GOVERNMENT OF
WESTERN AUSTRALIA

mriwa
Minerals Research Institute
of Western Australia

Minerals Research Institute of Western Australia

Annual Report 2020-21

minerals research
advancing WA

Statement of Compliance

For year ended 30 June 2021

HON BILL JOHNSTON MLA
Minister for Mines and Petroleum

In accordance with section 63 of the *Financial Management Act 2006* (WA), we hereby submit for your information and presentation to Parliament, the Annual Report of the Minerals Research Institute of Western Australia (MRIWA or the Institute) for the reporting period ended 30 June 2021.

The Annual Report has been prepared in accordance with the provisions of the *Financial Management Act 2006* (WA) and any other relevant written law.

The financial statements comply with Australian Accounting Standards – Reduced Disclosure Requirements issued by the Australian Accounting Standards Board.

Miriam Stanborough
Chairperson of the Board

Date: 26 August 2021

Helen Cook
Deputy Chairperson of the Board

Date: 26 August 2021

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Overview

This section provides an overview of the Minerals Research Institute of Western Australia (MRIWA or the Institute), our vision and values and the broader MRIWA team who work to deliver on our strategic plan.

Highlights

COLLABORATIVE RESEARCH LEADERSHIP

Industry, academic and government relationships activate innovation and research networks attracting investment in high value activities

MRIWA partnered with the Critical Raw Materials for Electric Vehicles to host a European webinar to showcase Western Australia's assets and capabilities in the battery supply chain and rare earth minerals

Preparation is underway for MRIWA's Net Zero Emission Mining WA conference to be held October 2021

IMPACTFUL RESEARCH

Applied research creates capability and delivers economic and social benefit for Western Australia

Launch of $1 million targeted funding round to attract investment in our Net Zero Emission Mining focus area and priority themes

MRIWA Indigenous Postgraduate Scholarship introduced to complement existing scholarships offered

Highlights (continued)

KNOWLEDGE TRANSFER

MRIWA is well-known and its minerals research outcomes are implemented

Establishment of fortnightly enewsletter to promote MRIWA's latest news, upcoming events, and project updates

Evaluation and review of MRIWA-funded research projects completed 2013-2018 and preparation of technical summaries for these projects

GOVERNANCE

Robust governance and contemporary fit-for-purpose corporate practices

Inaugural MRIWA College Colloquium held November 2020

Results of Office of the Auditor General of Western Australia focus audit on our grant administration showed MRIWA's practice in this area to be of a high standard

Message from the Chair

On behalf of the Board of MRIWA, I am delighted to present the Annual Report for 2020-2021. We are very proud of the achievements of our team this year, including the progress of our research portfolio, and the implementation of a number of new initiatives.

Under our **Impactful Research** pillar, MRIWA administers a research grants program which leverages financial and in-kind contributions from industry and research organisations to build knowledge, create capability and deliver economic and social value for Western Australia.

In addition to our research grants, MRIWA has historically awarded at least two PhD research scholarships annually. During the year, we enhanced the value of these scholarships by offering recipients tailored professional and communication skills training, and a number of opportunities to engage with the MRIWA Board and College to develop their networks.

In June we were pleased to launch the MRIWA Indigenous Postgraduate Research Scholarship to support the development of research champions and industry thought-leaders from the Aboriginal community.

Under our pillar of **Collaborative Research Leadership**, the MRIWA College comprises leading experts in disciplines relevant to MRIWA's Research Priority Plan.

In November we held the inaugural College Colloquium, designed to leverage the extensive academic and industry experience of this group to inform our strategic plan and focus areas for future initiatives.

Launches of the Green Steel and Net Zero Emission Mining challenges followed, signalling MRIWA's intention to set specific research agendas, alongside our conventional grant application process.

In support of the WA Government's Future Battery Industry Strategy, MRIWA is a participant in the Future Battery Industries Cooperative Research Centre (FBI CRC) and supports 10 FBI CRC projects, some of which are being completed in two stages. The Board has focused on those projects likely to bring the most benefit to Western Australia in line with our mineral endowments and other competitive advantages.

MRIWA's third pillar is **Knowledge Transfer**, which recognises that the job of delivering value from research does not finish with the publication of a report, but that an important next step is to clearly communicate the research findings to drive implementation and adoption.

To this end, the Board endorsed a comprehensive communication strategy during the year. Many of our stakeholders will have observed a significantly increased social media presence from MRIWA as one result of this.

Finally, I would like to thank our Minister, the Hon. Bill Johnston, for his unfailing support for MRIWA and demonstration of the long-term commitment required to invest in minerals research throughout the economic cycle.

Thank you also to Deputy Chair Helen Cook, and our fellow board members for their considered stewardship of our organisation, and to our College members for bringing their expertise to grant assessments and informing the future priorities of MRIWA.

I also acknowledge the considerable effort of our small but hardworking team, ably led by CEO Nicole Roocke. Nicole has brought many new ideas to MRIWA and strengthened our links to industry and government, laying the groundwork for MRIWA to contribute even more to the advancement of Western Australia through minerals research.

I invite you to read on, to find out more about the progress of our research portfolio and our collaborative research leadership initiatives.

Miriam Stanborough
Chairperson of the MRIWA Board

Responsible Minister

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

About Us

The Minerals Research Institute of Western Australia (MRIWA or the Institute) is a statutory body established by the Western Australian Government in 2013 under the *Minerals Research Institute of Western Australia Act 2013* (WA) (the MRIWA Act).

Our Work

MRIWA fosters and promotes minerals research for the benefit of the State by:

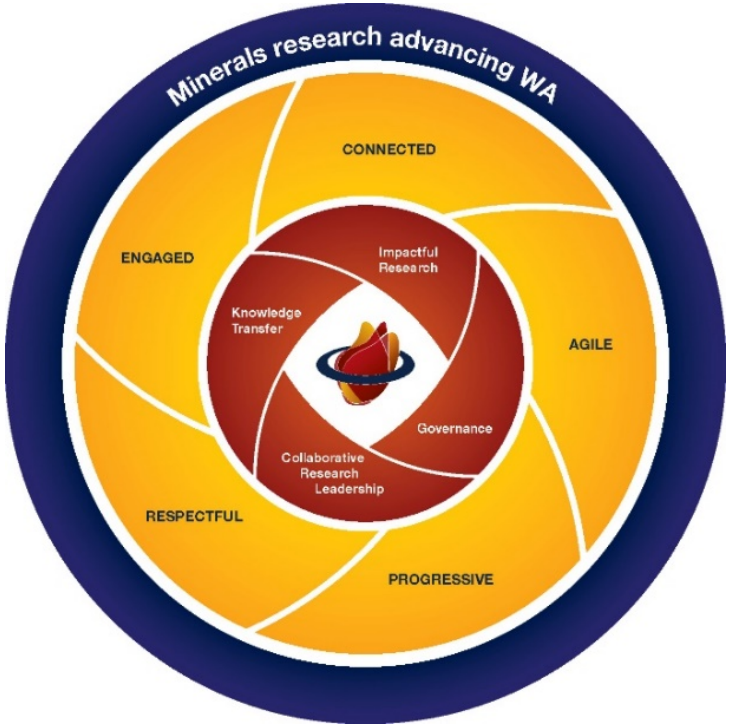
- Undertaking, procuring or managing minerals research projects;
- Fostering academic activities;
- Conferring and collaborating on matters relating to minerals research;
- Maintaining current knowledge of minerals research;
- Promoting awareness of and fostering public interest in matters relating to minerals research; and
- Providing advice to the Minister.

MRIWA may administer and co-invest in research projects undertaken within Western Australia, nationally and internationally. MRIWA collaborates with industry, research institutions and government partners to support research which will deliver tangible economic, environmental or social benefit for Western Australia.

As well as directly supporting minerals research projects, MRIWA funds are available for projects, programs and events that promote public awareness of, and interest in, minerals research.

Through our Education Program, we fund scholarships for PhD and postgraduate candidates where the field of study is relevant to the MRIWA objectives. Tailored professional and communication skills training is provided for postgraduate students accepted into the MRIWA program.

Vision and Values



Message from the CEO

Over the last financial year, the MRIWA team have continued to focus on delivering high quality grants administration while also exploring new opportunities.

Key highlights

- Commencement of the Net Zero Emission Mining Challenge, which aims to reduce the carbon footprint, lower overall energy costs and improve the energy efficiency of the Western Australian mining sector through harnessing collective efforts, enabling decarbonisation to become an opportunity for the sector, not a cost.

  This year the Challenge involved the launch of a competitive grants round and agreement to partner with CSIRO and Practera to deliver the Innovate to Grow Program.

- Continuing discussions on the potential opportunities for Green Steel, engaging with iron ore producers, the research community and steel manufacturers seeking to understand how Western Australia can leverage its amazing iron ore assets.

- Delivery of our Education Program and the provision of additional professional development to our scholars, including cultural awareness training.

- Introduction of project evaluations and review of our historic projects to determine impact resulting from the research. Our Retrospectives will be published via social media to further promote the learnings contained in completed projects.

Significant Issues and Trends

Current and Emerging Issues and Trends

MRIWA's research program is highly regarded and funded through a combination of state government appropriation, federal government research grants and sponsorship from third parties.

Strategic changes in government policy, exposure to variations in economic conditions resulting from COVID-19 and decisions by other research grant bodies all influence the success and efficiency of this model. Maintaining key sponsor relationships is crucial to ensuring the continuity and momentum of key research programs.

While this year has seen a smaller number of projects approved by the Board, it has not reduced the volume of work for the organisation as we have been continuing to work with those leading research projects supported by MRIWA to deliver quality outcomes in challenging circumstances.

Likely Developments & Forecast Results of Operations

In the upcoming period MRIWA will continue to focus on proactively initiating conversations to determine those areas of minerals research where we can deliver maximum impact back to the State.

Our Net Zero Emission Mining and Green Steel Challenges provide us with the opportunity to champion existing capability and activity in Western Australia.

Next year will see us progress work on specific topics in each Challenge area to ensure we can effectively position Western Australia to thought leaders in these topics.

Throughout the year we continued the deployment and implementation of system improvements which enable us to operate flexibly and productively regardless of work location.

We have again had changes in our team. However, this has not impacted on our ability to deliver results and I would like to acknowledge the fantastic efforts of the MRIWA team and the way they continue to embrace new opportunities and find avenues to deliver outstanding results with the limited resources we have.

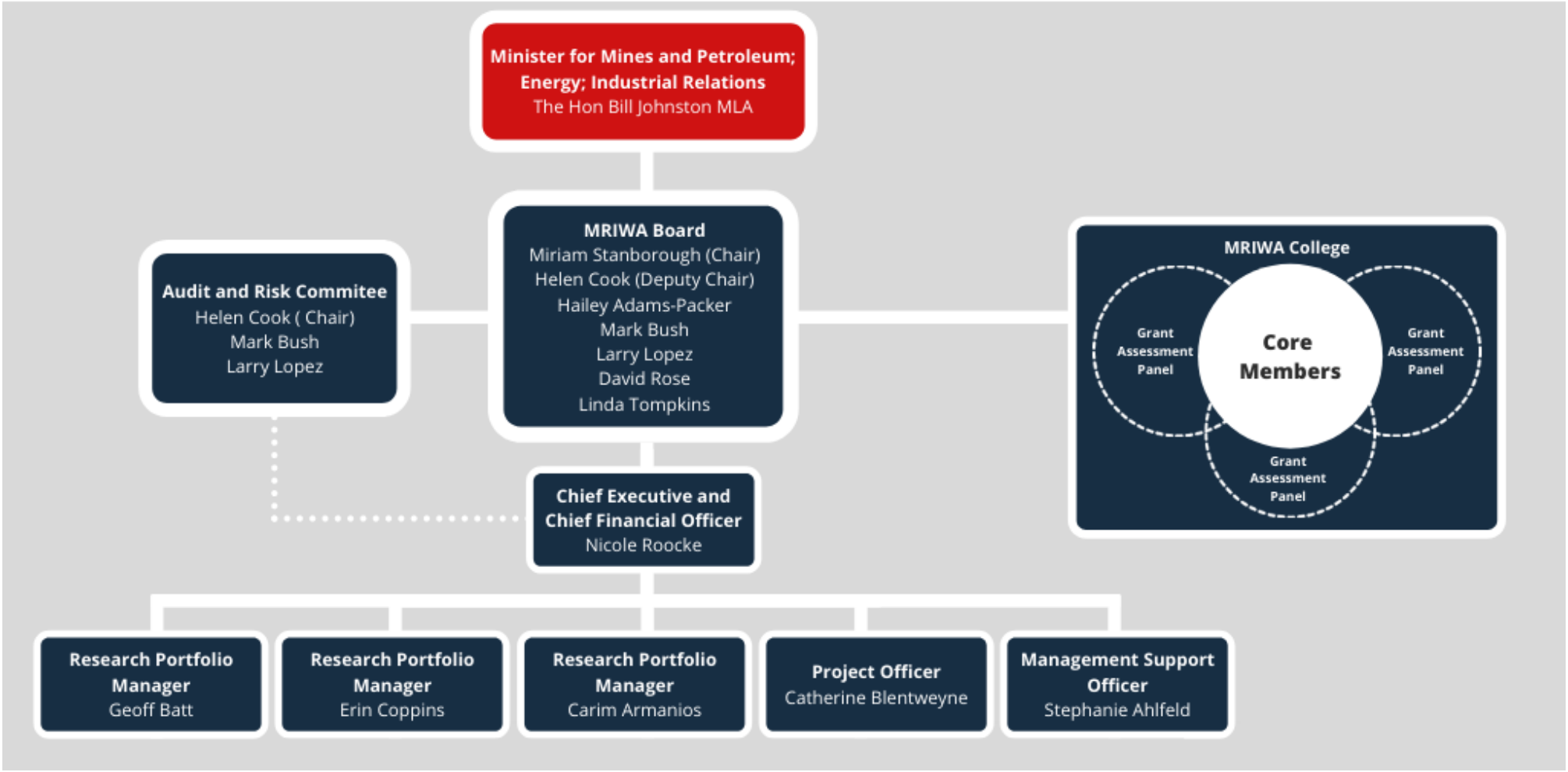
The MRIWA Board continues to ensure there is robust decision making and breadth in consideration of issues. Their commitment to MRIWA is appreciated and their insights enable us to be well positioned going forward.

The Minister for Mines and Petroleum, the Hon. Bill Johnston continues to actively promote the capability of our organisation and his staff provide valued advice and support.

While the last twelve months have seen many challenges, MRIWA is well positioned to support minerals research in areas which will advance Western Australia over the coming years.

Nicole Roocke
Chief Executive Officer and Chief Financial Officer

Our Structure



The Organisation Chart is published on the MRIWA website https://www.mriwa.wa.gov.au/about-us/our-people/

Our Team

Ms Nicole Roocke, *Chief Executive Officer and Chief Financial Officer*

Appointed CEO in November 2018, Nicole joined MRIWA after spending 15 years at the Chamber of Minerals and Energy of Western Australia coordinating industry input on a variety of government regulatory and policy issues and facilitating collaboration within the resources sector.

Nicole holds a Master of Science in Industrial and Organisational Psychology from the University of Western Australia (UWA) and a Master of Risk Management from the University of New South Wales (UNSW).

Ms Stephanie Ahlfeld
Management Support Officer

Stephanie's career in the public service includes roles in administration, finance and human resources within a Regional Local Authority. She commenced as the Institute's Management Support Officer at the end of 2015 with a focus on customer service, compliance and continuous process improvement.

Stephanie holds a Bachelor of Commerce (Accounting) from Curtin University.

Dr Carim Armanios
Research Portfolio Manager

Carim joined MRIWA in January 2021 as Research Portfolio Manager and brings with him over 25 years' experience working in R&D, with roles in mineral refining, environmental solutions, research management, technology deployment and commercialisation as well as business improvement and strategy.

He holds a first-class honours in Applied Chemistry and a PhD in Petroleum Geochemistry from Curtin University and later in his career obtained an MBA from the University of Western Australia.

Ms Catherine Blentweyne
Project Officer

Catherine has over 12 years' experience supporting research, with roles in libraries, administration and research development.

She maintains a strong interest in scholarly communication and metrics-based evaluation of research quality and impact.

Catherine holds a Master of Information Studies in Information Architecture from Charles Sturt University (CSU).

Dr Geoffrey Batt
Research Portfolio Manager

Geoff has been a Research Portfolio Manager providing strategic direction and project management services for MRIWA since 2019. He leads MRIWA's education and scholarship programs and maintains a strong focus on science communication, supporting the accessibility and transferability of research innovation in the applied mining sector.

An experienced research scientist and manager, Geoff came to MRIWA from a private sector consulting role and has spent 20 years as a successful and respected researcher and educator at leading institutions around the globe.

He holds a PhD in Earth Science from the Australian National University (ANU), and an MBA from UWA.

Ms Erin Coppins
Research Portfolio Manager

Erin joined the MRIWA team as a Research Portfolio Manager in May 2021, bringing experience in strategic advice, project and contract management across the public and private sectors. She is leading the MRIWA Challenge on Net Zero Emission Mining and has a strong focus on strategic development and stakeholder engagement.

With a passion for sustainability and a background in clean energy and regional development, Erin came to MRIWA having been involved in the development of State Government renewable energy priorities including COVID-19 recovery projects and the WA Renewable Hydrogen Strategy.

Originally from the United Kingdom, she holds an MSc in International Development and a Bachelors degree in Law from the University of Bristol.

Our Board Members

Ms Miriam Stanborough became Chair of MRIWA in January 2020.

Miriam is a chemical engineer with more than 20 years' experience in the minerals processing industry, across commodities including copper, uranium, gold, silver, alumina and mineral sands. Miriam is currently Group Manager – Productivity and Innovation with Monadelphous.

Miriam has held roles in technical development, production management, project management, business improvement, HR & diversity strategy, and sales and marketing.

She holds additional degrees in Arts and Mineral Economics, is a member of the Australasian Institute of Mining and Metallurgy and is a graduate of the Australian Institute of Company Directors.

Miriam's other current board roles include Deputy Chair of the Northern Agricultural Catchments Council and Director of Scouts WA. With her husband, she runs a beef cattle operation, and she also sits on the Independent Assessment Committee for the Federal Government's Boosting Female Founders Initiative.

Ms Helen Cook has longstanding board experience across various sectors and has been Deputy Chair of the MRIWA Board since 2017 and Chairman of the Audit and Risk Committee since 2014.

The National Partner in charge of KPMG's Energy and Natural Resources Group until 2014, she then commenced Non-Executive Directorship roles with RAC Holdings, RAC Finance and RAC Insurance.

She currently serves on the UWA Mining Energy and Natural Resources Law Advisory Board, Juniper Aged Care Board, and a Finance and Governance Panel for the Australia Council, and is a Councillor of the National Gallery of Australia, WA Councillor of the Australian Institute of Company Directors, and a member of Chief Executive Women.

Helen's past board roles include Deputy Chair of Fremantle Ports, Chair of the Art Gallery of WA, Director of the Perth Theatre Trust and various roles in the resources and commercial sectors.

Ms Hailey Adams-Packer has considerable public policy experience having worked across a number of portfolios within Western Australia's public service.

She has worked within the mining and petroleum portfolio since 2013. Currently in the role of General Manager Title Compliance, Hailey is well recognised for her leadership, strategic thinking and policy development.

Hailey is also the Managing Director of Pacmentality Consulting, a digital business support agency and brings a unique blend of experience in technology, business, organisation development and government relations.

Outside of the workplace, Hailey represents Western Australia in lawn bowls and actively gives back to her sport through her involvement as a member of the BowlsWA Board's Club Development committee.

Professor Mark Bush has over 30 years of experience in research, research leadership, grant assessment and grant administration, while holding various academic and leadership positions with UWA.

Mark brings with him a broad knowledge of Engineering. He is currently Emeritus Professor with UWA and has served as Head of Department of Mechanical and Materials Engineering; Dean of the Faculty of Engineering, Computing and Mathematics; and Director of Animal Research Services.

He is an Honorary Fellow of Engineers Australia (Hon FIEAust), Chair of the National Engineering Accreditation Board and Chartered Professional Engineer (CPEng), and Fellow of the Academy of Technological Sciences of Engineering (FTSE), and has served in various leadership positions in these organisations.

Mr Larry Lopez is a Partner at Perth-based Australian Venture Consultants. Larry has over 35 years of experience financing innovative projects and companies. He has held numerous executive roles in government agencies, and private and public companies that enable the commercialisation of research outputs and intellectual property.

Larry is the Chair of Fulbright Australia and a non-executive director of several private companies. He also sits on a number of not-for-profit boards including the Centre for Entrepreneurial Research and Innovation. He has been a director or partner in four venture capital funds, including funds investing in technology that enables the mining sector. Larry is currently a General Partner at AC Ventures, a venture capital fund focussed on investing in and growing early-stage Australian Companies.

Larry obtained a BSc from Menlo College, School of Business Administration and is a graduate of the Pacific Coast Banking School at the University of Washington.

Mr David Rose is a Director in mining consulting with KPMG, with 35 years of diverse experience in the mining industry across gold, base metals, coal, diamonds and iron ore, in both open pit and underground operations.

David's most recent executive roles were Chief Operating Officer, St Barbara Ltd, and Managing Director, Rio Tinto (Argyle Diamonds and Rio Tinto Iron Ore).

His consulting engagements have included expert panel reviews, operational improvement projects and management systems upgrade projects for mature operating mines. He has also undertaken operational readiness and systems design engagements for pre-start-up and transitional mines, in Australia and overseas.

David is a past Deputy Chairman and now Honorary Fellow of Leadership WA, a Fellow of the AusIMM, a Graduate of the AICD, President of Rowing WA and the Deputy Chair of St Catherine's College (UWA).

Dr Linda Tompkins has over 35 years of global experience in the resource sector through professional roles as a research and exploration geologist, technical director of an ASX- and AIM- (London) listed exploration company, corporate and resource lawyer, and group general counsel and company secretary of an ASX-listed company with overseas mining interests.

She has on-site experience in Australia, Brazil, China, and Africa in exploration, development, and mining operations for diamonds, lead-zinc, nickel and gold.

Linda has a PhD (Geology) and LLB (Hons) from The University of Western Australia (UWA), and is a member of the Geological Society of Australia and the Resources and Energy & Resources Law Association (formerly AMPLA).

She is also a director of the Munda Biddi Foundation. Her past board roles include director of the AMPLA national board, member of the advisory board of the UWA Geoscience Foundation, and other roles in the resources sector.

MRIWA Board

MRIWA Board members are appointed by the Minister for Mines and Petroleum, in accordance with Section 27(1) of the MRIWA Act and are remunerated by an annual fee set by the Public Sector Commissioner. The fee has not been varied since first established on 20 December 2013.

Membership as at 30 June 2021	Initial Appointment	Term Expiry	No. of Meetings Attended	Sitting fees ($)
Miriam Stanborough (Chair)	1 Oct 2017	31 Dec 2022	5 of 5	22,691[(a)]
Helen Cook (Deputy Chair and Chair, Audit and Risk Committee)[(b)]	28 Jan 2014	31 Jan 2023	4 of 5	13,614
Hailey Adams-Packer	1 Feb 2020	31 Jan 2023	5 of 5	0[(c)]
Mark Bush[(b)]	1 Feb 2016	31 Dec 2021	5 of 5	11,405[(a)]
Larry Lopez[(b)]	1 Jan 2016	31 Dec 2021	5 of 5	11,405[(d)]
David Rose	1 Jun 2018	31 Apr 2024	5 of 5	11,405[(d)]
Linda Tompkins	1 Mar 2020	28 Feb 2023	5 of 5	11,405

(a) Foregoes a portion of remuneration and donates back to the MRIWA Directors' Scholarship
(b) Audit and Risk Committee Member - the Committee assists the MRIWA Board by providing an objective review of the effectiveness of the financial management and reporting, risk management, audit and compliance framework. The Chief Financial Officer and Deloitte attend ex-officio
(c) Ineligible for remuneration in accordance with Premier's Circular 2019/07 State Government Boards and Committees
(d) Foregoes all remuneration and donates back to the MRIWA Directors' Scholarship

Legislation

Enabling and Administered Legislation

MRIWA was established as an agency in February 2014, under the *Minerals Research Institute of Western Australia Act 2013* (WA).

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

MRIWA staff and PhD scholars participating in a Cultural Awareness Workshop March 2021

Other Key Legislation Impacting on our Activities

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

- *Auditor General Act 2006*
- *Disability Services Act 1993*
- *Electoral Act 1907*
- *Equal Opportunity Act 1984*
- *Financial Management Act 2006*
- *Freedom of Information Act 1992*
- *Government Employees Superannuation Act 1987*
- *Industrial Relations Act 1979*
- *Interpretation Act 1984*
- *Library Board of Western Australia Act 1951*
- *Limitation Act 1935*
- *Minimum Conditions of Employment Act 1993*
- *Occupational Safety and Health Act 1984*
- *Public Interest Disclosure Act 2003*
- *Public Sector Management Act 1994*
- *Salaries and Allowances Act 1975*
- *State Records Act 2000*
- *State Supply Commission Act 1991*
- *Workers' Compensation and Injury Management Act 1981*

Report on Operations

Actual Results versus Budget Targets

	2021 Target $	2021 Actual $	Variation $
Total cost of services	9,610,901	7,668,515	1,942,386
Net cost of services	6,228,199	4,867,085	1,361,114
Total equity	6,964,520	9,860,619	2,896,099
Net increase / (decrease) in cash held	(811,531)	600,061	1,411,592
Approved salary expense level	785,155	828,373	43,218

For detailed information on MRIWA's financial performance, refer to the *Financial Statement and Notes* section of this report.

Summary of Key Performance Indicators

Key Effectiveness Indicator	2020-21 Target	2020-21 Actual
Ratio of total cash investments in research projects to total approved MRIWA cash investment in those research projects	*4*	239.34
Key Efficiency Indicator	**2020-21 Target**	**2020-21 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	*4%*	1.31%

For detailed information on MRIWA's Key Performance Indicators, refer to the *Our Performance* section of this report.

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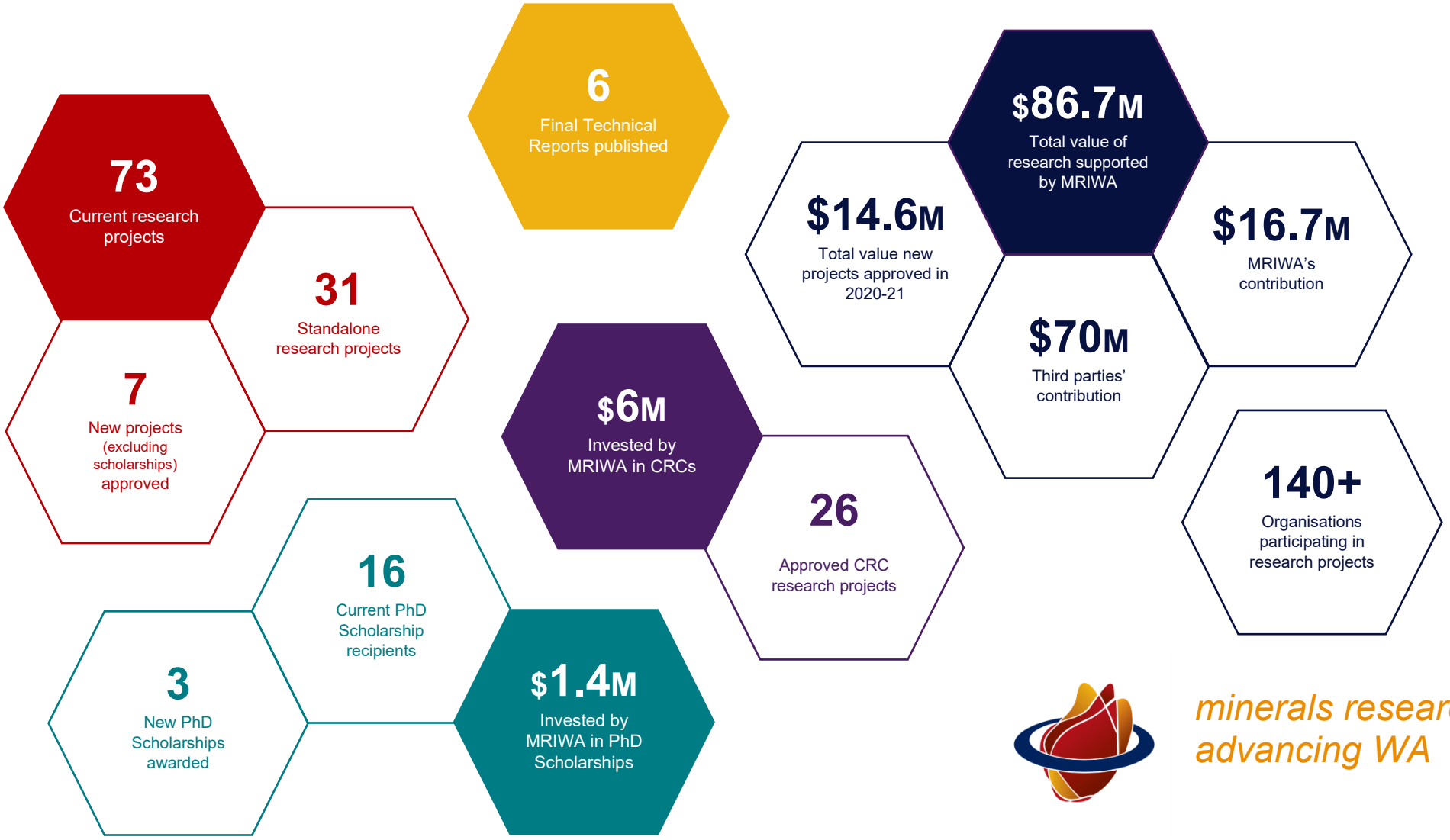
Our Projects

This section outlines our applied research projects, how we create capability and deliver economic and social benefit for Western Australia.

Through the MRIWA research portfolio, industry, academic and government relationships are activated enabling innovation and research networks to attract investment in high-value research activities.

Highlights for 2020-21



Research Priorities

The Minerals Research Institute of Western Australia (MRIWA) is focused on the research and development needs of the Western Australian minerals industry to ensure it remains an engine of economic growth for Western Australia.

MRIWA invests through competitive grants made to organisations within Australia and abroad that leverage multi-partner funding from industry and/or other government sources.

The MRIWA Research Priority Plan (the Plan) identifies the key areas where investments will be made into high impact research and development. Those seeking to work with MRIWA on our **Impactful Research** program need to demonstrate alignment with the priorities outlined in the Plan and how their proposals would deliver economic and social benefit for Western Australia.

The revised Research Priority Plan was released in February 2020 and describes the medium to long term knowledge and technology needs of the State's minerals industry.

Priorities included in the Plan reflect those issues which industry, the research sector and the MRIWA Board agree present real and significant challenges inhibiting Western Australians from benefiting from the minerals sector to its fullest extent; and where resolution of these will create opportunities and deliver value.

The priorities fall across six broad research areas (Program areas). The Program areas incorporate priorities specific to parts of the mining value chain, and broader themes applicable across the value chain, with an integrated approach required to achieve the intended outcomes outlined in the Plan.

MRIWA Challenges

MRIWA Challenges are campaigns targeting specific focus areas which seek to stimulate and amplify activities of high value to the State. Challenges may fall in areas specific to parts of the mining value chain or have impact across the entire value chain, with the benefit to be realised in Western Australia.

During 2020-21 MRIWA launched two challenges:

Net Zero Emission Mining

This MRIWA Challenge aims to reduce the carbon footprint, lower overall energy costs and improve the energy efficiency of the Western Australian mining sector through harnessing collective efforts, enabling decarbonisation to become an opportunity for the sector, not a cost.

A targeted call for project proposals was launched in May 2021, with up to $1 million in MRIWA co-funding for research addressing a challenge or issue in the Western Australian mining sector that, if overcome, could facilitate a move towards net zero emissions. A decision on funding is expected in August 2021.

MRIWA is working in partnership with CSIRO and ed-tech start-up Practera to enable small and medium businesses in the mining equipment, technology and services (METS) sector to participate in the Innovate to Grow Program. The program will commence July 2021.

Planning is underway for MRIWA's inaugural Net Zero Emission Mining WA Conference to be held on 13 October 2021.

Green Steel

This MRIWA Challenge aims to map the pathway to enable Western Australia to maximise use of its magnetite and hematite iron ore resources and emerging hydrogen and renewable energy potential to support global green steel ambitions, creating new markets and industries for this state.

MRIWA put out a request for tender for suitably qualified and experienced organisations to undertake a green steel value chain assessment.

Research Priority Plan Summary

CRC Participation

CRC TiME

Transformations in Mining Economies

The Cooperative Research Centre for Transformations in Mining Economies (CRC TiME) brings together mining companies, regulators and community participants to deliver coordinated investment into research addressing the challenges underpinning mine closure and relinquishment.

CRC TiME's research mission is structured around five program areas targeting those areas where Australia's economic, environmental and social resilience are recognised as most vulnerable during the transition from mining to post-mine scenarios.

Over its lifetime, this research centre is intended to deliver practical outcomes empowering and supporting transformational and world-leading change in the Australian mine closure sector.

In 2020-21 there were two CRC TiME projects which received an allocation of MRIWA funds.

Commenced operation:	2020
Funding duration:	10 years
Participants:	74 participants including leading mining and METS companies, regional development organisations, government and research partners
Total Project Value:	$130M comprised of $29.5M cash from the CRC Program $30.5M cash from industry and research participants $70M in-kind support
MRIWA contribution:	$300,000 over 10 years

FUTURE BATTERY INDUSTRIES CRC

The Future Battery Industries Cooperative Research Centre (FBI CRC) is enabling the growth of battery industries to power Australia's future and ensure Australia plays a leading role in the global battery revolution.

The FBI CRC brings together organisations covering the full extent of the battery value chain, including mining, extraction, processing, and refining of battery minerals, metals and materials, as well as downstream uses such as precursor chemical manufacture, battery cell manufacture, battery recycling and battery deployment in defence, electrical utilities, mining, and other mobile and stationary applications.

In 2020-21 there were 10 current and two completed FBI CRC projects which received an allocation of MRIWA funds.

Commenced operation:	2019
Funding duration:	6 years
Participants:	Over 60 partners from mining and METS companies, government, and research partners
Total Project Value:	$116M comprised of $25M cash from the CRC Program $25.7M cash industry and research participants $32.5M non-staff in-kind $32.8M staff in-kind
MRIWA contribution:	$6 million over 6 years ($500,000 is contributed by Department of Jobs, Tourism, Science and Innovation)

MinEx CRC is delivering coordinated investment in research to develop more productive, safer and environmentally friendly drilling technologies and workflows to improve the success rate and efficiency of discovering and defining mineral deposits.

Key deliveries from the MinEx CRC will include the development of a new style of drilling rig incorporating revolutionary coiled tubing drilling technology, and a suite of new and innovative technologies for collecting data while drilling.

MinEx CRC will operate for three contract phases, with phase 1 of the MinEx research program due for completion at the end of December 2021.

In 2020-21 there were three MinEx CRC projects which received an allocation of MRIWA funds.

Commenced operation:	2018
Funding duration:	10 years
Participants:	Over 40 partners from mining and METS companies, government, and research
Total Project Value:	$220M comprised of $50M cash from the CRC Program $41M cash industry and research participants $51M non-staff in-kind $78M staff in-kind
MRIWA contribution:	$1.47 million over 10 years

CRC ORE completed its second funding terms and operations on 30 June 2021.

Its prime directive was to identify and implement innovation to improve operational value and reverse the marked trend of declining productivity in the mining industry over the past decade.

CRC ORE was focused on applied innovation, technology development and technology transfer rather than fundamental research.

Since 2015, seven CRC ORE projects have received an allocation of MRIWA funds.

Commenced operation:	2015
Funding duration:	6 years
Participants:	Partners from mining and METS companies, government, and research
Total Project Value:	$137.7M comprised of $34.4M cash from the CRC Program $42.5M cash industry and research participants $29.6M non-staff in-kind $31M staff in-kind
MRIWA contribution:	$600,000 over 6 years

Our Research

It is the Institute's goal to have an impactful research program, where applied research creates capability and delivers economic and social benefit for Western Australia.

Organised by Research Priority Plan Program area, this section provides an overview of all research MRIWA supported throughout 2020-21.

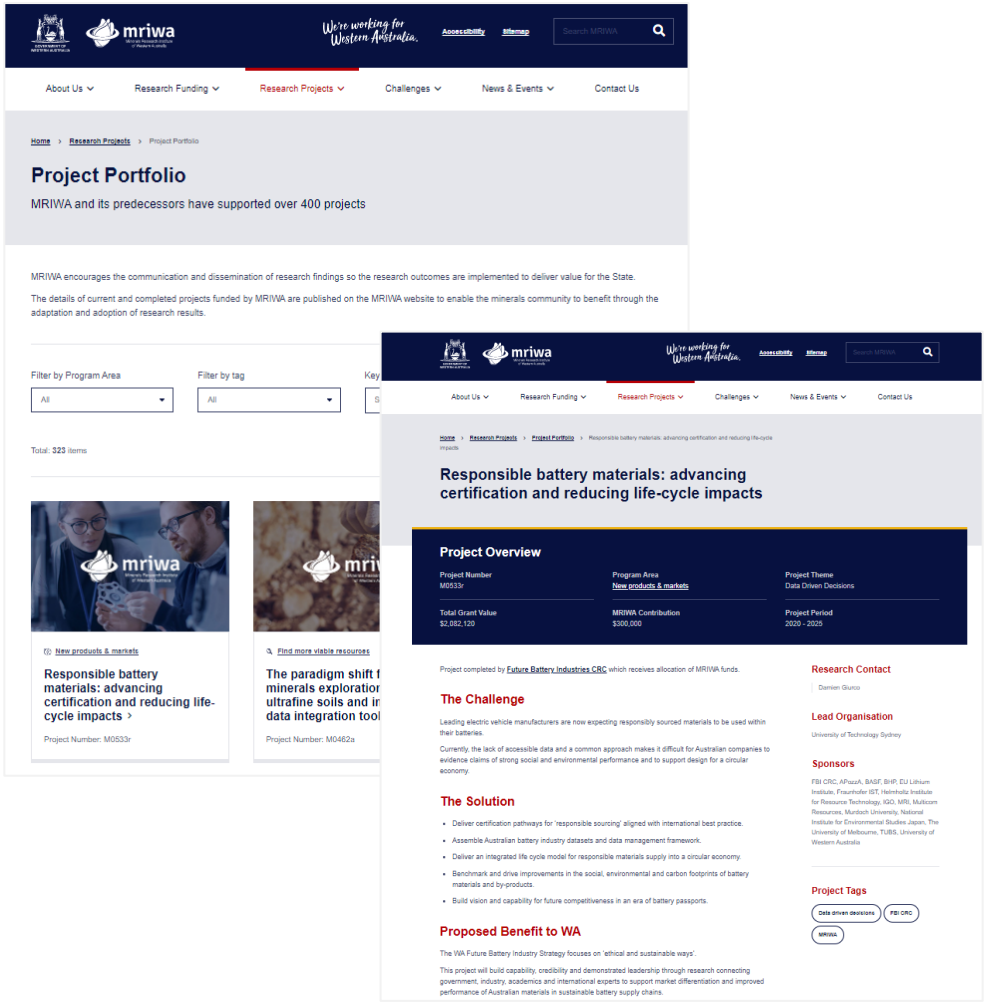
Case studies are provided for those research projects approved by the Board and where a research report was made publicly available throughout the year.

MRIWA Project Portfolio

The MRIWA website[1] features current and completed MRIWA-funded research projects, the challenges they are seeking to address and the intended benefits the projects will deliver to Western Australia.

In 2021, MRIWA reviewed the outcomes of sponsored research projects completed between 2012 and 2018. Through this review process, we have sought to better understand the value delivered by our research to industry, and to promote the outcomes of this work to a broader audience and increase adoption of potentially valuable innovations.

To support the transfer of knowledge to industry, MRIWA has produced a set of concise technical summaries. It is hoped the release of these summaries highlights some of the great research work previously undertaken in this area that is freely available from MRIWA for use by industry.



Project Portfolio on MRIWA website

[1] https://www.mriwa.wa.gov.au/research-projects/project-portfolio/

Research Portfolio Summary

No. Projects	19	15	22	2	10	5
MRIWA Contribution	$5.1M	$3.9M	$3.4M	$375K	$3.5M	$519K
Third-Party Contribution	$24.1M	$5.4M	$11.1M	$1M	$27.5M	$858K
Total Grant Value	**$29.2M**	**$9.3M**	**$14.5M**	**$1.4M**	**$31M**	**$1.4M**

Note: Due to rounding, some totals may not correspond with the sum of the separate figures

PROGRAM 1: Find More Viable Resources

Western Australia's easily found and economically viable mineral deposits near to the surface are being exploited at a greater rate than which they are being replenished by new discoveries.

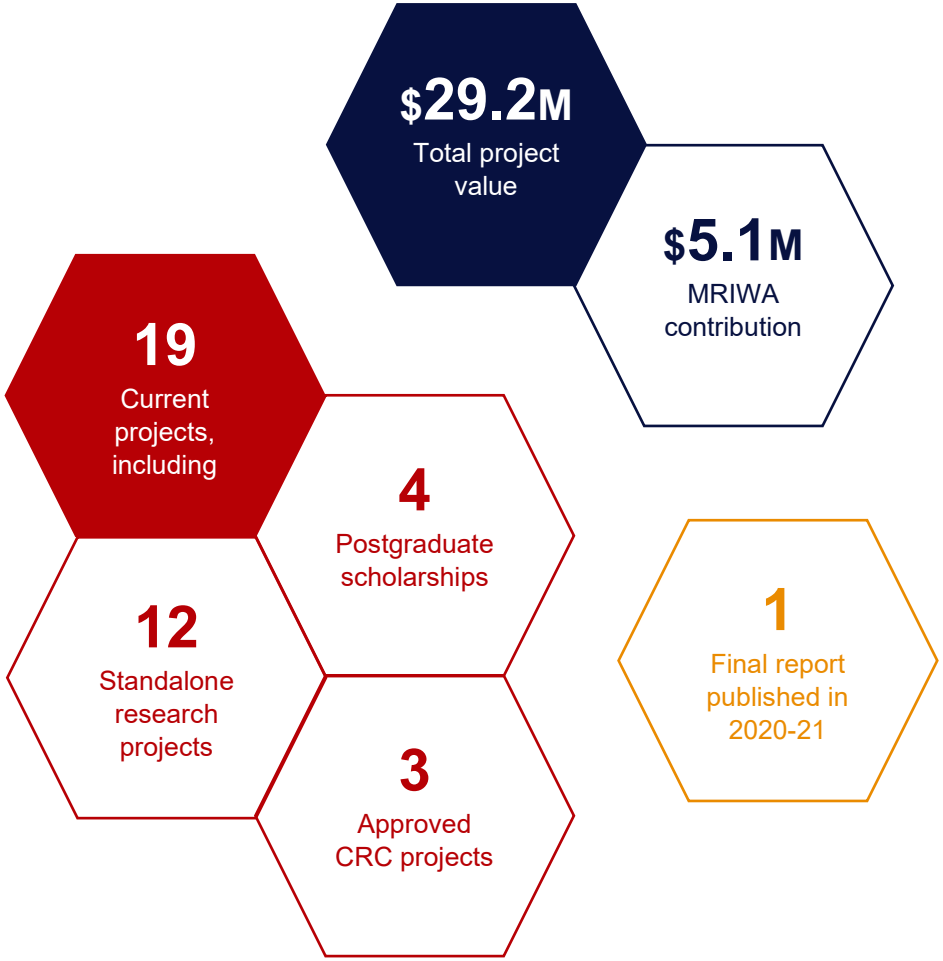
To meet the challenge of finding significant new discoveries, and building on UNCOVER Australia and the Western Australian Government's Exploration Incentive Scheme, the research priority areas in Program 1 are intended to systematically advance knowledge and capability to improve mineral exploration productivity through detection, exploration technology and prediction performance.

In doing so, the research will inform the pre-competitive geological, geochemical and geophysical knowledge base and create exploration capability to:

- position Western Australia as a global leader in exploration technology
- facilitate private sector investment in existing and newly identified Western Australian mineral provinces to develop the State's rich natural resources.

Themes

- Mineral Systems
- Detection Technology
- Data Driven Decisions
- Regulatory Tools and Processes
- Safety, Social and Environmental Sustainability
- Workforce of the Future



Project Case Studies

4D evolution of WA ore systems (WA4D): Re-Os sulfide geochemistry

Program 1 – Find More Viable Resources (Mineral Systems)

STATUS: Final Report Published[2] **Project No: M0446**

THE CHALLENGE

Understanding of many important Western Australian mineral systems has been limited by inability to directly date the relevant ore minerals.

The use of common datable minerals such as zircon to indirectly frame mineralisation timing can leave the sequence of events leading to economic ore system development uncertain.

Direct dating of key sulfide ore minerals would support the development of more-effective mineral exploration models.

KEY FINDINGS

This research validated the use of isotopes of the elements Rhenium (Re) and Osmium (Os) to directly date common sulfide ore minerals.

This direct dating delivered improved understanding of the evolution of two types of sulfide-hosted ore systems that comprise important components of Western Australia's mineral endowment, constraining the evolution and accumulation of ore minerals more firmly in the context of known geological events.

BENEFIT TO WA

This study helps define the geological events responsible for major ore systems in Western Australia.

The new Re-Os method for sulfide dating could support mineral exploration by defining regions that have experienced known mineralisation episodes. These insights will improve exploration efficiency and encourage investment targeting the next generation of ore bodies in WA.

Sponsors

Curtin University

Department of Mines, Industry Regulation and Safety (GSWA)

Thermo Fisher Scientific

Lead Organisation

Curtin University

Research Contact

Brett McInnes

Total Grant Value

$341,650

MRIWA Contribution

$175,000 over 3 years

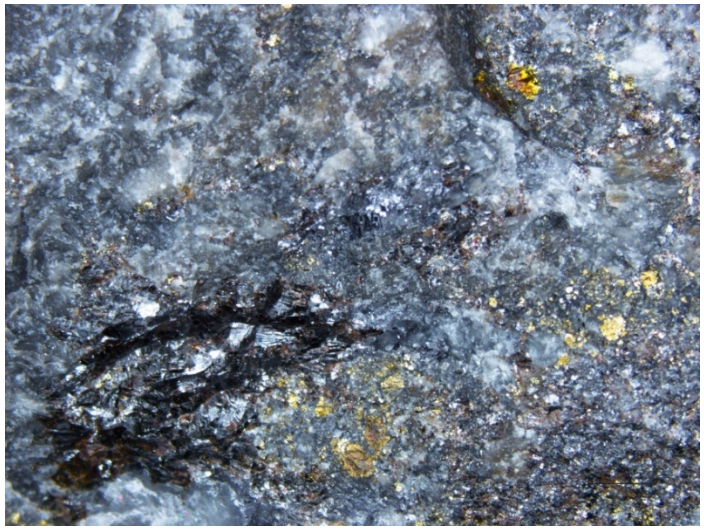


Image captured in project M0446 showing sulfide mineralisation in the Nimbus volcanic-hosted massive sulfide deposit. The Pb-isotopic composition in the sulfide minerals present was used to identify the relative timing of mineralisation, as described in Barrote et al. (2020) https://doi.org/10.1016/j.precamres.2019.105536. **Image courtesy of Svetlana Tessalina, Curtin University**.

[2] https://www.mriwa.wa.gov.au/research-projects/project-portfolio/4d-evolution-of-wa-ore-systems-re-os-sulfide-geochemistry/

Current Projects

Program 1 – Find More Viable Resources (Mineral Systems)

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0557	Orebody knowledge, landscape history and mineralisation of Martite – Goethite Ores in the Hamersley Province (WA)	CSIRO Erick Ramanaidou	BHP Billiton Iron Ore Pty Ltd Bureau Veritas Minerals Pty Ltd Commonwealth Scientific Industrial Research Organisation (CSIRO) FMG Resources Pty Ltd Rio Tinto Pilbara Iron Company (Services) Pty Ltd Roy Hill Iron Ore Pty Ltd	2	1,552,000	388,000
M0554	Evolution of Proterozoic multistage rift basins – key to mineral systems	University of Western Australia Mark Jessell	Anglo American PLC Australian Research Council BHP Group Operations Pty Ltd Commonwealth Scientific Industrial Research Organisation (CSIRO) Department of Mines, Industry Regulation and Safety (GSWA) IGO Limited Monash University University of Sydney University of Western Australia	4	2,388,576	540,837
M0551	Integrated 3G - Geochronology-geochemistry-grain shape: a new toolkit for mineral sands understanding	Curtin University Milo Barham	Curtin University Iluka Resources Limited	3	740,000	260,000
M0530	Yilgarn 2020	Centre for Exploration Targeting (UWA) Nicolas Thebaud	BHP Nickel West Pty Ltd Bogada Gold Pty Ltd Evolution Mining Limited Gold Fields Australia Pty Ltd Gold Road Resources Ltd Newmont Goldcorp Services Pty Ltd Northern Star Resources Limited Saracen Mineral Holdings Limited	3	2,346,000	796,000

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0521	Lithospheric and crustal-scale controls on multi-stage basin evolution: impacts on mineralising systems	Centre for Exploration Targeting (UWA) Weronika Gorczyk	Department of Mines, Industry Regulation and Safety (GSWA) First Quantum Minerals Exploration (Australia) Pty Ltd First Quantum Minerals Ltd Fortescue Metals Group Ltd University of Western Australia (CET - Centre for Exploration Targeting)	4	1,493,737	733,737
M0470a	A multi-scale approach to controls on mineralization in the Fraser Zone, Western Australia	Curtin University Katy Evans	Curtin University Department of Mines, Industry Regulation and Safety (GSWA) IGO Limited MG Creasy	3	1,023,300	341,300
M0448	4D Evolution of WA ore systems (WA4D): Rutile - pathfinder to ores	Curtin University Neal McNaughton	Curtin University Department of Mines, Industry Regulation and Safety (GSWA) IGO Limited	3	489,763	263,113
M0424	Multiscale dynamics of hydrothermal mineral systems	University of Western Australia Alison Ord	AngloGold Ashanti Australia Limited First Quantum Minerals (Australia) Pty Ltd Department of Mines, Industry Regulation and Safety (GSWA) Silver Lake Resources Ltd	4	630,000	210,000

Detection Technology

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0543	Field-based XRF for prompt Au analysis	Portable PPB Pty Ltd Simon Bolster	Barrick Gold Corporation Bellevue Gold Mines Ltd Centerra Madencilik A.Ş. Fosterville Gold Mine Pty Ltd Gold Fields St Ives Gold Mining Company Pty Ltd Gold Road Resources Ltd Newcrest Mining Limited Perseus Mining	1	658,000	218,000
M0514	Novel seismic methodologies for exploration of mineral resources in a hypersaline environment	Curtin University Milovan Urosevic	Curtin University HiSeis Pty Ltd MinEx CRC Matsa Resources Ltd	2	372,800	100,000
M0515	Development of drilling fluid system for the Coiled Tube drill rig	Curtin University Masood Mostofi	Curtin University Deep Exploration Technologies CRC	1	400,000	150,000
M0509d	Centrifuge optimisation for fluid management in coiled tubing drilling	MinEx CRC Andrew Bailey	MinEx CRC	1.75	1,923,125	471,875
M0509c	Seismic in the drilling workflow	MinEx CRC Andrew Bailey	MinEx CRC	3	1,403,600	111,700
M0509b	Petrophysics for mineral discovery during drilling	MinEx CRC Andrew Bailey	MinEx CRC	3	10,578,700	111,700
M0509a	Coiled tubing drilling for definition of mineral deposits	MinEx CRC Andrew Bailey	MinEx CRC	3	2,294,700	110,000

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0462a	The paradigm shift for minerals exploration using ultrafine soils and intelligent data integration tools	CSIRO Ryan Noble	Condamine Resources De Grey Mining Department of Mines, Industry Regulation and Safety (GSWA) Dreadnought Resources Fortescue Metals Group Ltd Geological Survey of New South Wales Geological Survey of Queensland Geological Survey of South Australia Greenmount Resources Pty Ltd Hexagon Energy Materials Limited IGO Limited Kaiross Minerals Kalamazoo Resources MCA Nominees Mining Investments Australia Newmont Goldcorp Tanami Pty Ltd Northern Star Resources Limited Northern Territory Geological Survey Tojo Minerals	3	983,749	117,000

PROGRAM 2: Expand the Mining Envelope

A significant proportion of the future Western Australian resource base is likely to reside in deep and complex geotechnical environments. Additionally, most major open-cut and underground operations are known to have extensions to their mineralisation, albeit at possibly lower grade. Mining methods have to adapt to allow continued economic and safe extraction of resources.

The research priority areas in Program 2 are intended to systematically advance knowledge and capability toward solutions for mining more ore from challenging deposits.

In doing so, the research will create engineering capability and demonstrate technical feasibility of mining more selectively and deeper to:

- position Western Australia as a global leader in extraction technologies
- decrease the capital and operating costs associated with mining
- allow for safer and increased productivity from existing mines and a new generation of deposits to be brought into production.

Themes

- Deep and Complex Extraction Systems
- Engineering in Highly Stressed and Complex Rock Masses
- Mining Technology
- Data Driven Decisions
- Energy Utilisation
- Regulatory Tools and Processes
- Safety, Social and Environmental Sustainability
- Workforce of the Future

Project Case Studies

Sustainable optimisation of mining complexes through innovative algorithms

Program 2 – Expand the Mining Envelope (Data Driven Decisions)

STATUS: Approved by Board

Project No: M10430

THE CHALLENGE

Mine planning software can be an important value generator in mining operations by helping sequence activities to minimise costs associated with haulage and waste storage, but current state-of-the-art software lacks the capacity to optimise planning for complex mine systems that include multiple pits, processing options/streams and waste dumps.

KEY FINDINGS

This project will develop and test an innovative mine planning algorithm designed to identify a globally optimised operational plan for a complex mine system to maximise Net Present Value delivered over life-of-mine.

BENEFIT TO WA

Optimised planning could support investment decisions and enhance operating mine life for ore bodies throughout Western Australia, delivering substantial benefit to the state through employment, tax revenue, and downstream economic activity. The proposed research will also contribute to recognised leadership of WA in delivering cutting-edge technology for modern mining operations.

Sponsors

Norton Gold Fields

Total Grant Value

$105,000

MRIWA Contribution

$60,000 over 3.5 years

Lead Organisation

Curtin University

Research Contact

Waqar Asad

Probabilistic stope design

Program 2 – Expand the Mining Envelope (Engineering in Highly Stressed and Complex Rock Masses)

STATUS: Final Report Published[3] **Project No: M0489**

THE CHALLENGE

Despite representing an important influence on the profitability of safe modern underground mining methods, measurement of stope volume and its reconciliation against mine planning are generally poorly quantified at an operational level.

This limitation restricts understanding of the factors influencing stoping outcomes and their effective management in the mine planning process.

KEY FINDINGS

The octree analysis system developed in this research provides an innovative technique for reconciliation, subdividing stope volumes into blocks small enough to accurately resolve the relationship between stope geometry and mine infrastructure.

This enables new types of investigation to deliver understanding of the effects of multiple factors on the outcome of stope development, including blasting, planned stope geometry, and geology.

Analysis on a per-octree basis allows the root causes of overbreak and underbreak to be identified and corrected.

BENEFIT TO WA

The octree analysis system will allow optimisation of stope design, reducing overbreak and underbreak and delivering more efficient development in Western Australian mines.

The economic benefits from this increased efficiency can be easily implemented via the existing mXrap geotechnical software developed by the ACG in WA.

Sponsors

Agnico Eagle Mines Ltd
BHP Olympic Dam
Glencore AU Zinc Mount Isa Mines Ltd
Gold Fields Australia Pty Ltd
Hecla Québec
Iamgold Mine Westwood
MMG Management Pty Ltd

Total Grant Value

$430,000

MRIWA Contribution

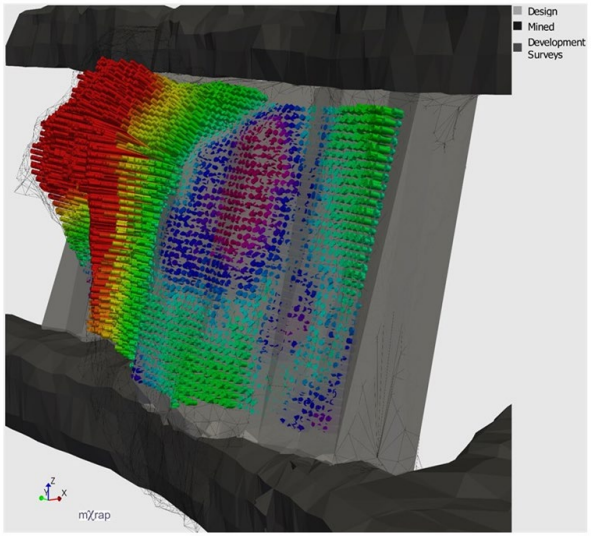
$85,000 over 2 years

Lead Organisation

Australian Centre for Geomechanics (ACG)

Research Contact

Yves Potvin



Example of mine development performance captured in MRIWA project M0489. Image displays relative over- (red-yellow) and under-excavation (blue-violet) produced by an explosive blast with respect to the planned surface. **Image courtesy of the Australian Centre for Geomechanics**.

[3] https://www.mriwa.wa.gov.au/research-projects/project-portfolio/probabilistic-stope-design/

Real-time mining face grade determination using hyperspectral imaging techniques

Program 2 – Expand the Mining Envelope (Mining Technology)

STATUS: Final Report Published[4] **Project No: M0518**

THE CHALLENGE

Current practice of determining mining face ore grade prevents the creation of precise ore grade maps for use in mine planning and scheduling.

This limits capacity for controlling mining processes, resulting in lower mine efficiency and productivity, and negatively impacting sustainability.

KEY FINDINGS

Hyperspectral imaging-based mapping is viable as a means for ore grade classification at the mine face.

This finding establishes the commercialisation potential of terrestrial hyperspectral imaging for real-time ore grade classification at the point of excavation.

BENEFIT TO WA

Real-time ore grade classification at the mine face will bring substantial benefit to the large-scale efficient operations dominating Western Australia's mining industry, including:

- enhanced mine scheduling;
- improved resource recovery and minimised processing waste; and
- supporting autonomous mining systems and machinery.

Sponsors
AngloGold Ashanti Australia Limited
CITIC Pacific Mining Management Pty Ltd
Plotlogic Pty Ltd

Lead Organisation
University of Queensland

Research Contact
Andrew Job, Ross McAree

Total Grant Value
$850,850

MRIWA Contribution
$250,000 over 2 years

Plotlogic's OreSense® system pictured during trials in project M0518 using hyperspectral image processing to deliver real-time mining face grade determination at CITIC Pacific's Sino Iron operations. **Image courtesy of Plotlogic.**

[4] https://www.mriwa.wa.gov.au/research-projects/project-portfolio/real-time-mining-face-grade-determination-using-hyperspectral-imaging-techniques/

Current Projects

Deep and Complex Extraction Systems

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0545	Evaluation of in-situ barrier technology for risk mitigation and extraction optimisation for in-situ-recovery operations	Curtin University Navdeep Dhami	BHP Pty Ltd CMTE Development (trading as Mining3) Newcrest Mining Limited Orano Mining	3.25	225,000	75,000
M0544	Towards a mechanistic understanding of electrokinetic in situ leaching	University of Western Australia Andy Fourie	BHP Pty Ltd Evolution Mining Limited Newcrest Mining Limited Newmont Goldcorp Services Pty Ltd	3	842,605	290,605
M0529	Lixiviant access creation in impermeable hard rock mass for the in situ underground leaching of metals from ore	Murdoch University Aleks Nikoloski	CMTE Development (trading as Mining3) Murdoch University	3	120,000	30,000

Engineering in Highly Stressed and Complex Rock Masses

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0499	Establishing in-situ rock bolt behaviour underground in order to model and design improved rock bolt support systems	CMTE Development (trading as Mining3) Ewan Sellers	Curtin University CMTE Development (trading as Mining3) Peabody Australia	3	1,270,000	400,000
M0497	Ground support systems optimisation - Phase 2	Australian Centre for Geomechanics (ACG) Yves Potvin	Agnico Eagle Mines Ltd Dywidag-Systems International Pty Ltd (formerly Fero Strata Systems Pty Ltd T/As DSI Underground) Dywidag-Systems International Pty Ltd (T/As DSI Underground) Garock Gold Fields Agnew Gold Mining Company Pty Ltd Gold Fields St Ives Gold Mining Company Pty Ltd Iamgold Mine Westwood IGO Limited Jennmar Australia Pty Ltd New Concept Mining Newcrest Cadia Holdings Pty Ltd Sandvik Mining and Rock Technology University of Western Australia (ACG - Australian Centre for Geomechanics)	3	1,931,250	671,250

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0464	Rock properties to predict rockburst vulnerability in three dimensions	Australian Centre for Geomechanics (ACG) Phil Dight	Agnico Eagle Mines Ltd AngloGold Ashanti Australia Limited BHP Nickel West Pty Ltd BHP Olympic Dam Glencore Ernest Henry Mining Pty Ltd Glencore Sudbury Integrated Nickel Operations Gold Fields Agnew Gold Mining Company Pty Ltd Gold Fields Australia GSM Mining Company Pty Ltd Gold Fields Australia Pty Ltd Gold Fields St Ives Gold Mining Company Pty Ltd Iamgold Mine Westwood LKAB Sweden Newcrest Mining Limited Northern Star (Kanowna) Pty Ltd Tritton Resources Limited University of Western Australia (ACG - Australian Centre for Geomechanics)	4	2,140,000	1,100,000

Mining Technology

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0522	Physics models for ore tracking in surface mines	CMTE Development (trading as Mining3) Paul Lever	Fortescue Metals Group Ltd South32	1.5	760,000	380,000
M0510	Safe, sustainable management of filtered tailings	University of Western Australia Andy Fourie	Alcoa of Australia /Ltd Alumina Quality Workshop (Inc) BHP Billiton Group Operations Pty Ltd International Aluminium Institute Rio Tinto Technological Resources Pty Ltd	3	482,500	142,000
M0515	Development of drilling fluid system for the Coiled Tube drill rig	Curtin University Masood Mostofi	Curtin University Deep Exploration Technologies CRC	1	400,000	150,000
M0487	Hard rock disc cutting technologies: Fundamentals of cutter/rock interaction and rock failure mechanism	CMTE Development (trading as Mining3) Ewan Sellers	CMTE Development (trading as Mining3)	3	550,000	200,000

PROGRAM 3: Increase Recovered Value Through Processing

More complex and lower grade orebodies, combined with higher energy costs and the need for a lower environmental footprint, are driving the development of advanced methods of processing to transform low value deposits to be economic.

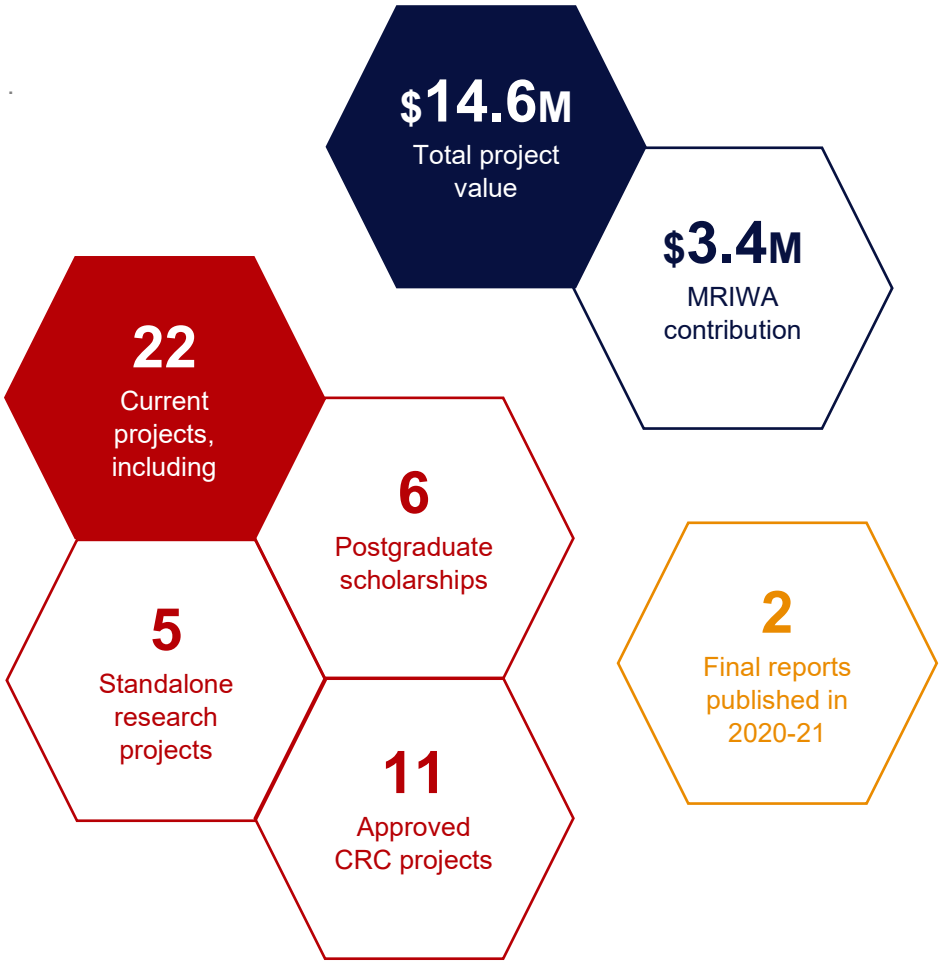
The research priority areas in Program 3 are intended to systematically advance knowledge and capability toward solutions for increasing yield and throughput and optimising the use of raw materials by breaking down operational silos.

In doing so, the research will create mineral processing capability and accelerate the development, testing, piloting, scale-up and other technical de-risking activities associated with new processing technologies to:

- position Western Australia as a global leader in mineral processing
- decrease the capital and operating costs associated with mineral processing
- allow for safer and increased productivity from processes and a new generation of processing technologies to be deployed.

Themes

- Processing Technology
- Interoperability
- Data Driven Decisions
- Energy Utilisation
- Regulatory Tools and Processes
- Safety, Social and Environmental Sustainability
- Workforce of the Future



Project Case Studies

Investigation on the relationship between ore grade and size fraction in the Kalgoorlie-Boulder region

Program 3 – Increase Recovered Value Through Processing (Processing technology)

STATUS: Final Report Published[5] **Project No: M0441f**

THE CHALLENGE

Large scale testing of grade-by-size amenability can be challenging and expensive.

Development and validation of inexpensive, simple methods to assess the potential for further testing and implementation of screening will increase likelihood of uptake in the industry.

KEY FINDINGS

Deposits vary in their response to grade-by-size testing, even between those with similar general geological characteristics.

Care should be taken in sampling as provenance is important, and response may vary significantly across a deposit.

Some gold deposits showed wide ranging responses, while nickel ores tested exhibited greater internal consistency.

Reverse Circulation (RC) chips require further testing to determine the legitimacy of the data and an appropriate analysis method.

BENEFIT TO WA

This work displays the potential for using small-scale samples for indicative testing of the grade-by-size assessment potential of an ore.

Sponsors
CRC ORE

Total Grant Value
$83,800

MRIWA Contribution
$43,000 over 1.75 years

Lead Organisation
CRC ORE

Research Contact
Paul Revell

CRC ORE
Optimising Resource Extraction

[5] https://www.mriwa.wa.gov.au/research-projects/project-portfolio/investigation-on-the-relationship-between-ore-grade-and-size-fraction-in-the-kalgoorlie-boulder-region/

A novel direct leach approach to extract Platinum group from the Panton Sill PGM deposit in the Kimberley region of WA

Program 3 – Increase Recovered Value Through Processing (Processing technology)

STATUS: Final Report Published[6]

Project No: M0458

THE CHALLENGE

The Panton Sill in WA's Kimberley region contains a potential resource of 14.32 million tonnes of ore at 2.19 g/t Pt, 2.39 g/t Pd (for an estimated total contained resource of c.2 Moz of Pt+Pd) and 0.31 g/t Au.

The distribution of this mineralisation across multiple thin stratiform reefs is not amenable to economic extraction by existing mineral processing technologies.

KEY FINDINGS

A viable method of extracting Platinum Group Metals (PGMs) from the Panton Sill deposit was developed by Curtin University.

The optimal method for processing the ore was to produce a flotation concentrate, followed by conventional roasting and an HCl/NaCl/H_2O_2 leach.

Extraction rates achieved were 97% Pt, 90% Pd and 97% Au.

BENEFIT TO WA

Application of the identified methodology at scale may allow the development of a viable mining operation to extract the PGMs from the Panton Sill deposit.

Commercial exploitation of this resource would bring benefits to the state including employment and royalty revenue.

Sponsors
Curtin University
Panoramic Resources Ltd

Total Grant Value
$510,860

MRIWA Contribution
$200,000 over 4 years

Lead Organisation
Curtin University

Research Contact
Alireza Rabieh

Aerial view of the Panton Sill complex studied in project M0458, showing outcropping of a chromite horizon rich in platinum group metals (white band) in the centre foreground.
Image courtesy of Future Metals.

[6] https://www.mriwa.wa.gov.au/research-projects/project-portfolio/a-novel-direct-leach-approach-to-extract-platinum-group-metals-pgm-from-the-panton-sill-pgm-deposit-in-the-kimberley-region-of-wa/

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

Program 3 – Increase Recovered Value Through Processing (Processing technology)

STATUS: Final Report Published[7] **Project No: M0488**

THE CHALLENGE

Limited understanding of the performance of chemical recovery systems in real ore bodies has held back development of practical in-situ recovery (ISR) technology in mining.

KEY FINDINGS

Sulfate and salt solutions reacting with copper ores produce mineral precipitates which prevent the reactive fluids reaching the surface of the copper minerals present, slowing reactions.

This behaviour prevents accurate prediction of ISR performance in real ore systems, where porosity of rocks and ability of chemical reactants to interact with the ore are critical.

The greatest recovery efficiency obtained in this study was delivered by a solution of ferric chloride and hydrochloric acid.

BENEFIT TO WA

Western Australia is the world's sixth-largest copper producer, with recent major discoveries and a wealth of exploration prospects adding to the future potential significance of this metal for the state.

By supporting practical and environmentally sensitive development of ISR technology, the findings of this research could prolong the operation of many existing copper mines in Western Australia or help convert currently sub-economic systems into commercial prospects, all while reducing the impact of mining on the landscape.

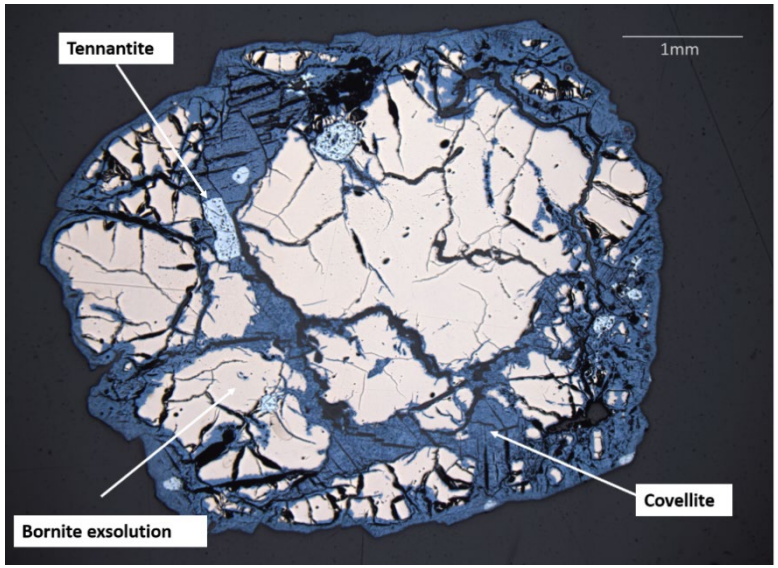
Sponsors
BASF Australia Ltd
Curtin University

Total Grant Value
$239,364

MRIWA Contribution
$100,500 over 3.5 years

Lead Organisation
CSIRO

Research Contact
Laura Kuhar



Reflected light microscope image from research in project M0488, capturing reaction textures produced in a crystal of bornite after exposure to a hydrochloric acid solution at 90°C for one month. **Image courtesy of Tania Hidalgo**.

[7] https://www.mriwa.wa.gov.au/research-projects/project-portfolio/understanding-fluid-rock-interactions-and-lixiviant-oxidant-behaviour-for-the-in-situ-recovery-of-metals-from-deep-ore-bodies/

Integration of enhanced grade engineering grade by size gangue liberation and more energy efficient comminution

Program 3 – Increase Recovered Value Through Processing (Processing technology)

STATUS: Final Report Published[8] **Project No: M0503**

THE CHALLENGE

To enhance grade-by-size ore sorting through the use of more-selective breakage mechanisms, reducing the energy required to break up and process ore through early rejection of coarse crushed material.

KEY FINDINGS

There is an opportunity for multiple-impact breakage to enhance grade-by-size deportment-based Grade Engineering outcomes.

The Grade Engineering response using equipment able to impart precisely controlled energies such as a Vertical Shaft Impactor (VSI) and JK Rotary Breakage Tester (JKRBT) is better that that obtained using standard jaw crusher technology.

Surface abrasion of ore material has the potential to produce finer material with higher copper content, although mass and mineral recovery are relatively small.

BENEFIT TO WA

Exploiting inherent rock-property controls on deportment through application of more selective and energy-efficient breakage mechanisms offers the opportunity to enhance the benefits of screening-based Grade Engineering.

This includes generation of higher-grade feed streams and step-change improvements in overall comminution energy intensity through development of next generation devices capable of delivering significantly improved breakage efficiency and selective gangue rejection.

Sponsors
CRC ORE

Lead Organisation
CRC ORE

Research Contact
Paul Revell

Total Grant Value
$976,748

MRIWA Contribution
$75,000 over 2 years

CRC ORE
Optimising Resource Extraction

[8] https://www.mriwa.wa.gov.au/research-projects/project-portfolio/integration-of-enhanced-grade-engineering-grade-by-size-gangue-liberation-and-more-energy-efficient-comminution/

Current Projects

Processing Technology

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0541	Organic acid leach system for rare earth extraction technology development	Curtin University Laurence Dyer	Curtin University Department of Industry, Innovation and Science Lynas Corporation Ltd Mt Weld Mining Pty Ltd	4.25	345,160	115,000
M0537	The effect of water quality on rare earth minerals flotation	Curtin University Bogale Tadesse	Curtin University Lynas Corporation Ltd Mt Weld Mining Pty Ltd	3.9	210,500	70,000
M0534	On-belt gamma activation analysis (GAA) sensing for gold: Phase 3 - Preparation for pilot plant campaign	CRC ORE Paul Revell	CRC ORE	1	236,000	62,000
M0533i and M0533v	Benefication and chemical processing of lithium minerals - Stages 1 and 2	Murdoch University Aleks Nikoloski	FBI CRC and partner organisations	4.5	4,572,282	700,000
M0533e and M0533f	Hydrometallurgical processing for nickel and cobalt ores, concentrates, tailings, wastes - Stages 1 and 2	Curtin University (Stage 1) Elsayed Oraby	FBI CRC and partner organisations	4	4,074,422	600,000
M0532	Geology, mineralogy and metallurgy of eMaterials deposits in WA	Curtin University Mark Aylmore	Department of Mines, Industry Regulation and Safety (GSWA) Lithium Australia NL Rio Tinto Exploration Pty Limited	1	525,146	175,146

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0519	Broadening the opportunity for in-situ recovery of value from mineral deposits	CMTE Development (trading as Mining3) Paul Lever	Barrick Gold Corporation CMTE Development Ltd T/As Mining3 Environmental Copper Recovery Pty Ltd Freeport Minerals Corporation Gold Fields St Ives Gold Mining Company Pty Ltd Hatch Heathgate Resources Pty Ltd Mining and Process Solutions Pty Ltd Newcrest Mining Limited Newmont USA Limited Solvay-Cytec Industries Inc. BHP Group Operations Pty Ltd	3	960,000	240,000
M0505	Glycine heap leaching	Mining and Process Solutions Pty Ltd Ivor Bryan	Barrick Gold Corporation Gindalbie Metals Ltd Mining and Process Solutions Pty Ltd Poseidon Nickel Ltd Sandfire Resources Limited	2	700,000	265,000
M0441h	Mine site validation of a real-time fluorine mineral sensor	CRC ORE Paul Revell	CRC ORE BHP Pty Ltd Newcrest Mining Limited	1.75	620,000	120,000
M0441g	Integrated screening and particle sorting collaborative study	CRC ORE Paul Revell	CRC ORE	1.5	451,210	150,000

Data Driven Decisions

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0508a	Conversational agents and dialogue management systems in highly domain specific environments with scarce data	University of Western Australia Tyler Bikaun	MRIWA	3.5	120,000	120,000
M0508b	Improving predictability of failure and the condition assessment of critical mineral processing assets	Curtin University Gabriel Gonzalez	MRIWA	3.5	120,000	120,000

M0508a and M0508b are PhD Scholarships funded by MRIWA through the ARC Industrial Transformation Training Centre for Transforming Maintenance through Data Science (the Training Centre).

MRIWA is partnering with the Australian Research Council (ARC), Curtin University, University of Western Australia, CSIRO, Alcoa, BHP, Roy Hill and the CORE Innovation Hub in the ARC Industrial Transformation Training Centre for Transforming Maintenance through Data Science (the Training Centre). The Training Centre seeks to deliver the next generation of data science solutions focused on the problems that industry needs addressed to deliver efficient and effective maintenance.

PROGRAM 4: Infrastructure and Logistics

Western Australia's export-oriented mining projects place heavy demands on regional infrastructure requiring long term planning and a high level of capital investment by both government and industry. As the sector moves to adopt automated technologies, greater demand will be placed on network bandwidths.

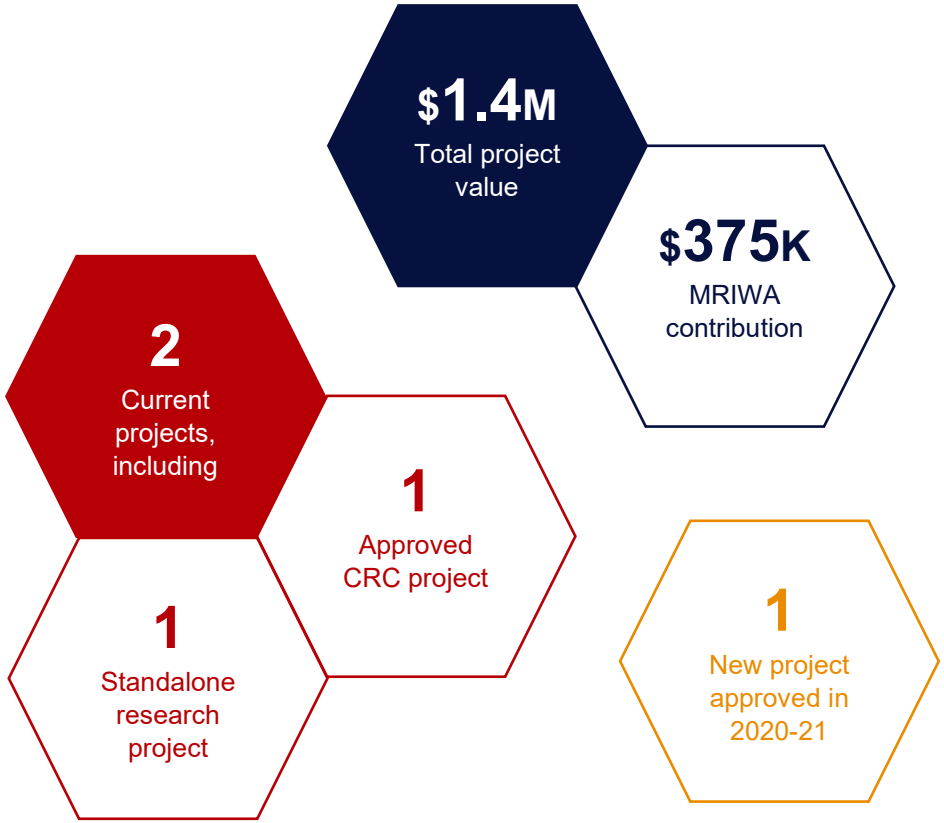
The research priority areas in Program 4 are intended to systematically advance knowledge and capability to:

- optimise supply chain infrastructure usage, haulage and export logistics
- enable enhanced networks and accurate geo-positioning
- decrease the capital and operating costs associated with getting commodities to market.

In doing so, the research under this program will inform Infrastructure WA regarding aggregated needs of the mining sector.

Themes

- Communications and Positioning Technology
- Data Driven Decisions
- Energy Utilisation
- Safety, Social and Environmental Sustainability



Project Case Studies

Assessment, design and operation of battery-supported electric mining vehicles and machinery

Program 4 – Infrastructure and Logistics (Data Driven Decisions)

STATUS: Approved by Board

Project No: M0533u

THE CHALLENGE

About 30-50% of total mine site energy usage is related to diesel-powered mining vehicles. This represents a significant proportion of current mining operational costs, and the prevalence of diesel fuel usage presents health and safety concerns. The mining industry also contributes 4 to 7% of greenhouse gas emissions globally.

PROPOSED SOLUTION

This project will provide the Australian mining industry with the tools and information needed to help transition operations to using battery-supported electric vehicles (BEVs) and associated stationary machinery on mine sites.

Standard tools for application, economic modelling and best practice guidelines will be developed to enable equipment, technology and service providers to study the case study sites, input into plans, and commercialise the outputs.

PROPOSED BENEFIT TO WA

The project will carry out in-depth case studies at two mine sites in Western Australia which will directly benefit the industry in the State.

This project contributes to the WA Future Battery Industry Strategy by facilitating application of rechargeable batteries to support *transitioning to modern, cleaner and energy-secure societies*.

Sponsors

FBI CRC
and partner organisations

Total Grant Value

$1,160,000

MRIWA Contribution

$300,000 over 3.5 years

Lead Organisation

University of Adelaide

Research Contact

Ali Pourmousavi Kani

FUTURE BATTERY INDUSTRIES CRC

Current Projects

Communications and Positioning Technology

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0507	QA4UAV - A standard workflow to quality assure UAV products	CRC SI Nathan Quadros	CRC for Spatial Information Department of Water, Environment and Regulation	1	250,000	75,000

PROGRAM 5: New Products and Markets

Rapid adoption of new high-tech products and manufacturing processes is changing the demand for high-value, low-volume minerals and creating opportunities for the re-use and recycling of by-products and waste.

Increasing emphasis is being placed on those critical minerals which are subject to high risks of supply, but are irreplaceable inputs for important technological and industrial innovations, especially renewable energy systems, electric vehicles, rechargeable batteries, consumer electronics, telecommunications, specialty alloys, and defence technologies.

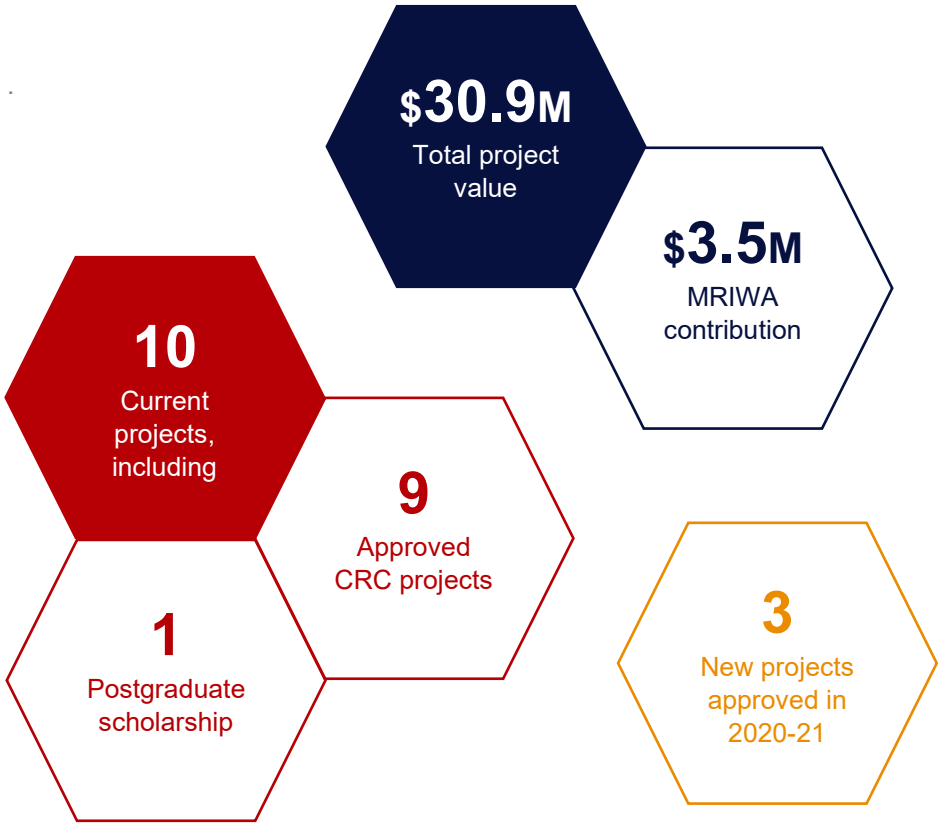
Given Western Australia is well-positioned with significant reserves of a broad variety of minerals now required globally, the research priority areas in Program 5 are intended to systematically advance knowledge and capability which will:

- create new industries
- result in increased demand for one or more minerals found in this State
- develop and demonstrate ethical and sustainable production of minerals, metals and chemicals
- create premium products which can be marketed and sold to new generations of customers.

In doing so, the research will create new niche markets for minerals and position Western Australia as a global supplier of critical minerals while also creating opportunities for progressive downstream processing activity in the State.

Themes

- Strategic Foresight
- Downstream Processing Technology
- Data Driven Decisions
- Energy Utilisation
- Regulatory Tools and Processes
- Safety, Social and Environmental Sustainability
- Workforce of the Future



Project Case Studies

Super anode proposal

Program 5 – New Products and Markets (Downstream Processing Technology)

STATUS: Approved by Board

Project No: M0533k

THE CHALLENGE

Graphite anodes used in lithium-ion batteries are typically manufactured from a blend of natural and synthetic graphite. The level of natural graphite is expected to increase to 70% as cost and environmental pressures increase. Natural graphite, however, must be processed via a complex set of processes which leads to significant wastage and increased cost. Further, the recent addition of silicon to anodes to enhance energy density poses significant challenges, primarily due to the ~400% volume change during cycling.

PROPOSED SOLUTION

This project aims to develop a processing pipeline for silicon-loaded natural graphite for anode production with a reduction of up to 30% of natural graphite wastage in anode production and up to 25% improvement in electrochemical performance of assembled anodes.

This pipeline will include improved, environmentally-friendly and safe processing of natural graphite through spheronisation, purification, coating, and silicon incorporation and will examine the feasibility of hybrid graphite materials for anodes and perform a full life-cycle analysis.

PROPOSED BENEFIT TO WA

This project will assist creation of a market for future WA graphite projects by providing a significant step towards establishing natural graphite as the key raw material in the production of anode materials. It will support the nascent graphite anode manufacturing industry in Australia via the development of superior capacity graphitic anodes in battery manufacturing.

Sponsors

FBI CRC
and partner organisations

Lead Organisation

University of Melbourne

Research Contact

Amanda Ellis

FUTURE BATTERY INDUSTRIES CRC

Total Grant Value

$3,500,000

MRIWA Contribution

$200,000 over 4 years

National battery testing facility

Program 5 – New Products and Markets (Data Driven Decisions)

STATUS: Approved by Board

Project No: M0533j

THE CHALLENGE

To scale and compete, local manufacturers of batteries and storage systems need to demonstrate their products are as safe and efficient as products produced internationally.

Currently, there is no comprehensive Australian battery testing facility with capability and capacity to test battery systems to international standards for reliable and safe operation.

PROPOSED SOLUTION

This project will develop a national facility 'The FBICRC National Battery Testing Centre' with the capability to integrate, test and characterise a wide range of battery types up to and including large-scale systems.

The facility will test battery systems to international standards for reliable and safe operation when deployed in main grids, micro-grids, and other large-scale applications such as electric vehicles, defence applications, and mining. It will also provide the basis for nationally accepted standards for deployment of these systems in local and national electricity grids.

PROPOSED BENEFIT TO WA

The capability to test battery systems from Australian manufacturers under operational conditions will provide a service for performance and safety verification against existing commercially-available battery energy storage solutions (BESS).

The ability to test and benchmark large-scale BESS's under operational conditions within a functional transmission grid is key to developing practical storage systems for implementation into Australia's electricity network.

Sponsors
FBI CRC
and partner organisations

Total Grant Value
$4,947,363

MRIWA Contribution
$200,000 over 4 years

Lead Organisation
Queensland University of Technology

Research Contact
Joshua Watts

FUTURE BATTERY INDUSTRIES CRC

Development of a trusted supply chain for Australian battery minerals and products

Program 5 – New Products and Markets (Data Driven Decisions)

STATUS: Approved by Board

Project No: M0533q

THE CHALLENGE

Ethical and sustainable sourcing of battery materials is becoming an increasingly important factor in the entire battery supply chain ecosystem, especially for EV consumers. Australia has a unique opportunity to utilise our leading position in raw battery mineral export to capitalise on current global opportunities through the battery value chain.

PROPOSED SOLUTION

The project seeks to connect customers to the sources of battery minerals by developing tools and platforms to mediate transparency within the supply chain to manage any ethical and sustainable sourcing risks and be compliant with a changing regulatory landscape with two main objectives:

- Provenance: an Australian battery mineral and processed chemical database using geochemical fingerprinting tools for identifying material provenance.
- Traceability: a secure digital platform to visualise, communicate and manage supply chain information.

PROPOSED BENEFIT TO WA

The project will ensure WA suppliers have the opportunity to maximise market access, share and value, particularly where end users are seeking premium products sourced from responsible production jurisdictions. It will introduce new independent scientific methods for suppliers to manage risks associated with unsustainable suppliers by differentiating products through the supply chain.

Sponsors
FBI CRC
and partner organisations

Total Grant Value
$4,200,000

MRIWA Contribution
$500,000 over 3 years

Lead Organisation
Curtin University

Research Contact
Prokopiy Vasilyev

FUTURE BATTERY INDUSTRIES CRC

Current Projects

Downstream Processing Technology

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0533g and M0533h	Cathode precursor production pilot plant in Western Australia - Stages 1 and 2	Curtin University Mark Aylmore (Stage 1)	FBI CRC and partner organisations	4	9,130,065	900,000
M0533c and M0533d	Process legacy - Stages 1 and 2	Curtin University Arie van Riessen	FBI CRC and partner organisations	4.75	3,600,000	655,000

Data Driven Decisions

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0533r	Battery materials for a circular economy	University of Technology Sydney Damien Giurco	FBI CRC and partner organisations	4.5	1,587,000	400,000
M0533m	Electrochemical testing of Li-ion battery materials in standard cell formats	Queensland University of Technology Maggie Gulbinska	FBI CRC and partner organisations	4	3,725,396	500,000

PROGRAM 6: Remediation and Mine Closure

An increasing number of Western Australian mining operations are approaching scheduled mine closure, with a lack of certainty in the process for relinquishment of rehabilitated land to the State and the potential for trailing liabilities.

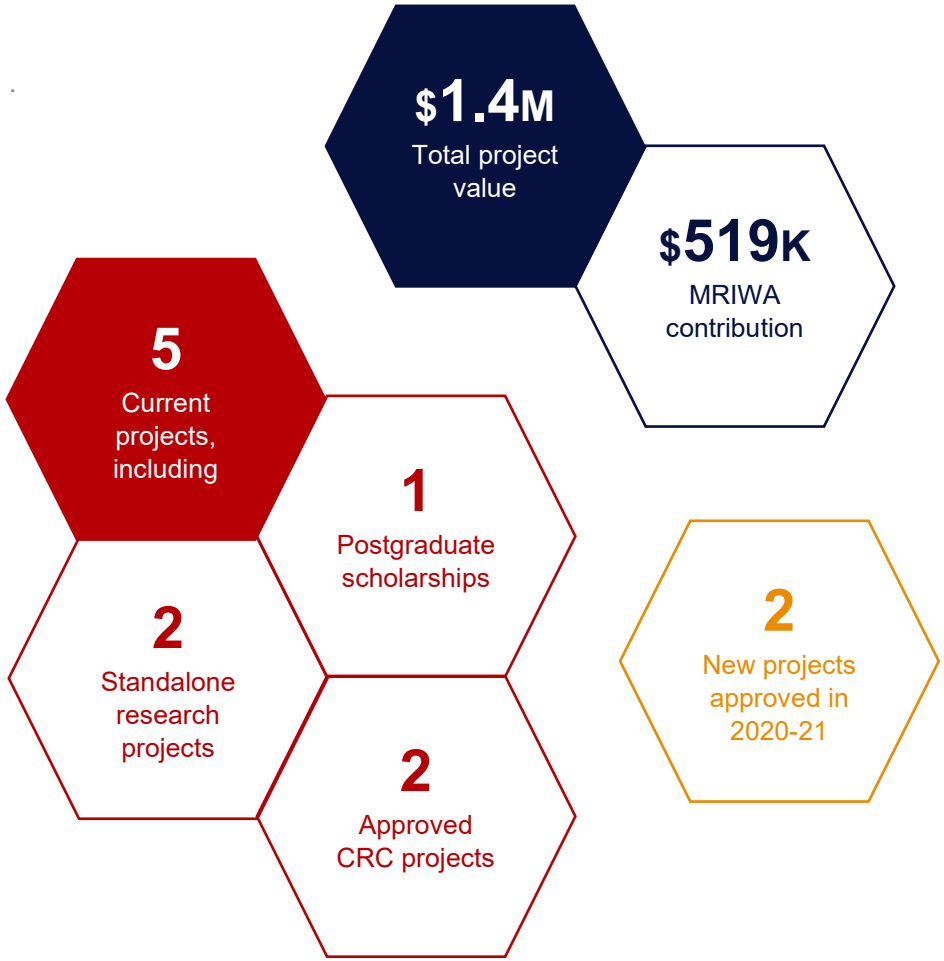
To meet the challenge of mine closure and to support the Western Australian Biodiversity Science Institute's Research Priorities and other work happening across government, the research priority areas in Program 6 are intended to systematically advance knowledge and capability toward developing new technologies and approaches for mine remediation and alternative land use, while filling knowledge gaps to ensure a sustainable positive legacy for the industry and surrounding communities.

In doing so, the research will:

- position Western Australia as a global leader in mine closure
- decrease the capital and operating costs associated with remediation and mine closure
- allow for evidence-based decision making.

Themes

- Acid Mine Drainage and Treatment of Tailings
- Sustainable Land Use Post-mining
- Data Driven Decisions
- Regulatory Tools and Processes
- Safety, Social and Environmental Sustainability
- Workforce of the Future



Project Case Studies

How can CRC TiME help industry, government and communities prevent closure related acid and metalliferous drainage impacts?

Program 6 – Remediation and Mine Closure (Acid Mine Drainage and Treatment of Tailings)

STATUS: Approved by Board

Project No: M10409

THE CHALLENGE

Acid and metalliferous drainage (AMD) is a major issue for mine closure and land relinquishment. Progress in understanding this challenge is limited by lack of an evidence base defining how AMD has been addressed in successful end-of-mine transitions, and how risks and benefits of transition are balanced by mine operators.

PROPOSED SOLUTION

Through a program of stakeholder workshops and interviews, this project will deliver a clear and concise overview of past and current global research activities relating to AMD. This foundational knowledge will be used to define potential priority areas where AMD research investment by CRC TiME could deliver maximum value to the mining industry, providing the basis for articulation of a research agenda and goals covering the first 5 years of CRC operation.

PROPOSED BENEFIT TO WA

The large number of active and former mine sites across Western Australia leave the state disproportionately exposed to the environmental risks of acid and metalliferous drainage. Through improving understanding of current best practice and defining a research agenda for AMD, this project will contribute to reducing this environmental risk.

Sponsors

CRC TiME
and partners

Total Grant Value

$100,000

MRIWA Contribution

$15,000 over 0.67 years

Lead Organisation

University of Western Australia

Research Contact

Carolyn Oldham

CRC TiME
Transformations in Mining Economies

Post mining land use – practice mapping options

Program 6 – Remediation and Mine Closure (Acid Mine Drainage and Treatment of Tailings)

STATUS: Approved by Board

Project No: M10413

THE CHALLENGE

Although an inevitable end point for all mining operations, planning for end-of-mine transition and the relinquishment of mined ground is restricted by the lack of a systematic evidence base as to how successful end-of-mine transitions to subsequent economic purposes have been achieved and how the risks and benefits of transition can be balanced by mine operators.

PROPOSED SOLUTION

This project will deliver enhanced understanding of the challenge of post-closure value optimisation through: (1) Rigorous desktop review of research relevant to the repurposing of mine sites; (2) interrogation of national and international databases relating to mine closure outcomes and re-use, and; (3) case studies of mine repurposing in Australia, consulting broadly with community stakeholders.

PROPOSED BENEFIT TO WA

The significance of the mining industry to Western Australia's economy, the remoteness of some WA mining sites and communities, and the fragility of the WA environment leave our State disproportionately exposed to the risks of mine closure. Better understanding the possible solutions for optimising post-mining land use planning will improve the net benefit of mining to the WA community.

Sponsors
CRC TiME
and partners

Total Grant Value
$149,459

MRIWA Contribution
$15,000 over 1 year

Lead Organisation
University of South Australia

Research Contact
Andrew Beer

CRC TiME
Transformations in Mining Economies

Current Projects

Acid Mine Drainage and Treatment of Tailings

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0478	Mine pit lakes – Their characterisation, assessment, management and value as potential lead indicators for in-situ metal recovery opportunities	ChemCentre Silvia Black	CRC for Contamination Assessment and Remediation of the Environment	2	550,000	220,000

Regulatory Tools and Processes

Project No	Project Title	Lead Org. and Contact	Sponsors	Duration (yrs)	Total Project Value $	MRIWA Contribution $
M0513	Validation and standardisation of sequential leaching tools to better predict the impact of iron ore mining on ground and surface water quality – Phase 2	ChemCentre Silvia Black	BHP Billiton Iron Ore Pty Ltd CRC for Contamination Assessment and Remediation of the Environment Fortescue Metals Group Ltd Rio Tinto Limited (Iron Ore)	2.5	525,000	216,000

Education Program

MRIWA provides a program of scholarships and other education support to shape and empower future mining industry thought leaders.

The MRIWA Education Program supports the development of exceptional talent to help meet the future needs of the Western Australian mining industry, with the intention of:

- Attracting domestic and international applicants of exceptional academic capability to the Western Australian research community.
- Effectively marketing MRIWA and the participating universities and research institutions.
- Expanding the diversity of research supported by MRIWA.
- Producing skilled graduates aligned to the needs of the WA mining sector.

Participants in the inaugural MRIWA Student-Industry workshop held October 6, 2020. Pictured (L-R) Leon Morgan and MRIWA PhD students Tyler Bikaun and Xingjie Chen, working online with the SiMINE team in South Africa to optimise a simulated mine operation.

Education program components

- A minimum of three prestigious MRIWA scholarships available each year to support post-graduate research students at Western Australian universities.
- Tailored professional and communication skills training for research students accepted into the MRIWA program.
- Outreach and mentoring to encourage students of exceptional ability to consider careers in the mining industry.
- Sponsorship of the work of **Australian Earth Science Education**[9] (formerly Earth Science Western Australia) supporting earth science teaching in Western Australia's schools.

[9] https://ausearthed.com.au/wa/

MRIWA Scholarships

MRIWA Scholarships are awarded through a competitive application process to students undertaking research aligned to MRIWA's Research Priority Plan at any university in Western Australia.

The MRIWA scholarship program is currently supporting the studies and professional development of a cohort of 16 students undertaking PhD degrees at three different Western Australian universities.

This scholarship program delivers on MRIWA's mission for applied research to create capability and deliver economic and social benefit for Western Australia by supporting the development of professionals prepared for the future workforce needs of the minerals industry.

On an annual basis, subject to availability of funds and receipt of suitable applications, MRIWA may award:

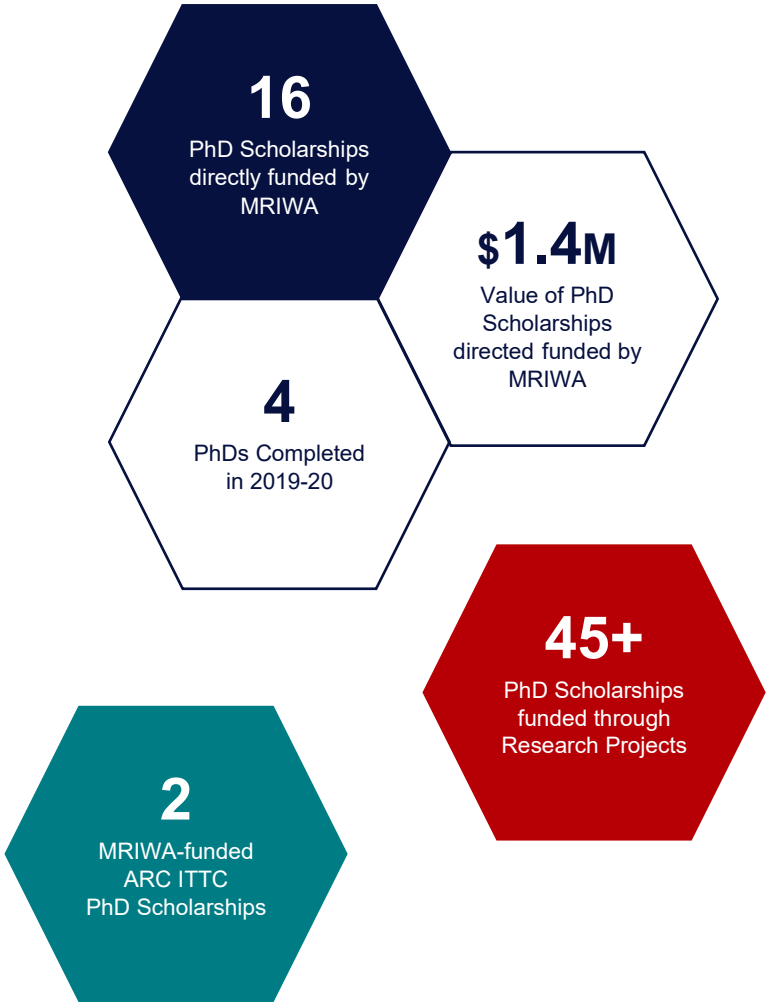
- 1 MRIWA Directors' PhD Scholarship valued at no less than $45,000 per year
- 2 PhD research scholarships valued at no less than $40,360 per year
    - MRIWA Odwyn Jones PhD Scholarship
    - MRIWA PhD Scholarship for Women

From June 2021, MRIWA has also introduced an annual MRIWA Indigenous Postgraduate Research Scholarship valued at no less than $40,360 per year. This scholarship is available to Aboriginal or Torres Strait Islander students undertaking research relevant to the minerals industry in Western Australia.

MRIWA's support for scholarships directed at groups traditionally under-represented in mining industry leadership positions contributes to a diverse and innovative minerals industry delivering value to all Western Australians.

MRIWA also funds the scholarships of two students undertaking PhD research within the ARC Centre for Transforming Maintenance through Data Science, and indirectly supports approximately 45 further PhD students through scholarships funded under individual projects in the research portfolio summarised in the previous section.

Scholarship Overview



2021 MRIWA Scholarship Recipients

Devika Bhatia – MRIWA PhD Scholarship for Women

Project Title
Taxation of Australian mining firms

Host University	University of Western Australia	**MRIWA Contribution**
Project Number	M10407	$107,627 over 2.67 years
Status	Commenced	

A graduate of the University of Delhi and Jawaharlal Nehru University in India, Devika was awarded the 2021 MRIWA PhD Scholarship for Women to support her ongoing PhD studies at the University of Western Australia under the supervision of Dr Ishita Chatterjee, Professor Rick Krever and Dr Shawn Chen.

Framed against a background of significant recent and proposed changes to the national and trans-national taxation landscape, Devika's research will deliver understanding of how Australian tax policy affects the operation and profitability of mining companies operating in Western Australia, and their potential contribution to the economic and social fabric of the State.

Liz Wall – MRIWA Odwyn Jones PhD Scholarship

Project Title
A New Deal between mining companies and communities to deliver sustained positive development outcomes for Indigenous or land-connected communities

Host University	University of Western Australia	**MRIWA Contribution**
Project Number	M10406	$52,972.50* over 3.5 years
Status	Commenced	

Liz holds a Bachelor of Engineering (Mining) with first class honours from the University of New South Wales, and postgraduate degrees from James Cook University and Oxford University.

She was awarded the 2021 MRIWA Odwyn Jones PhD Scholarship as a top-up to an Australian Research Training Program (RTP) award supporting her PhD studies at the University of Western Australia under the supervision of Professors Fiona Haslam McKenzie and Allan Trench.

By delivering better understanding of how mining projects can contribute to improved sustainable development outcomes, Liz's research will provide an important foundation to consent-based relationships between mining companies and Indigenous communities affected by mining.

This work could provide a firm foundation for negotiations for land access agreements and help with long-term planning for positive social development legacies post mine closure.

* Top-up stipend only

Alexandra Halliday – MRIWA PhD Scholarship

Project Title

Integrating field monitoring and numerical modelling to better quantify the stability of tailings storage facilities

Host University	University of Western Australia
Project Number	M10408
Status	Commenced

MRIWA Contribution

$52,972.50* over 3.5 years

Alexandra holds a Bachelor of Civil and Structural Engineering with first class honours from the University of Adelaide and was awarded a 2021 MRIWA PhD Scholarship as a top-up to an Australian RTP award. She is undertaking PhD studies at the University of Western Australia under the supervision of Professor Andy Fourie and Dr Cristina Vulpe.

By developing an improved means for the efficient, reliable and safe monitoring of tailings storage facilities, Alexandra's research will contribute to the environmental sustainability and safety of mining operations across Western Australia.

* Top-up stipend only

MRIWA staff and PhD scholars participating in a Cultural Awareness Day workshop March 2021

MRIWA Directors' PhD Scholarship

The MRIWA Directors' PhD Scholarship is funded in part via the donation of sitting fees by Directors of the MRIWA Board. This scholarship is awarded at the discretion of the MRIWA Board and is not guaranteed to be offered every year. A total of four Directors' Scholarships have been awarded since 2014.

Current recipients

Project No	Scholarship Recipient	Project Title	Host University	Duration (yrs)	Status	MRIWA Contribution ($)
M0523	Keith Giglia	Monitoring and control of hydrocyclones by use of convolutional neural networks and deep reinforcement learning	Curtin University	3.5	Commenced	106,050
M0501	Yihao Fu	Characterisation of ore and bulk solid systems by use of multivariate image analysis and deep learning neural networks	Curtin University	3.5	Commenced	104,006

MRIWA PhD Scholarship for Women

The MRIWA PhD Scholarship for Women is awarded annually. It was first awarded in 2018 and aims to promote opportunities for women in higher degree research in the minerals sector.

Current recipients

Project No	Scholarship Recipient	Project Title	Host University	Duration (yrs)	Status	MRIWA Contribution ($)
M0563	Alicja Polewacz	Processes at the interface between fluids and lithium minerals	Murdoch University	3.5	Commenced	142,500
M0547	Polyanna Moro	Geodynamics and basin evolution of the Paterson Orogen from the Paleoproterozoic to Neoproterozoic based on 3D geophysical modelling and data inversion	University of Western Australia	3.5	Commenced	106,050
M0524	Kudzai Angeline Mchibwa	Innovative processes for leach liquor purification and production of battery grade LiOH from Li mineral resources	Murdoch University	3.5	Commenced	105,000

MRIWA Odwyn Jones PhD Scholarship

The MRIWA Odwyn Jones PhD Scholarship (formerly the MRIWA Scholarship) is awarded annually. This award is named for Emeritus Professor Odwyn Jones, in recognition of his outstanding contribution to education in support of the mining industry in Western Australia.

Current recipients

Project No	Scholarship Recipient	Project Title	Host University	Duration (yrs)	Status	MRIWA Contribution ($)
M0561	John Grigson	Giant rare-metal pegmatite deposits of the East Pilbara Terrane, Western Australia: mineral systems analysis and criteria for terrane-scale exploration	University of Western Australia	3.5	Commenced	55,000
M0548	Xingjie Chen	Investigating the underground support provided by shotcrete using tailings and waste rock	University of Western Australia	3.5	Commenced	105,000
M0502	Zela Ichlas	Development of an industrially applicable electrostatic solvent extraction column for process metallurgy	Curtin University	3.5	Commenced	105,000
M0454	Siwei Chen	Rock fracture under the action of multiple field coupling	Curtin University	3.5	Commenced	105,000

Completed in 2020-21

Eunjoo Choi – MRIWA Scholarship

Project Title

Investigating geochemical and isotopic features of alkaline rocks of the Yilgarn Craton, in order to define the role of the mantle in the evolution of Archean cratons and identify new mineral deposits

Host University	University of Western Australia	**MRIWA Contribution**
Project Number	M0475	$69,006* over 3.5 years
Status	Completed	

Originally from South Korea, Eunjoo Choi was awarded a MRIWA Scholarship in 2016 to undertake PhD studies at the University of Western Australia, where she investigated the geochemical and isotopic features of alkaline rocks in the Yilgarn Craton.

Working with leading experts on the igneous rocks of this mineral-rich region of WA, Eunjoo's research focused on defining the role of the mantle in the evolution of Archean cratons, and identifying geochemical characteristics that could be used in exploring for new mineral deposits.

Eunjoo completed her studies in July 2020, and was awarded the prestigious David Groves Prize for Postgraduate Research in Geology by UWA.

Following graduation, Eunjoo initially took up a position with Newcrest as an Exploration Geologist at their Havieron site in Western Australia. She has recently moved to a new exploration role with BHP.

* Top-up stipend only

Rashid Geranmayeh Vaneghi – MRIWA Scholarship

Project Title

Progressive damage mechanisms of rocks subjected to cyclic loading

Host University	Curtin University	**MRIWA Contribution**
Project Number	M0474	$69,006* over 3.5 years
Status	Completed	

A graduate of Iran's Tarbiat Modares University, Rashid was awarded a MRIWA Scholarship in 2016 to support his PhD studies at Curtin University in mining engineering and rock damage mechanisms.

Working at the Western Australian School of Mines in Kalgoorlie, Rashid's research focused on the effect of repeated loading and unloading on the strength and deformation style of different rock types. Fatigue damage from cyclical stress is an important factor in the stability of excavated mine environments. Better understanding of this process will help in the assessment and prediction of seismic-induced rock failure and the design of improved drilling tools.

Rashid's thesis was accepted in November 2020, and he is now applying his skills in industry as an underground Geotechnical Engineer with KCGM.

* Top-up stipend only

Harry Watts – MRIWA Scholarship

Project Title

Developing a more benign way to extract rare earths from monazite ore using a sequence of weak organic acids at a moderate pH and room temperature and ore recirculation

Host University	University of Western Australia	**MRIWA Contribution**
Project Number	M0472	$61,632.76* over 3.1 years
Status	Completed	

Harry was awarded a MRIWA scholarship in 2016 to support PhD studies in mineral processing at UWA.

An award-winning graduate in metallurgical engineering from Curtin University's Western Australian School of Mines, Harry's PhD work focused on research into more environmentally benign methods for processing monazite ore.

Current practice for the extraction of industrially-important rare earth elements (REE) from monazite involves costly and complex processing under conditions of extreme acidity and high temperature. Demonstrating a feasible workflow for processing monazite ore using weak organic acids at room temperature could offer an important pathway to supporting development of commercial REE processing in Western Australia.

Harry graduated in April 2021, and is now applying his expert knowledge and skills to support the emerging rare earth mining sector in WA as founding partner and lead researcher at private consulting house Watts and Fisher Pty Ltd.

* Top-up stipend only

Cameron Adams – MRIWA Scholarship

Project Title

An investigation of the relationship between positive magnetic anomalies and nickel-sulphide deposits, Kambalda, Western Australia

Host University	University of Western Australia	**MRIWA Contribution**
Project Number	M0456	$105,000 over 3.5 years
Status	Completed	

Cam was awarded a MRIWA scholarship in 2015 to support his PhD studies at the University of Western Australia.

Working at the Centre for Exploration Targeting, Cam investigated methods for improving geophysical exploration for nickel sulfide ore deposits. By integrating chemical and mineralogical data in the interpretation of geophysical signals, his research aimed to reduce the subjectivity of defining potential exploration targets from geophysical data.

Cam graduated in May of 2021 and has recently taken up a post-doctoral fellowship with the MinEx CRC. He will be continuing his research into enhancing exploration targeting through investigating the geophysical response of prospective rocks in the Macquarie Arc system of eastern Australia.

Although working primarily with the University of Newcastle and the Geological Survey of NSW, Cam plans to remain based in Western Australia, and will be spending a good part of his research time using the world-leading analytical facilities at UWA and the John de Laeter Centre here in Perth.

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Financial Statements and Notes

Certification of Financial Statements

For the year ended 30 June 2021

The accompanying financial statements of the Minerals Research Institute of Western Australia (MRIWA or the Institute) have been prepared in compliance with the provisions of the *Financial Management Act 2006* (WA) from proper accounts and records to present fairly the financial transactions for the financial year ended 30 June 2021 and the financial position as at 30 June 2021.

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.

Miriam Stanborough
Chairperson of the Board

Date: 6 August 2021

Helen Cook
Deputy Chairperson of the Board

Date: 6 August 2021

Nicole Roocke
Chief Financial Officer

Date: 6 August 2021

Independent Auditor's Report

Auditor General

INDEPENDENT AUDITOR'S OPINION
2021
Minerals Research Institute of Western Australia

To the Parliament of Western Australia

Report on the audit of the financial statements

Opinion

I have audited the financial statements of the Minerals Research Institute of Western Australia (Institute) which comprise:

- the Statement of Financial Position at 30 June 2021, and the Statement of Comprehensive Income, Statement of Changes in Equity and Statement of Cash Flows for the year then ended
- 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 2021 and the financial position at the end of that period
- 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 & Ethical Standards Board's APES 110 *Code of Ethics for Professional Accountants (including Independence Standards)* (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.

Responsibilities of the Institute for the financial statements

The Institute is responsible for:

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

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In preparing the financial statements, the Institute is responsible for:

- assessing the entity's ability to continue as a going concern
- disclosing, as applicable, matters related to going concern
- 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 responsibilities 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. 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.

A further description of my responsibilities for the audit of the financial statements is located on the Auditing and Assurance Standards Board website. This description forms part of my auditor's report and can be found at https://www.auasb.gov.au/auditors_responsibilities/ar4.pdf.

Report on the audit of 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 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 2021.

The Institute's responsibilities

The Institute 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 were implemented as designed.

An assurance engagement involves performing procedures to obtain evidence about the suitability of the controls design to achieve the overall control objectives and the implementation of those controls. The procedures selected depend on my judgement, including an 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 in operation, the overall control objectives may not be achieved so that fraud, error or non-compliance 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 audit of 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 2021. The key performance indicators are the Under Treasurer-approved key effectiveness indicators and 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 2021.

The Institute's responsibilities for the key performance indicators

The Institute 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 it 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 Institute 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 responsibilities

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 entity'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.

Other information

Those charged with governance are responsible for the other information. The other information is the information in the entity's annual report for the year ended 30 June 2021, but not the financial statements, key performance indicators and my auditor's report.

My opinions do not cover the other information and, accordingly, I do not express any form of assurance conclusion thereon.

Matters relating to the electronic publication of the audited financial statements and key performance indicators

This auditor's report relates to the financial statements, controls and key performance indicators of the Minerals Research Institute of Western Australia for the year ended 30 June 2021 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, controls 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, controls or key performance indicators. If users of the financial statements, controls and key performance indicators are concerned with the inherent risks arising from publication on a website, they are advised to contact the entity to confirm the information contained in the website version of the financial statements, controls and key performance indicators.

Labuschagne

Sandra Labuschagne
Deputy Auditor General
Delegate of the Auditor General for Western Australia
Perth, Western Australia
9 August 2021

Statement of Comprehensive Income

For the year ended 30 June 2021

	Notes	2021 $	2020 $
COST OF SERVICES			
Expenses			
Research grants		6,167,805	6,212,765
Scholarships		225,765	309,890
Employee benefits expense	2.1.1	828,373	728,632
Institute Contractor fees		-	3,208
Board and committee fees and costs	2.2	114,544	82,633
Supplies and services	2.3	236,715	301,461
Other expenses	2.3	32,052	43,837
Accommodation expenses		54,000	59,250
Depreciation expense	4.1	9,261	2,316
Total cost of services		**7,668,515**	**7,743,992**
Income			
Revenue & Income			
Interest revenue		49,278	128,989
Other revenue		54,831	40,591
Income from Industry Sponsorship	3.2	2,697,321	2,615,213
Total Revenue & Income		**2,801,430**	**2,784,793**
Total income other than income from State Government		**2,801,430**	**2,784,793**
NET COST OF SERVICES		**4,867,085**	**4,959,199**

	Notes	2021 $	2020 $
Income from State Government			
State Government Grant	3.1	4,655,000	4,297,000
Resources received free of charge	3.1	54,000	59,250
Total income from State Government		**4,709,000**	**4,356,250**
SURPLUS/(DEFICIT) FOR THE PERIOD		**(158,085)**	**(602,949)**
TOTAL COMPREHENSIVE INCOME/(DEFICIT) FOR THE PERIOD		**(158,085)**	**(602,949)**

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

Statement of Financial Position

As at 30 June 2021

	Notes	2021 $	2020 $
ASSETS			
Current Assets			
Cash and cash equivalents	6.1.1	1,097,832	3,674,211
Restricted cash and cash equivalents	6.1.2	13,053,196	9,876,756
Receivables	5.1	1,047,958	854,712
Other current assets	5.2	12,970	19,988
Total Current Assets		**15,211,956**	**14,425,667**
Non-Current Assets			
Office Equipment	4.1	-	9,261
Total Non-Current assets		**-**	**9,261**
TOTAL ASSETS		**15,211,956**	**14,434,928**

	Notes	2021 $	2020 $
LIABILITIES			
Current Liabilities			
Payables	5.3	583,455	96,437
Employee benefit provisions	2.1.2	61,498	38,046
Deferred income	5.4	4,623,237	4,245,610
Total Current Liabilities		**5,268,190**	**4,380,093**
Non-Current Liabilities			
Employee benefit provisions	2.1.2	83,147	36,131
Total Non-Current Liabilities		**83,147**	**36,131**
TOTAL LIABILITIES		**5,351,337**	**4,416,224**
NET ASSETS		**9,860,619**	**10,018,704**
EQUITY			
Accumulated surplus	8.7	9,860,619	10,018,704
TOTAL EQUITY		**9,860,619**	**10,018,704**

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 2021

	Notes	Accumulated Surplus $
Balance at 1 July 2019		10,621,653
Surplus for the period	8.7	(602,949)
Balance at 30 June 2020		**10,018,704**
Balance at 1 July 2020		10,018,704
Deficit for the period	8.7	(158,085)
Balance at 30 June 2021		**9,860,619**

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 2021

	Notes	2021 $	2020 $
CASH FLOWS FROM STATE GOVERNMENT			
State Government Grant		4,655,000	4,297,000
Net cash provided by State Government		**4,655,000**	**4,297,000**
Utilised as follows:			
CASH FLOWS FROM OPERATING ACTIVITIES			
Payments			
Research Grant Payments and Scholarship		(5,933,570)	(6,743,562)
Employee benefits		(762,018)	(705,029)
Institute Contractor fees		-	(3,208)
Board and Advisory committee fees		(59,713)	(42,044)
Supplies, Services and Other Expenses		(287,145)	(397,337)
GST paid on purchases		(599,696)	(627,277)
Receipts			
Receipts from Sponsors		2,869,835	3,920,419
Interest received		55,807	171,548
GST received on sales		287,738	360,615
Net GST refunded from ATO (or paid)		373,823	78,379
Net cash used in operating activities		**(4,054,939)**	**(3,987,496)**
Net increase in cash and cash equivalents		600,061	309,504
Cash and cash equivalents at the beginning of the period		13,550,967	13,241,463
CASH AND CASH EQUIVALENTS AT THE END OF THE PERIOD	6.1.1	**14,151,028**	**13,550,967**

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 2021

Note 1. Basis of preparation

The Institute is a WA Government entity and is controlled by the State of Western Australia, which is the ultimate parent company. The Institute is a not-for-profit entity (as profit is not its principal objective).

A description of the nature of its operations and its principal activities have been included in the 'Overview' and 'Our Projects' sections of the Institute's Annual Report which does not form part of these financial statements.

These annual financial statements were authorised for issue by the Accountable Authority of the Institute on 6 August 2021.

Statement of compliance

These general-purpose financial statements are prepared in accordance with:

1) The *Financial Management Act 2006* (WA) **(FMA)**
2) The Treasurer's Instructions **(TIs)**
3) Australian Accounting Standards (**AASs**) - Reduced Disclosure Requirements
4) Where appropriate, those **AAS** paragraphs applicable for not-for-profit entities have been applied.

The *Financial Management Act 2006* (WA) and the Treasurer's Instructions take precedence over AASs. Several AASs are modified by TIs to vary application, disclosure format and wording. 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.

Basis of preparation

The financial statements are presented in Australian dollars applying the accrual basis of accounting and using the historical cost convention. Certain balances will apply a different measurement basis (such as the fair value basis). Where this is the case the different measurement basis is disclosed in the associated note.

Judgements and estimates

Judgements, estimates, and assumptions are required to be made about financial information being presented. The significant judgements and estimates made in the preparation of these financial statements are disclosed in the notes where amounts affected by those judgements and/or estimates are disclosed. Estimates and associated assumptions are based on professional judgements derived from historical experience and various other factors that are believed to be reasonable under the circumstances.

Note 2. Use of our funding

Expenses incurred in the delivery of services

This section provides the additional information about how the Institute's funding is applied and the accounting policies that are relevant for an understanding of the items recognised in the financial statements. The primary expenses incurred by the Institute in achieving its objectives and the relevant notes are:

	Notes	2021 $	2020 $
Research grants		6,167,805	6,212,765
Scholarships		225,765	309,890
Employee benefits expenses	2.1.1	828,373	728,632
Employee benefits provisions	2.1.2	144,645	74,177
Board and committee fees and costs	2.2	114,544	82,633
Other expenditure	2.3	268,767	345,298
Accommodation expenses		54,000	59,250

Research grants expense is recognised 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.

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

Accommodation expense represents the Institute's rental expense.

2.1.1 Employee benefits expenses

	2021 $	2020 $
Wages and salaries	753,934	657,156
Superannuation - defined contribution plans[(a)]	74,439	71,476
	828,373	**728,632**

(a) Defined contribution plans include West State Superannuation Scheme (WSS), Gold State Superannuation Scheme (GSS), Government Employees Superannuation Board Schemes (GESBs) and other eligible funds.

Wages and salaries: Employee expenses include all costs related to employment including wages and salaries and leave entitlements.

Superannuation: The amount recognised in profit or loss of the Statement of Comprehensive Income comprises employer contributions paid to the GSS (concurrent contributions), the WSS Scheme, the GESBs or other superannuation funds.

2.1.2 Employee related provisions

Provision is made for benefits accruing to employees in respect of wages and salaries, annual leave and long service leave for services rendered up to the reporting date and recorded as an expense during the period the services are delivered.

	2021 $	2020 $
Current		
Annual leave[(a)]	61,498	38,046
Long service leave[(b)]	-	-
	61,498	**38,046**
Non-Current		
Long service leave[(c)]	83,147	36,131
	83,147	**36,131**
	144,645	**74,177**

(a) **Annual leave liabilities:** Classified as current as there is no unconditional right to defer settlement for at least 12 months after the reporting period.

The provision for annual leave is calculated at the present value of expected payments to be made in relation to services provided by employees up to the reporting date.

(b) **Long service leave liabilities**: Unconditional long service leave provisions are classified as **current** liabilities as the Institute does not have an unconditional right to defer settlement of the liability for at least 12 months after the end of the reporting period.

(c) Pre-conditional and conditional long service leave provisions are classified as **non-current** liabilities because the Institute has an unconditional right to defer the settlement of the liability until the employee has completed the requisite years of service.

The provision for long service leave is calculated at present value as the Institute does not expect to wholly settle the amounts within 12 months. The present value is measured taking into account the present value of expected future payments to be made in relation to services provided by employees up to the reporting date. These payments are estimated using the remuneration rate expected to apply at the time of settlement, and discounted using market yields at the end of the reporting period on national government bonds with terms to maturity that match, as closely as possible, the estimated future cash outflows.

Key sources of estimation uncertainty – long service leave
Key estimates and assumptions concerning the future 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.

Several estimates and assumptions are used in calculating the Institute's long service leave provision. These 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. Any gain or loss following revaluation of the present value of long service leave liabilities is recognised as employee benefits expense.

2.2 Board and committee fees and costs

	2021 $	2020 $
Board of Directors' remuneration	81,925	77,232
Advisory Committee attendance fees	27,438	3,917
Board and Advisory Committee's expenses	5,181	1,484
	114,544	**82,633**

2.3 Other expenditure

	2021 $	2020 $
Supplies and services		
Printing and stationery	2,905	2,807
Advertising	-	1,855
Communications	22,755	49,331
Business travel	1,743	10,097
Accounting services	72,727	101,780
Consultants	74,934	83,798
Legal services	2,970	16,553
Insurance	11,721	11,692
Sponsorships	-	-
Subscriptions	19,299	11,199
Other	27,661	12,349
Total supplies and services	**236,715**	**301,461**
Other expenses		
Audit fees	19,184	19,184
Loss allowance	-	-
Employee expenses	8,070	19,626
Worker's Compensation	4,798	5,027
Office fit out	-	-
	32,052	**43,837**
Total other expenditure	**268,767**	**345,298**

Supplies and services: Supplies and services are recognised as an expense in the reporting period in which they are incurred.

Other expenses: Other expenditures generally represent the day-to-day running costs incurred in normal operations.

Employee on-costs: Includes workers' compensation insurance. Superannuation contributions accrued as part of the provision for leave are employee benefits and are not included in employment on-costs.

Note 3. Our funding sources

How we obtain our funding

This section provides additional information about how the Institute obtains its funding and the relevant accounting policy notes that govern the recognition and measurement of this funding. The primary income received by the Institute and the relevant notes are:

	Notes	2021 $	2020 $
Income from State Government	3.1	**4,709,000**	**4,356,250**

3.1 Income from State Government

	2021 $	2020 $
State Government Grants	4,655,000	4,297,000
	4,655,000	**4,297,000**

Services received free of charge from other State Government agencies during the period:

	2021 $	2020 $
Department of Mines, Industry Regulation and Safety	54,000	59,250
	54,000	**59,250**
	4,709,000	**4,356,250**

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

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.

3.2 Income from Industry Sponsorship

	2021 $	2020 $
Sponsorship income	2,697,321	2,615,213

Income from Industry Sponsorship: MRIWA provides a service to sponsors by administering sponsorship funds for research projects. This service is completed under a contractual arrangement. Income from sponsors is recognised at the point in time MRIWA has completed this service.

Note 4. Key assets

Assets the Institute utilises for economic benefit or service potential

This section includes information regarding the key assets the Institute utilises to gain economic benefits or provide service potential. The section sets out both the key accounting policies and financial information about the performance of these assets:

	Notes	2021 $	2020 $
Office equipment	4.1	-	9,261

4.1 Office Equipment

	2021 $	2020 $
Office equipment		
At cost	33,480	33,480
Accumulated depreciation	(33,480)	(24,219)
	-	**9,261**
Office equipment		
Carrying amount at start of period	9,261	11,577
Depreciation	(9,261)	(2,316)
Carrying amount at end of period	**-**	**9,261**

Initial recognition

Items of plant and equipment costing $5,000 or more are recognised initially at cost. Where an asset is acquired for no or nominal cost, the cost is valued at its fair value at the date of acquisition. 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).

Subsequent measurement

All plant and equipment is stated at historical cost less accumulated depreciation and accumulated impairment losses.

Depreciation

All plant and equipment 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 generally calculated on a straight-line basis, at rates that allocate the asset's value, less any estimated residual value, over its estimated useful life. The expected useful life for plant and equipment is 3 to 7 years.

The estimated useful lives, residual values and depreciation method are reviewed at the end of each annual reporting period, and adjustments are made where appropriate.

Impairment

Non-financial assets, including items of plant and equipment, are tested for impairment whenever there is an indication that the assets may be impaired. Where there is an indication of impairment, the recoverable amount is estimated at the higher of fair value less costs of disposal and value in use. 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.

Where an asset measured at cost is written down to its recoverable amount, an impairment loss is recognised through profit or loss.

As the Institute is a not-for-profit institute, the recoverable amount of regularly revalued specialised assets is anticipated to be materially the same as fair value.

If there is an indication that there has been a reversal in impairment, the carrying amount shall be increased to its recoverable amount. However, this reversal should not increase the asset's carrying amount above what would have been determined, net of depreciation or amortisation, if no impairment loss has been recognised in prior years.

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/amortisation reflects the level of consumption or expiration of the asset's future economic benefits and to evaluate any impairment risk from declining replacement costs.

Note 5. Other assets and liabilities

This section sets out those assets and liabilities that arose from the Institute's controlled operations and includes other assets utilised for economic benefits and liabilities incurred during normal operations:

	Notes	2021 $	2020 $
Receivables	5.1	1,047,958	854,712
Other current assets	5.2	12,970	19,988
Payables	5.3	583,455	96,437
Deferred income	5.4	4,623,237	4,245,610

5.1 Receivables

	2021 $	2020 $
Current		
Grant Receivables - Sponsorship	767,549	562,438
Less: provision for doubtful debts	-	-
	767,549	**562,438**
GST receivable	280,409	292,274
	1,047,958	**854,712**

Trade receivables are recognised at original invoice amount less an allowance for any uncollectible amounts (i.e. expected credit loss). The collectability of receivables is reviewed on an ongoing basis and any receivables identified as uncollectible are written off against the allowance account. In the current year no expected credit loss was recognised. The carrying amount is equivalent to fair value as it is due for settlement within 30 days.

5.2 Other current assets

	2021 $	2020 $
Accrued Interest	12,484	19,013
Prepayments	486	975
	12,970	**19,988**

Revenue is recognised when the interest accrues.

5.3 Payables

	2021 $	2020 $
Current		
Research grants payable	550,000	6,344
Scholarships payable	15,150	40,000
Accrued general expenses	3,224	43,767
Accrued salaries	10,878	6,326
Other Payables	4,203	-
	583,455	**96,437**

All 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.

Accrued salaries 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.

General expenses represent the amounts due to researchers and suppliers but unpaid at the end of the financial year. These payments are settled within 30 days of the financial year end. MRIWA considers the carrying amount of accrued expenses to be equivalent to its fair value.

5.4 Deferred Income

	2021 $	2020 $
Deferred Income - Sponsorship	4,623,237	4,245,610
	4,623,237	**4,245,610**

Deferred Income 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. Refer to Note 3.2.

Note 6. Financing

This section sets out the material balances and disclosures associated with the financing and cash flows of the Institute.

	Notes	2021 $	2020 $
Cash and cash equivalents	6.1.1	1,097,832	3,674,211
Restricted cash and cash equivalents	6.1.2	13,053,196	9,876,756
Commitments	6.2	8,585,000	10,702,566

6.1 Cash and cash equivalents

6.1.1 Reconciliation of cash

	2021 $	2020 $
Cash and cash equivalents	1,097,832	3,674,211
Restricted cash and cash equivalents - current	13,053,196	9,876,756
	14,151,028	**13,550,967**

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.

6.1.2 Restricted cash and cash equivalents

	2021 $	2020 $
Research grants	12,665,413	9,521,278
Scholarships	387,783	355,478
	13,053,196	**9,876,756**

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

6.2 Commitments

	2021 $	2020 $
Other expenditure commitments		
Within 1 year	4,037,897	5,594,766
Later than 1 year and not later than 5 years	4,357,103	4,907,800
Later than 5 years	190,000	200,000
	8,585,000	**10,702,566**

The total presented for other expenditure commitments are GST exclusive.

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 7. Financial instruments and contingencies

This note sets out the key risk management policies and measurement techniques of the Institute.

	Notes
Financial Instruments	7.1
Contingent Liabilities and Assets	7.2

7.1 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:

	2021 $	2020 $
Financial assets		
Cash and cash equivalents	1,097,832	3,674,211
Restricted cash and cash equivalents	13,053,196	9,876,756
Receivables[(a)]	767,549	562,438
Other current assets	12,484	19,013
Total financial assets	**14,931,061**	**14,132,418**
Financial liabilities		
Liabilities measured at amortised cost	583,455	96,437
Total financial liability	**583,455**	**96,437**

(a) The amount of receivables/financial assets at amortised cost excludes GST recoverable from the ATO (statutory receivable).

7.2 Contingent assets and liabilities

MRIWA has no contingent liabilities or contingent assets.

Note 8. Other disclosures

This section includes additional material disclosures required by accounting standards or other pronouncements, for the understanding of this financial report.

	Notes
Events occurring after the end of the reporting period	8.1
Key management personnel	8.2
Related party transactions	8.3
Related bodies	8.4
Affiliated bodies	8.5
Remuneration of auditors	8.6
Equity	8.7
Supplementary financial information	8.8
Explanatory statement	8.9

8.1 Events occurring after the end of the reporting period

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

8.2 Key management personnel

The Institute has determined key management personnel include the responsible Minister, board members, and senior officers of the Authority.

The Institute does not incur expenditures to compensate Ministers and those disclosures may be found in the *Annual Report on State Finances.*

The total fees, salaries, superannuation, non-monetary benefits and other benefits for senior officers of the Institute for the reporting period are presented within the following bands:

	2021	2020
Compensation band ($)		
0 – 10,000	1	1
10,000 – 20,000	5	6
20,000 – 30,000	1	-
250,000 – 300,000	1	1

	2021 $	2020 $
Total compensation of senior officers	**365,107**	**375,216**

Total compensation includes the superannuation expense incurred by the Institute in respect of senior officers.

8.3 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 Cabinet 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;
- the Government Employees Superannuation Board (GESB);
- 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.

Significant transactions with related parties throughout the year ended 30 June 2021 include:

- Department of Mines, Industry Regulation and Safety
  - Appropriations (refer note 3.1)
  - Accommodation received free of charge (included in Accommodation Expense and Resources Received Free of Charge (refer note 3.1)
- Department of Jobs, Tourism, Science and Innovation
  - Funds received under a Memorandum of Understanding for allocation to the Future Battery Industries Cooperative Research Centre (FBI CRC) ($150,000)
- ChemCentre
  - Research grants provided (included within Research Grants Expenses) of $274,104)

8.4 Related bodies

The Institute has no related bodies.

8.5 Affiliated bodies

The Institute has no affiliated bodies.

8.6 Remuneration of auditors

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

	2021 $	2020 $
Auditing the accounts, financial statements and key performance indicators	19,600	19,184

8.7 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.

	2021 $	2020 $
Accumulated surplus		
Balance at start of period	10,018,704	10,621,653
Result for the period	(158,085)	(602,949)
Balance at end of period	**9,860,619**	**10,018,704**
Total Equity at end of period	**9,860,619**	**10,018,704**

8.8 Supplementary financial information

(a) Write-offs

	2021 $	2020 $
Public property written-off by the Authority during the period	-	-
	-	-

(b) There were no losses through theft, defaults and other causes.

(c) No gifts of public property were provided by the Institute.

8.9 Explanatory statement

All variances between estimates (original budget) and actual results for 2021, and between the actual results for 2021 and 2020 are shown below. Narratives are provided for key variations selected from observed major variances which are greater than 10% and 1% of Total Cost of Services for either the lower of the budget or prior period actual for the Statements of Comprehensive Income and Statement of Cash Flows, and are greater than 10% and 1% of Total Assets for either the lower of the budget or prior period actual for the Statement of Financial Position.

Statement of Comprehensive Income

	Variance note	Original budget 2021 $	Actual 2021 $	Actual 2020 $	Variance between estimate and actual $	Variance between actual results for 2021 and 2020 $
COST OF SERVICES						
Expenses						
Research grants	1	7,875,261	6,167,805	6,212,765	(1,707,456)	(44,960)
Scholarships	2, A	322,831	225,765	309,890	(97,066)	(84,125)
Employee benefits expense	B	785,155	828,373	728,632	43,218	99,741
Institute Contractor fees		50,000	-	3,208	(50,000)	(3,208)
Board and committee fees and costs		117,202	114,544	82,633	(2,658)	31,911
Supplies and services	3	346,943	236,715	301,461	(110,228)	(64,746)
Other expenses		51,944	32,052	43,837	(19,892)	(11,785)
Accommodation expense		59,250	54,000	59,250	(5,250)	(5,250)
Depreciation expense		2,315	9,261	2,316	6,946	6,945
Total cost of services		**9,610,901**	**7,668,515**	**7,743,992**	**(1,942,386)**	**(75,477)**

8.9 Explanatory statement (continued)

Statement of Comprehensive Income (continued)

	Variance note	Original budget 2021 $	Actual 2021 $	Actual 2020 $	Variance between estimate and actual $	Variance between actual results for 2021 and 2020 $
Income						
Revenue						
Interest revenue	C	120,000	49,278	128,989	(70,722)	(79,711)
Other revenue		41,148	54,831	40,591	13,683	14,240
Income from Industry Sponsorship	4	3,221,554	2,697,321	2,615,213	(524,233)	82,108
Total Revenue		**3,382,702**	**2,801,430**	**2,784,793**	**(581,272)**	**16,637**
Total income other than income from State Government		**3,382,702**	**2,801,430**	**2,784,793**	**(581,272)**	**16,637**
NET COST OF SERVICES		**(6,228,199)**	**(4,867,085)**	**(4,959,199)**	**1,361,114**	**92,114**
Income from State Government						
State Government Grant		4,305,000	4,655,000	4,297,000	350,000	358,000
Resources received free of charge		59,250	54,000	59,250	(5,250)	(5,250)
Total income from State Government		**4,364,250**	**4,709,000**	**4,356,250**	**344,750**	**352,750**
SURPLUS/(DEFICIT) FOR THE PERIOD		**(1,863,949)**	**(158,085)**	**(602,949)**	**1,705,864**	**444,864**
TOTAL COMPREHENSIVE INCOME FOR THE PERIOD		**(1,863,949)**	**(158,085)**	**(602,949)**	**1,705,864**	**444,864**

8.9 Explanatory statement (continued)

Statement of Comprehensive Income (continued)

Major Estimate and Actual (2021) Variance Narratives

1. Research grants are below estimate as payments to researchers are a function of:
   - the number and financial scale of applications submitted to MRIWA;
   - the time required to negotiate the Conditions of Grant for a project with the sponsors and research partners; and
   - progress by the researchers in executing the 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.

2. Scholarship expense has decreased due to the value of scholarships awarded being less than originally budgeted as a result of them only being offered as a 'top-up' scholarship and delays invoicing by the host universities.

3. Supplies and services decreased due to reduce need for legal and consulting services and a reduction in the number of events and sponsorship originally planned.

4. Income from industry sponsorship is below estimate as it is difficult to forecast an accurate value of industry sponsorship income for new research projects. Revenue from industry sponsorship is also impacted by decisions of sponsors to pay funds direct to researchers, rather than MRIWA, for projects forecast to be approved throughout the financial year.

Major Actual (2021) and Comparative (2020) Variance Narratives

A. Expenses relating to Director's Scholarship is significantly lower in FY21 as compared to FY20 leading to the decrement in Scholarship expenses.

B. Employee benefits expense has increased due to the increase in number of staff from prior year. This was offset by a decrease in the estimated consulting expenditure.

C. Interest revenue decreased due to low interest rate.

8.9 Explanatory statement (continued)

Statement of Financial Position

	Variance note	Original budget 2021 $	Actual 2021 $	Actual 2020 $	Variance between estimate and actual $	Variance between actual results for 2021 and 2020 $
ASSETS						
Current Assets						
Cash and cash equivalents		2,316,067	1,097,832	3,674,211	(1,218,235)	(2,576,379)
Restricted cash and cash equivalents		9,264,266	13,053,196	9,876,756	3,788,930	3,176,440
Receivables and other assets		459,155	1,047,958	854,712	588,803	193,246
Other current assets		30,000	12,970	19,988	(17,030)	(7,018)
Total Current Assets		**12,069,488**	**15,211,956**	**14,425,667**	**3,142,468**	**786,289**
Non-Current Assets						
Office equipment		9,261	-	9,261	(9,261)	(9,261)
Total Non-Current Assets		**9,261**	**-**	**9,261**	**(9,261)**	**(9,261)**
TOTAL ASSETS		**12,078,749**	**15,211,956**	**14,434,928**	**3,133,207**	**777,028**

8.9 Explanatory statement (continued)

Statement of Financial Position (continued)

	Variance note	Original budget 2021 $	Actual 2021 $	Actual 2020 $	Variance between estimate and actual $	Variance between actual results for 2021 and 2020 $
LIABILITIES						
Current Liabilities						
Payables		629,159	583,455	96,437	(45,704)	487,018
Provisions		15,600	61,498	38,046	45,898	23,452
Deferred income	A	4,411,850	4,623,237	4,245,610	211,387	377,627
Total Current Liabilities		**5,056,609**	**5,268,190**	**4,380,093**	**211,581**	**888,097**
Non-Current Liabilities						
Provisions		57,620	83,147	36,131	25,527	47,016
Total Non-Current Liabilities		**57,620**	**83,147**	**36,131**	**25,527**	**47,016**
TOTAL LIABILITIES		**5,114,229**	**5,351,337**	**4,416,224**	**237,108**	**935,113**
NET ASSETS		**6,964,520**	**9,860,619**	**10,018,704**	**2,896,099**	**(158,085)**
EQUITY						
Accumulated surplus		6,964,520	9,860,619	10,018,704	2,896,099	(158,085)
TOTAL EQUITY		**6,964,520**	**9,860,619**	**10,018,704**	**2,896,099**	**(158,085)**

8.9 Explanatory statement (continued)

Statement of Financial Position (continued)

Major Estimate and Actual (2021) Variance Narratives

Nil

Major Actual (2021) and Comparative (2020) Variance Narratives

A. Deferred revenue has increased from prior years as projects that had Conditions of Grant not yet finalised at the end of 2019-20 had negotiations concluded and research commence in this financial year. The income received from sponsors have a direct relationship to the deferred revenue calculated.

8.9 Explanatory statement (continued)

Statement of Cash Flows

	Variance note	Original budget 2021 $	Actual 2021 $	Actual 2020 $	Variance between estimate and actual $	Variance between actual results for 2021 and 2020 $
CASH FLOWS FROM STATE GOVERNMENT						
State Government Grant						
Net cash provided by State Government		4,305,000	4,655,000	4,297,000	350,000	358,000
		4,305,000	**4,655,000**	**4,275,000**	**350,000**	**358,000**
Utilised as follows:						
CASH FLOWS FROM OPERATING ACTIVITIES						
Payments						
Research Grant Payments and Scholarship	1, A	(8,670,007)	(5,933,570)	(6,743,562)	2,736,437	809,992
Employee benefits		(785,155)	(762,018)	(705,029)	23,137	(56,989)
Institute Contractor fees		(50,000)	-	(3,208)	50,000	3,208
Board and Advisory committee fees		(65,886)	(59,713)	(42,044)	6,173	(17,669)
Supplies and Services	2, F	(398,887)	(287,145)	(397,337)	111,742	110,192
GST payments on purchases	3	(911,889)	(599,696)	(627,277)	312,193	27,581

8.9 Explanatory statement (continued)

Statement of Cash Flows (continued)

	Variance note	Original budget 2021 $	Actual 2021 $	Actual 2020 $	Variance between estimate and actual $	Variance between actual results for 2021 and 2020 $
Receipts						
Receipts from Sponsors	4, B	4,733,404	2,869,835	3,920,419	(1,863,569)	(1,050,584)
Interest received	5, C	120,000	55,807	171,548	(64,193)	(115,741)
GST receipts on sales	6, D	473,340	287,738	360,615	(185,602)	(72,877)
GST receipts from taxation authority	E	438,549	373,823	78,379	(64,726)	295,444
Net cash used in operating activities		**(5,116,531)**	**(4,054,939)**	**(3,987,496)**	**1,061,592**	**(67,443)**
Net increase/(decrease) in cash and cash equivalents		(811,531)	600,061	309,504	1,411,592	290,557
Cash and cash equivalents at the beginning of the period		12,391,863	13,550,967	13,241,463	1,159,104	309,504
CASH AND CASH EQUIVALENTS AT THE END OF THE PERIOD		**11,580,332**	**14,151,028**	**13,550,967**	**2,570,696**	**600,061**

8.9 Explanatory statement (continued)

Statement of Cash Flows (continued)

Major Estimate and Actual (2021) Variance Narratives

1. Research grants are below estimate as payments to researchers are a function of:
   - the number and financial scale of applications submitted to MRIWA;
   - the time required to negotiate the condition of grant for a project with the sponsors and research partners; and
   - progress by the researchers in executing the project and the timeliness of researchers' submission of their progress reports and financial statements in order to receive the next claim. COVID 19 has caused delays with a number of projects.

   Payments to researchers will differ from year to year based on the progress of the research.

2. Supplies and Services has decreased due to reduce need for legal and consulting services and a reduction in the number of events and sponsorship originally planned

3. GST Payments on Purchases has decreased as there is a direct relationship to the reduced payments to researchers and supplies and services.

4. Income from industry sponsorship is below estimates as it is difficult to forecast an accurate value of industry sponsorship income for new research projects. Revenue from industry sponsorship is also impacted by decisions of sponsors to pay funds direct to researchers, rather than MRIWA, for projects forecast to be approved throughout the financial year.

5. Interest Received has decreased due to lower interest rates in FY21.

6. GST Received has decreased due to lower receipts than estimated in this financial year.

Major Actual (2021) and Comparative (2020) Variance Narratives

A. Research grant payments have decreased from the prior year as less projects progressed in their research during this financial year, resulting in less researcher payments being made. COVID 19 has cause delays with a number of projects.

B. Receipts from sponsors are driven by the terms set in the Conditions of Grant at the commencement of every new research project. The decrease in receipts reflects no new Conditions of Grants were entered into where the industry sponsorship was to be paid to MRIWA to manage on behalf of the sponsors.

C. Interest Received has decreased due to lower interest rates.

D. GST Receipts has decreased due to lower receipts in sponsors in FY21 as compared to FY20.

E. GST Receipts from taxation authority has increased due to net refundable position in FY21.

F. Supplies and Services payments have decreased due to decreased payments for legal and consulting services and a reduction in the number of events and sponsorships.

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Our Governance

MRIWA's robust governance and contemporary fit-for-purpose corporate practices are outlined in this section highlighting some of the mechanisms in place to improve our performance, deliver business outcomes and ensure compliance.

Message from the Audit and Risk Committee Chair

The Audit and Risk Committee continued its focus on supporting MRIWA's strategic pillar of governance in 2020-21.

Key activities included stewarding the continuous improvements in our financial and performance reporting and risk management systems and controls during this year in addition to the ongoing monitoring of our financial statements and Key Performance Indicators. Deloitte continued as our Financial Services provider in keeping with the arrangement of exemption from TI 824 with financial support to the organisation.

During the year, management undertook a review and update of the Financial Management Manual and spent considerable time on ICT governance developments including aligning to government's heightened focus on security and significant software upgrades. In particular, MRIWA undertook a move to the cloud for our key information system (CMAPS) and our integrated financial system.

Continuing with overall improvements in the MRIWA governance framework we further developed and finalised the fit-for-purpose internal audit plan that incorporated the requirements of agency reporting to streamline our various assurance activities. The organisation also undertook an assessment of controls on our risk register to ensure they were current for our new business model.

It was pleasing to receive the results of a focus audit on our grant administration which showed that MRIWA's practice in this area is of a high standard.

The Committee undertook a further review of its charter and developed a specific skills matrix to support succession planning which now includes a plan for succession of members over the next two years and is aligned with Board planning.

The Committee also commenced work on a review of our KPI measures to ensure that they appropriately reflect the Board and government's goals for the organisation into the future. This work will continue in 2021-22.

I would like to again acknowledge the work of my Audit and Risk Committee members Larry Lopez and Mark Bush and thank them for their continued valuable contribution, our CEO Nicole Roocke and Stephanie Ahlfeld from MRIWA together with Peter Reynolds from Deloitte.

Helen Cook
Chair
Audit and Risk Committee

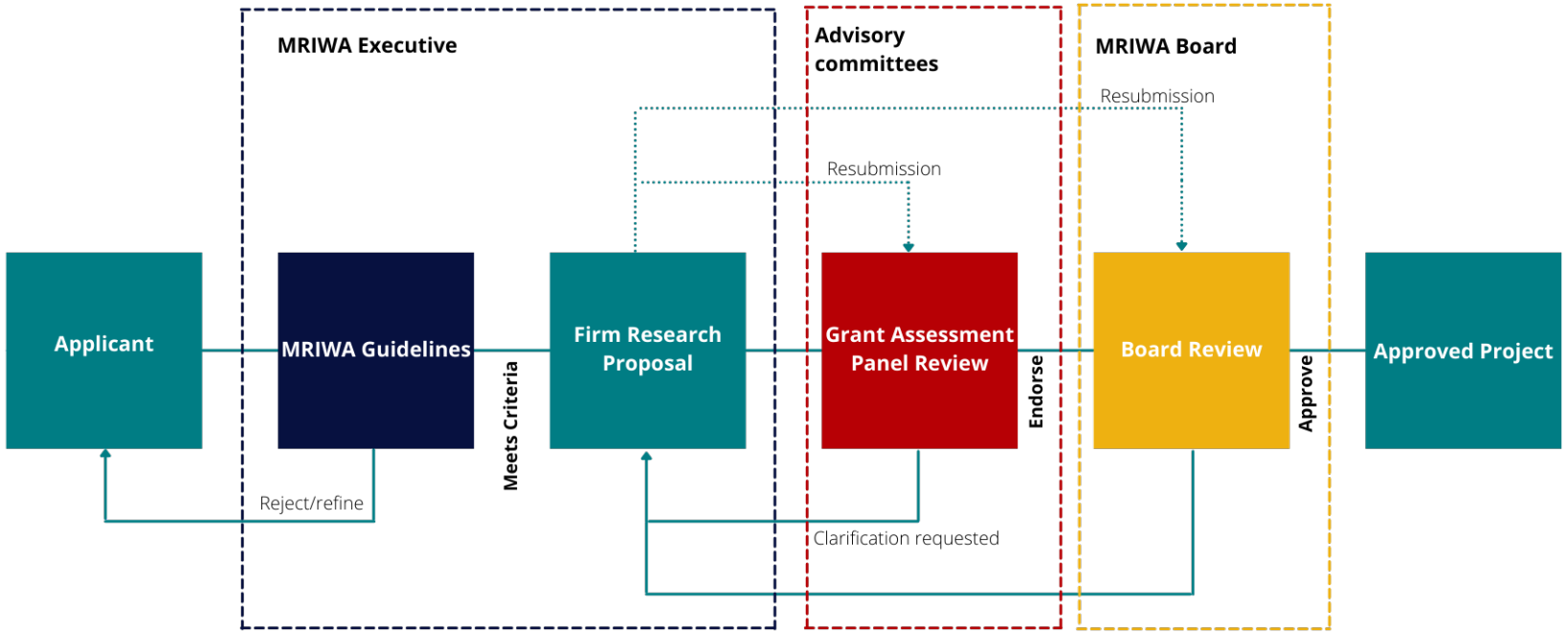
Committee Structure and Decision-Making Framework

Control and management of MRIWA is vested in a Board of seven members (MRIWA Board), who are appointed by the Minister. The CEO administers day-to-day operations, subject to the direction of the MRIWA Board.

The MRIWA College is an advisory group appointed by the MRIWA Board to provide advice to MRIWA and the MRIWA Board on minerals research priorities and assist in the assessment of research grant applications which seek to address the challenges facing the State's minerals industry to ensure it can deliver an economic and social benefit for Western Australia.

The MRIWA College is comprised of individual representatives with specific knowledge and experience relevant to one or more of the program areas in the MRIWA Research Priority Plan[1]. These representatives are drawn from a range of industry, research community and government organisations.

Research applications are developed by an Applicant with input from MRIWA, before being reviewed by a Grant Assessment Panel (GAP). Members of the GAP are drawn from the MRIWA College. The GAP make a recommendation to the MRIWA Board on each project. It is the role of the MRIWA Board to approve investment decisions for all projects.



1. https://www.mriwa.wa.gov.au/research-funding/research-priorities/

MRIWA College Colloquium

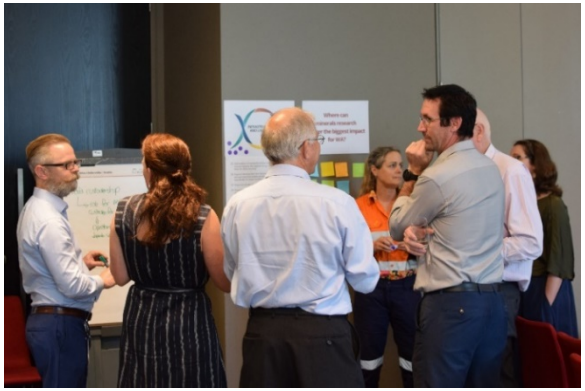
The inaugural MRIWA College Colloquium was held on 25 November 2020 and was the first time the College itself had met as a body.

The half-day event was structured to provide opportunities for consultation regarding the issues and challenges facing the minerals industry, and MRIWA's potential role in supporting industry innovation to address these challenges.

Following a briefing on current MRIWA portfolio activities, College members participated in small-group discussions to identify emerging industry challenges and research questions. Further open discussion was then invited from the floor on key issues that could inform the development and improvement of MRIWA's operations.

The Board considered feedback from the Colloquium as part of the strategic planning for 2021-2022.

The next MRIWA College Colloquium will be held 28 October 2021.



MRIWA College Colloquium November 2020

MRIWA College Workshops

The MRIWA College provides a rich source of knowledge and experience across the mining value chain and acts as MRIWA's brains trust.

During 2020-21 College members were invited to participate in workshops to assist with strategic planning.

Net Zero Emission Mining

Facilitated by Peter Mann and Brian Innes of Partners in Performance, this workshop considered the main areas of opportunity for MRIWA research priorities to enable WA industry to improve competitiveness in a low/zero carbon global economy.

The discussion identified themes aligned with MRIWA's Research Priority Plan around which MRIWA's ongoing activity could be structured. The summary of the workshop discussion was presented to the MRIWA Board, with a significant program of work adopted as part of the Net Zero Emission Mining Challenge.

Increased Recovered Value Through Processing - Reflections, Outcomes and Future Direction

MRIWA has invested in 15 completed projects in this program area over the last 5 years. This workshop considered the assimilated learnings of the 2021 assessment of the outcomes and benefits resulting from research within this program area.

Feedback from College members attending the workshop identified actions for MRIWA to progress as part of its continuous improvement process for grants administration.

Grants Administration Audit Outcome

Robust governance and contemporary fit-for-purpose corporate practices are the goals of MRIWA's Governance Pillar in its strategic plan.

The results of an audit undertaken by the Office of the Auditor General (OAG) were released in January 2021. MRIWA was one of eight State government entities responsible for administering grants examined as part of this audit.

The focus of the OAG audit was to assess whether the sampled entities had sound grant administrative practices for various stages of the grant process, including awarding and approval of grants, monitoring of grant milestones, acquittal of grants and assessing the effectiveness of grant programs.

The report[1] found MRIWA was one of two agencies who displayed sound policies, practices and controls for grant administration.

MRIWA agrees with the OAG that it is critical government entities administer grants in a way that ensures funds are allocated in accordance with eligibility requirements via a transparent process and are spent in accordance with the stated purpose of the grant program and parliamentary appropriation.

Work has been undertaken over the last twelve months to continually improve our processes with the:

- new Grant Guidelines and supporting forms available on our website;
- formation of the MRIWA College to assist in the assessment of research applications; and
- new purpose-built grant administration database to enable financial management and ongoing monitoring of project progress.

Given the robust processes in place, MRIWA is now positioned to offer research project facilitation on a fee-for-service basis where parties are seeking an independent third party to manage collaborative research activities.

[1] https://audit.wa.gov.au/reports-and-publications/reports/grants-administration/

Disclosures

Shared Responsibilities with Other Agencies

The Institute did not share any responsibilities with other agencies in 2020-21.

Ministerial Directives

There have been no Ministerial directives to MRIWA in 2020-21.

Other Financial Disclosures

Capital Works

MRIWA has no capital works projects.

Employment and Industrial Relations

As of 30 June 2021, MRIWA employed 6 people, equating to 5.5 full-time equivalents (FTE).

During the year 1 person ceased employment with MRIWA.

MRIWA employment profile

Employment Type	2021	2020
Fixed Term Full-Time	2	2
Fixed Term Part-Time	1	0

Staff Development

MRIWA is committed to supporting its employees through the provision of training and development opportunities.

Diversity Profile

Diversity Group	2021	2020
Women on the Board	57%	57%
Women in Senior Executive Services (SES)	100%	100%
Indigenous Australians	0	0
Employees from Culturally-Diverse Background	0	0
Employees with Disabilities	0	0
Youth (under 25 years)	0	0

Occupational Safety & Health; Workers Compensation and Injury Management

MRIWA is committed to providing a safe work environment. OHS policies and procedures are directly linked to the MRIWA Risk Register as the control mechanism for reducing the risk of injury of employees, students and visitors. All risks and controls are reviewed annually.

During 2020-21 there were no Workers Compensation claims lodged and there are no employees on return-to-work plans.

Unauthorised use of credit cards

Officers of MRIWA hold corporate credit cards where their functions warrant usage of this facility.

There were **three (3)** instances where the Western Australian Government Purchasing Cards were used for personal purposes during the period.

The aggregate amount of personal use expenditure for the reporting period: **$68.81**

The aggregate amount of personal use expenditure settled by the due date: **$68.81**

The number of referrals for disciplinary action instigated by the notifiable authority during the reporting period: **None**

Governance Disclosures

Advertising

In accordance with section 175ZE of the *Electoral Act 1907* (WA), MRIWA has not incurred any expenditure for advertising agencies, market research, polling, direct mail or media advertising agencies.

Board and Committee Representation

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 MRIWA Board and supporting advisory committees.

MRIWA Board members are appointed in accordance with Section 27(1)(a) of the MRIWA Act and are remunerated by an annual fee set by the Public Sector Commissioner. The fee has not been varied since first established on 20 December 2013.

Further information on MRIWA Board membership can be located in the *Overview* section of the Annual Report.

Under the MRIWA Act, the MRIWA Board has the authority to establish any committee or appoint any organisation or individual to provide it with advice, especially on the merit of applications for research grants (section 60).

From 17 February 2020, the advisory committee convened by MRIWA has taken the form of an assessment panel comprised of Core Members and subject matter experts drawn from the MRIWA College and known as a Grant Assessment Panel.

Members of MRIWA College are appointed in accordance with Section 60(1) of the MRIWA Act and are remunerated based on attendance at a rate set by the Public Sector Commissioner.

Three Grant Assessment Panels were convened in 2020-21.

Additional activities College members were involved in include the 2020 College Colloquium and the College workshops.

College - Core Membership

Up to ten (10) persons will be appointed as Core Members of the College. At the expiry of their term as a Core Member, individuals may continue to participate in the College as a subject matter expert.

Core Members are invited to attend all Grant Assessment Panel meetings, to ensure a consistent approach in the assessment of research grant applications.

Name	Position	Appointment Approved	Period of Membership	Sitting Fees $
Ian Suckling	Chair	01 Jan 2021	31 Dec 2022	3,162[(a)]
Gerard Danckert	Core Member	01 Jun 2020	31 May 2023	1,362[(a)]
Rob Freeth	Core Member	01 Jun 2020	31 May 2023	1,768[(a)]
Rob Hough	Core Member	01 Jun 2020	31 May 2023	0[(b)]
Laura Kuhar	Core Member	01 Jun 2020	31 May 2023	0[(b)]
Alison Morley	Core Member	01 Jun 2020	31 May 2023	2,176[(a)]
Allan Trench	Core Member	01 Jun 2020	31 May 2023	1,768[(a)]

Notes

(a) Foregoes all remuneration and donates sitting fees back to MRIWA for the Education Program

(b) Ineligible for remuneration in accordance with Premier's Circular 2019/07 State Government Boards and Committees

College Members

Name	Position	Appointment Approved	Period of Membership	Sitting Fees $
Alexander Logan	Member	1-Sep-20	31-Aug-23	442[a]
Allon Brent	Member	1-Jan-21	31-Dec-23	442[a]
Andy Fourie	Member	1-Jun-20	31-May-23	442[a]
Andy Lamb	Member	1-Sep-20	31-Aug-23	442
Anel Joubert	Member	1-Jun-20	31-May-23	1,326[a]
Anna Kaksonen	Member	1-Jun-20	31-May-23	-
Bryan Maybee	Member	1-Jun-20	31-May-23	884[b]
Caroline Perring	Member	1-Jun-20	31-May-23	0[c]
Charles Elliott	Member	22-Jun-20	31-May-23	442
Charlotte Hall	Member	1-Jun-20	31-May-23	0[a]
Chitra Viswanathan	Member	1-Sep-20	31-Aug-23	-
Chris Kirkland	Member	1-Jun-20	31-May-23	442[a]
Christopher Baker	Member	1-Jun-20	31-May-23	442[a]
Deborah Lord	Member	1-Sep-20	31-Aug-23	442
Erkan Topal	Member	22-Jun-20	31-May-23	884[a]
Fiona Haslam-McKenzie	Member	1-Jun-20	31-May-23	442[a]
Ivor Roberts	Member	1-Jun-20	31-May-23	0[c]

Name	Position	Appointment Approved	Period of Membership	Sitting Fees $
Joanne Heyes	Member	1-Jun-20	31-May-23	884[a]
John Clout	Member	1-Sep-20	31-Aug-23	1,326[a]
John Dell	Member	1-Jun-20	31-May-23	884[a]
Jon Hronsky	Member	1-Jun-20	31-May-23	1,326[a]
Kane Moyle	Member	1-Jun-20	31-May-23	884[a]
Karen Caple	Member	1-Sep-20	31-Aug-23	0[c]
Kerryl Bradshaw	Member	1-Jun-20	31-May-23	884[a]
Louisa O'Connor	Member	1-Jun-20	31-May-23	442
Mark Jessell	Member	1-Jun-20	31-May-23	-
Melanie Blanchette	Member	1-Jun-20	31-May-23	442[a]
Melinda Hodkiewicz	Member	1-Jun-20	31-May-23	884[a]
Michelle Keegan	Member	1-Jun-20	31-May-23	1,768[a]
Peter Bewick	Member	1-Jun-20	31-May-23	-
Pietro Guj	Member	1-Nov-20	31-Oct-23	-
Rathy Brandes de Roos	Member	1-Jun-20	31-May-23	442[a]
Renee Hallam	Member	1-Nov-20	31-Oct-23	884
Ryan Fraser	Member	1-Nov-20	31-Oct-23	442
Vanessa Lickfold	Member	1-Jan-21	31-Dec-23	884[a]

(a) Foregoes all remuneration and donates sitting fees back to MRIWA for the Education Program
(b) Foregoes a portion of remuneration and donates back to the MRIWA Education Program
(c) Ineligible for remuneration in accordance with Premier's Circular 2019/07 State Government Boards and Committees

Contracts with Senior Officers

No member of MRIWA staff had any interest or benefit from any contract entered by MRIWA.

Freedom of Information

The *Freedom of Information Act 1992* (WA) enables the public to apply for access to documents held by MRIWA. No freedom of information request was received by the organisation in 2020-21.

Public Sector Standards and Ethical Codes

All members of MRIWA Board and MRIWA College are aware of the need to comply with Part 4 – Administration, Subdivision 3 of the *Minerals Research Institute of Western Australia Act 2013* (WA), which sets out the provisions for disclosure of material personal interest, and MRIWA's Code of Conduct.

MRIWA has complied with Section 31(1) of the *Public Sector Management Act 1994* (WA) in the administration of the MRIWA's human resource management practices relating to Public Sector Standards, Western Australian Public Sector Code of Ethics and MRIWA's Code of Conduct.

MRIWA utilises the Department of Mines, Industry Regulation and Safety's human resources services and is confident their human resources management principles have adequate checks in place to ensure compliance requirements are met.

In 2020-21 no breach claims were lodged in relation to either the Public Sector Standards or the WA Public Sector Commission's Code of Ethics.

MRIWA is compliant with the *Public Interest Disclosure Act 2003* (WA). In accordance with this Act, our Chief Executive Officer is our designated Public Interest Disclosure Officer.

In 2020-21 we had no public interest disclosures lodged under the Act. MRIWA submitted the Public Sector Entity Survey to the Public Sector Commission with no reports for breach of discipline under the *Public Sector Management Act 1994* (WA).

Quarterly reporting of MRIWA's gift and benefits register to the MRIWA Board continues to ensure no inappropriate acceptance of gifts or benefits and to monitor any notable trends.

Record Management Plan

MRIWA's Recordkeeping Plan was last reviewed in November 2019 in accordance with section 28 of the *State Records Act 2000* (WA).

The revised Recordkeeping Plan was originally scheduled for submission to the State Records Office in September 2020. Interruptions due to COVID-19 extended deadlines by 12 months.

MRIWA has been advised the State Records Office is now reviewing the existing seven standards and is intending to propose a new way of reporting for managing State records in a simplified single standard.

MRIWA will incorporate these changes into its Recordkeeping Plan, which is now due for submission in September 2021.

WA Multicultural Policy Framework

The MRIWA Multicultural Plan 2021-2024 was submitted in January 2021.

In March 2021, MRIWA Staff and a number of our current PhD scholars participated in an on-country session with Bindi Bindi Dreaming to learn more about Noongar culture. Over two thirds of MRIWA's PhD Scholars are from overseas, and have little to no prior knowledge of Noongar culture.

For the first time, MRIWA is offering an Indigenous Postgraduate Research Scholarship to support the development of research champions and industry thought-leaders from the Aboriginal community. This scholarship complements the Institute's existing scholarship offerings.

Other Legal Requirements

Annual Estimates

Statement of Comprehensive Income

As at 30 June 2021

	Estimate 2022 $
COST OF SERVICES	
Expenses	
Research grants	13,441,343
Scholarships	340,930
Loss on disposal of assets	
Employee benefits expense	793,415
Institute Contractor fees	52,000
Board and committee fees and costs	148,633
Supplies and services	1,118,604
Other expenses	66,697
Accommodation expenses	59,250
Depreciation expense	
Total cost of services	**16,020,872**
Income	
Revenue	
Interest revenue	120,000
Other revenue	99,598
Revenue from Industry Sponsorship	6,867,697
Total revenue	**7,087,295**
Total income other than income from State Government	**7,087,295**
NET COST OF SERVICES	**8,933,577**

	Estimate 2022 $
Income from State Government	
State Government Grant	6,805,000
Resources received free of charge	59,250
Total income from State Government	**6,864,250**
Surplus/(Deficit) for the period	**(2,069,327)**
TOTAL COMPREHENSIVE INCOME FOR THE PERIOD	**(2,069,327)**

Statement of Financial Position

As at 30 June 2021

	Estimate 2022 $
ASSETS	
Current Assets	
Cash and cash equivalents	2,688,052
Restricted cash and cash equivalents	10,752,207
Receivables and other assets	456,139
Other Current Assets	30,000
Total Current Assets	**13,926,398**
Non-Current Assets	
Property, plant and equipment	-
Total Non-Current assets	**-**
TOTAL ASSETS	**13,926,398**

	Estimate 2022 $
LIABILITIES	
Current Liabilities	
Payables	147,590
Provisions	15,600
Deferred revenue	4,643,992
Total Current Liabilities	**4,807,182**
Non-Current Liabilities	
Provisions NCL	74,660
Total Non-Current Liabilities	**74,660**
TOTAL LIABILITIES	**4,881,842**
NET ASSETS	**9,044,556**
EQUITY	
Accumulated surplus	9,044,556
TOTAL EQUITY	**9,044,556**

Statement of Cash Flows

For the year ended 30 June 2021

	Estimate 2022 $
Cash flows from State Government	
Cash receipts from Government	6,805,000
Cash flows from operating activities	
Payments	
Research Grant Payments	(13,922,912)
Employee benefits	(793,415)
Institute Contractor Fees	(52,000)
Board and Advisory Committee Fees	(35,523)
Supplies and Services	(1,185,301)
GST Paid on Purchases	(1,516,021)
Other payments	
Receipts from Sponsors	7,099,839
Interest received	120,000
GST received on sales	709,984
Net GST refunded from ATO (or paid)	806,037
Cash generated from operations	**(8,769,312)**
Cash flows from investing activities	
Purchase of non-current assets	-
Net cash from investing activities	**-**

	Estimate 2022 $
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	(1,964,312)
Cash and cash equivalents 1 July 2021	15,404,571
CASH AND CASH EQUIVALENTS AT END OF YEAR	**13,440,259**

Our Performance

This section contains and overview of the MRIWA Performance Management Framework and the audited key performance indicators for 2020-21

Audited Key Performance Indicators

Certification of Key Performance Indicators

For the year ended 30 June 2021

We hereby certify 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 2021.

Miriam Stanborough
Chairperson of the Board

Date: 6 August 2021

Helen Cook
Deputy Chairperson of the Board

Date: 6 August 2021

Changes to outcome-based management framework

MRIWA's Outcome Based Management Framework did not change during 2020-21.

Key Effectiveness Indicator

Government Goal Responsible financial management and better service delivery

Outcome 1: Fostering and promoting minerals research for the benefit of the State.

One measure of the effect of MRIWA research investments is to use minerals royalties accruing to Western Australia and the economic impact of that research more broadly. However, it is difficult to measure the direct impact resulting from minerals research due to the duration of the research projects; the many other factors influencing implementation; and the timeframe between creation of knowledge and generation of royalties.

For these reasons, the key indicator of effectiveness for MRIWA demonstrates the increased value of research enabled by leveraging funds from third parties on the State Government investment through MRIWA.

Key Effectiveness Indicator	2018-19 Actual	2019-20 Actual	*2020-21 Target*	2020-21 Actual
Ratio of total cash investments in research projects to total approved MRIWA cash investment in those research projects [a], [b]	3.51[c] [d]	21.67[d] [e]	*4*[c]	239.34[e]

Notes:
(a) Investment totals are for projects approved by the MRIWA Board in the reporting year.
(b) Measure reported as a multiple.
(c) In 2018-19, an above target result was received as the target leverage was 3 or above. The Board increased the Key Effectiveness Indicator target to 4 by resolution at its meeting on 14 October 2019.
(d) The result for 2018-19 and 2019-20 has been re-stated to include all projects where there is a drawdown on pre-existing funding commitments to be consistent with the methodology applied across all subscription type projects
(e) The total cash investment of specific research projects in Cooperative Research Centres (CRCs), which includes financial contributions by sponsors paid direct to the CRC, is only known in subsequent years after the MRIWA cash investment is made by the Board. The MRIWA commitment to the Future Battery Industry (FBI) CRC was made in 2017-18 and the contribution reflected in that year's KPI calculation. The Board commenced approving specific projects in the FBI CRC in 2019-20 with the sponsor co-investment only known at this time and resulting in a higher financial leverage than targeted. In 2020-21, six out of seven projects approved by the Board were FBI CRC projects with the co-investment by sponsors only being realised in the current financial year, three years after the initial Board decision to commit funds. Only one project was approved in 2020-21 which did not draw down on a pre-existing CRC funding commitment, causing misalignment of this KPI. Without including the investment in the CRC's, the Effectiveness Indicator for 2019-20 was 4.01 and 2.75 in 2020-21.

Key Efficiency Indicator

Government Goal Responsible financial management and better service delivery

Service 1: Administer research grant applications and manage approved projects efficiently.

The primary service provided by MRIWA is to identify research opportunities and resources, support the development of Grant applications and to manage a portfolio of approved projects.

The administration effort required of MRIWA to do so is measured as a function of the total financial scale of the portfolio of research projects.

The key indicator of efficiency demonstrates the focus on maximising investment in research projects and a continued focus on minimising overheads from administration efforts.

Key Efficiency Indicator	2018-19 Actual	2019-20 Actual	*2020-21 Target*	2020-21 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.	4.2%[a]	1.75%[b] [c]	*4%*	1.31%[c]

Notes:
(a) The efficiency indicator target was lowered to 4% for 2018-19 from the target 4.5% in the preceding year to continue a focus on administrative efficiencies. Increases in administration expenses resulting from recruitment activity for the CEO role, higher costs for IT and financial management services than anticipated and the need to engage consulting services for the delivery of the Economic Impact Assessment and Five Year Review of MRIWA required as part of the 2019-20 budget submission resulted in a higher than targeted outcome for the Institute's Efficiency Indicator in 2018-19.
(b) The result for 2019-20 has been re-stated to include all projects where there is a drawdown on pre-existing funding commitments to be consistent with the methodology applied across all subscription type projects
(c) The above target result is due to of the commencement of a number of Future Battery Industry (FBI) CRC projects and a project with the MinEx CRC resulting in the total project value for these being incorporated into the total cash value of research projects under management by MRIWA.

Annexure: Information Statement

Information statement 2020-21

Introduction

Part 5 of the Freedom of Information Act 1992 (WA)[1] (the FOI Act) requires each agency publish an information statement and update the statement at intervals of not more than 12 months (sections 96 and 97 of the FOI Act).

The Minerals Research Institute of Western Australia (MRIWA) publishes its Information Statement as an annexure to the Annual Report. This Annexure supplements the detail provided in the Annual Report to ensure all information required under the FOI Act is publicly available.

Details of legislation administered

Refer Annual Report – Overview > Legislation.

The *Minerals Research Institute of Western Australia Act 2013* (the Act) repealed the *Minerals and Energy Research Act 1987* thereby abolishing the Minerals and Energy Research Institute of Western Australia (MERIWA). All assets, rights and liabilities of MERIWA (the abolished Institute) were transferred to MRIWA on the commencement of the new Act.

Organisational structure

Refer Annual Report – Overview > Responsible Minister.

The current organisation chart is available on the MRIWA website[2].

Decision-making framework

Refer Annual Report – Governance > Committee Structure and Decision-Making Framework.

Agency functions

Refer Annual Report – Overview > About Us.

The Annual Report also includes independently audited financial statements and performance indicators and an overview of our performance in respect of governance requirements.

Details of functions, including decision-making functions, affecting the public

Except for those persons who are directly involved in assessing or undertaking the research projects, the general public is not involved in the day-to-day operations of the Institute.

[1] https://www.legislation.wa.gov.au/legislation/statutes.nsf/main_mrtitle_353_homepage.html
[2] https://www.mriwa.wa.gov.au/about-us/our-people/

Public participation in the formulation of policy and performance of agency functions

MRIWA regularly engages with representatives from industry, the research community and government organisations.

Details of the MRIWA College are provided in the Annual Report – Governance > Committee Structure and Decision-Making Framework. The Terms of Reference are available on the MRIWA website[3].

As required by the *Minerals Research Institute of Western Australia Act 2013*, the Minister carried out a review of the operation and effectiveness of the Act following the fifth anniversary of the commencement of the Act. This review took place in 2018-19 and included a comprehensive stakeholder consultation process. The full report is available on the MRIWA website[4].

The MRIWA Research Priority Plan identifies the key areas where investments will be made into high impact research and development. The 2019-20 review of the Research Priority Plan encompassed a broad range of preliminary stakeholder consultation which informed the development of a revised Plan. This was released for public consultation with all feedback considered by the Board prior to finalisation of the Plan.

Types of documents held by MRIWA

The MRIWA website[5] contains a broad range of publicly accessible documents relating to our functions and activities. This includes:

- annual reports;
- policies and guidelines; and
- final project reports.

MRIWA creates documents for the operation of business activities to carry out our functions and duties. This includes documents relating to:

- accounting and finance
- administrative operations
- contracts, tenders and memorandums of understanding
- governance and compliance
- grant administration
- human resources
- ministerial correspondence and briefing notes
- policy and procedure
- records management
- strategy and policy documents

Procedures for obtaining access to documents not publicly available

It is the aim of MRIWA to make information available promptly and at the least possible cost. Whenever possible, documents will be provided outside the FOI process.

If information is not routinely available, the FOI Act provides the right to apply for documents held by MRIWA and to enable the public to ensure that personal information in documents is accurate, complete, up to date and not misleading.

[3] https://www.mriwa.wa.gov.au/about-us/corporate-publications/corporate-governance/
[4] https://www.mriwa.wa.gov.au/about-us/corporate-publications/mriwa-act/
[5] https://www.mriwa.wa.gov.au/

Freedom of information application process

Access applications have to:

- Be in writing;
- Give enough information so that the documents requested can be identified;
- Give an Australian address to which notices can be sent; and,
- Be lodged at the agency with any application fee payable.

Applications and enquiries should be addressed to the CEO (postal address: 100 Plain Street, East Perth, WA 6004) or telephone (08) 6180 4340.

Applications will be acknowledged in writing and the applicant will be notified of the decision within 45 (calendar) days.

Freedom of Information Charges

A scale of fees and charges are set under the FOI Act Regulations. Apart from the application fee for non-personal information, all charges are discretionary. The charges are as follows:

1. Type of Fee	
– Personal information about the applicant	No fee
– Application fee (for non-personal information)	$30.00
2. Type of Charge	
– Charge for time dealing with the application (per hour, or pro rata)	$30.00
– Access time supervised by staff (per hour, or pro rata)	$30.00
– Photocopying staff time (per hour, or pro rata)	$30.00
– Per photocopy	0.20 cents
– Transcribing from tape, film or computer (per hour, or pro rata)	$30.00
– Duplicating a tape, film or computer information	Actual Cost
– Delivery, packaging and postage	Actual Cost
3. Deposits	
– Advance deposit of the estimated charges may be required	25%
– Further advance deposit may be required to meet the charges for dealing with the application	75%

For financially disadvantaged applicants or those issued with prescribed pensioner concession cards, the charge payable is reduced by 25%.

Access Arrangements

Access to documents can be granted by way of inspection, a copy of a document, a copy of an audio or video tape, a computer disk, a transcript of a recorded, shorthand or encoded document from which words can be reproduced.

Notice of Decision

As soon as possible, but in any case within 45 days of receipt of application, the applicant will be provided with a notice of decision which will include details such as:

- The date which the decision was made;
- The name and the designation of the officer who made the decision;
- If the document is an exempt document the reasons for classifying the matter exempt; or the fact that access is given to an edited document; and,
- Information on the right to review and the procedures to be followed to exercise those rights.

Refusal of Access

An applicant who is dissatisfied with a decision of the Institute is entitled to ask for an internal review by the Institute. Application should be made in writing within 30 days of receiving the notice of decision.

Applicants will be notified of the outcome of the review within 15 days.

If the applicant disagrees with the result the applicant can apply to the Information Commissioner for an external review, and details would be advised to applicants when the internal review decision is issued.

Access and Points of Contact

The above documents are available on application by:

Contact:	Coordinator, Executive Services
Telephone:	(08) 6180 4340
E-Mail:	enquiries@mriwa.wa.gov.au
Mail:	100 Plain Street, East Perth, WA, 6004
Website:	www.mriwa.wa.gov.au

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This report was published by the Minerals Research Institute of Western Australia, September 2021.

Visit the MRIWA website for digital versions of this report.

Disclaimer

MRIWA makes the information in this report available on the understanding users exercise their own skill and care with respect to its use and interpretation. Changes in circumstances after this document is made available may impact on the accuracy of the information.

Contact us

Minerals Research Institute of Western Australia
100 Plain St, EAST PERTH, 6004
Email: mail@mriwa.wa.gov.au
Website: www.mriwa.wa.gov.au