Depreciation expense	16	4,522	5,652
Total cost of services		4,838,273	4,460,699
Income			
Revenue			
Interest revenue		205,654	237,878
Other revenue		53,309	72,574
Revenue from Industry Sponsorship		1,512,402	799,300
Total Revenue		1,771,365	1,109,752
Total income other than income from State Government		1,771,365	1,109,752
NET COST OF SERVICES		3,066,908	3,350,947
Income from State Government	12		
State Government Grant		4,134,772	1,823,000
Resources received free of charge		47,250	47,250
Total income from State Government		4,182,022	1,870,250
SURPLUS/(DEFICIT) FOR THE PERIOD		1,115,114	(1,480,697)
TOTAL COMPREHENSIVE INCOME FOR THE PERIOD		1,115,114	(1,480,697)

The Statement of Comprehensive Income should be read in conjunction with the accompanying notes.

Statement of Financial Position

As at 30 June 2017

	Notes	2017 \$	2016 \$
ASSETS			
Current Assets			
Cash and cash equivalents	22	4,984,944	4,263,210
Restricted cash and cash equivalents	13	5,961,490	5,181,151
Receivables and other assets	14	780,289	207,787
Other current assets	15	55,365	58,762
Total Current Assets		11,782,088	9,710,910
Non-Current Assets			
Office equipment	16	18,088	22,610
Total Non-Current Assets		18,088	22,610
TOTAL ASSETS		11,800,176	9,733,520
LIABILITIES			
Current Liabilities			
Payables	18	594,071	93,616
Provisions	19	93,266	71,780
Deferred revenue	20	1,667,569	1,237,968
Total Current Liabilities		2,354,906	1,403,364
TOTAL LIABILITIES		2,354,906	1,403,364
NET ASSETS		9,445,270	8,330,156
EQUITY			
Accumulated surplus	21	9,445,270	8,330,156
TOTAL EQUITY		9,445,270	8,330,156

The Statement of Financial Position should be read in conjunction with the accompanying notes

Statement of Changes in Equity

For the year ended 30 June 2017

	Note	Accumulated surplus \$
Balance at 1 July 2015	21	9,810,853
Deficit for the period		(1,480,697)
Balance at 30 June 2016		<u>8,330,156</u>
Balance at 1 July 2016	21	8,330,156
Surplus for the period		1,115,114
Balance at 30 June 2017		<u>9,445,270</u>

The Statement of Changes in Equity should be read in conjunction with the accompanying notes

Statement of Cash Flows

For the year ended 30 June 2017

	Note	2017 \$	2016 \$
CASH FLOWS FROM STATE GOVERNMENT			
State Government Grant		4,134,772	1,823,000
Net cash provided by State Government		4,134,772	1,823,000
Utilised as follows:			
CASH FLOWS FROM OPERATING ACTIVITIES			
Payments			
Research Grant Payments		(3,335,311)	(3,499,474)
Employee benefits		(510,410)	(508,121)
Institute Contractor fees		(100,808)	(166,981)
Board and Advisory committee fees		(40,617)	(34,205)
Supplies and Services		(224,105)	(247,993)
GST payments on purchases		(394,821)	(327,084)
Receipts			
Receipts from Sponsors		1,331,402	1,340,617
Interest received		209,051	236,603
GST receipts on sales		128,528	101,221
GST receipts from taxation authority		304,392	192,182
Net cash used in operating activities	22	(2,632,699)	(2,913,235)
Net increase/(decrease) in cash and cash equivalents		1,502,073	(1,090,235)
Cash and cash equivalents at the beginning of the period		9,444,361	10,534,596
CASH AND CASH EQUIVALENTS AT THE END OF THE PERIOD	22	10,946,434	9,444,361

The Statement of Cash Flows should be read in conjunction with the accompanying notes.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 1. Australian Accounting Standards

General

MRIWA's financial statements for the year ended 30 June 2017 have been prepared in accordance with Australian Accounting Standards. The term 'Australian Accounting Standards' refers to Standards and Interpretations issued by the Australian Accounting Standards Board (AASB).

MRIWA has adopted any applicable new and revised Australian Accounting Standards from their operative dates.

Early adoption of standards

MRIWA cannot early adopt an Australian Accounting Standard unless specifically permitted by TI 1101 *Application of Australian Accounting Standards and Other Pronouncements*. There has been no early adoption of any other Australian Accounting Standards that have been issued or amended (but not operative) by the Institute for the annual reporting period ended 30 June 2017.

Note 2. Summary of significant accounting policies

(a) General statement

MRIWA is a not-for-profit reporting entity that prepares general purpose financial statements in accordance with Australian Accounting Standards, the Framework, Statements of Accounting Concepts and other authoritative pronouncements of the AASB as applied by the Treasurer's Instructions. Several of these are modified by the Treasurer's Instructions to vary application, disclosure, format and wording.

The Financial Management Act 2006 and the Treasurer's Instructions impose legislative provisions that govern the preparation of financial statements and take precedence over Australian Accounting Standards, the Framework, Statements of Accounting Concepts and other authoritative pronouncements of the AASB.

Where modification is required and has had a material or significant financial effect upon the reported results, details of that modification and the resulting financial effect are disclosed in the notes to the financial statements.

(b) Basis of preparation

The financial statements have been prepared on the accrual basis of accounting using the historical cost convention.

The accounting policies adopted in the preparation of the financial statements have been consistently applied throughout all periods presented unless otherwise stated.

The financial statements are presented in Australian dollars and all values are rounded to the nearest dollar.

Note 3 'Judgements made by management in applying accounting policies' discloses judgements that have been made in the process of applying the Institute's accounting policies resulting in the most significant effect on amounts recognised in the financial statements.

Note 4 'Key sources of estimation uncertainty' discloses key assumptions made concerning the future, and other key sources of estimation uncertainty at the end of the reporting period, that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 2. Summary of significant accounting policies (continued)

(c) Reporting entity

This reporting entity comprises MRIWA and no other related bodies.

(d) Income

Revenue recognition

Revenue is recognised and measured at the fair value of consideration received or receivable. The following specific recognition criteria must also be met before revenue is recognised for the major business activities as follows:

Rendering of services

Revenue is recognised by reference to the stage of completion of the transaction.

Interest

Revenue is recognised as the interest accrues.

Sponsorship Revenue

Sponsorship from Industry is recognised as revenue by reference to the stage of completion of the transaction, i.e. when the Institute has fulfilled its obligations for research project grants.

Deferred Revenue is recognised when the sponsorship funds are received or receivable and the Institute has not fulfilled its obligations under the terms of the sponsorship agreement.

State Government Grant

Revenue is recognised at fair value when MRIWA obtains control over the assets comprising the contributions, usually when cash is received.

(e) Property, plant and equipment

Capitalisation/expensing of assets

Items of plant and equipment costing \$5,000 or more are recognised as assets and the cost of utilising assets is expensed (depreciated) over their useful lives. Items of plant and equipment costing less than \$5,000 are immediately expensed direct to the Statement of Comprehensive Income (other than where they form part of a group of similar items which are significant in total).

Initial recognition and measurement

Plant and equipment are initially recognised at cost. For items of plant and equipment acquired at no cost or for nominal cost, the cost is their fair value at the date of acquisition.

Subsequent measurement

After recognition as an asset, the historical cost model is used for the measurement of plant and equipment and stated at cost less accumulated depreciation and accumulated impairment losses.

Depreciation

All non-current assets having a limited useful life are systematically depreciated over their estimated useful lives in a manner that reflects the consumption of their future economic benefits.

Depreciation is calculated using the straight line method, using rates which are reviewed annually. The expected useful life for plant and equipment is 3 to 7 years.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 2. Summary of significant accounting policies (continued)

(f) Impairment of assets

Plant and equipment are tested for any indication of impairment at the end of each reporting period. Where there is an indication of impairment, the recoverable amount is estimated. Where the recoverable amount is less than the carrying amount, the asset is considered impaired and is written down to the recoverable amount and an impairment loss is recognised. As MRIWA is a not for profit entity, unless an asset has been identified as a surplus asset, the recoverable amount is the higher of an asset's fair value less costs to sell and depreciated replacement cost.

The risk of impairment is generally limited to circumstances where an asset's depreciation is materially understated, where the replacement cost is falling or where there is a significant change in useful life. Each relevant class of assets is reviewed annually to verify that the accumulated depreciation reflects the level of consumption or expiration of the asset's future economic benefits and to evaluate any impairment risk from falling replacement costs.

The recoverable amount of assets identified as surplus assets is the higher of fair value less costs to sell and the present value of future cash flows expected to be derived from the asset. Surplus assets carried at fair value have no risk of material impairment where fair value is determined by reference to market-based evidence. Where fair value is determined by reference to depreciated replacement cost, surplus assets are at risk of impairment and the recoverable amount is measured. Surplus assets at cost are tested for indications of impairment at the end of each reporting period.

See also note 2(j) and note 14 'Receivables and other assets' for impairment of receivables.

(g) Financial instruments

In addition to cash, MRIWA has two categories of financial instrument:

- Receivables; and
- Financial liabilities measured at amortised cost

Financial instruments have been disaggregated into the following classes:

- Financial Assets
 - Cash and cash equivalents
 - Restricted cash and cash equivalents
 - Receivables
- Financial Liabilities
 - Payables

Initial recognition and measurement of financial instruments is at fair value which normally equates to the transaction cost or the face value. Subsequent measurement is at amortised cost using the effective interest method.

The fair value of short-term receivables and payables is the transaction cost or the face value because there is no interest rate applicable and subsequent measurement is not required as the effect of discounting is not material.

(h) Cash and cash equivalents

For the purpose of the Statement of Cash Flows, cash and cash equivalents (and restricted cash and cash equivalents) assets comprise cash on hand and short-term deposits with original maturities of three months or less that are readily convertible to a known amount of cash and which are subject to insignificant risk of changes in value.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 2. Summary of significant accounting policies (continued)

(i) Accrued salaries

Accrued salaries (see Note 18 'Payables') represent the amount due to staff but unpaid at the end of the financial year. Accrued salaries are settled within a fortnight of the financial year end. MRIWA considers the carrying amount of accrued salaries to be equivalent to its fair value.

(j) Receivables

Receivables are recognised at original invoice amount less an allowance for any uncollectible amounts (i.e. impairment). The collectability of receivables is reviewed on an ongoing basis and any receivables identified as uncollectible are written off against the allowance account. The allowance for uncollectible amounts (doubtful debts) is raised when there is objective evidence that MRIWA will not be able to collect the debts. The carrying amount is equivalent to fair value as it is due for settlement within 30 days. See also note 2(g) 'Financial Instruments' and note 14 'Receivables and other assets'.

(k) Payables and Accrued Expenses

Payables are recognised when MRIWA becomes obliged to make future payments as a result of a purchase of assets or services. The carrying amount is equivalent to fair value, as they are generally settled within 30 days. See also note 2(g) 'Financial instruments' and note 18 'Payables'.

(l) Research Grants

Grants expense is recognized when the Institute becomes obliged to make payment to the grantee. The Institute becomes obliged to make payment when the grantee has met the conditions of the grant agreement, normally on a quarterly basis.

(m) Scholarships

Scholarship expense represents the Institute's obligation to fund approved scholarships.

(n) Provisions

Provisions are liabilities of uncertain timing or amount and are recognised where there is a present legal or constructive obligation as a result of a past event and when the outflow of resources embodying economic benefits is probable and a reliable estimate can be made of the amount of the obligation. Provisions are reviewed at the end of each reporting period.

Provisions – employee benefits

All annual leave and long service leave provisions are in respect of employees' service up to the end of the reporting period.

Annual leave

The provision for annual leave is classified as a current liability as MRIWA does not have an unconditional right to defer settlement of the liability for at least 12 months after the end of the reporting period.

Long service leave

The liability for long service leave that is expected to be settled within 12 months after the end of the reporting period is recognised and measured at the undiscounted amounts expected to be paid when the liability is settled. A liability for long service leave is recognised based on remuneration rates current as at the end of the reporting period.

It is determined that the liability measured using the short-hand measurement technique was not materially different from the liability determined using the present value of expected future payments. This calculation is consistent with the MRIWA's experience of employee retention and leave taken.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 2. Summary of significant accounting policies (continued)

(n) Provisions (continued)

Unconditional long service leave provisions are classified as current liabilities as MRIWA does not have an unconditional right to defer the settlement of the liability for at least 12 months after the end of the reporting period. Pre-conditional and conditional long service leave provisions are classified as non-current liabilities because MRIWA has an unconditional right to defer the settlement of the liability until the employee has completed the requisite years of service.

Superannuation

The Government Employees Superannuation Board (GESB) and other fund providers administer public sector superannuation arrangements in Western Australia in accordance with legislative requirements. Eligibility criteria for membership in particular schemes for public sector employees vary according to commencement and implementation dates.

Eligible employees contribute to the Pension Scheme, a defined benefit pension scheme closed to new members since 1987, or the Gold State Superannuation Scheme (GSS), a defined benefit lump sum scheme closed to new members since 1995.

Employees commencing employment prior to 16 April 2007 who were not members of either the Pension Scheme or the GSS became non-contributory members of the West State Superannuation Scheme (WSS). Employees commencing employment on or after 16 April 2007 became members of the GESB Super Scheme (GESBS). From 30 March 2012, existing members of the WSS or GESBS and new employees have been able to choose their preferred superannuation fund provider. MRIWA makes contributions to GESB or other fund providers on behalf of employees in compliance with the Commonwealth Government's Superannuation Guarantee (Administration) Act 1992. Contributions to these accumulation schemes extinguish MRIWA's liability for superannuation charges in respect of employees who are not members of the Pension Scheme or GSS.

The GSS is a defined benefit scheme for the purposes of employees and whole-of-government reporting. However, it is a defined contribution plan for agency purposes because the concurrent contributions (defined contributions) made by MRIWA to GESB extinguishes the agency's obligations to the related superannuation liability.

MRIWA has no liabilities under the Pension Scheme or the GSS. The liabilities for the unfunded Pension Scheme and the unfunded GSS transfer benefits attributable to members who transferred from the Pension Scheme, are assumed by the Treasurer. All other GSS obligations are funded by concurrent contributions made by the MRIWA to the GESB.

The GESB makes all benefit payments in respect of the Pension Scheme and GSS, and is recouped from the Treasurer for the employer's share.

Provisions - other

Employee on-costs

Employment on-costs, including workers' compensation insurance, are not employee benefits and are recognised separately as liabilities and expenses when the employment to which they relate has occurred. Employment on-costs are included as part of 'Other expenses' and are not included as part of MRIWA's 'Employee benefits expense'. The related liability is included in 'Employment on-costs provision'.

(o) Superannuation expense

Superannuation expense is recognized in the profit or loss of the Statement of Comprehensive Income and comprises employer contributions paid to the GSS (concurrent contributions), the West State Superannuation (WSS) Scheme, the GESB Super Scheme (GESBS) and other superannuation funds.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 2. Summary of significant accounting policies (continued)

(p) Resources received free of charge or for nominal cost

Resources received free of charge or for nominal cost that MRIWA would otherwise purchase if not donated, are recognised as income at fair value where they can be reliably measured. A corresponding expense is recognised for services received. Receipts of assets are recognised in the Statement of Financial Position.

Resources received from other State Government agencies are separately disclosed under Income from State Government in the Statement of Comprehensive Income.

(q) Comparative figures

Comparative figures are, where appropriate, reclassified to be comparable with the figures presented in the current financial year.

Note 3. Judgements made by management in applying accounting policies

The preparation of financial statements requires management to make judgements about the application of accounting policies that have a significant effect on the amounts recognised in the financial statements. MRIWA evaluates these judgements regularly.

Note 4. Key sources of estimation uncertainty

MRIWA makes key estimates and assumptions concerning the future. These estimates and assumptions are based on historical experience and various other factors that have a significant risk of causing a material adjustment to the carrying amount of assets and liabilities within the next financial year.

Long service leave

Several estimations and assumptions used in calculating MRIWA's long service leave provision include expected future salary rates, discount rates, employee retention rates and expected future payments. Changes in these estimations and assumptions may impact on the carrying amount of the long service leave provision.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 5. Disclosure of changes in accounting policy and estimates

Initial application of an Australian Accounting Standard

MRIWA has applied the following Australian Accounting Standards effective for annual reporting periods beginning on or after 1 July 2016 that impacted on MRIWA:

AASB 1057	<i>Application of Australian Accounting Standards</i> This Standard lists the application paragraphs for each other Standard (and Interpretation), grouped where they are the same. There is no financial impact.
AASB 2014-4	<i>Amendments to Australian Accounting Standards – Clarification of Acceptable Methods of Depreciation and Amortisation [AASB 116 & 138]</i> The adoption of the new Standard has no financial impact for the Institute as depreciation and amortisation is not determined by reference to revenue generation, but by reference to consumption of future economic benefits.
AASB 2015-1	<i>Amendments to Australian Accounting Standards – Annual Improvements to Australian Accounting Standards 2012-2014 Cycle [AASB 1, 2, 3, 5, 7, 11, 110, 119, 121, 133, 134, 137 & 140]</i> The amendments arise from the issuance of International Financial Reporting Standard Annual Improvements to IFRSs 2012-2014 Cycle in September 2014, and editorial corrections. The Institute has not yet determined the application or the potential impact of the Standard.
AASB 2015-2	<i>Amendments to Australian Accounting Standards – Disclosure Initiative: Amendments to AASB 101 [AASB 7, 101, 134 & 1049]</i> This Standard amends AASB 101 to provide clarification regarding the disclosure requirements in AASB 101. Specifically, the Standard proposes narrow-focus amendments to address some of the concern expressed about existing presentation and disclosure requirements and to ensure entities are able to use judgement when applying a Standard in determining what information to disclose in their financial statements. There is no financial impact.
AASB 2015-6	<i>Amendments to Australian Accounting Standards – Extending Related Party Disclosures to Not-for-Profit Public Sector Entities [AASB 10, 124 & 1049]</i> The amendments extend the scope of AASB 124 to include application by not-for-profit public sector entities. Implementation guidance is included to assist application of the Standard by not-for-profit public sector entities. The Institute has not yet determined the application of the Standard, though there is no financial impact.
AASB 2015-10	<i>Amendments to Australian Accounting Standards – Effective Date of Amendments to AASB 10 & 128</i> This Standard defers the mandatory effective date (application date) of amendments to AASB 10 & 128 that were originally made in AASB 2014-10 so that the amendments are required to be applied for annual reporting periods beginning on or after 1 January 2018 instead of 1 January 2016. The Institute has not yet determined the application or the potential impact of AASB 2014-10.

Future impact on Australian Accounting Standards not yet operative

MRIWA cannot early adopt an Australian Accounting Standard unless specifically permitted by TI 1101 *Application of Australian Accounting Standards and Other Pronouncements*. Consequently, MRIWA has not applied early any of the following Australian Accounting Standards that have been issued that may impact MRIWA. Where applicable, MRIWA plans to apply these Australian Accounting Standards from their application date.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 5 Disclosure of changes in accounting policy and estimates (continued)

**Operative for
reporting periods
beginning on/after**

AASB 9	<i>Financial Instruments</i>	1 Jan 2018
	<p>This Standard supersedes AASB 139 <i>Financial Instruments: Recognition and Measurement</i>, introducing a number of changes to accounting treatments. The mandatory application date of this Standard is currently 1 January 2018 after being amended by AASB 2012-6, AASB 2013-9 and AASB 2014-1 <i>Amendments to Australian Accounting Standards</i>. The Institute has not yet determined the application or the potential impact of the Standard.</p>	
AASB 15	<i>Revenue from Contracts with Customers</i>	1 Jan 2019
	<p>This Standard establishes the principles that the Institute shall apply to report useful information to users of financial statements about the nature, amount, timing and uncertainty of revenue and cash flows arising from a contract with a customer.</p> <p>The Institute's income is principally derived from appropriations which will be measured under AASB 1058 <i>Income of Not-for-Profit Entities</i> and will be unaffected by this change. However, the Institute has not yet determined the potential impact of the Standard on 'User charges and fees' and 'Sales' revenues. In broad terms, it is anticipated that the terms and conditions attached to these revenues will defer revenue recognition until the Institute has discharged its performance obligations.</p>	
AASB 16	<i>Leases</i>	1 Jan 2019
	<p>This Standard introduces a single lessee accounting model and requires a lessee to recognise assets and liabilities for all leases with a term of more than 12 months, unless the underlying asset is of low value. The Institute has not yet determined the application or the potential impact of the Standard.</p>	
AASB 1058	<i>Income of Not-for-Profit Entities</i>	1 Jan 2019
	<p>This Standard clarifies and simplifies the income recognition requirements that apply to not-for-profit (NFP) entities, more closely reflecting the economic reality of NFP entity transactions that are not contracts with customers. Timing of income recognition is dependent on whether such a transaction gives rise to a liability or other performance obligation (a promise to transfer a good or service), or a contribution by owners, related to an asset (such as cash or another asset) received by an entity. The Institute has not yet determined the application or the potential impact of the Standard.</p>	

Notes to the Financial Statements

For the year ended 30 June 2017

Note 5 Disclosure of changes in accounting policy and estimates (continued)

		Operative for reporting periods beginning on/after
<i>AASB 2010-7</i>	<p><i>Amendments to Australian Accounting Standards arising from AASB 9 (December 2010) [AASB 1, 3, 4, 5, 7, 101, 102, 108, 112, 118, 120, 121, 127, 128, 131, 132, 136, 137, 139, 1023 and 1038 and Int 2, 5, 10, 12, 19 & 127]</i></p> <p>This Standard makes consequential amendments to other Australian Accounting Standards and Interpretations as a result of issuing AASB 9 in December 2010.</p> <p>The mandatory application date of this Standard has been amended by AASB 2012-6 and AASB 2014-1 to 1 January 2018. MRIWA has not yet determined the application or the potential impact of the Standard.</p>	1 Jan 2018
<i>AASB 2014-1</i>	<p><i>Amendments to Australian Accounting Standards</i></p> <p>Part E of this Standard makes amendments to AASB 9 and consequential amendments to other Standards. It has not yet been assessed by MRIWA to determine the application or potential impact of the Standard.</p>	1 Jan 2018
<i>AASB 2014-5</i>	<p><i>Amendments to Australian Accounting Standards arising from AASB 15</i></p> <p>This Standard gives effect to the consequential amendments to Australian Accounting Standards (including Interpretations) arising from the issuance of AASB 15. The mandatory application date of this Standard has been amended by AASB 2015-8 to 1 January 2018. MRIWA has not yet determined the application or the potential impact of the Standard.</p>	1 Jan 2018
<i>AASB 2014-7</i>	<p><i>Amendments to Australian Accounting Standards arising from AASB 9 (December 2014)</i></p> <p>This Standard gives effect to the consequential amendments to Australian Accounting Standards (including Interpretations) arising from the issuance of AASB 9 (December 2014). MRIWA has not yet determined the application or the potential impact of the Standard.</p>	1 Jan 2018
<i>AASB 2015-8</i>	<p><i>Amendments to Australian Accounting Standards – Effective Date of AASB 15</i></p> <p>The Standard amends the mandatory effective date of AASB 15 Revenue from Contracts with Customers so that AASB 15 is required to be applied for annual reporting periods beginning on or after 1 January 2018 instead of 1 January 2017. MRIWA has not yet determined the application or the potential impact of AASB 15.</p>	1 Jan 2019
<i>AASB 2016-2</i>	<p><i>Amendments to Australian Accounting Standards – Disclosure Initiative: Amendments to AASB 107</i></p> <p>This Standard amends AASB 107 Statement of Cash Flows (August 2015) to require disclosures that enable users of financial statements to evaluate changes in liabilities arising from financing activities, including both changes arising from cash flows and non-cash changes. There is no financial impact.</p>	1 Jan 2017

Notes to the Financial Statements

For the year ended 30 June 2017

Note 5 Disclosure of changes in accounting policy and estimates (continued)

		Operative for reporting periods beginning on/after
AASB 2016-3	<p><i>Amendments to Australian Accounting Standards – Clarifications to AASB 15</i></p> <p>This Standard clarifies identifying performance obligations, principal versus agent considerations, timing of recognising revenue from granting a licence, and, provides further transitional provisions to AASB 15. MRIWA has not yet determined the application or the potential impact.</p>	1 Jan 2018
AASB 2016-4	<p><i>Amendments to Australian Accounting Standards – Recoverable Amount of Non-Cash-Generating Specialised Assets of Not-for-Profit Entities</i></p> <p>This Standard clarifies that the recoverable amount of primarily non-cash-generating assets of not-for-profit entities, which are typically specialised in nature and held for continuing use of their service capacity, is expected to be materially the same as fair value determined under AASB 13 Fair Value Measurement. MRIWA has not yet determined the application or the potential impact.</p>	1 Jan 2017
AASB 2016-7	<p><i>Amendments to Australian Accounting Standards – Deferral of AASB 15 for Not-for-Profit Entities</i></p> <p>This Standard amends the mandatory effective date (application date) of AASB 15 and defers the consequential amendments that were originally set out in AASB 2014-5 Amendments to Australian Accounting Standards arising from AASB 15 for not-for-profit entities to annual reporting periods beginning on or after 1 January 2019, instead of 1 January 2018. There is no financial impact.</p>	1 Jan 2017
AASB 2016-8	<p><i>Amendments to Australian Accounting Standards – Australian Implementation Guidance for Not-for-Profit Entities.</i></p> <p>This Standard inserts Australian requirements and authoritative implementation guidance for not-for-profit entities into AASB 9 and AASB 15. This guidance assists not-for-profit entities in applying those Standards to particular transactions and other events. There is no financial impact.</p>	1 Jan 2019

Changes in accounting estimates

There have been no changes in accounting estimates.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 6. Employee benefits expense

	2017	2016
	\$	\$
Wages and salaries	487,844	433,526
Superannuation - defined contribution plans	42,795	37,872
Total employee benefits	530,639	471,398

Note 7. Compensation of Key Management Personnel

The Institute has determined that key management personnel include the responsible Minister, board members, and, senior officers of the Authority. However, the Institute is not obligated to compensate Ministers and therefore disclosures in relation to Ministers' compensation may be found in the Annual Report on State Finances:

Compensation of members of the accountable authority

The number of Board members whose total fees, salaries, superannuation, non-monetary benefits and other benefits for the financial year fall within the following bands are:

	2017	2016
\$		
0 - 10,000	2	6
10,000 - 20,000	4	4
20,000 - 30,000	1	-

The total remuneration includes the superannuation expense incurred by MRIWA in respect of members of MRIWA.

No members of MRIWA are members of the Pension Scheme.

Compensation of senior officers (other than senior officers reported as members of the accountable authority)

The number of senior officers whose total fees, salaries, superannuation, non-monetary benefits and other benefits for the financial year fall within the following bands are:

	2017	2016
\$		
290,000 - 300,000	1	-
310,000 - 320,000	-	1
	\$	\$
Short-term employee benefits	331,853	348,230
Post-employment benefits	27,533	26,716
Other long term benefits	26,368	30,716
Termination benefits	-	-
Total compensation of all key management personnel	385,754	405,662

The total remuneration includes the superannuation expense incurred by MRIWA in respect of senior officers other than board members.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 8. Board and committee fees and costs

	2017	2016
	\$	\$
Board of Directors' remuneration	78,215	91,121
Advisory Committee attendance fees	15,136	15,927
Board and Advisory Committee's expenses	3,306	2,979
	96,657	110,027

Note 9. Supplies and services

	2017	2016
	\$	\$
Printing and stationery	1,253	2,434
Advertising	-	5,009
Communications	33,028	32,971
Business travel	17,545	6,461
Accounting services	80,370	101,515
Consultants	3,843	48,063
Legal services	5,702	8,230
Insurance	15,706	9,321
Sponsorships	21,045	2,000
Other	22,825	18,192
	201,317	234,196

Note 10. Other expenses

	2017	2016
	\$	\$
Audit fees	18,400	18,000
Bad debts expense	-	10
Other expenses	786	-
	19,186	18,010

Note 11. Related Party Transactions

The Institute is a wholly owned and controlled entity of the State of Western Australia. In conducting its activities, the Institute is required to pay various taxes and levies based on the standard terms and conditions that apply to all tax and levy payers to the State and entities related to State.

Related parties of the Institute include:

- all Ministers and their close family members, and their controlled or jointly controlled entities;
- all senior officers and their close family members, and their controlled or jointly controlled entities;
- other departments and public sector entities, including related bodies included in the whole of government consolidated financial statements; and
- associates and joint ventures that are included in the whole of government consolidated financial statements.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 11. Related Party Transactions (continued)

Significant transactions with related parties throughout the year ended 30 June 2017 include:

- Department of Mines and Petroleum
 - Appropriations (refer note 12)
 - Sponsorship of a research project (included within Revenue from Industry Sponsorship, to the value of \$350,000)
 - Accommodation received free of charge (included in Accommodation Expense and Resources Received Free of Charge, refer note 12)
- ChemCentre
 - Sponsorship of a research project (included within Revenue from Industry Sponsorship, to the value of \$295,644)
- Water Corporation of Western Australia
 - Sponsorship of a research project (included within Revenue from Industry Sponsorship, to the value of \$60,000)

Note 12. Income from State Government

	2017	2016
	\$	\$
State Government Grants	4,134,772	1,823,000
	<u>4,134,772</u>	<u>1,823,000</u>
Services received free of charge from other State Government agencies during the period:		
Department of Mines and Petroleum	47,250	47,250
	<u>47,250</u>	<u>47,250</u>
Total Income from State Government	<u>4,182,022</u>	<u>1,870,250</u>

Note 13. Restricted cash and cash equivalents

	2017	2016
	\$	\$
Research grants	5,205,862	4,458,422
Director's Scholarship	755,628	722,729
	<u>5,961,490</u>	<u>5,181,151</u>

Cash held in the account is to be used only for the purpose of providing grants for research and development of projects to grantees.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 14. Receivables

	2017	2016
	\$	\$
<u>Current</u>		
Grant receivables - Sponsorship	728,145	55,000
GST receivable	52,144	152,787
	<u>780,289</u>	<u>207,787</u>

There are no receivables individually determined as impaired at the end of the reporting period. See also note 2(j) 'Receivables', 2(d) 'Sponsorship Revenue', and note 27 'Financial Instruments'.

Reconciliation of changes in the allowance for impairment of receivables

<u>Balance at start of period</u>	-	-
Doubtful debts expense recognised during the period	-	10
Receivables written off during the period	-	(10)
Balance at end of period	<u>-</u>	<u>-</u>

Note 15. Other current assets

	2017	2016
	\$	\$
Accrued Interest	55,365	58,762
	<u>55,365</u>	<u>58,762</u>

Note 16. Office equipment

	2017	2016
	\$	\$
<u>Office equipment</u>		
At cost	33,480	33,480
Accumulated depreciation	(15,392)	(10,870)
	<u>18,088</u>	<u>22,610</u>
Total Office equipment	<u>18,088</u>	<u>22,610</u>

Office equipment

Carrying amount at start of period	22,610	28,262
Additions	-	-
Disposals	-	-
Depreciation	(4,522)	(5,652)
Carrying amount at end of period	<u>18,088</u>	<u>22,610</u>

Notes to the Financial Statements

For the year ended 30 June 2017

Note 17. Impairment

There were no indications of impairment to office equipment at 30 June 2017. MRIWA held no goodwill or intangible assets with an indefinite useful life during the reporting period.

Note 18. Payables

	2017	2016
	\$	\$
<u>Current</u>		
Research grants payable	-	38,712
Scholarships payable	-	17,000
Payables	545	11,666
Accrued research grants	558,295	-
Accrued general expenses	33,340	26,238
Accrued salaries	1,891	-
Total current	594,071	93,616

See also note 2(k) 'Payables', 2(l) 'Research Grants' and note 27 'Financial Instruments'

Note 19. Provisions

	2017	2016
	\$	\$
<u>Current</u>		
Employee benefits provision		
Annual leave ^(a)	17,061	8,049
Long service leave ^(b)	76,205	63,731
	93,266	71,780

^(a) Annual leave liabilities have been classified as current as there is no unconditional right to defer settlement for at least 12 months after the reporting period. Assessments indicate that actual settlement of the liabilities will occur as follows:

	2017	2016
	\$	\$
Within 12 months of the end of the reporting period	17,061	8,049
More than 12 months after the end of the reporting period	-	-
	17,061	8,049

^(b) Long service leave liabilities have been classified as current where there is no unconditional right to defer settlement for at least 12 months after the reporting period. Assessments indicate that actual settlement of the liabilities will occur as follows:

	2017	2016
	\$	\$
Within 12 months of the end of the reporting period	-	-
More than 12 months after the end of the reporting period	76,205	63,731
	76,205	63,731

Notes to the Financial Statements

For the year ended 30 June 2017

Note 20. Deferred revenue

	2017	2016
	\$	\$
Deferred Revenue - Sponsorship	1,667,569	1,237,968
	<u>1,667,569</u>	<u>1,237,968</u>

Note 21. Equity

The Western Australian Government holds the equity interest in MRIWA on behalf of the community. Equity represents the residual interest in the net assets of MRIWA.

Accumulated surplus	2017	2016
	\$	\$
Balance at start of period	8,330,156	9,810,853
Result for the period	1,115,114	(1,480,697)
Balance at end of period	<u>9,445,270</u>	<u>8,330,156</u>
Total Equity at end of period	<u>9,445,270</u>	<u>8,330,156</u>

Notes to the Financial Statements

For the year ended 30 June 2017

Note 22. Notes to the Statement of Cash Flows

Reconciliation of cash

Cash at the end of the financial year as shown in the Statement of Cash Flows is reconciled to the related items in the Statement of Financial Position as follows:

	2017	2016
	\$	\$
Cash and cash equivalents	4,984,944	4,263,210
Restricted cash and cash equivalents - current (Note 13 'Restricted cash and cash equivalents')	5,961,490	5,181,151
	<u>10,946,434</u>	<u>9,444,361</u>

Reconciliation of net cost of services of net cash flows used in operating activities

	2017	2016
	\$	\$
Net cost of services	(3,066,908)	(3,350,947)

Non-cash Items

Depreciation and amortisation expense (Note 16 'Office Equipment')	4,522	5,652
Resources received free of charge (Note 12 'Income from State Government')	47,250	47,250

(Increase)/decrease in assets

Accrued Interest	3,397	(1,275)
Grants receivable - Sponsorship	(673,145)	6,733
Change in GST in receivables/payables ^(c)	(266,293)	(225,863)
Net GST receipts/(payments) ^(b)	304,392	192,182

Increase/(decrease) in liabilities

Grants payable - Research and Scholarship ^(a)	502,583	(78,910)
Employee benefits	20,229	(36,723)
Deferred Revenue	492,145	544,837
Other Liabilities	(871)	(16,171)
Net cash used in operating activities	<u>(2,632,699)</u>	<u>(2,913,235)</u>

(a) Note that the Australian Taxation Office (ATO) receivable/payable in respect of GST and the receivable/payable in respect of the sale/purchase of non-current assets are not included in these items as they do not form part of the reconciling items.

(b) This is the net GST paid/received, i.e. cash transactions.

(c) This reverses out the GST in receivables and payables.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 23. Commitments

	2017	2016
	\$	\$
Other expenditure commitments		
Within 1 year	3,069,551	2,202,138
Later than 1 year and not later than 5 years	2,127,387	1,983,302
Later than 5 years	-	110,000
	<u>5,196,938</u>	<u>4,295,440</u>

The total commitments reported above represent only projects with completed contractual liabilities in place. MRIWA has committed additional monies to research projects during this period. The contracts for these projects are still to be finalised. These monies have not been included in the amounts reflected above.

Note 24. Contingent Liabilities and contingent assets

MRIWA has no contingent liabilities or contingent assets.

Note 25. Events occurring after the end of the reporting period

MRIWA has had no events occurring after the end of the reporting period.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 26. Explanatory statement

All variances between estimates (original budget) and actual results for 2017, and between the actual results for 2017 and 2016 are shown below. Narratives are provided for key variations selected from observed major variances, which are generally greater than:

- 5% and \$89,214 for the Statement of Comprehensive Income and the Statement of Cash Flows
- 5% and \$194,670 for the Statement of Financial Position

Statement of Comprehensive Income

	Variance note	Original budget 2017 \$	Actual 2017 \$	Actual 2016 \$	Variance between estimate and actual \$	Variance between actual results for 2017 and 2016 \$
COST OF SERVICES						
Expenses						
Research grants	1,A	4,252,525	3,573,888	3,218,990	(678,637)	354,898
Scholarships		252,432	264,006	201,574	11,574	62,432
Employee benefits expense		571,240	530,639	471,398	(40,601)	59,241
Institute Contractor fees		86,400	100,808	153,602	14,408	(52,794)
Board and committee fees and costs		139,817	96,657	110,027	(43,160)	(13,370)
Supplies and services		208,682	201,317	234,196	(7,365)	(32,879)
Other expenses		18,000	19,186	18,010	1,186	1,176
Accommodation expense		47,250	47,250	47,250	-	-
Depreciation expense		6,000	4,522	5,652	(1,478)	(1,130)
Total cost of services		5,582,346	4,838,273	4,460,699	(744,073)	377,574

Notes to the Financial Statements

For the year ended 30 June 2017

Note 26. Explanatory statement (continued)

Statement of Comprehensive Income

	Variance note	Original budget 2017 \$	Actual 2017 \$	Actual 2016 \$	Variance between estimate and actual \$	Variance between actual results for 2017 and 2016 \$
Income						
Revenue						
Interest revenue		230,000	205,654	237,878	(24,346)	(32,224)
Other revenue		68,311	53,309	72,574	(15,002)	(19,265)
Revenue from Industry Sponsorship	2,B	1,939,403	1,512,402	799,300	(427,001)	713,102
Total Revenue		2,237,714	1,771,365	1,109,752	(466,349)	661,613
Total income other than income from State Government		2,237,714	1,771,365	1,109,752	(466,349)	661,613
NET COST OF SERVICES		3,344,632	3,066,908	3,350,947	(277,724)	(284,039)
Income from State Government						
State Government Grant	C	4,073,000	4,134,772	1,823,000	61,772	2,311,772
Resources received free of charge		47,250	47,250	47,250	-	-
Total income from State Government		4,120,250	4,182,022	1,870,250	61,772	2,311,772
SURPLUS/(DEFICIT) FOR THE PERIOD		775,618	1,115,114	(1,480,697)	339,496	2,595,811
TOTAL COMPREHENSIVE INCOME FOR THE PERIOD		775,618	1,115,114	(1,480,697)	339,496	2,595,811

Notes to the Financial Statements

For the year ended 30 June 2017

Note 26. Explanatory statement (continued)

Major Estimate and Actual (2017) Variance Narratives

1. Research grants are below estimate as payments to researchers are impacted by both the progress of the research project, and the timeliness of researchers' submission of their progress reports and financial statements in order to receive the next claim. Payments to researchers will differ from year to year based on the progress of the research. One of MRIWA's roles is to administer the payment to researchers upon satisfactory review of their submission of progress reports and financial statements at each phase of their project.
2. Revenue from industry sponsorship is below estimates due to an inability to forecast an accurate value of industry sponsorship revenue for research projects. The financial difficulties experienced by the minerals industry resulting from the downturn in the global mineral commodity prices in recent years has adversely affected the reduced co-contribution into research projects by sponsors.

Major Actual (2017) and Comparative (2016) Variance Narratives

- A. Research grants expenditure has increased from prior year as result of the increased number of projects being managed by MRIWA due to current year approvals, and commencement of projects approved in the previous year.
- B. Revenue from industry sponsorship has increased from the prior year due to an increased number of projects approved throughout the year, and Board emphasis on improving financial leverage from industry sponsors.
- C. The State government grant revenue increase from prior year has arisen due to a timing variance in relation to government funds received. A portion of 30 June 2016 funding was recognised as income in the year ended 30 June 2015.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 26. Explanatory statement (continued)

Statement of Financial Position

	Variance note	Original budget 2017 \$	Actual 2017 \$	Actual 2016 \$	Variance between estimate and actual \$	Variance between actual results for 2017 and 2016 \$
ASSETS						
Current Assets						
Cash and cash equivalents	1, A	3,120,841	4,984,944	4,263,210	1,864,103	721,734
Restricted cash and cash equivalents	2, B	7,281,963	5,961,490	5,181,151	(1,320,473)	780,339
Receivables and other assets	3, C	193,940	780,289	207,787	586,349	572,502
Other current assets		57,500	55,365	58,762	(2,135)	(3,397)
Total Current Assets		10,654,244	11,782,088	9,710,910	1,127,844	2,071,178
Non-Current Assets						
Office equipment		16,956	18,088	22,610	1,132	(4,522)
Total Non-Current Assets		16,956	18,088	22,610	1,132	(4,522)
TOTAL ASSETS		10,671,200	11,800,176	9,733,520	1,128,976	2,066,656

Notes to the Financial Statements

For the year ended 30 June 2017

Note 26. Explanatory statement (continued)

	Variance note	Original budget 2017 \$	Actual 2017 \$	Actual 2016 \$	Variance between estimate and actual \$	Variance between actual results for 2017 and 2016 \$
LIABILITIES						
Current Liabilities						
Payables	4, D	110,582	594,071	93,616	483,489	500,455
Provisions		85,000	93,266	71,780	8,266	21,486
Deferred revenue	5, E	1,200,000	1,667,569	1,237,968	467,569	429,601
Total Current Liabilities		1,395,582	2,354,906	1,403,364	959,324	951,542
TOTAL LIABILITIES		1,395,582	2,354,906	1,403,364	959,324	951,542
NET ASSETS						
		9,275,618	9,445,270	8,330,156	169,652	1,115,114
EQUITY						
Accumulated surplus		9,275,618	9,445,270	8,330,156	169,652	1,115,114
TOTAL EQUITY		9,275,618	9,445,270	8,330,156	169,652	1,115,114

Notes to the Financial Statements

For the year ended 30 June 2017

Note 26. Explanatory statement (continued)

Major Estimate and Actual (2017) Variance Narratives

1. The variance for both cash and restricted cash is closely linked. The actual cash and cash equivalents is above estimate due to the recognition of restricted cash being dependent on the timing of executing the Condition of Grant for each project and the progress of the research for each project in the Institute's portfolio.
2. Refer to comment in 1
3. The receivables is above estimate as the invoicing schedule for a large number of approved projects called for invoices to be sent to sponsors late in the financial year. Receipts from sponsors for each project is determined at the time a Condition of Grant is negotiated and can vary based on the length of the project.
4. The payables is above estimate due to claims orders being raised, however invoices from researchers not being received and subsequently paid.
5. Deferred revenue is above estimate due to the inability to forecast an accurate value of deferred revenue as it is determined by the individual sponsorship value of each project and the timing of cash received.

Major Actual (2017) and Comparative (2016) Variance Narratives

- A. The cash and cash equivalents has increased from prior year due to projects approved by the Board that still have Conditions of Grant to be finalised being included in this cash balance. There were 13 projects with this status at 30 June 2017.
- B. The restricted cash and cash equivalents balance has increased from prior year due to increased projects being approved during the financial year, as that will have a direct impact on the increased amount of restricted cash recognised.
- C. Receivables has increased from the prior year as the invoicing schedule for a large number of approved projects called for invoices to be sent to sponsors late in the financial year.
- D. Payables are above estimate due to increased numbers of research projects requesting for payments in the month June 2017.
- E. Deferred revenue has increased from the prior year due to an increased number of projects commencing within the financial year, as such an increased deferred revenue recognised.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 26. Explanatory statement (continued)

Statement of Cash Flows

Statement of Cash Flows	Variance note	Original budget 2017 \$	Actual 2017 \$	Actual 2016 \$	Variance between estimate and actual \$	Variance between actual results for 2017 and 2016 \$
CASH FLOWS FROM STATE GOVERNMENT						
State Government Grant						
Net cash provided by State Government	A	4,073,000	4,134,772	1,823,000	61,772	2,311,772
		4,073,000	4,134,772	1,823,000	61,772	2,311,772
Utilised as follows:						
CASH FLOWS FROM OPERATING ACTIVITIES						
Payments						
Research Grant Payments	1	(4,541,491)	(3,335,311)	(3,499,474)	1,206,180	164,163
Employee benefits		(560,255)	(510,410)	(508,121)	49,845	(2,289)
Institute Contractor fees		(84,738)	(100,808)	(166,981)	(16,070)	66,173
Board and Advisory committee fees		(48,777)	(40,617)	(34,205)	8,160	(6,412)
Supplies and Services		(222,136)	(224,105)	(247,993)	(1,969)	23,888
GST payments on purchases	2	(514,837)	(394,821)	(327,084)	120,016	(67,737)

Notes to the Financial Statements

For the year ended 30 June 2017

Note 26. Explanatory statement (continued)

	Variance note	Original budget 2017 \$	Actual 2017 \$	Actual 2016 \$	Variance between estimate and actual \$	Variance between actual results for 2017 and 2016 \$
Receipts						
Receipts from Sponsors	3	2,075,463	1,331,402	1,340,617	(744,061)	(9,215)
Interest received		228,738	209,051	236,603	(19,687)	(27,552)
GST receipts on sales		207,546	128,528	101,221	(79,018)	27,307
GST receipts from taxation authority	B	340,290	304,392	192,182	(35,898)	112,210
Net cash used in operating activities		(3,120,197)	(2,632,699)	(2,913,235)	487,498	280,536
<hr/>						
Net increase/(decrease) in cash and cash equivalents		952,803	1,502,073	(1,090,235)	549,270	2,592,308
Cash and cash equivalents at the beginning of the period		9,450,000	9,444,361	10,534,596	(5,639)	(1,090,235)
CASH AND CASH EQUIVALENTS AT THE END OF THE PERIOD		10,402,803	10,946,434	9,444,361	543,631	1,502,073

Notes to the Financial Statements

For the year ended 30 June 2017

Note 26. Explanatory statement (continued)

Major Estimate and Actual (2017) Variance Narratives

1. Research grants payments is below estimate due to an inability to accurately forecast payments to researchers as this is dependent on the number of projects in progress, the actual progress of the project undertaken by the researchers and the value of the projects in progress.
2. The GST payments on purchases is below estimate as there is a direct relationship to the reduced payments to researchers.
3. Receipts from sponsors is below estimate due to an inability to accurately forecast receipts from sponsors as this is dependent on the number of projects in progress, the actual progress of the project undertaken by the researchers and the financial leverage from sponsors.

Major Actual (2017) and Comparative (2016) Variance Narratives

- A. The State Government Grant cash flow has increased from the prior year due to a timing variance in relation to government funds received. A portion of 30 June 2016 funding was recognised as income in the year ended 30 June 2015.
- B. GST receipts from taxation authority has increased from the prior year as a large refund was received at start of year relating to prior year GST lodgement.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 27. Financial Instruments

(a) Financial risk management objectives and policies

Financial instruments held by MRIWA are cash and cash equivalents, restricted cash and cash equivalents, receivables, and payables. MRIWA has limited exposure to financial risks. MRIWA's overall risk management program focuses on managing the risks identified below.

Credit risk

Credit risk arises when there is the possibility of MRIWA's receivables defaulting on their contractual obligations resulting in financial loss to MRIWA.

The maximum exposure to credit risk at the end of the reporting period in relation to each class of recognised financial assets is the gross carrying amount of those assets inclusive of any allowance for impairment as shown in the table at note 27(c) 'Financial instrument disclosures' and note 14 'Receivables and other assets'.

MRIWA trades only with recognised, creditworthy third parties. MRIWA has policies in place to ensure that sales of products and services are made to customers with an appropriate credit history. In addition, receivable balances are monitored on an ongoing basis with the result that MRIWA's exposure to bad debts is minimal. At the end of the reporting period there were no significant concentrations of credit risk.

Liquidity risk

Liquidity risk arises when MRIWA is unable to meet its financial obligations as they fall due.

MRIWA is exposed to liquidity risk through its trading in the normal course of business.

MRIWA has appropriate procedures to manage cash flows including drawdowns of appropriations by monitoring forecast cash flows to ensure that sufficient funds are available to meet its commitments.

Market Risk

Market risk is the risk that changes in market prices such as interest rates will affect MRIWA's income or the value of its holdings of financial instruments. MRIWA does not trade in foreign currency and is not materially exposed to other price risks. The Institute's exposure to market risk for changes in interest rates relates primarily to short-term investments comprised of term deposits and bank bills. The risk is managed by the Institute through diversification and variation in maturity dates.

(b) Categories of financial instruments

The carrying amounts of each of the following categories of financial assets and financial liabilities at the end of the reporting period are as follows:

	2017	2016
	\$	\$
<u>Financial assets</u>		
Cash and cash equivalents	4,984,944	4,263,210
Restricted cash and cash equivalents	5,961,490	5,181,151
Receivables ^(a)	728,145	55,000
Other current assets	55,365	58,762
<u>Financial liabilities</u>		
Finance lease liabilities measured at amortised cost	594,071	93,616

^(a) The amount of receivables excludes GST recoverable from the ATO (statutory receivable).

Notes to the Financial Statements

For the year ended 30 June 2017

Note 27. Financial Instruments (continued)

(c) Financial instrument disclosures

Credit risk

The following table discloses the MRIWA's maximum exposure to credit risk and the ageing analysis of financial assets. The MRIWA's maximum exposure to credit risk at the end of the reporting period is the carrying amount of financial assets as shown below.

The MRIWA does not hold any collateral as security or other credit enhancements relating to the financial assets it holds.

	Carrying Amount \$	Not past due and not Impaired \$	Past due but not impaired					Impaired financial assets \$
			Up to 1 Month \$	1-3 months \$	3 months to 1 year \$	1-5 years \$	More than 5 years \$	
2017								
Cash and cash equivalents	4,984,944	4,984,944	-	-	-	-	-	-
Restricted cash and cash equivalents	5,961,490	5,961,490	-	-	-	-	-	-
Receivables ^(a)	728,145	-	524,645	154,000	49,500	-	-	-
Other current assets	55,365	55,365	-	-	-	-	-	-
	11,729,944	11,001,799	524,645	154,000	49,500	-	-	-
2016								
Cash and cash equivalents	4,263,210	4,263,210	-	-	-	-	-	-
Restricted cash and cash equivalents	5,181,151	5,181,151	-	-	-	-	-	-
Receivables ^(a)	55,000	-	38,500	16,500	-	-	-	-
Other current assets	58,762	58,762	-	-	-	-	-	-
	9,558,123	9,503,123	38,500	16,500	-	-	-	-

(a) The amount of receivables excludes GST recoverable from the Australian Taxation Office (statutory receivable)

Notes to the Financial Statements

For the year ended 30 June 2017

Note 27. Financial Instruments (continued)

(c) Financial instrument disclosures (continued)

Liquidity risk

The following table details the contractual maturity analysis of financial assets and financial liabilities. The amounts disclosed in the table are the contractual undiscounted cash flows (interest and principal). Balances due within 12 months equal their carrying balances as the impact of discounting is not significant.

	Weighted average effective interest rate %	Interest rate exposure			Maturity dates					
		Carrying amount \$	Variable interest rate \$	Non- interest bearing \$	Nominal amount \$	Up to 1 month \$	1-3 months \$	3 months to 1 year \$	1-5 years \$	More than 5 years \$
2017										
<u>Financial Assets</u>										
Cash and cash equivalents	1.982	4,984,944	4,984,944	-	4,984,944	-	-	-	-	-
Restricted cash and cash equivalents	1.982	5,961,490	5,961,490	-	5,961,490	-	-	-	-	-
Receivables ^(a)		728,145	-	728,145	728,145	-	-	-	-	-
Other current assets		55,365	-	55,365	55,365	55,365	-	-	-	-
		11,729,944	10,946,434	783,510	11,729,944	55,365	-	-	-	-
<u>Financial Liabilities</u>										
Payables		594,071	-	594,071	594,071	594,071	-	-	-	-
		594,071	-	594,071	594,071	594,071	-	-	-	-

(a) The amount of receivables excludes GST recoverable to the Australian Taxation Office (statutory receivable). Impaired receivables have also been excluded.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 27. Financial Instruments (continued)

(c) Financial instrument disclosures (continued)

Liquidity risk (continued)

	Weighted average effective interest rate %	Interest rate exposure			Maturity dates					
		Carrying amount \$	Variable interest rate \$	Non- interest bearing \$	Nominal amount \$	Up to 1 month \$	1-3 months \$	3 months to 1 year \$	1-5 years \$	More than 5 years \$
2016										
<u>Financial Assets</u>										
Cash and cash equivalents	2.394	4,263,210	4,263,210	-	4,263,210	-	-	-	-	-
Restricted cash and cash equivalents	2.394	5,181,151	5,181,151	-	5,181,151	-	-	-	-	-
Receivables ^(a)		55,000	-	55,000	55,000	-	-	-	-	-
Other current assets		58,762	-	58,762	58,762	58,762	-	-	-	-
		9,558,123	9,444,361	113,762	9,558,123	58,762	-	-	-	-
<u>Financial Liabilities</u>										
Payables		93,616	-	93,616	93,616	93,616	-	-	-	-
		93,616	-	93,616	93,616	93,616	-	-	-	-

(a) The amount of receivables excludes GST recoverable to the Australian Taxation Office (statutory receivable). Impaired receivables have also been excluded.

Notes to the Financial Statements

For the year ended 30 June 2017

Note 27. Financial Instruments (continued)

(c) Financial instrument disclosures (continued)

Interest rate sensitivity analysis

The following table represents a summary of the interest rate sensitivity of MRIWA's financial assets and liabilities at the end of the reporting period on the surplus for the period and equity for a 1% change in interest rates. It is assumed that the change in interest rates is held constant throughout the reporting period.

	Carrying amount \$'000	-100 basis points		+100 basis points	
		Surplus \$'000	Equity \$'000	Surplus \$'000	Equity \$'000
2017					
Financial assets					
Cash and cash equivalents	4,984,944	(49,849)	(49,849)	49,849	49,849
Restricted Cash and cash equivalents	5,961,490	(59,615)	(59,615)	59,615	59,615
Total Increase/Decrease		(109,464)	(109,464)	109,464	109,464

	Carrying amount \$'000	-100 basis points		+100 basis points	
		Surplus \$'000	Equity \$'000	Surplus \$'000	Equity \$'000
2016					
Financial assets					
Cash and cash equivalents	4,263,210	(42,632)	(42,632)	42,632	42,632
Restricted Cash and cash equivalents	5,181,151	(51,812)	(51,812)	51,812	51,812
Total Increase/Decrease		(94,444)	(94,444)	94,444	94,444

Fair values

All financial assets and liabilities recognised in the Statement of Financial Position, whether they are carried at cost or fair value, are recognised at amounts that represent a reasonable approximation of fair value unless otherwise stated in the applicable notes.

Notes to the financial statements

For the year ended 30 June 2017

Note 28. Remuneration of auditor

Remuneration paid or payable to the Auditor General in respect of the audit for the current financial year is as follows:

	2017	2016
	\$	\$
Auditing the accounts, financial statements and key performance indicators	18,650	18,400

Note 29. Schedule of income and expenses by service

Treasurer's Instruction 1101(9) requires that statutory authorities provide segment information in the form of services.

MRIWA has one sole activity (or service) which is to finance and coordinate minerals and energy research.

No schedule is prepared as this information is reported in the Statement of Comprehensive Income.

Note 30. Supplementary financial information

(a) Write-offs

	2017	2016
	\$	\$
Public property written-off by the Authority during the period	-	10
	<u>-</u>	<u>10</u>

The Institute has no related or affiliated bodies

There were no losses through theft, defaults and other causes

No gifts of public property were provided by the Institute.

Certification of Key Performance Indicators For the Year Ended 30 June 2017

We hereby certify that the key performance indicators are based on proper records, are relevant and appropriate for assisting users to assess the Minerals Research Institute of Western Australia's performance, and fairly represent the performance of the Minerals Research Institute of Western Australia for the financial year ended 30 June 2017.



Dr P Lilly
Chairman of the Board
Date: 3/8/17



Ms H Cook
Member of the Board
Date: 3/8/17/

Key Performance Indicators

For the year ended 30 June 2017

Outcomes Based Management

The primary function of the Minerals Research Institute of Western Australia (MRIWA) is to provide and administer funding grants to carry out minerals research.

MRIWA's overarching objective is to stimulate minerals research to support investment in, and operation of, a globally competitive minerals industry in Western Australia to optimise economic and social benefits to the State into the future.

From a fiscal perspective, the State Government investment in minerals research is part of the strategy to ensure that the State's mining operations are competitive with operations in lower cost jurisdictions, nationally and internationally. The State co-investment in minerals research contributes to securing the significant revenues generated for the State by the minerals industry.

MRIWA represents a strategic model for minerals research in Western Australia. It provides an efficiency gain for the State with research for the minerals industry being better managed, coordinated and strategically targeted than would otherwise be the case.

As well as directly supporting minerals research projects, MRIWA is also able to undertake and procure minerals research itself and to collaborate with local, Australian and worldwide research and scientific institutions. MRIWA funds are available for projects, programmes and events that promote public awareness of and interest in minerals research, and to support relevant academic activities. The expertise of MRIWA is available to the Minister and the WA Government.

Reason for new OBM for MRIWA

MRIWA commenced on 1 February 2014 after the *Minerals Research Institute of Western Australia Act 2013* (the Act) established the Minerals Research Institute of Western Australia as a statutory corporation to foster and promote minerals research for the benefit of Western Australia.

The Act repealed the *Minerals and Energy Research Act 1987* with the effect that MRIWA replaced the existing Minerals and Energy Research Institute of Western Australia (MERIWA).

The intention of the revised Key Performance Indicators reported here is to provide measurable outcomes relevant to MRIWA's objective and functions.

Desired Outcomes and Key Effectiveness Indicator

The calculation of the KPI bases the measure on:

- The decisions of the Board during the reporting period. The measure will be useful to key stakeholders as it is closely coupled to the Board decisions and is not be influenced by the lagging and highly variable process to complete the project contracts with the various parties involved, which can be up to six months.
- The end-of-month values during the reporting period, rather than just end-of-year. This refinement will allow appropriate inclusion of projects commenced and completed during the reporting period.

It is recognised that it will be appropriate for MRIWA to measure the effect of its research investments on WA State minerals royalties, and their economic impact more broadly. It is recommended that as acquiring the information for these measures is a significant undertaking, and the results are difficult to audit, they are done only periodically, say every 3 years, and are not incorporated in the OBM structure for routine use. It is noted that the State's minerals royalty's receipts vary significantly from year to year as a consequence of price and volume variations in the particular market. Deloitte Access Economics completed an Economic Impact Assessment for MRIWA in September 2015.

Key Performance Indicators

For the year ended 30 June 2017

Services and Key Efficiency Indicator

MRIWA is a granting agency for the purpose of fostering research to the benefit of the State's minerals endowment.

The primary service provided by MRIWA is to seek research opportunities and resources, assist aggregate the resources to Grant applications and to manage completing approved projects. This is illustrated in the model of the MRIWA 'value chain':

The administration effort required of the Institute is appropriately measured as a function of the total financial scale of the portfolio of research projects.

The efficiency measure is the total administration cost for the year as a percentage of the total cash value of research projects and the education program under management during the year.

The efficiency indicator is in keeping with the intention of the MRIWA Act that the Board is accountable for a portfolio of projects, with discretion to manage the interlinking elements of the project value (financial scale), project financial leverage and project duration, to name some of the major considerations.

OUTCOME BASED MANAGEMENT STRUCTURE	
GOVERNMENT GOAL	Financial and Economic Responsibility: Responsibly managing the State's finances through the efficient and effective delivery of services, encouraging economic activity and reducing regulatory burdens on the private sector.
AGENCY LEVEL GOVERNMENT DESIRED OUTCOME	Fostering and promoting minerals research for the benefit of the State.
KEY EFFECTIVENESS INDICATOR	<p>KPI 1 Ratio of total cash investments in research projects to total approved MRIWA cash investment in those research projects.</p> <p>Notes:</p> <ul style="list-style-type: none"> a) Investment totals are for projects approved by the MRIWA Board in the reporting year. b) Measure reported as a multiple.
SERVICE	Administer research grant applications and manage approved projects.
KEY EFFICIENCY INDICATOR	<p>KPI 2 Total administration cost for the year as a percentage of the total cash value of research projects and the education program under management during the year.</p> <p>Notes:</p> <ul style="list-style-type: none"> a) "Under management" being from the time of Board approval of the Grant to the time of the Chair approving the final report for the project. b) The "total value of research projects" to be calculated as the annual average of the end-of-month values.

Key Performance Indicators

For the year ended 30 June 2017

KPI 1 - Effectiveness Indicator – Outcome	Target (multiple)	Actual (multiple)	Comments
Ratio of total cash investments in research projects to total approved MRIWA cash investment in those research projects			
2015/2016	3	2.14	
2016/2017	3	2.55	(a)

KPI 2 - Efficiency Indicator – Service	Target (%)	Actual (%)	
Total administration cost for the year as a percentage of the total cash value of research projects and the education program under management during the year.			
2015/2016	4.5	5.7	
2016/2017	5	4.4	(b)

- (a) The below target actual result is due to approved projects at the end of the year not having finalised contracts in place. This has resulted in likely direct funding not being included in the total calculations, which directly impacts upon efficiency. The Board has been pushing towards improved leverage through encouragement of direct contributions, however as these amounts are subject to change during contract negotiations, so they have not been included. The actual effectiveness has improved over the prior year due to this push towards improved leverage and approval of a greater number of projects.
- (b) The better than target result has reduced from the 2016 year due to average value of the portfolio increasing by approximately \$4.8m, with a minor decrease in administrative costs. The significant value increase in the portfolio has been managed effectively throughout the year due to utilisation and encouragement of direct contributions, requiring minimal further administrative action as the funds do not have to go through MRIWA and instead are paid directly to the researchers.

Ministerial Directives

There have been no Ministerial directives to MRIWA during the reporting period.

Governance Disclosures

To achieve its objective, MRIWA draws substantially on members of the minerals community contributing their experience and knowledge. This is particularly the case for the members of the Board, the Advisory Committee and Theme Advisory Committees.

All members are aware of the matter of conflict of interest: the Board and the Committees apply standard practices for managing potential and actual matters of material personal interest.

Part 4 – Administration, Subdivision 3 of the *Minerals Research Institute Act 2013* sets out the provisions for disclosure of material personal interest.

Board and Committee Remuneration

Members of the Board of the Minerals Research Institute of Western Australia for 2016/17

Name	Position	Type of remuneration or fee	Section of MRIWA Act	Appointment Approved	Notes	Period of Membership	Gross remuneration (\$)
Ms Michelle Jane ANDREWS	Deputy Chair	Annual / \$0	Section 27 (1) (c)	28 January 2014	Resigned 2 May 2017	3 years	0
Prof Mark BUSH	Member	Annual / \$11,405	Section 27 (1) (d)	19 October 2015	-	3 years	11,405
Ms Helen COOK	Member	Annual / \$11,405	Section 27 (1) (a)	28 January 2014	-	3 years	11,405
Ms Denise GOLDSWORTHY	Member	Annual / \$11,405	Section 27 (1) (a)	19 October 2015	-	3 years	11,405
Dr Peter Arthur LILLY	Chair	Annual / \$22,691	Section 27 (1) (b)	19 October 2015	-	3 years	22,691
Mr Larry LOPEZ	Member	Annual / \$11,405	Section 27 (1) (d)	19 October 2015	-	3 years	5,702
Mr Andrew Arthur SHOOK	Member	Annual / \$11,405	Section 27 (1) (b)	28 January 2014	Resigned 11 May 2017	3 years	9,821

Advisory Committee to the Minerals Research Institute of Western Australia at 30 June 2017

Name	Position	Type of remuneration or fee	Section of MRIWA Act	Appointment Approved	Period of Membership	Gross remuneration (\$)
Mr Ian SUCKLING	Chair	Attendance	Section 60 (1)	30 September 2015	31 July 2018	1,971*
Dr Christopher BAKER	Member	Attendance	Section 60 (1)	30 September 2015	31 January 2018	1,680*
Mr Gerard DANCKERT	Member	Attendance	Section 60 (1)	30 September 2015	31 January 2018	1,810*
Prof John DELL	Member	Attendance	Section 60 (1)	2 October 2015	31 January 2018	384*
Mr Rob FREETH	Member	Attendance	Section 60 (1)	30 September 2015	31 January 2018	1,344
Dr Rob HOUGH	Member	Attendance	Section 60 (1)	30 September 2015	31 January 2018	768*
Dr Bryan SMITH	Member	Attendance	Section 60 (1)	30 September 2015	31 January 2018	1,312
Ms Alison MORLEY	Deputy Chair	Attendance	Section 60 (1)	30 September 2015	31 January 2018	1832

Note (1) Gross remuneration includes payments for attendance at Advisory Committee and, where applicable, Scholarship Panel.

*Indicates contribution to advisory education fund.

Theme Committees

Name	Position (see Note 2)	Type of remuneration or fee	Section of MRIWA Act	Appointment Approved	Period of Membership	Gross remuneration (\$)
Dr Christopher BAKER	Chair Theme 3	Attendance	Section 60 (1)	30 September 2015	31 January 2018	See Advisory Committee
Mr Peter BEWICK	Member Theme 1	Attendance	Section 60 (1)	1 October 2015	31 January 2018	228
Dr James CLEVERLEY	Member Theme 1	Attendance	Section 60 (1)	1 October 2015	31 January 2018	114
Mr Grant CAFFREY	Member Theme 3	Attendance	Section 60 (1)	1 October 2015	31 January 2018	0
Mr Gerard DANCKERT	Chair Theme 2	Attendance	Section 60 (1)	30 September 2015	31 January 2018	See Advisory Committee
Prof John DELL	Chair Theme 4 & 5	Attendance	Section 60 (1)	2 October 2015	31 January 2018	See Advisory Committee
Mr Jon HRONSKY	Member Theme 1	Attendance	Section 60 (1)	1 October 2015	31 January 2018	0

Dr James KYLE	Member Theme 3	Attendance	Section 60 (1)	1 October 2015	31 January 2018	114
Name	Position (see Note 2)	Type of remuneration or fee	Section of MRIWA Act	Appointment Approved	Period of Membership	Gross remuneration (\$)
Dr Ivor ROBERTS	Member Theme 1	Attendance	Section 60 (1)	1 October 2015	31 January 2018	114*
Mr David ROSE	Member Theme 2	Attendance	Section 60 (1)	2 October 2015	31 January 2018	306
Dr Gamini SENANAYAKE	Member Theme 3	Attendance	Section 60 (1)	1 October 2015	31 January 2018	726 ⁽¹⁾
Dr Bryan SMITH	Chair Theme 1	Attendance	Section 60 (1)	30 September 2015	31 January 2018	See Advisory Committee
Mr William STAUNTON	Member Theme 3	Attendance	Section 60 (1)	1 October 2015	31 January 2018	228
Mr Richard STROUD	Member Theme 2	Attendance	Section 60 (1)	1 October 2015	31 January 2018	228
Mr John de VRIES	Member Theme 2	Attendance	Section 60 (1)	1 October 2015	31 January 2018	534*
Dr Chris WARD	Member Theme 4 & 5	Attendance	Section 60 (1)	1 October 2015	31 January 2018	114*
Prof Kathleen WRIGHT	Member Theme 4 & 5	Attendance	Section 60 (1)	1 October 2015	31 January 2018	410* ⁽¹⁾

Note (1) Gross remuneration includes payments for attendance at Theme Advisory Committee and, where applicable, Scholarship Panel.

Note (2). There are separate Theme Advisory Committees for Themes 1, 2 and 3 and a single Theme Advisory Committee for Themes 4 and 5. This structure is designed to match the expected work load and will be amended if necessary.

*Indicates contribution to education fund.

Other Legal Requirements

Expenditure on Advertising, Market Research, Polling and Direct Mail

In accordance with s175ZE of the *Electoral Act 1907*, the MRIWA incurred the following expenditure in advertising, market research, polling, direct mail and media advertising:

Total expenditure for the reporting period was \$7,209.

Expenditure was incurred in the following areas	Total	Expenditure	Amount
Advertising agencies	\$2,583	Telstra Directories Listings	\$2,583
Market research organisations	Nil		
Polling organisations	Nil		
Direct mail organisations	Nil		
Media advertising organisations	Nil		

Disability Access and Inclusion Plan Outcomes

The Institute is housed within the Department of Mines and Petroleum building, Mineral House, 100 Plain Street, East Perth, which has a comprehensive and effective plan to ensure compliance with the *Disability Services Act, 1993*.

Compliance with Public Sector Standards and Ethical Codes

During the reporting period there were no known breaches of public sector standards, the *Code of Ethics* or the Institute's Code of Conduct and Ethics.

Recordkeeping Plans

The Institute's Recordkeeping Plan and the Retention and Disposal Plan are approved by the State Records Commissioner and are current.

Substantive Equality

Due to the small size of the Institute, matters concerning women, family and domestic violence, equal employment opportunities, language, cultural diversity and youth were addressed on an individual basis, as required.

Occupational Safety, Health and Injury Management

There were no fatalities or lost time injuries during the reporting period.

MRIWA has relevant OS&H policies and procedures. The Institute is housed within the Department of Mines and Petroleum building, Mineral House, 100 Plain Street, East Perth. Where appropriate, MRIWA adhered to the OSH and Injury Management policies and practices of the Department of Mines and Petroleum.

Legislation Impacting on the Institute's Activities

Freedom of Information

There were no applications under the *Freedom of Information Act* during the year. A copy of the Information Statement is available by contacting the Chief Executive Officer on (08) 6180 4343 or by writing to the Minerals Research Institute of Western Australia, 100 Plain Street, East Perth 6004.

Disability Services Plan

The Institute is housed within the Department of Mines and Petroleum building, Mineral House, 100 Plain Street, East Perth, which has a comprehensive and effective plan to ensure compliance with the *Disability Services Act, 1993*.

Customer Group Outcomes

Due to the small size of the Institute, matters concerning women, family and domestic violence, equal employment opportunities, language, cultural diversity and youth were addressed on an individual basis, as required.

Corruption Prevention

The Board of MRIWA was satisfied that the processes and procedures followed by the Institute, its staff and committees were robust and effective in the requirement to eliminate the possibility of corruption.

Annual Estimates 2017/18

STATEMENT OF COMPREHENSIVE INCOME

	S40 ESTIMATE 2018 \$
COST OF SERVICES	
Expenses	
Research grants	5,505,751
Scholarships	833,000
Loss on disposal of assets	-
Employee benefits expense	504,194
Institute Contractor fees	103,680
Board and committee fees and costs	135,848
Supplies and services	254,945
Other expenses	18,400
Accommodation expenses	47,250
Depreciation expense	6,000
Total expenses	7,409,068
Income	
<i>Revenue</i>	
Interest revenue	237,295
Other revenue	68,311
Revenue from Industry Sponsorship	3,300,000
Donations	-
Total revenue	3,605,606
Total income other than income from State Government	3,605,606
NET COST OF SERVICES	3,803,462
Income from State Government	
State Government Grant	3,089,000
Resources received free of charge	47,250
Total income from State Government	3,136,250
Surplus for the period	(667,212)
TOTAL COMPREHENSIVE INCOME FOR THE PERIOD	(667,212)

STATEMENT OF FINANCIAL POSITION

	S40 ESTIMATE
	2018
	\$
ASSETS	
Current Assets	
Cash and cash equivalents	1,529,586
Restricted cash and cash equivalents	8,667,657
Receivables and other assets	330,000
Other Current Assets	59,324
Total Current Assets	<u>10,586,567</u>
Non-Current Assets	
Property, plant and equipment	<u>11,304</u>
Total Non-Current assets	<u>11,304</u>
TOTAL ASSETS	<u>10,597,871</u>
LIABILITIES	
Current Liabilities	
Payables	147,116
Provisions	95,000
Deferred revenue	1,450,000
Total Current Liabilities	<u>1,692,116</u>
Non-Current Liabilities	
Provisions NCL	<u>-</u>
Total Non-Current Liabilities	<u>-</u>
Total Liabilities	<u>1,692,116</u>
Net Assets	<u>8,905,754</u>
EQUITY	
Accumulated surplus	<u>8,905,754</u>
Total Equity	<u>8,905,754</u>

STATEMENT OF CASH FLOWS

S40 ESTIMATE
2018
\$

Cash flows from State Government

Cash receipts from Government	3,089,000
	3,089,000

Cash flows from operating activities

Payments

Research Grant Payments	(6,369,333)
Employee benefits	(494,498)
Institute Contractor Fees	(101,686)
Board and Advisory Committee Fees	(48,777)
Supplies and Services	(273,874)
GST Paid on Purchases	(674,489)

Other payments

Receipts from Sponsors	2,910,940
Interest received	235,471
GST received on sales	291,094
Net GST refunded from ATO (or paid)	383,395

Cash generated from operations	(4,141,757)
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Cash flows from investing activities

Purchase of non-current assets	-
Net cash from investing activities	-

Cash flows from financing activities

Related entities loans	-
Proceeds from other borrowings	-
HP Financing	-
Finance leases	-
Net cash from financing activities	-

Net increase in cash and cash equivalents	(1,052,757)
Cash and cash equivalents 1 July 2016	11,250,000
Cash and Cash Equivalents at End of Year	10,197,243