Science & Technology AUSTRALIA

POLICY SUBMISSION

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2026 NATIONAL RESEARCH INFRASTRUCTURE ROADMAP EXPOSURE DRAFT

Science & Technology Australia thanks the Department of Education and the NRI Advisory Group for the opportunity to respond to 2026 National Research Infrastructure Roadmap Exposure Draft.

Science & Technology Australia (STA) is the peak body for the nation's science and technology sectors, representing nearly 150 member organisations and more than 235,000 scientists and technologists. We connect science and technology with governments, business and the community to advance science's role in solving some of humanity's greatest challenges.

STA welcomes the 2026 National Research Infrastructure Roadmap Exposure Draft and supports its ambition to strengthen Australia's research infrastructure as a foundation for scientific excellence, innovation, productivity and national prosperity. Australia's national research infrastructure (NRI) is a critical strategic asset, enabling discoveries, supporting industry and helping Australia respond to emerging economic, environmental, health and national security challenges. The Roadmap presents an important opportunity to build on the success of NCRIS, and the broader NRI system, and establish a more strategic, coordinated and sustainable approach to national investment.

With current NCRIS funding approaching a cliff in 2028–29, securing long-term funding certainty and continuity of critical national capabilities must be an urgent priority for this Roadmap. NRI cannot be switched on and off within short-term funding cycles. Facilities, specialist workforces and the expertise built around them take decades to develop and can be difficult or impossible to rebuild once lost. However, funding certainty must be accompanied by rigorous prioritisation. Not all NRI can or should be funded equally or indefinitely, and Australia must be prepared to make difficult choices about what to sustain, expand, transform or retire. This is unfortunately where this Roadmap Exposure Draft currently falls short.

To achieve this, STA recommends that the final Roadmap establish stronger cross-portfolio governance, a clearer definition of NRI, include a comprehensive audit of existing capabilities based on available information, and a practical framework of functional capabilities against which future needs can be assessed. Transparent prioritisation criteria, applied at the capability rather than facility level, should guide recommended investment decisions and identify where resources can be redirected to emerging national priorities.

The Roadmap must also recognise the foundational role of specialist workforces and digital infrastructure, while addressing urgent capacity pressures, particularly in high-performance computing. Ultimately, Australia needs a Roadmap that identifies not just what we *could* invest in, but what we *should* invest in, what must be sustained, and where investment will deliver the greatest national benefit.

Science & Technology Australia Recommendations

The final 2026 National Research Infrastructure Roadmap must:

1. Recommend that such a sub-committee of the National Resilience and Science Council with high-level, cross-portfolio responsibility for research infrastructure should be established with alacrity. This committee must be equipped with the appropriate expertise, resources and

delegation to develop a Roadmap that properly oversees and guides Commonwealth's investments in NRI regardless of portfolio funding source.

2. Improve the definition of institutional and national research infrastructures, and ensure that all suggested NRI is robustly tested against the definition to ensure clarity between research projects and the infrastructure that enables them, and that funding the infrastructure is beyond the means of institution/s.
3. Improve the resolution of detail on NRIs capabilities needs, especially in chapter 5, to include more details on suggested capabilities type, mode and resolution, and where funding should be prioritised in available funding, and conversely should be "demoted" from NRI with funding reallocated to new capabilities, i.e. not all NRI is the same, with prioritisation at the capability/asset not at the facility level.
4. Include an NRI landscape scan or audit based on currently available information, with a view for this to be published publicly and reviewed annually.
5. Identify a more workable set of broad NRI functional capabilities and then identify current facilities and capacity under each of these functional capabilities to determine any gaps or future needs. This must be at a resolution that is clearly NRI and that a business case could be developed by the sector for the investment planning stage. Our suggested functional capabilities would be:
    - Observation and monitoring
    - Characterisation and measurement
    - Synthesis, fabrication and scale-up
    - Experimentation and testing
    - Collections and biological resources
    - Computing and data
6. Develop a clear set of prioritisation criteria for current and future NRI at the capability level, these could draw on the past work of STA for NSTC or international examples, such as the European Strategy Forum on Research Infrastructures (ESFRI) framework.
7. Using these criteria, develop a suggested funding prioritisation, including identification of capabilities/facilities that may need to be defunded so as to allocate funding to a higher order priority. The Government and sector has hard decisions to make on NRI, and action on recommendation 3–7 will especially helpful for this critical process.
8. Recommend establishing a working group to advise on NRI evaluation metrics, with representation from NCRIS and non-NCRIS NRI facilities.
9. Acknowledge workforce and digital research infrastructure as foundational components of all NRI capabilities, not unique and separate NRI capabilities in their own right.
10. Be clear on the boundaries between research projects and their impact, and the enabling NRI capability. Blurring these boundaries confuses potential funding directions.
11. Provide minimum specifications for an immediate upgrade to national Tier 1 high performance compute (HPC), with work to commence ahead of the proposed phase 1 of the HPC work.
12. Simplify the Roadmap by separating it into a number of separate and related documents, with the Roadmap focussing more specifically on strategic NRI needs.

Survey questions

What does good National Research Infrastructure (NRI) look like?

The following questions refer to 'Chapter 3: What does a good NRI system look like? ' (3000 character limit for each question)

Q1. What additional elements of 'what good looks like' should be considered in the future design of the NRI system?

The four elements of a 'good NRI system' – strategic planning, prioritisation, monitoring and evaluation and supporting pathways to translation – are a robust framework to deliver an effective NRI system.

Q2. Where are the opportunities to strengthen the analysis of the global context and how could they be addressed?

The Exposure Draft summarises several models used in other countries to manage RI, but fails to effectively compare these with the Australian context or assess whether they would work here. While useful to understand how other countries manage consultation, prioritisation and support for translation processes, it is unclear if any of these international models would be appropriate or effective in Australia.

It is also important to acknowledge that in an international context a wider definition of research infrastructure that incorporates costs for research projects is often used, e.g. CERN and DARIAH. NRI in Australia does not fund research; e.g. ACCESS-NRI funds the software engineers to turn understanding of research into code to build climate models, but does not undertake research on how the climate behaves. This is not to suggest either approach is best, but funding research and research projects through NRI, especially NCRIS, would be a significant change in funding scope and increase pressures on limited funds. The final Roadmap must be clear on this, and not allow the boundaries between the NRI and the research it enables to be blurred.

There are also examples of how other countries manage translational infrastructure and support for industry focused needs. Germany's Fraunhofer facilities often house research infrastructure for researchers and industry side-by-side. Analysis of how Australia could learn from or incorporate such approaches would be useful, and should form part of the final Roadmap's recommendations to Government.

The Roadmap should acknowledge the important role high-quality and leading-edge NRI plays in attracting global research talent to Australia, and the leverage it gives Australia in global scale collaborations.

While we welcome the thinking that has gone into this document, much of the discussion in the international and other sections provide broad contextual information rather than the actual strategic landscape for the next 10 years. This detracts from the detail on NRI needs. We would strongly encourage this and other sections that are contextual and exploratory be moved to a separate document about Australian infrastructure considerations, or an appendix to the Roadmap.

Q3. Where are the opportunities to strengthen the analysis of the current state in Australia, and how could they be addressed?

The Exposure Draft lacks substantive information and analysis of the current state. It mentions several aspects of Australia's NRI (including elements it declares to be out of scope for the Roadmap) yet fails to illustrate how the system fundamentally works, what capabilities Australia currently has, the interconnections between these, nor any gaps or future needs. Indeed, it notes that '…further analysis that identifies, prioritises and assessed the connections between national and landmark RI should be considered as part of the NRI Roadmap process' (p25). Given this document is the 2026

NRI Roadmap Exposure Draft, a major milestone of the 'NRI Roadmap process', it is very difficult to understand why this work has not been included in the Exposure Draft.

The Exposure Draft later declares 'The best provision of NRI thrives on a blend of funding from sources such as the Commonwealth government, state and territory governments, universities and other research institutions, industry and philanthropy' (p25). This is a very strong statement with no evidence to indicate why what very easily turns into a piecemeal agglomeration of uncertain funding sources delivers the 'best provision of NRI'. While this may be true in hindsight, the reality is that most NRI facilities have been established with substantive Commonwealth funding, either direct budget appropriations or grants. This Commonwealth funding crowds in cash and in-kind support from other sources, yet often continues to cover a majority of capital and ongoing costs.

The document itself immediately then notes the challenges of negotiating with state and territory governments across different jurisdictions. Granted, leveraging multiple sources of funding to deliver better value for money on Government investments and share the cost burden across all parties who stand to benefit is a sensible approach, but requires a more sophisticated and nuanced discussion than what the Exposure Draft currently delivers.

While we welcome the start of an evaluation framework developed in the document, section 3.3, this should be separated into another separate but complementary document that should exist extend beyond the life of this Roadmap. Again, including this in the single document confuses the purpose and objective of this document.

Q4. What opportunities for change to current national planning and prioritisation approaches do you recommend for consideration?

The Exposure Draft does not identify the current national planning and prioritisation approaches. Every different NRI capability applies its own approach, which often is an optimal process of consultation and prioritisation, but generally done in a distinct, if not completely isolated, process to other capabilities. That said, NCRIS capabilities have clear prioritisation processes, with strong collaborative structures in place within and across projects to ensure optimal planning, collaboration and funding allocations. Clear prioritisation is also in place for PFRA-hosted NRI assets.

As the Exposure Draft notes, the *Ambitious Australia* report called for a sub-committee of the National Resilience and Science Council to oversee all research infrastructure needs. This high-level oversight would enable a more coordinated approach and ensure clearer line of sight across capabilities and deliver a more effective strategic approach to planning and prioritisation (and funding). The Roadmap should recommend that such a committee should be established with alacrity and ensure it is **equipped with the appropriate expertise, resources and delegation to develop a Roadmap that properly oversees and guides Commonwealth's investments in NRI regardless of portfolio funding source**.

We strongly encourage a more transparent and set process, as outlined in advice given to the NSTC in 2025. The current process is highly fluid and opaque, for those new to NRI and institutions who host or are deeply involved in NRI alike. Notably, we encourage this Roadmap to include a clear process flow diagram and prioritisation criteria, a capability/facility level, similar to the framework established by the European Strategic Forum on Research Infrastructure. Importantly, the process must:

- include a published audit of all current NRI assets, capabilities and their hosts/nodes
- determine gaps and strategic needs
- have clear published timelines that will be held to for key funding opportunities
- include a system-wide evaluation framework for NRI.

Q5. What opportunities do you see for more effective coordination or integration among NRI facilities?

Effective coordination needs a complete picture of the current system, which the Exposure Draft does not yet provide. Such a picture would also enable visibility of national capabilities and facilities beyond their immediate community – enabling other potential users to benefit from access and reduce potential duplication in the system.

STA recommends mapping each functional capability and the facilities, capability leads and requirements that sit under it. This should not be difficult given the NCRIS grant agreements and the Research Infrastructure Connect (RIC) service provide a clear starting point. This would enable clear sightlines of where facilities and nodes unnecessarily duplicate or complement each other or aspects of other facilities.

NCRIS's collaborative model, where projects/facilities set priorities and access arrangements on behalf of the community, and also jointly with each other, should be extended across the system, including PFRA-hosted capabilities. Practical steps include shared access and booking arrangements, common metadata and identifier standards, and clear accountability for what each capability lead delivers.

While we support coordination and integration where practical, extending integration efforts too far (i.e. trying to force collaboration in areas of marginal benefit) runs the risk of distracting NRI providers from their primary task of delivering infrastructure to their original community. We need to be mindful that research forms the basis of collaboration and NRI facilities and capabilities need to maximise their connectivity to support that demand, where there is science excellence or sovereign capability is a priority.

Q6. What specific opportunities for improved coordination between funding schemes do you recommend should be subject to further analysis in 2027–2028?

The Exposure Draft does not identify all relevant funding schemes, direct appropriation or grants, nor provide clarity on any formal coordination process with other agencies, so it is challenging to know what will be considered to be in or out of scope for the final Roadmap.

However, the Exposure Draft notes that some NCRIS-funded health and medical NRI capabilities also receive some level of support through the MRFF. The recently released National Health and Medical Research Strategy called for the development of a dedicated Health and Medical Research Infrastructure Roadmap. In submissions to that process, STA argued against such a plan, as it will likely lead to further fragmentation and disjointed planning and funding arrangements across the sector, particularly as many capabilities health and medical research rely on are cross-cutting across other disciplines as well. MRFF support for NRI is certainly a positive addition, but it would be better realised through an ongoing appropriation that contributes to NCRIS. This would maintain a coordinated approach to NRI funding, particularly given there are already several health and medical focused NCRIS projects already.

It is critical that NRI Roadmaps provide the overarching framework and strategic priorities, with any health and medical research infrastructure roadmap nesting within it.

As the Exposure Draft notes, the *Ambitious Australia* report called for a sub-committee of the National Resilience and Science Council to oversee all research infrastructure needs. This high-level oversight would enable a more coordinated approach and ensure clearer line of sight across capabilities and deliver a more effective strategic approach to planning and prioritisation and funding. The Roadmap should recommend that such a committee should be established with alacrity and ensure it is **equipped with the appropriate expertise, resources and delegation to develop a Roadmap that properly oversees and guides Commonwealth's investments in NRI regardless of portfolio funding source**.

Q7. What specific opportunities to improve governance should be analysed in 2027–2028 to enhance the efficiency and value for money of Australia's NRI?

Given the Roadmap's horizon is meant to be 10 years it is unclear why this question focusses only on only the next financial year. Any final recommendation must have a horizon of at least 5 years, when the next Roadmap process should be coming to completion.

Effective governance for NRI requires a system-level approach that understands and can be held accountable for all elements in the system – NRI hosted by PFRAs, by universities, through NCRIS, or through other government and non-government entities funded through direct budget appropriations. This is even more critical in a tightly constrained funding environment, with multiple competing demands on finite resources, and particularly as the 11-year NCRIS uplift from the 2018 NRI Investment Plan comes to an end in the coming years. Failure to take a comprehensive approach results in a fragmented, competitive environment, with complicated and tangled funding pathways and complex inter-dependencies. It does not deliver the most effective return on investment for constrained Government funds.

As recommended in the *Ambitious Australia* report, NRI should be overseen by a sub-committee of the National Resilience and Science Council – and this committee must be given appropriate powers – and the commensurate accountability – to assess NRI priorities and direct funding accordingly. The Roadmap should recommend that such a committee should be established with alacrity and ensure it is equipped with the appropriate expertise and resources.

Effective governance requires a robust evaluation plan to oversee all NRI investments to ensure investments are meeting the needs identified in Roadmaps and deliver on expectations. Given the current disparate nature of Australia's NRI system, any reporting done is effectively siloed and does not contribute to a broad, system-wide evaluation.

It will be important that the evaluation tracks NRI capabilities against previous Roadmaps and how well the capability/facility meets researchers' needs with respect to access, availability, technical support etc.

The Department of Education formerly supported an NCRIS KPI and metrics working group. A similar group that has oversight of the entire NRI system would be beneficial. The Roadmap should recommend establishing such a group to support NRIAG or the proposed sub-committee of the National Resilience and Science Council.

Capabilities—Digital research infrastructure

Q8. AI is impacting research practices in all domains. What are the implications for how we should plan and prioritise national research infrastructure? (You may wish to respond with respect to one or more specific domains, or with respect to digital research infrastructure as an enabling capability.)

As the Exposure Draft notes, digital research infrastructure is now pervasive and embedded throughout all research domains, and basically all aspects of research infrastructure. Most capabilities have been digital for a long time, with research techniques and tools continuing to evolve and maximise value.

As such, **there is no need to keep treating NDRI as a standalone domain**. It makes little sense to silo NDRI off as a distinct capability, divorced from the actual capabilities in which it is embedded. It makes for a confusing and disjointed approach to funding capabilities, as they are forced to segment their activities under false dichotomies that hamper, rather than support, efficient and effective allocation of limited RI funding.

This is reinforced in the NCRIS Directors' submission, which points out that digital research infrastructure and AI is only possible as a result of investment into physical research infrastructure, rather than standalone.

AI is both affecting research across all domains and is a separate research area in and of itself – with its own unique infrastructure needs. As the Government progresses work to harness international investments in data centres in Australia, it must acknowledge these needs. Work to develop any standards or agreements with data centre companies, hyperscalers or neo clouds to support Australian research must be underpinned by a robust understanding of Australian researchers' needs – for AI research itself, and for all other aspects of research that deploy AI tools.

A key consideration for work post this Roadmap should be to scope what parts of the AI architecture should be considered unique NRI vs integrated into an existing NRI capabilities, e.g. a microscopy suite or astronomy data and analytical tools. While all need compute, this can range from being sufficient on a researchers laptop through to Tier 1 HPC.

Capabilities—Collections

Q9. Do you agree with the definition of nationally significant research collections in terms of reach, connectivity and research impact? Why or why not?

This identified priority has aspects of the lack of clarity around NRI that we referred to in our response to previous questions.

In the context of nationally significant collections, clarity must be established on what exactly is the NRI: the collections themselves; infrastructure that houses nationally significant collections; or an overarching data access layer that specifically enables researcher access to collections?

The latter 2 have precedent in NRI Investment Plans, with funding to establish the new CSIRO collections building and tools that sit above TROVE hosted by the National Library of Australia that improved access for researchers. Both provided a short-term capex uplift but not ongoing opex or capex for the underlying collections.

Additionally, the document's lack of clarity around the role with other funders means it is difficult, and likely presumed by many readers, that any next steps should be funded through NCRIS rather than the relevant government entity – state/territory or Commonwealth – that already provides the core funding for the collections, e.g. a state health department; Commonwealth entities like the National Museum of Australia. The Roadmap must be clear in identifying where primary responsibility for governance – and funding – lies.

If the collections themselves are to be deemed NRI, then reach, connectivity, significance to key national policy outcomes and research impact are sensible criteria. These must be applied consistently across all collections, wherever they are held. The definition should explicitly cover digital and data collections and living biological collections. It should also recognise irreplaceability: unlike most infrastructure, many collections cannot be rebuilt once lost.

We note the section has limited acknowledgement of the role of existing significant NRI capability in DCA and AURIN in data linkage and enabling access for many digital collections, i.e. largely government administrative sets and longitudinal collections. Organisations like Phenomics Australia and BPA have significant collections that they manage for research purposes. We suggest this section be updated to acknowledge that collections are not a complete 'green fields' issue when it comes to NRI.

Capabilities—Overall

Q11. In the descriptions of any of the capabilities (workforce, digital research infrastructure, fabrication, observation, measurement, and collections), are there key aspects that have not been mentioned? If so, please elaborate.

These 'capabilities' are a mix of actual RI capabilities and embedded foundational components/ requirements that exist across all RI capabilities and facilities, with semantic and functional differences that make this chapter somewhat jarring. Focussing on this list of capabilities will not deliver an effective framework to guide future strategic investment.

To effectively identify Australia's current NRI needs and future strategic direction, a more workable set of broad functional capabilities is required, eg:

- Observation and monitoring
- Characterisation and measurement
- Synthesis, fabrication and scale-up
- Experimentation and testing
- Collections and biological resources
- Computing and data

The next step is to identify the more granular capabilities and facilities and that sit within these functional capabilities, noting current and future needs. This must form the basis of the Roadmap, as it is what's needed to guide strategic planning and funding decisions. It must also embrace the challenge of mapping out the entire system, rather than declaring it too complex or out of scope. This includes identifying the connections and inter-dependencies between what are currently classified as NRI and 'landmark' RI – and in doing so, perhaps abandon the distinction as it likely makes matters more confusing and leads to false silos and fragmentation across the system.

Workforce is not a discrete RI capability

The Roadmap must undoubtedly acknowledge the importance of Australia's RI workforce, and recognise the unique challenges that arise in maintaining such a highly skilled and niche workforce. But aligning it at the same level/category as the broad functional capabilities confuses planning processes and appropriate funding levels for capabilities. Every functional capability has distinct workforce needs, and appropriate strategic planning for each capability must account for this and recognise the current challenges that insecure funding pose on both contract continuity and maintaining competitive remuneration levels for a highly skilled, niche workforce that is in demand globally. Ultimately, the resolution for the issues raised in this section are institutional enterprise arrangements that allow for appropriate employment contracts and renumeration, and investment in training.

We recommend that workforce issues form a separate chapter of the Roadmap, or ideally, form the basis of a separate document on effective workforce management that includes buy-in from all significant employers across the NRI system. This could be implemented and monitored via mechanisms such as NCRIS funding arrangements, and PFRA Corporate Plans (which are reportable to Parliament) and university compacts.

NDRI should not be a standalone capability

Digital RI is now embedded across all research domains, and all research infrastructure capabilities and facilities. As such, it should be a standard part of strategic planning for individual capabilities.

Near-term coordination

The level of implementation detail in Chapter 6 is not appropriate in a Roadmap document. Identifying urgent priorities is welcomed, but implementation should be treated separately. These would be better outlined in a project scoping document or the next NRI implementation/investment plan. For each near-term need, each phase should articulate a timeframe, as past experience of the sector has been of delays and lack of clear timelines.

Q12. Do you have any comments on the proposed phased approach to elevate Indigenous Knowledge Systems?

While most actions and phases in general are sensible and meritorious in better acknowledging and supporting Indigenous Knowledges, we question whether the phase 2 action "The Indigenous NRI Governance Committee will lead workforce uplift initiatives that enable Aboriginal and Torres Strait Islander peoples to participate fully and equitably across the NRI system..." is within scope of NRI specifically. Indigenous participation should be a standard consideration of university and NRI facility activities and strategic planning, and should give due consideration to any advice from the proposed committee if established.

STA strongly supports First Nations owned and led activities that ensure appropriate governance and custodianship of Indigenous Knowledges and data. Any new infrastructure should build on the existing work that has already been established across the sector, such as AIATSIS, which has a Commonwealth Government mandate to support Indigenous Knowledges and research protocols. Its position within the Prime Minister and Cabinet portfolio also provides it a very central position to influence wider government systems, resources and setting.

Q13. Do you have any comments on the proposed integrated national approach to HPC (high-performance computing)?

HPC is a genuinely shared national capability, unlike digital infrastructure more broadly, which is built into every capability. Universities cannot simply meet all demand themselves: running HPC carries significant costs and specialist staffing needs, and demand is spread across many research groups. As Government secures international data centre investment, it is already flagged that it is exploring models to give researchers access to commercial AI compute, to complement publicly funded HPC.

Given the ever-increasing reliance on HPC (current demand for Australia's two Tier-1 facilities, NCI and Pawsey is 3 times their combined capacity) it is critical that this Roadmap not just provide a sensible and secure pathway for sustainable sovereign HPC, but one that does not conflate or confuse HPC with AI infrastructure.

Significant work has already been undertaken to progress a nationally coordinated governance structure for Australia's HPC. The goal is to deliver a more coherent national HPC ecosystem wherein the Tier 1 facilities Australia's research sector relies on are securely funded through Commonwealth investment, and are complemented by Tier 2 and/or commercial providers as appropriate. We acknowledge that the proposed work will continue this.

But we are astonished that given all the discussions and information undertaken over recent years about HPC, that the 2018 Investment Plan including funding for a scoping study and the previous NDRI work, that the need for a firm short-term minimum Tier 1 national CPU, GPU and data full refresh mandate with quantified high-level specifications is not articulated in the Roadmap. Given the criticality of funding for the current systems, irrespective of Tier 2 and potential future commercial access models under consideration, this Roadmap must identify potential system sizes, or single overall national capacity need, based on the expert advice of NCI, Pawsey and indicative NCMAS demand already at hand.

Ideally, the final Roadmap will also deliver greater clarity on the nature and form of institutional responsibility in delivering base-level HPC and data needs for their core needs. HPC need and demand has changed rapidly in recent years as research methods and tools have evolved. It would be useful for NRIAG to deliver some form of expectation statement on institutions' own responsibility in maintaining foundational HPC capacity, similar to wet labs and other core institutional research infrastructure needs.

"Ensure continued research access to national High Performance Compute and Data facilities." must be an immediate action with quantified minimum specifications, not part of a Phase 1 approach, as time is critical, especially given demand information already known and the time needed for procurement, installation and validation/testing.

Q14. Do you have any comments on the proposed phased approach to collections?

Findings

Q15. Please add any feedback on the draft findings you would like the Roadmap Expert Working Group to consider.

The findings, as high-level motherhood statements, are sensible and robust. The sentiment is right. The acknowledgment that NRI needs sustained and long-term funding certainty is especially welcomed. However, the rest of the Exposure Draft does not clearly support these findings, nor provide any substance or detail that can effectively inform robust recommendations for Government action.

Overall

Q16. Please add any other feedback you would like the Roadmap Expert Working Group to consider.

The Exposure Draft rightfully acknowledges the need for a system-wide, coordinated approach to NRI system design. However, it fails to offer any such detailed plan going forward or provide the necessary groundwork to build such a plan. Rather, it identifies the need, then points to previous consultation rounds as potentially providing the "insights" that should be considered as "part of the next steps of a national landscape analysis"(p21).

It's difficult to see how the Exposure Draft could enable delivery of clear and robust recommendations on NRI that the Government needs, and the sector expects, while postponing the work needed to underpin such recommendations. STA notes that significant information is already available that could inform an initial 'audit' of current NRI capabilities: NCRIS reporting to the Department of Education and PFRA's own reporting systems are an obvious starting point. There are also specific, currently unpublished, reports developed for NSTC on the domestic NRI and the international research infrastructure landscapes. Given the Exposure Draft acknowledges it is "highly desirable" (p20) to have such a landscape analysis to inform a Roadmap, this information should be included in the Roadmap, as an appendix at a minimum.

The Exposure Draft also speaks to the importance of all aspects of the system, yet simultaneously declares significant components of the NRI system as out of scope for the Roadmap. STA advocates for taking this system-wide approach, especially if HASS and GLAM collections are an area of priority. Several government portfolios are responsible for these, e.g. the Department of Infrastructure, Regional Development, Communications, Sport and the Arts, the Department of Social Services, the Australian Bureau of Statistics. The Department of Prime Minister and Cabinet holds responsibility for First Nations collections through the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS).

A system-wide approach will also enable due acknowledgement of areas where Australia, as a country, is too small to invest in certain large-scale infrastructures, and engages in international partnerships to gain access to such capabilities. These partnerships must be recognised as essential components of Australia's NRI, not simply as expendable 'nice to haves' – but at the same time, must be fairly weighed up against other demands on NRI funding.

Further, the document has insufficient clarity on research infrastructure 'categories', which leads to confusion on how the needs align with the definition of NRI, with many examples in the document arguably being institutional infrastructure or research projects. It will be critical that all NRI needs listed in the final Roadmap are tested against the NRI definition, and that the document maintains clarity on the boundaries between research projects and their impact, and the enabling NRI

capability. A number of the case studies and the future-looking scenarios blur these boundaries, which confuses potential funding decisions.

For example, the Exposure Draft refers to research activity and RI funded through programs like Grains Research and Development Corporation, yet fails to identify clearly identify if this really fits the definition of NRI, including accessibility to researchers. Further, p42 states "Through additional funding provided under the National Digital Research Infrastructure Strategy, this program will be expanded to engage with a broader network of Indigenous Ranger groups and to improve the utility of NRIs such as ALA and TERN" implies that NRI funding should be directed towards expanding a research or land management project that uses NRI not the actual NRI, i.e. ALA and TERN. While an extremely worthy program that no doubt should be expanded, this example does not demonstrate why NRI funding should be used to do so.

The document needs a hard edit to clarify the boundaries between NRI, institutional RI and research projects – this will help manage expectations and remove any scope creep.

Additionally, alongside its conflation of NRI capabilities and foundational components, the "high-level description of the functions and properties of the respective capability" (p54) given in chapter 5 is so high-level it fails to define any actual NRI. For example, under Fabrication, all capabilities listed under Materials lack the specificity needed to identify whether these capabilities already exist (e.g. as part of Australian National Fabrication Facility or Microscopy Australia), or guide any sort of prioritisation for an implementation or investment plan. Many are so generic it can not be robustly established they would even be NRI, rather than institutional level capabilities.

Collaboration is an essential part of the entire research endeavour, and research infrastructure capabilities are no exception. As noted in the Exposure Draft, there are numerous examples of collaboration across Australia's various NRI capabilities, within NCRIS and beyond. However, the Exposure Draft neglects an important component of collaboration, and in particular, the 'Collaboration' in NCRIS.

An underpinning NCRIS principle is that projects/facilities collaborate across the sector to undertake a consultative and sensible NRI prioritisation process that best meets the sector's needs, for example what equipment and sensors meet the need of the leading-edge and wider community. The lead project then determines how best to deliver this, such as through a single facility at scale, or through nodes in different locations to maximise access and utility. This can lead to pivoting and defunding of some assets and reduces duplication within available funds – all done through a process of sector consultation and a deep understanding of the sector's needs.

Capabilities hosted by PFRAs also conduct similar consultative processes to determine operational priorities and access, most recently by ANSTO in its infrastructure funding prioritisation process. As such, individual projects/facilities are custodians/stewards of the NRI that best serves the sector – custodianship that is underpinned by collaboration and consultation in their domain and across interdependent NRI. The Roadmap and subsequent implementation (especially through Investment Plans and NCRIS) should value this expertise and resource, which underpins the **non-competitive** nature of the NCRIS program.

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