Future Pathways Policy Team
Ministry of Business, Innovation & Employment
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Dear Policy Team,

Re: Submission to the Te Ara Paerangi Future Pathways Green Paper 2021 document

GeoDiscoveryNZ welcomes the opportunity to submit on the Te Ara Paerangi Future Pathways Green Paper.

GeoDiscoveryNZ is a Committee of Crown Research Institutes and academic research organisations (GNS Science, NIWA, Victoria University of Wellington, University of Otago and the University of Auckland), that govern New Zealand participation in global scientific drilling through the International Ocean Discovery programme (IODP), together with the Australian-New Zealand IODP Consortium (ANZIC), and the International Continental Drilling Program (ICDP). Collectively, IODP and ICDP represents access for New Zealanders to research infrastructure valued at more than two billion dollars.

New Zealand membership of IODP and ICDP is currently supported by MBIE Strategic Science Investment Fund allocation to GNS Science (till 2024) and by annual co-funded contributions of GeoDiscoveryNZ members to support participation in activities relating to scientific drilling. Contracted agreements and Memorandum of Understanding govern the organisational relationships nationally and internationally.

We limit our submission to Chapter 6, **Te Hanga Rangahau: Research Infrastructure**, and Key Question 17: How do we support sustainable, efficient and enabling investment in research infrastructure?

Te Hanga Rangahau: Research Infrastructure

GeoDiscoveryNZ advocates for a well-financed and long-term sustainable National Research Infrastructure fund.

GeoDiscoveryNZ collectively participates in frontier global science where access to multinational collaborative research infrastructure is at scale where the cost is beyond the means of a single nation. New Zealand participation in globally reaching scientific drilling missions has demonstrably addressed impactful challenges and built enduring international partnerships. GeoDiscoveryNZ ensures Aotearoa New Zealand is at the forefront of global collaboration.

Global collaboration

New Zealand's position in the Southern Ocean and astride the active Pacific-Australian plate boundary provides an ideal natural laboratory for a global community of researchers to answer the Earth system's most challenging questions. The coordinated New Zealand and Australia Earth science community was the cornerstone behind several successful IODP expeditions in the region between 2017-19, resulting in a vastly improved understanding of Earth processes and higher resolution models of changing ocean and climate processes. New Zealand benefits greatly from the economies of scale of the pooled international resources of IODP and ICDP to have access to world-

class facilities beyond the capabilities of NZ and Australia and has leveraged well over US$100M of international funding from the current investment in these drilling expeditions.

> **GeoDiscoveryNZ supports Research Infrastructure that is nationally significant, large scale that serves diverse research needs, and is global. As a principle, we recommend Research Infrastructure that: supports Aotearoa New Zealand collaborations with overseas governments and international funders through strategic bilateral and multilateral co-operation.**

Integrated Research Infrastructure

Our experience in developing substantial mission led investment from the international community attracting scientific drilling is the importance of linkages and leveraging from existing Government funded Research Infrastructure Investment. This has been achieved nationally through the RV *Tangaroa* where more than 25 voyages have been completed since 2011, either supporting scientific drilling proposals or undertaking complementary science. The success to date has been through leadership in CRIs. However, the failure to fully fund the RV *Tangaroa* has, for example, been a missed opportunity to engage Universities in marine science and proactivity grow talented diverse teams in large-scale international interdisciplinary research including, undergraduate experience at sea, PhD students, Post-Doctoral Fellows, and University academics. Currently vessel time only is funded and does not include equipment and technical scientific staff. The additional costs of equipment and technical personnel to support vessel users is a significant impediment to maximising the investment in the RV *Tangaroa*.

We also acknowledge international agencies and collaboration through complementary Australian NRI investment (AuScope, Marine National Facility RV *Investigator*, RSV *Nuyina*, and IMOS) together with USA, Japanese, Korean, and European research vessels and instrument pools. In future addressing global challenges will require greater linkages and interaction across the RSI system and encourage multiple services from the national Research Infrastructure investment.

> **GeoDiscoveryNZ recommends an integrated national Research Infrastructure guided by a decadal Roadmap long-term investment plan. A Roadmap would establish Research Infrastructure priorities across the science sector, examine the impact and benefit of existing national capabilities, ensure broad access, prepare Aotearoa to meet future challenges, and recognise the importance of leveraging international research infrastructure investments.**

Invest in skills

National Research Infrastructure is an investment in future careers and national capability by providing opportunities across the RSI sector to engage with cutting-edge research, development and innovation. The current investment in membership of IODP and ICDP has encouraged our best emerging and established Earth science researchers to continue to lead and influence the future direction and societal relevance of scientific drilling in upcoming decades

The career of scientists and training and development of skilled technical staff is also important to ensure sustained impact from Research Infrastructure investment. While Workforce considerations are acknowledged elsewhere in the Te Ara Paerangi Future Pathways Green Paper, we wish to highlight the importance of investing in skills with an emphasis on key, scarce research technology professional skills that support land and marine Earth science operations, laboratories, equipment and databases.

Regards

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Rob McKay, Victoria University of Wellington
Joshu Mountjoy, NIWA
Christina Riesselman, University of Otago
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