MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

# BRIEFING

## Further advice regarding Callaghan Innovation's Research and Development Solutions Division

| | | | |
|---|---|---|---|
| **Date:** | 28 February 2025 | **Priority:** | High |
| **Security classification:** | In Confidence | **Tracking number:** | BR-REQ-0010034 |

| Minister | Action sought | Deadline |
|---|---|---|
| Hon Dr Shane Reti<br>**Minister of Science, Innovation and Technology** | **Agree** to an option for the future of the Biotechnologies Group of Callaghan Innovation's Research and Development Solutions (RDS) Division.<br><br>**Agree** to an option for the future of the Applied Technologies Group of Callaghan Innovation's RDS Division. | 3 March 2025 |

| **Contact for telephone discussion (if required)** | | | | |
|---|---|---|---|---|
| **Name** | **Position** | **Telephone** | | **1st contact** |
| Dean Ford | General Manager, Technology and Innovation | 04 901 9882 | Privacy of natural persons | ✓ |
| Iain Cossar | Science System Reforms Programme Director | | | |
| Gina Williamson | Manager, Innovation Policy | 04 901 8203 | | |

| **The following departments/agencies have been consulted** |
|---|
| Callaghan Innovation |

**Minister's office to complete:**

- ☐ Approved
- ☐ Noted
- ☐ Seen
- ☐ See Minister's Notes
- ☐ Declined
- ☐ Needs change
- ☐ Overtaken by Events
- ☐ Withdrawn

**Comments**

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
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## Purpose

To provide requested advice and seek your decision regarding options for the future of Callaghan Innovation's Research and Development Solution (RDS) Division's Biotechnologies and Applied Technologies Groups, including transferring these as with sufficient funding to new public research organisations.

## Recommended action

The Ministry of Business, Innovation and Employment recommends that you:

a **Note** a central feature of the science, innovation and technology reforms is to enable reprioritisation over time, requiring hard decisions to deprioritise lower value activities.

*Noted*

b **Note** the previous Minister of Science, Innovation and Technology agreed to reprioritise funding for the Biotechnologies Group and Applied Technologies Groups of Callaghan Innovation's RDS Division from 1 July 2025.

*Noted*

c **Note** you requested further information regarding the Biotechnologies and Applied Technologies Groups, including consideration of options to retain and transfer these Groups to relevant public research organisations (PRO).

*Noted*

d **Note** commercial revenue from RDS does not cover direct costs, and provision of these services to businesses requires ongoing government subsidisation.

*Noted*

e **Note** funding for the wider science, innovation and technology reforms is premised on realising savings from the disestablishment of Callaghan Innovation (including RDS activities) and reallocation Confidential advice to Government

*Noted*

f **Note** retaining funding for the Biotechnologies and/or Applied Technologies Groups impacts your ability to deliver the Advanced Technologies PRO and/or Invest New Zealand.

*Noted*

g **Note** the urgency of decisions regarding the future of the Biotechnologies and Applied Technologies Groups due to implications for consultation processes currently underway at Callaghan Innovation Confidential advice to Government

*Noted*

h **Agree** to one of the following options for the future of the **Biotechnologies Group** of Callaghan Innovation's RDS Division:

i. Continue to operate within Callaghan Innovation until transfer with appropriate future funding to a new public research organisation, at an estimated ongoing cost Confidential advice to Government

*Agree / Disagree*

**OR**

ii. Close but defer closure to 31 March 2026 with funding reprioritised from 30 June 2026, giving customers time to find alternative arrangements and at a one-off cost Confidential advice to Government

*Agree / Disagree*

**OR**

iii. Status Quo – Close with funding reprioritised as of 1 July 2025, consistent with the current letter to Callaghan Innovation Confidential advice to Government

*Agree / Disagree*

i **Agree** to one of the following options for the future of the **Applied Technologies Group** of Callaghan Innovation's RDS Division:

i. Continue to operate within Callaghan Innovation until transfer with appropriate future funding to a new public research organisation, at an estimated ongoing cost Confidential advice to Government

*Agree / Disagree*

**OR**

ii. Close but defer closure to 30 June 2025 with funding reprioritised from 30 September 2025, giving customers time to find alternative arrangements and at a one-off cost Confidential advice to Government

*Agree / Disagree*

**OR**

iii. Status Quo – Close with funding reprioritised as of 1 July 2025, consistent with the current letter to Callaghan Innovation Confidential advice to Government

*Agree / Disagree*

Gina Williamson
**Manager, Innovation Policy**
Labour, Science and Enterprise, MBIE

28 / 02 / 2025

Hon Dr Shane Reti
**Minister of Science, Innovation and Technology**

..... / ..... / .....

## Background

1. Callaghan Innovation's Research and Development Solutions (RDS) Division comprises several groups. This briefing concerns RDS's Biotechnologies Group and Applied Technologies Group. The Measurement Standards Laboratory and Glycosyn are out of scope of this briefing as it has been decided that the Measurement Standards Laboratory will continue Confidential advice to Government and Commercial Information [CAB-24-MIN-0504.02 and REQ-0007440 refers].

2. In disestablishing Callaghan Innovation, the previous Minister of Science, Innovation and Technology decided (following a high-level assessment of RDS capabilities within the wider science system) that funding for RDS would be reprioritised from 1 July 2025 (REQ-0007162 refers].[1] This was communicated in your letter to the Chair of the Board of Callaghan Innovation on 24 January 2025. Callaghan Innovation has begun processes to plan and implement closure of the Biotechnologies and Applied Technologies Groups of RDS.

3. You have requested further information about the Biotechnologies Group and the Applied Technologies Group within RDS, including its financial performance and the structure of contracts. You have also requested advice as to where and how RDS delivers value, and options for the future of RDS, including consideration of transferring one or both the Biotechnologies and Applied Technologies Groups with appropriate funding to one of the new public research organisations.

4. A decision on this matter is particularly urgent as it has immediate implications for consultation processes underway with staff at Callaghan Innovation. Negotiations

5. MBIE's prior advice on these matters has acknowledged that RDS is of value to the businesses that use it and delivers value to the New Zealand economy through these businesses. However, when considering RDS in the context of the wider science and innovation system, meeting the objectives of the reforms within a constrained budget requires the reprioritisations of funding from RDS towards higher value activities of an advanced technology-focused PRO and Invest New Zealand.

[1] Note regarding interpretation: References throughout this briefing to choices to close or retain RDS Groups means the decisions by Ministers to cease or continue funding to these activities and period for which funding is provided. It is then an operational decision for the Callaghan Innovation Board to close these activities.

## Structure and performance of RDS

### Value delivered through the Biotechnologies Group and the Applied Technologies Group

6. The RDS Biotechnologies and Applied Technologies groups provide scientific expertise to New Zealand businesses on a fee-for-service basis. The types of activities include contract manufacture, scale-up, testing and validation, compliance, proof-of-concept, and applied R&D.

7. Across these services, RDS engages with a wide range of businesses. These businesses are drawn from a wide spectrum including large entities Commercial Information small to medium entities, and smaller frontier venture and start-ups. Both Biotechnologies and Applied Technologies also provide services as a 'sub-contractor' to other Crown Research Institutions and universities undertaking government-funded R&D projects. A list of organisations to which RDS has, or will, deliver more than 100 hours of project delivery activity within the current financial year is included at Annex One.

8. RDS's value comes from providing either expertise and equipment that is not otherwise available in New Zealand, or capability that New Zealand businesses would not otherwise be able to access due to cost, compliance, or lack of in-house technical expertise or infrastructure. In many instances, the unique offering of RDS is not that the capability or scientific equipment is unique in that it exists nowhere else in New Zealand, but that the combination of different capabilities and equipment is only currently available at Callaghan Innovation (including interaction with wider innovation support services), and/or the capability or equipment is directly available for New Zealand businesses (i.e. other public research organisations or private companies may hold the same capability or equipment, but it is not readily available to businesses).

*The Biotechnologies Group*

9. Detailed information about the structure, scientific expertise and specialist equipment within the Biotechnologies Group is included at Annex Two.

10. Commercial utilisation, defined as hours charged to customer delivery projects as a percentage of total available hours (i.e. excluding absence), within the Biotechnologies Group was reasonably good Commercial Information In part, the general high utilisation across the Group reflects the integrated nature of services provided to customers from across the Biotechnologies Group.

11. In the same period, the Biotechnologies Group's average charge out rate (CoR), defined as total commercial revenue divided by total hours charged to customer delivery, Commercial Information This did not cover its costs however.

*The Applied Technologies Group*

12. Detailed information about the structure, scientific expertise and specialist equipment within the Applied Technologies Group is included at Annex Three.

13. The Applied Technologies Group has low overall commercial utilisation rates. [redacted]
Commercial Information
[redacted]

14. In the same period, the average CoR of the Applied Technologies Group was [redacted]
Commercial Information
[redacted]

## The structure of fees and contracts

15. A fee-for-service approach is used for all RDS engagements. Fees charged are based off a standard Callaghan Innovation price book but will vary depending on the type of work, customer services delivered to and demand.

16. In many cases, contracts for RDS services are structured under a Master Services Agreement (MSA), an overarching, long-term contract providing the terms of access for businesses to RDS expertise. Individual Statements of Work that set out details and terms of specific projects or activities within the MSA are used to manage actual delivery of projects. The duration of MSAs varies depending on the client and their needs. Normally these agreements cover multiple years. Individual statements of work are typically much shorter and are focused on specific deliverables over weeks or months.

17. This contract structure is valuable to businesses as MSAs provide long-term commitment and certainty of access to expertise, with flexibility around the timing and terms of specific projects. MSAs allow customers to build long-term relationships with RDS staff, with familiarity between companies and technical staff helping advance work more rapidly than might otherwise be the case.

18. For Callaghan Innovation, this contracting structure creates a useful view of customers who are seeking longer-term commercial relationships and therefore where commercial effort may be directed. However, beyond what is agreed in a Statement of Work, MSAs do not bind companies to any minimum spend.

19. Callaghan Innovation currently has 40 active MSAs across RDS. There are 82 signed Statements of Work.

[redacted]
Commercial Information
[redacted]

**Financial performance and government funding of RDS**

20. Table 2 provides the financial position for the Biotechnologies Group and Applied Technologies Group for 2022/23 to 2024/25 (YTD), including commercial revenue and Crown funding. The data provided in Table 2 gives the most robust assessment of the financial performance of RDS for some years. Historical data is difficult to compile on a comparable basis due to changes in cost allocation models over time.


21. Despite recent efforts to lift commercial revenue performance within RDS (to some success), RDS has been consistently loss making, in that commercial revenues do not cover direct costs and exclude any allowance for facilities and other overhead costs. This means RDS services are subsidised by government on an ongoing basis. Some government subsidisation of these activities may be expected given high capital costs and lack of private sector supply. Commercial revenue has covered around 75-85 percent of total direct costs for Biotechnologies and 30-40 percent for Applied Technologies over recent years. If current cost allocations are included, commercial revenue covers only 40-50 percent and 15-20 percent respectively.

22. $19.5 million per annum of Crown funding is provided to RDS through the R&D Services and Facilities category of the Callaghan Innovation Operations Multi-Category Appropriation (MCA). This funding for RDS also provides for the operating costs of the Gracefield Innovation Quarter (GIQ). Commercial Information

23. These deficits across RDS (and GIQ) have ultimately been funded through reallocation of Crown funding from other categories within the Callaghan Innovation Operations MCA, particularly from funding for providing wider innovation services to businesses.

24. If you wish to retain RDS services (per options set out below), this would need to be financially sustainable and would therefore require a material and sustained lift in commercial revenue Free and frank opinions and/or additional Crown funding.

### Implications of closing RDS

25. If the Biotechnologies and Applied Technologies Groups close, we believe there are alternative options available to businesses. These include building capabilities themselves, working with competitors or industry partners who have similar equipment, accessing services via CRIs or universities, or going offshore. Whether these options are practically possible will depend on the characteristics and needs of the individual business, and some may not be able to engage suitable alternatives and may cease R&D activities. Consideration of the feasibility for businesses of these options is included at Annex Four.

26. We note that the ability of businesses to access services via CRIs may improve through the science reforms. This is particularly through the establishment of the PROs and the intention for these to have stronger connections to industry, and the ability to leverage the New Zealand Product Accelerator and Bioresource Processing Alliance to facilitate and broker research partnerships between research institutions and businesses. Some impacts may also be mitigated through the transfer of scientific equipment to other parts of the science system, which may allow for continued access for businesses (though this could be on different terms or pricing). MBIE and Callaghan Innovation will work through a facilitated process for potential transfer of scientific equipment.

## Future options for the Biotechnologies and Applied Technologies Groups

27. There are three options for the future pathway for the Biotechnologies Group and/or the Applied Technologies Group. These options are consistent with the overall decision to disestablish Callaghan Innovation and transfer its most important functions to other parts of the SI&T system. You may consider different options for the two different groups, or (as we set out further in option one), you may consider a more granular approach across the high and low value components of each Group.

### Option one: Continue to operate and subsidise these activities, and transfer to a new public research organisation

28. If based on the information provided, you see sufficient value to continue RDS activities, you have the option of continuing to operate RDS and transfer the Biotechnology and Applied Technology Groups with sufficient Crown funding to an appropriate PRO. As an indication, the Biotechnology Group could transfer to the Bioeconomy PRO, while Applied Technologies could be considered for fit with the Advanced Technology PRO – though further consideration of this would be warranted.

29. We emphasise in this option that retaining RDS includes the mandate to sign new contracts and agree new Statements of Work. This provides certainty to businesses engaging with RDS

and helps sure up commercial revenue and reduce the level of Crown funding required. It is also important to note that this option is premised on continuing government subsidisation of access to R&D services to businesses. Over time, you might expect PROs to rationalise or consolidate RDS activities within their mandate and operating model.

30. Confidential advice to Government

31. Commercial Information

32. Should affordability be of concern, you also have the option of only partially retaining RDS. There are parts of RDS where utilisation by business is low. You could consider retaining, funding and transferring to PROs only the high value activities within RDS. This would be consistent with the overarching decision to transfer the most important of Callaghan Innovation's functions to other parts of the SI&T system and would reduce the overall cost of retaining RDS.

33. The information provided above indicates that the Biotechnologies Group has both higher commercial utilisation and CoRs relative to Applied Technologies. Given the highly integrated services delivered through the Biotechnologies Group, delivering for customers invariably requires capabilities spread across the group. Confidential advice to Government

34. The higher utilisation parts of the Applied Technologies Group are not concentrated in specific capabilities or in a consistent pattern of demand across time. An ongoing challenge for the Applied Technologies Group is holding a broad spectrum of capabilities to meet customer demands when needed, but at a high overall cost.

35. The Applied Technologies Group is developing AI capabilities, largely focused on the data scientists. However, these capabilities are not unique in the science system or in the private

Commercial Information

sector and have been consistently underutilised. It is not the nature of capability which is envisaged for the Advanced Technology PRO.

### Option two: Close on an agreed future date giving customers time to find alternative arrangements

36. If you view the value delivered through RDS as low or low relative to other priorities within the science system, we recommend you continue with the decision to close RDS. If your concern is to limit the disruption to businesses currently engaged with RDS, you could defer the closure date to a specific future date. Deferred closure would give businesses time to engage new service providers (e.g. some might engage through the New Zealand Product Accelerator to broker partnerships with scientists though that network) and enable some current contractual agreements to be delivered.

37. We emphasise in this option the importance of communicating clearly that RDS will close and a specific date for that closure. It would be clear that companies would need to find other innovation providers, and there would be a strong incentive for them to do so.

38. In relation to existing contracts, the expectation of Callaghan Innovation within this period would be to work to exit from master agreements, where possible to complete contracted Statements of Work and/or to bring forward delivery under Statements of Work to deliver as soon as possible and limit underutilisation of scientists and equipment.

39. Negotiations

40. Based on existing contractual relationships, we suggest providing a further 12 months would allow for managed closure of the Biotechnologies Group. That is, the Biotechnologies Group would close as of 31 March 2026 (with some funding continuing for residual closure activities through to 30 June 2026).

41. This timeframe could be considerably shorter for the Applied Technologies Group, and it is advisable to close this Group as soon as practicable. Negotiations

42. The cost of this option would be continuing operating both the Biotechnologies and Applied Technologies Groups for an additional 12 months, Confidential advice to Government

43. Across options one and two, continuing RDS activities temporarily or permanently will still entail some changes to scope and means of service delivery. This would be to ensure the most efficient use of resources across RDS. This will include some rationalisation of activities

and facilities footprint, particularly those in Auckland (Biotechnologies and Applied Technologies) and Christchurch (Applied Technologies only) where Callaghan Innovation is substantially down the path of exiting by 30 June 2025. There will be impacts of these exits on a limited number of customers which Callaghan Innovation will manage.

### Option three: Status Quo – Close and reprioritise funding as of 1 July 2025 (per current letter to Callaghan Innovation)

44. If you are seeking to close RDS and minimise commitment of further government funding, you could choose to continue with the current course of action, consistent with the letter to the Chair of the Callaghan Innovation Board. Under this option, Callaghan Innovation will proceed with planning for and giving effect to a swift closure of RDS. This would incur redundancy costs but would allow reprioritisation of existing RDS funding to other purposes from 1 July 2025.

45. On balance, MBIE recommends closing RDS, though deferring the date of closure per option 2. Confidential advice to Government [redacted] Deferring closure of the Biotechnologies Group would enable a better managed wind down and may better align timing with processes to transfer or sell scientific equipment which MBIE and Callaghan Innovation are currently shaping. Allowing a short additional period for wind down of the Applied Technologies Group would allow for more active Statements of Work to be completed.

46. It remains MBIE's view that meeting the objectives of the reforms within a constrained budget requires the reprioritisations of funding from RDS towards higher value activities of an advanced technology-focused PRO and Invest New Zealand.

## If you choose to transfer RDS to public research organisations

47. If retaining and transferring the Biotechnologies and/or Applied Technologies Groups to new PROs, transfer of these units is best to occur at the effective date of the proposed Science, Innovation and Technology legislation that will give formal effect to the reforms.

48. Transfer prior to legislation would be complex, Confidential advice to Government [redacted]

49. Confidential advice to Government [redacted]

50. The implication of transferring via legislation is that Callaghan Innovation would need to continue running RDS through 2025/2026 and will require sufficient funding to continue these operations.

51. However transfers are implemented, we recommend communicating Cabinet's policy intentions regarding RDS clearly to CRIs. This will enable the CRIs to factor this into their voluntary merger processes, and government to factor it into the core purpose and functions of the future PROs. It is also important to clearly communicate the level of funding Confidential advice to Government with which these activities will transfer, as well as any expectations regarding the continued delivery of services to business alongside the CRI/PROs' other research activities. Confidential advice to Government

52. If you choose to close RDS but defer the closure date, we recommend services continue to be delivered via Callaghan Innovation, rather than a CRI. This avoids the complexities and potential disruptions of a transfer process for a relatively short period of further service delivery. Under this option, you need only consider transfer to PROs should the deferred closure date be later than the date of formal disestablishment of Callaghan Innovation as an innovation agency and R&D service provider. If transfer is required, as above, this remains best done via legislation.

## Implications and trade-offs

53. A decision to retain RDS either temporarily or permanently has implications for delivery of the wider science reforms and the outcomes you are seeking to achieve through these reforms.

**[BUDGET SENSITIVE] Funding the reforms within fiscal constraints**

54. Confidential advice to Government

55.

56.

Confidential advice to Government

57.

58.

59.

60.

Confidential advice to Government

61. Free and frank opinions

62.

### Implications for the balance of current and future-focused science investment

63. Retaining RDS in its current state, with increased government funding, prioritises funding to existing research and innovation activities and further embeds government subsidisation of these activities, at the cost of future-focused research and innovation activities. Given the significant presence of the Biotechnologies and Applied Technologies Groups at Gracefield Innovation Quarter, retaining these activities will also impact on the future use of the site and the nature of the commercial opportunities that might be available.

64. A core objective of the science reforms is to increase the adaptability and flexibility within the science system to identify and reorient towards future system needs. A decision to retain RDS (particularly in its entirety) is in tension with this objective. We previously advised that, with a closure of RDS and the establishment of the new PROs, in the medium term we expect organisations to adapt to new structures, and to reorient their priorities and science capabilities [REQ-0007162 refers].

65. Successive Governments and reform programmes have struggled to make negative prioritisation decisions (i.e. to stop lower value or misaligned activities), undermining efforts to reorient the science system to future need rather than current interests. This includes at the inception of Callaghan Innovation, when the former Industrial Research Limited and responsibility for the Gracefield Innovation Quarter were retained and transferred into the new organisation on its existing operating basis.

## Next steps

66. Officials will be available to discuss this advice with you at your Officials meeting on Monday 3 March.

67. Confidential advice to Government

68.

69. Your decision will be reflected in the upcoming reforms Cabinet paper and will be communicated to the Callaghan Innovation Board. As necessary, options for public communication / announcement will be prepared.

## Annexes

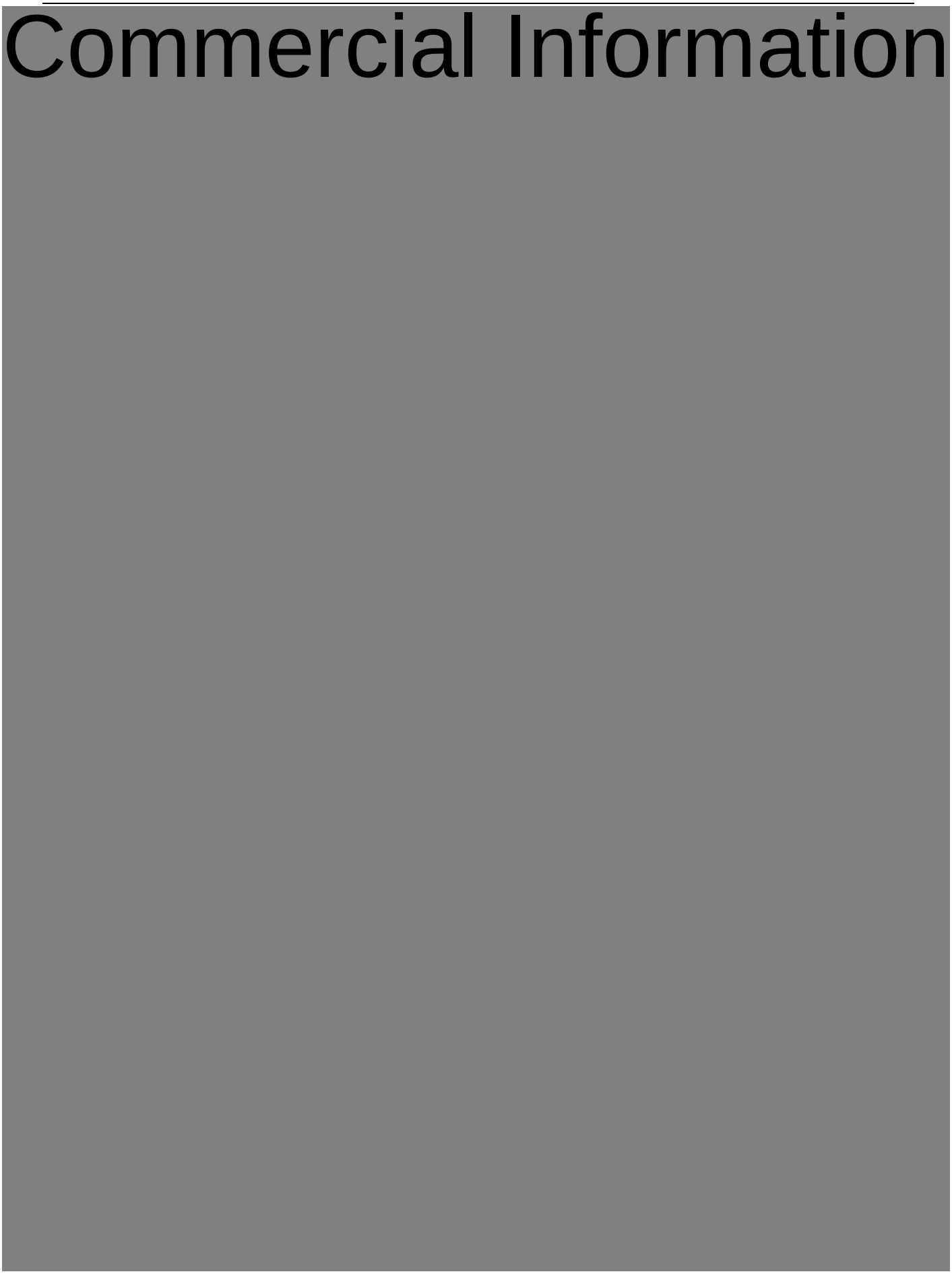
Annex One: Major RDS Customers in FY 2025 [Commercially sensitive]

Annex Two: Additional information about the Biotechnologies Group

Annex Three: Additional information about the Applied Technologies Group

Annex Four: Avenues for businesses to continue to access to R&D capabilities

## Annex One: Major RDS Customers in FY 2025 [Commercially Sensitive]



## Annex Two: Additional information about the Biotechnologies Group

The Biotechnologies Group has 37.3 staff (on a full-time equivalent basis).

| Capability | Location | Equipment or capability unique to NZ |
|---|---|---|
| **Lipids and Natural Products Chemistry**<br>• Advanced lipid and natural product analytical suite<br>• Separation, identification and characterisation of novel/complex bioactive lipids and natural products<br>• Support for new product development<br>• Assessments of bioactivity | Gracefield (GIQ) Wellington | • The Nuclear magnetic resonance (NMR) suite is only accredited lab for dairy phospholipid analysis<br>• Only FoodScreener NMR in NZ, for food authenticity testing<br>• Only GMP NMR capability |
| **Process Engineering**<br>• Natural product process development – raw material preparation, extraction, & formulation | Gracefield (GIQ) Wellington | • NZ's only supercritical $CO_2$, dimethyl ether, and propane R&D extraction facility |
| **Industrial Process Development**<br>• Extraction, Drying, Separation, Evaporation, | Gracefield (GIQ) Wellington | • Membrane separation contract R&D equipment portfolio<br>• Large scale contract flammable solvent extraction |
| **Fermentation and BioProcessing**<br>• Fermentation scale up and production (1, 20, 50, 300, 1000 L bioreactors)<br>• Small molecule and secondary metabolite production optimisation<br>• Pilot scale production, downstream processing and extraction of secondary metabolites, e.g. lipids, proteins, enzymes<br>• Transitional and containment facility for restricted biologics | Gracefield (GIQ) Wellington | • NZ's only contract PC2 300 L and 1000 L fermentation facility<br>• NZ's only live culture (probiotic) fermentation contract R&D suite |
| **Food & Beverage R&D**<br>• Food product & process development | Gracefield (GIQ) Wellington | • NZs only Ultra high pressure (1300 bar) CO2 extraction R&D plant |

| | | |
|---|---|---|
| • Specialist analysis & product support<br>• Pilot/demo scale R&D<br>• Development of high value ingredients | Foodbowl Auckland<br>Textile Centre Auckland | |
| **Food & Beverage Production**<br>• Specialist contract manufacturing<br>• Manufactured food and beverage for export<br>• Open laboratory for hire - strong links with the FOODBOWL<br>• Commercial food grade manufacture | Gracefield (GIQ) Wellington<br>Foodbowl Auckland<br>Textile Centre Auckland | • NZ's only food grade liquid propane and dimethyl ether manufacturing facility<br>• Large scale contract food grade flammable solvent extraction |
| **Protein and Enzymes**<br>• Natural source extraction: plant, marine, agriculture, honey, meat<br>• Bioactive screening<br>• Extraction, purification and characterisation<br>• Assay design for food and nutraceutical industry. Expression of reference materials<br>• Industrial chemo-enzymatic synthesis of high value biomaterials<br>• Recombinant production, purification and characterisation | Gracefield (GIQ) Wellington | • Suite of protein, peptide and enzyme bioactivity and quantification assays<br>• Contract recombinant protein expression R&D capability |

Commercial Information

## Annex Three: Additional information about the Applied Technologies Group

The Applied Technologies Group has 49.8 staff (on a full-time equivalent basis).

| Capability | Location | Equipment or capability unique to NZ |
|---|---|---|
| **Information**<br>• Knowledge Systems & Machine learning<br>• Artificial Intelligence<br>• Natural Language Programming<br>• Data science & computer vision<br>• Data Optimisation<br>• High Performance Computing<br>• Precision Medicine | Gracefield (GIQ) Wellington<br><br>Textile Centre Auckland | *Unique in that the service/equipment is directly available to Industry*<br>• Access to HPC<br>• Data DIY services |
| **Sensors & Sensing**<br>• Lasers, optics, fibre optics, photonics<br>• Image, Infrared & hyperspectral<br>• Lidar & Radar<br>• Magnetic, motion, pressure, touch and temperature<br>• Ultrasound and sonar<br>• Biometric<br>• Analogue & digital electronics, semiconductors | Gracefield (GIQ) Wellington<br><br>Sheffield Cres Christchurch | • Laser direct writer<br>• Femtosecond laser<br>*Unique in that the service/equipment is directly available to Industry*<br>• Ultrasound equipment<br>• Cleanroom |
| **Materials**<br>• Use, selection and testing<br>• Characterisation and analysis<br>• Polymers R&D and development<br>• Inorganic materials including Ceramics, Metals, Cements and glasses, composites | Gracefield (GIQ) Wellington | *Unique in that the service/equipment is directly available to Industry*<br>• X-ray diffractometer (XRD)<br>• Universal Testing Machine (UTM) |
| **Mechatronics**<br>• Robotics and automation, smart robotics, cobots, cloud robotics<br>• Industrial control systems | Gracefield (GIQ) Wellington Sheffield Cres Christchurch | *Unique in that the service/equipment is directly available to Industry*<br>• Robotics labs/Borrowable mobile robots<br>• Industry 4.0 Starter service |

| | | |
|---|---|---|
| • Digital twins, simulation, machine learning and sensing<br>• Renewable energy systems<br>• Electronics design, microcontroller systems<br>• Wireless communication<br>• Short run prototyping & PCB assembly | Textile Centre Auckland | • Surface Mount Technology (SMT) room |
| **Engineering**<br>• Mechanical engineering design, calculation & analysis<br>• Thermodynamics heat & mass transfer, cycling & cryogenics<br>• Hydrodynamics propulsion, flow, pumping & floating bodies<br>• Experimental<br>• Vibration & dynamics<br>• IoT<br>• AI | Gracefield (GIQ) Wellington<br>Sheffield Cres Christchurch | • Hydrodynamic test tunnel |
| **Energy**<br>• Batteries and fuel cells<br>• Hydroelectric<br>• Photovoltaic<br>• Wind turbines and wave energy<br>• Hydrogen & cryogenics | Gracefield (GIQ) Wellington<br><br>Sheffield Cres Christchurch | |
| **Telecommunications**<br>• Optical, wired & wireless networks<br>• Location & satellite | Gracefield (GIQ) Wellington | *Unique in that the service/equipment is directly available to Industry* |
| **Advanced Signal Processing**<br>• Digital Signal Processing<br>• Wireless Comms<br>• Sonar Systems<br>• Control System<br>• IoT Systems<br>• AI edge processing & machine learning | Gracefield (GIQ) Wellington | *Unique in that the service/equipment is directly available to Industry*<br>• RF Anechoic chambers<br>• Pick & Place machine (for printed circuit boards) |

| | | |
|---|---|---|
| • Custom modem development<br>• Beamforming<br>• System on Chip (SoC) Solutions | | |
| **Hardware**<br>• Field programmable gate arrays (FPGA)<br>• Electronics, custom design, printed circuit board short run prototyping, pick & place<br>• Lithography<br>• Analogue and digital electronics<br>• Microfabrication & Cleanroom | Gracefield (GIQ) Wellington<br><br>Sheffield Cres Christchurch | *Unique in that the service/equipment is directly available to Industry*<br>• Industry facing cleanroom & laser direct writer<br>• Possibly chip dicer |

## Annex Four: Avenues for businesses to continue to access to R&D capabilities

| | Applied Technologies | Biotechnologies |
|---|---|---|
| **Build services and capabilities themselves** | Unrealistic for most SMEs and start-ups. | Requires investment in multi-million-dollar facilities, sourcing appropriate expertise, and getting necessary regulatory accreditation.<br><br>Estimated 2-5-year programme to establish.<br><br>*May benefit from Invest NZ support in attracting foreign investment into R&D capacity.* |
| **Acquire Callaghan Innovation facilities individually or as joint venture of companies** | | Requires significant capital outlay and remains dependent on GIQ.<br><br>*MBIE and Callaghan Innovation setting processes to enable sale / transfer of assets.* |
| **Work with competitors or industry partners who have similar equipment**<br><br>**Convince another provider to implement capacity** | Risk of losing / sharing intellectual property.<br><br>Subject to availability and priorities of other party. | Many services are too bespoke for many companies who run a high throughput model. |
| **Access services via CRIs or universities** | Can be difficult to access given different priorities and operating models.<br><br>May not have necessary equipment in manufacturing and material spaces (re: Applied Technologies customers). *Though some assets may transfer from Callaghan Innovation to CRIs/PROs/universities as RDS closes.*<br><br>*Can engage existing entities that facilitate connections and assist in brokering projects between businesses and research organisation (e.g. NZPA, BPA).*<br><br>*Expectation of stronger industry connections from new PROs.* | |

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| **Go offshore to find expertise** | Time consuming and likely higher cost.<br><br>Potential to lose control of intellectual property.<br><br>Potential compliance issues due to different regulatory requirements in country of manufacture vs country of sale.<br><br>*Potential wider benefits from building international partnerships, e.g. accessing markets, supply chains, research networks.* | Not possible for some biological applications (i.e. biomaterials unable or infeasible to be shipped between countries). |