TE KĀHUI RARAUNGA

The environmental impacts of hyperscale data centres

Te Kāhui Raraunga
Aotearoa New Zealand

Abstract

The rapid expansion of hyperscale data infrastructure globally, driven by surging demand for artificial intelligence (AI) and cloud computing, is producing environmental harms of a kind and scale that have yet to be adequately reckoned with in Aotearoa New Zealand's policy discourse. This article examines the environmental impacts of hyperscale data centres, distinguishes them from conventional data centres, and situates those impacts within the broader context of Māori data sovereignty. Drawing on international comparative cases, including those from Chile, Uruguay, and the United States, alongside Aotearoa-specific examples such as the Datagrid NZ proposal in Murihiku and Amazon's aborted West Auckland development, the article argues that hyperscale data centres constitute a new and combined form of environmental and epistemic risk for Māori communities, one in which the physical harms to wai (water), whenua (land), and hau (breath) cannot be separated from the threats posed to mātauranga Māori (Māori knowledge) and tino rangatiratanga (absolute sovereignty) over data. This argument extends existing Māori data sovereignty scholarship, which has primarily addressed data governance and jurisdictional questions, to the material and ecological dimensions of data infrastructure. It contributes to Indigenous studies by demonstrating that hyperscale data infrastructure requires an integrated analytical response, one that holds environmental and data sovereignty concerns together rather than treating them as separate fields. Grounded in the

analytical frameworks of kaitiakitanga (guardianship), mauri (life force), whakapapa (genealogy), and iwi Māori (tribal nations), and informed by the published principles, models and frameworks of Te Kāhui Raraunga. This article offers iwi a critical foundation for evaluating, contesting, or engaging with proposals to establish large-scale digital infrastructure on or near whenua Māori (Māori land). The article concludes with recommendations grounded in Māori data governance principles and the assertion that tino rangatiratanga over data and the environment are inseparable.

Mā wai

Nā wai

Mō wai

Nō wai

Kei kīa he puna e māpuna mai ana i te manawa whenua.
Ko te wai te toto o te whenua.

Taku ihi

Taku wehi

Taku wana

Taku tū

Taku hikoi

Kei hinga aue

Kei mate aue

Kei pai mai

Kei kino mai

Ko au hei mana mōku.

Ka ū ki matanuku

Ka ū ki matarangi

Ka ū ki te whenua nei

Nā wai te utu kaimanawa [1]

[1] A tauparapara composed by Te Mauri Kingi (Tūhourangi)of Te Kāhui Raraunga to raise awareness of environmental impacts of new technologies

1. He kupu whakataki

Ka ora te wai, ka ora te whenua, ka ora te āpōpō – *healthy water, healthy land, healthy futures*. It is within this frame that we must approach the arrival of hyperscale data infrastructure in Aotearoa. For what is presented as a neutral technological development, a shift in where and how data is stored and processed, is, in practice, a series of significant decisions about water, land, energy, and sovereignty.

A 2026 report from the United Nations University Institute for Water, Environment and Health found that global data centres consumed an estimated 448 terawatt-hours of electricity in 2025, with that figure projected to nearly double by 2030, carrying carbon, water, and land footprints of a scale previously associated with entire nations (Aczel et al., 2026). The global data centre industry is accelerating at a pace that most communities, and particularly Indigenous communities, have not been prepared for. Every major technology corporation, Amazon, Google, Meta, Microsoft, and OpenAI, is racing to build massive, multi-billion-dollar facilities without, in most cases, meaningful community consent or transparent disclosure of the downstream harms (Honor the Earth, 2025). In Aotearoa, as in Chile, Uruguay, and across Turtle Island in North America, these facilities are landing in proximity to lands and waters that Indigenous peoples hold inter-generational obligations to protect.

Writing from Te Kāhui Raraunga, and with a mandate to support iwi in navigating the data landscape, we argue that hyperscale data infrastructure is not merely a technical matter. It is a governance matter, a wellbeing, economic, and geopolitical matter as well an environmental (including energy) matter, and, in the context of Te Tiriti o Waitangi (the Treaty of Waitangi), a sovereignty matter. Iwi require the conceptual tools, the technical literacy, and the rights-based confidence to engage, or decline to engage, on their own Māori sovereign terms.

Existing Māori data sovereignty scholarship has made foundational contributions to questions of digital governance, jurisdictional authority over data, and the operationalisation of tikanga Māori (Māori customs, values, and protocols) in information systems (Lilley et al., 2024; King et al., 2026). This article builds directly on two instruments developed by Te Kāhui Raraunga: the Māori Data

Governance Model, Tuia te Korowai o Hine Raraunga (Kukutai et al., 2023), and the Te Kāhui Raraunga Māori AI Governance Framework (Te Kāhui Raraunga, 2025), which extends that model to AI and algorithmic systems specifically. Building on these foundations, this article foregrounds the material and ecological dimensions of data infrastructure as inseparable from its governance dimensions. The scholarly contribution is to demonstrate that hyperscale data infrastructure creates a combined environmental and epistemic risk, one in which physical harms to wai, whenua, and hau are entangled with threats to mātauranga Māori and the exercise of tino rangatiratanga over data. The combination is analytically distinctive because the two risks are mutually reinforcing: environmental harm to wai and whenua degrades the relational context in which mātauranga Māori is produced, transmitted, and exercised, while the absence of iwi control over data governance enables the extraction and commercialisation of Indigenous knowledge without consent, compounding the harm already done to the land and water through which that knowledge is constituted. Each risk, in other words, creates the conditions under which the other deepens. Treating these as separate concerns, as current consenting frameworks and data governance models tend to do, leaves iwi analytically and strategically underprepared. An integrated response is required.

This article is articulated in six parts. We first define and distinguish conventional data centres from hyperscale data centres. We then examine the environmental impacts of these facilities, with particular attention to water, land, energy use, and emissions. We turn next to the New Zealand context, examining the Murihiku/Southland Datagrid case and the Auckland electricity crisis prompted by Amazon's expansion plans, before drawing on international Indigenous comparisons. The second half of the article foregrounds Māori data sovereignty as the primary analytical and political framework through which iwi should approach these developments, and concludes with concrete recommendations. A decision-making checklist for iwi is provided as an appendix, offering a practical reference tool for evaluating hyperscale data centre proposals.

2. He aha te rerekē? Defining data centres and hyperscale data centres

Before examining the environmental stakes, it is necessary to clarify what we mean when we speak of data centres and, more specifically, hyperscale or hyperscale data centres. These terms are often conflated in public discourse, but their distinctions carry significant implications for the scale and severity of the harms they produce.

2.1 Conventional data centres

A conventional or traditional data centre is, at its most basic, a facility that houses computing infrastructure, servers, storage systems, and networking equipment, to store data and run applications for organisations and users (Fernández-Cerero et al., 2020). These facilities are typically smaller in scale and are operated by private organisations, government agencies, or universities to support their own internal services. They are characterised by lower resource utilisation rates and are often associated with private-cloud solutions (Fernández-Cerero et al., 2020). In Aotearoa, many iwi, and public sector agencies, have used or contributed to conventional data centre infrastructure, including through government-hosted services and, through contracted cloud arrangements with offshore providers.

2.2 Hyperscale data centres

A hyperscale data centre is qualitatively different from its conventional predecessor. As Shehabi et al. (as cited in Fernández-Cerero et al., 2020) define it, hyperscale data centres are composed of a large number of resources operating at high utilisation rates to service cloud and big-data operations. They are characterised by their considerable scale, facilities that can consume over 25% of a local community's entire water supply and emit between 200,000 and 400,000 metric tonnes of CO_2 annually, roughly equivalent to the total annual greenhouse gas emissions of the Nelson region (Stats NZ, 2024; Honor the Earth, 2025). They are typically operated by a small number of globally dominant corporations: Google, Microsoft, Amazon Web Services, Meta, and OpenAI. They exist to power the computational demands of artificial intelligence, machine learning, cryptocurrency, and large-scale cloud services.

The resource consumption of hyperscale facilities is not merely larger than conventional data centres, it is categorically different in kind. In 2025, global data centres consumed an estimated 448 terawatt-hours (TWh) of electricity, and by 2030 that figure is projected to nearly double to 945 TWh (Aczel et al., 2026). The AI workloads running inside hyperscale facilities are a primary driver of this trajectory: in 2025, AI alone accounted for approximately 20% of total data centre electricity consumption, a share projected to reach 40% by 2030 (Aczel et al., 2026).

The power draw of a hyperscale data centre ranges from 100 MW to 1,000 MW, compared to 5–10 MW for a conventional facility. A single hyperscale facility may therefore consume as much electricity as 20 to 200 conventional data centres. The difference, however, is not simply one of scale. A hyperscale data centre introduces systemic dependencies on power infrastructure that a conventional facility does not, and generates a much wider range of impacts on the local environment, on water, land, air, and noise, that extend well beyond energy consumption alone.

3. He parekura taiao (environmental harms of hyperscale data centres)

The environmental footprint of hyperscale data infrastructure is considerable and multi-dimensional. It operates at the intersection of water, land, energy, and air, the very elements at the heart of Māori relationships with the natural world. We address each in turn.

3.1 Water consumption

Water is perhaps the most contested resource in the hyperscale debate. Data centres require enormous volumes of freshwater for cooling their servers. In 2025, the water footprint of global data centre electricity consumption was approximately 4.5 trillion litres, enough to fill 1.8 million Olympic-sized swimming pools or meet the minimum annual domestic water needs of over 600 million people in Sub-Saharan Africa. By 2030, that water footprint is projected to reach 9.3 trillion litres, equivalent to the annual domestic water needs of all 1.3 billion residents of Sub-Saharan Africa (Aczel et al., 2026). At the facility level, in 2023, Google's data centres alone used more than 6 billion gallons of water for

cooling, sufficient to supply the entire city of Los Angeles for two weeks (Honor the Earth, 2025). To place that volume in a local context, 6 billion gallons is equivalent to more than a year of Hamilton's entire municipal water supply (Hamilton City Council, 2022; Honor the Earth, 2025). The AI models that hyperscale centres run are themselves water-intensive: training GPT-4 alone required approximately 600 million litres of water, enough to fill 237 Olympic-sized pools (Aczel et al., 2026), and research has further revealed a significant and previously undisclosed water footprint embedded in the training and querying of large language models more broadly (Li et al., 2023).

The scale of this water use is documented in the peer-reviewed literature. Siddik et al. (2021) calculated that in the United States alone, approximately one-fifth of data centre servers draw cooling water from moderately to highly water-stressed watersheds, while Mytton (2021) identified that less than one-third of data centre operators measure their water consumption at all, compounding the difficulty of community oversight and accountability. In many cases, water used in cooling processes cannot be recaptured or returned to the water cycle (Honor the Earth, 2025). Residents living adjacent to data centre developments in the United States have reported loss of water pressure, dried wells, and contamination of groundwater sources (Honor the Earth, 2025). In Oregon, community advocates have alleged that Amazon's data centre expansion is associated with water contamination and elevated rates of cancer and miscarriage in affected communities (Honor the Earth, 2025). These claims have not been independently verified in peer-reviewed literature and are reported here as documented community testimony rather than established causal findings.

For Māori, the relationship with freshwater is not reducible to a utility calculation. Water is a taonga (treasure), and under Article 2 of Te Tiriti o Waitangi the Crown holds an obligation to actively protect taonga, a duty the Waitangi Tribunal has confirmed extends to the natural environment and the relationships Māori hold with it (Waitangi Tribunal, 2011). Iwi Māori uphold rangatiratanga (self-determination) and kaitiakitanga (guardianship) in relation to freshwater, insisting on a non-consumptive approach that safeguards wai (water) for future generations (Te Ao Mārama Inc., 2026). The introduction of a hyperscale facility that draws groundwater from shallow aquifers, as the Datagrid NZ proposal in

Makarewa, Southland would do, cuts directly against this obligation. In the Datagrid cultural impact assessment, Te Ao Mārama Inc. (2026) identified water take as a key issue, noting that mana whenua (those with authority over the land) view freshwater as precious and finite, and that any impacts must be subject to ongoing kōrero (discussion) and consent conditions that reflect mana whenua values.

3.2 Land use, earthworks, and wāhi tapu (sacred places)

The physical footprint of a hyperscale data centre requires substantial land modification. At the global scale, the land footprint of data centre electricity demand in 2025 was approximately 6,900 km², roughly four and a half times the size of Greater London and is projected to exceed 14,500 km² by 2030, an area approximately ten times the size of Mexico City (Aczel et al., 2026). At the Datagrid NZ Makarewa site in Southland, a facility proposed to serve as a landing point for the Tasman Ring transoceanic cable network, the required consents include removal of inland wetlands, construction of subsea cables across sensitive coastal environments including Ōreti Beach, and significant earthworks at 342-370 Flora Road (Te Ao Mārama Inc., 2026).

Each of these activities carries significant risk to wāhi tapu (sacred places), sacred sites that may be disturbed through trenching, earthwork, and ground modification. Wāhi tapu are themselves taonga, and the Crown's Article 2 duty to actively protect taonga, confirmed by the Waitangi Tribunal to extend to the natural environment, applies with particular force to sites of this kind (Waitangi Tribunal, 2011). For mana whenua, whakapapa (genealogy; the layering of relationships) is intertwined with the taiao (the natural world; the environment) and the landscape; altering that landscape has profound implications for cultural identity and for the intergenerational transmission of mātauranga (knowledge; expertise) (Te Ao Mārama Inc., 2026). The concept of Ki Uta Ki Tai (from the mountains to the sea), the principle connecting the mountains to the sea, expresses the holistic and relational nature of environmental health: a disruption at any point in that continuum affects all others.

The removal or modification of wetlands is particularly serious. Mana whenua have long referred to wetlands as the kidneys of the taiao, they filter contaminants, sustain mahinga kai (food-gathering practices) including tuna

(freshwater eel) gathering, and their health reflects the health of the wider takiwā (district) (Te Ao Mārama Inc., 2026). The Datagrid proposal required the removal of an existing inland wetland, with a commitment to create a constructed replacement, a commitment that mana whenua have engaged with, while reserving the right to require further kōrero if adverse effects cannot be mitigated.

3.3 Energy and carbon emissions

Data centres currently account for approximately 2% of global energy consumption, a figure that is projected to rise to between 3-13% by 2030 (Fernández-Cerero et al., 2020). That trajectory is being accelerated by the AI boom. In 2025, global data centres consumed an estimated 448 TWh of electricity. On current trajectories, that figure could exceed 945 TWh by 2030, roughly doubling in five years and accounting for nearly 3% of projected global electricity demand (Aczel et al., 2026). The associated carbon footprint of 2025 data centre electricity use was approximately 189 million tonnes of CO_2, a figure that could rise to 399 million tonnes by 2030 (Aczel et al., 2026). Industry projections, including one cited by Honor the Earth (2025) from financial analyst reporting, suggest that the global data centre industry may emit 2.5 billion tonnes of CO_2 through 2030, more than 40% of the United States' total annual emissions (Honor the Earth, 2025). A single hyperscale facility can emit between 200,000 and 400,000 metric tonnes of CO_2 annually, comparable to a small city (Honor the Earth, 2025). To contextualise the scale of projected consumption for an Aotearoa audience: 13% of global electricity is the equivalent of nearly 100 times New Zealand's entire annual electricity supply, every home, hospital, kura (school), and business in the country, multiplied by one hundred (Ministry of Business, Innovation and Employment [MBIE], 2025; Fernández-Cerero et al., 2020).

Around 60% of global energy generation continues to come from coal and natural gas sources (Fernández-Cerero et al., 2020), meaning that even where data centres claim to operate on renewable energy, the broader grid they draw from remains carbon-intensive. The training of large AI models compounds this. Training GPT-4 is estimated to have consumed between 50 and 70 gigawatt-hours (GWh) of electricity over 100 days, roughly 40 to 55 times the energy required to train its predecessor, GPT-3. The associated carbon footprint

of that single training run was approximately 25,000 tonnes of CO_2 (Aczel et al., 2026). Once deployed, the inference phase, generating responses for billions of daily interactions, is estimated to account for 80 to 90% of total AI energy use (Aczel et al., 2026). In Aotearoa, this carries particular significance: data centre expansion in Auckland has already been identified as a risk to the stability and equity of New Zealand's electricity network (Milne, 2021). Amazon's plans to build data centres in West Auckland were ultimately abandoned in 2025 partly due to soaring power prices, a direct consequence of how hyperscale demand distorts local energy markets (Milne, 2025). Under Article 2 of Te Tiriti o Waitangi, the Crown has an obligation to actively protect taonga, a category that the Waitangi Tribunal has confirmed extends to natural resources and infrastructure on which iwi Māori depend (Waitangi Tribunal, 2011). Where hyperscale demand drives electricity prices beyond the reach of whānau, hapū, and iwi, or crowds out the renewable energy capacity that iwi have secured through Treaty settlements, that constraint is not a market externality but a Treaty breach, one that engages Crown obligations regardless of whether the proximate cause is a private corporation rather than the Crown itself.

This is not a marginal issue. Hyperscale data centres are arriving in Aotearoa at precisely the moment when iwi, hapū (subtribe; clan), and whānau (family; extended family) are seeking to protect their own energy interests, including through participation in renewable energy assets linked to Treaty settlements. If the electricity grid is captured by the demands of hyperscale tenants, the cost and availability of electricity for Māori communities becomes a Treaty issue, not merely a commercial one. The potential restart of Rio Tinto's fourth potline at Tiwai Point in Murihiku, being reconsidered amid high aluminium prices, adds another layer of pressure to Southland's energy system precisely at the time when a major data centre development in the same region is seeking grid connection (RNZ, 2026).

3.4 Air pollution and noise

Emergency diesel generators, a standard feature of data centres for backup power, release fine particulate matter and nitrogen oxides when operated. These pollutants are associated with increased rates of asthma, cardiovascular disease, and, in recent research, miscarriage and rare cancers in communities adjacent to data centre sites (Honor the Earth, 2025). For mana whenua, air

pollution is not simply a health issue: it affects the mauri (life force) of the surrounding environment, degrades the hauora (health) of the taiao, and diminishes the sensory connection to the landscape through which whakapapa histories are recalled and transmitted (Te Ao Mārama Inc., 2026).

Noise pollution similarly affects mana whenua's relationship with the surrounding taiao. The ability to hear taonga species, the birds, the wind, the water, is integral to the ways in which whānau recall the histories and uses of a place embedded in those sounds (Te Ao Mārama Inc., 2026). Hyperscale data centres operate continuously and produce sustained mechanical noise that fundamentally alters the acoustic environment of the surrounding landscape.

4. He tirohanga ao whānui (a global perspective)

The environmental and sovereignty dimensions of hyperscale data infrastructure are not unique to Aotearoa. Indigenous communities around the world are confronting analogous challenges, and their responses offer both cautionary lessons and models for resistance and engagement.

4.1 Chile: elemental ethics as resistance

In Santiago, the working-class community group MOSACAT formed in 2019 in response to Google's proposed hyperscale data centre in Cerrillos. Despite lacking technical expertise, MOSACAT members, predominantly women, reviewed Google's own environmental report and identified that the facility planned to consume 169 litres of water per second in an area already experiencing drought (Lehuédé, 2024). Their campaign drew on what researcher Sebastián Lehuédé terms "elemental ethics": a grassroots framework that interrogates the AI value chain's relationship with the elements that make up the world, critiques the undermining of local and ancestral relationships with nature, and names the quotidian harms produced by so-called intelligent systems (Lehuédé, 2024).

Simultaneously, in the Atacama Desert, Lickan Antay Indigenous communities resisted lithium extraction, a resource fundamental to the rechargeable batteries that power data infrastructure, as an assault on the water and ancestral territories upon which their survival and identity depend. Both cases demonstrate that resistance to hyperscale data infrastructure is not merely

environmental activism: it is an assertion of the right to exist in relation to land and water, a claim rooted in elemental and Indigenous knowledges that precede and exceed Western legal frameworks (Lehuédé, 2024).

4.2 The United States: data colonialism in Indian country

Across North America, hyperscale data centre developers are deliberately targeting rural and tribal communities for new facilities, drawn by access to cheaper water, cheaper electricity, and tax incentives from local governments (Honor the Earth, 2025). The framing offered to tribal nations is appealing but misleading: that data centres on Indigenous land represent an exercise of data sovereignty. This framing is, as Honor the Earth (2025) documents, false. Indigenous communities are being told that AI data centres will help protect and assert their data sovereignty. However, many tribal nations do not have the capacity or legal infrastructure to regulate multinational corporations. Allowing these companies unfettered access to Indigenous land and resources is a relinquishment of power, not an exercise of data sovereignty (Honor the Earth, 2025).

Indigenous environmental advocates in Tulsa, Oklahoma, have highlighted that data centres threaten water, culture, and informed consent, dimensions of harm that conventional environmental impact assessments are ill-equipped to capture (Public Radio Tulsa, 2025). The protest by Tulsa residents against Meta's "Project Anthem" data centre over its water consumption (Abrams, 2026) reflects a growing movement across the United States that connects environmental, health, and sovereignty concerns into a unified resistance to what is increasingly named "data colonialism." The term carries theoretical weight beyond its advocacy usage. Couldry and Mejias (2019) define data colonialism as a new form of colonialism in which human life and social relations are appropriated through data, extending the logic of historical resource extraction into the domain of information and knowledge. Applied to the hyperscale context, the concept names something precise: the appropriation of Indigenous lands, waters, and knowledge systems to support a global data economy whose benefits accrue elsewhere, replicating the extractive structure of earlier colonial formations through digital rather than physical means.

Brodie (2023) provides a peer-reviewed analytical framework for understanding these dynamics, situating data centres as instruments of multinational extractive capitalism whose energy and environmental externalities reproduce uneven systems of benefit and harm: strategic value concentrated in the Global North, environmental costs localised in resource-rich communities. This framing aligns closely with the argument advanced in this article and provides academic grounding for the sovereignty concerns raised by Indigenous communities across the cases discussed here.

4.3 Uruguay: environmental protest and corporate accountability

In Uruguay, environmental protesters challenged Google's revised plans for a data centre development, raising concerns about carbon emissions, toxic waste, and water consumption that the company had sought to minimise in public communications (Livingstone, 2024). The Uruguayan case is instructive for Aotearoa because it demonstrates that even in national contexts with robust environmental regulation, the political and economic leverage exercised by hyperscale corporations can override democratic and community concerns. The lesson for iwi is that legal processes alone, resource consent, legal requirements, cultural impact assessments, while necessary, are not sufficient. The exercise of iwi Māori authority must be active, ongoing, and politically confident.

Read together, these cases anticipate much of what Te Kāhui Raraunga's own frameworks already require. MOSACAT's scrutiny of Google's environmental claims and the Uruguayan protesters' pushback against minimised disclosures both reflect the auditability and accountability that the Māori Data Governance Model and the Māori AI Governance Framework treat as a baseline, not an aspiration. Honor the Earth's insistence that a data centre's presence on Indigenous land is not, by itself, an exercise of sovereignty restates the authority principle at the centre of both instruments: control over data, and over the infrastructure that produces and holds it, cannot be inferred from location alone. The consent failures documented in Tulsa and the capacity gaps described across Indian Country are the practical consequences of the FPIC and capability-building provisions those frameworks set out to prevent. These are not risks unique to Aotearoa. They are what Te Kāhui Raraunga's frameworks were designed to guard against.

5. Māori data sovereignty as the primary framework

At Te Kāhui Raraunga, we hold a clear position: the environment in which data is stored, processed, and governed is not separate from the environment in which Māori live, work, and exercise kaitiakitanga. The infrastructure questions raised by hyperscale data centres are also data governance questions, and they must be addressed through a Māori data sovereignty framework.

5.1 Te Mana Raraunga and the foundations of Māori data sovereignty

Māori data sovereignty refers to the rights Māori have to data that relates to Māori, and to the exercise of control, power, and jurisdiction over that data at the individual, collective, and iwi level (Ruckstuhl, as cited in Royal Society Te Apārangi, 2023). Te Mana Raraunga (the Māori Data Sovereignty Network) articulates this through six core principles: rangatiratanga (authority), whakapapa (relationships), whanaungatanga (obligations), kotahitanga (collective benefit), manaakitanga (reciprocity) and kaitiakitanga (guardianship) (Te Mana Raraunga, 2018).

Te Kāhui Raraunga, established in 2019 as the independent operating arm of the Data Iwi Leaders Group, carries the mandate of many iwi communities throughout Aotearoa to operationalise these principles in practical and policy contexts. Te Kāhui Raraunga aims to enhance the social, cultural, environmental, and economic well-being of Māori; to enable iwi, hapū and whānau Māori to access, collect and use Māori data. To realise this, Te Kāhui Raraunga has produced a number of tribal-centred resources to support tribal data sovereignty. The Māori Data Governance Model Tuia te Korowai o Hine Raraunga (Kukutai et al., 2023) provides a framework through which iwi can assess their readiness to govern data in ways that reflect their own priorities, tikanga, environments and aspirations. Just as importantly, it describes considerations for government and other non-Māori data collectors and holders to better support Māori data governance and the rights of iwi Māori over their data.

The Māori Data Governance Model provides guidance for the system-wide governance of Māori data, consistent with the Government's responsibilities under te Tiriti o Waitangi. The Model is intended to assist all agencies to

undertake Māori data governance in a way that is values-led, centred on Māori needs and priorities, and informed by research.

A recent addition to the Māori Data Governance Model is the supplementary release of the Te Kāhui Raraunga Māori AI Governance Framework, calling for government agencies and organisations to embed culturally grounded safeguards into their AI policies and to recognise that Māori data is a taonga that must be governed with care and cultural sensitivity (Te Kāhui Raraunga, 2025). Because AI depends on the processing and storage capacity of hyperscale data centres, Māori data governance extends beyond the data itself to the physical infrastructure that produces and holds it.

5.2 Cloud storage is not neutral

A critical insight from the Māori data sovereignty framework is that cloud storage services are not jurisdictionally or culturally neutral. Cloud services most often based outside of Aotearoa New Zealand mean that data stored on those platforms could be subject to overseas law and would not be considered secure from a Māori data sovereignty perspective (Kukutai et al., 2022).

Most major technology corporations remain subject to the laws of their home countries regardless of where their infrastructure is physically located. Under the United States CLOUD Act (2018), for example, federal law enforcement can compel any US-based company to produce data stored on its servers, including those on foreign soil. Physical presence in Aotearoa does not exempt a US-owned platform from this reach. This is not a theoretical risk; the US Government issues tens of thousands of such legal demands each year (Kukutai et al., 2022).

The arrival of hyperscale data infrastructure physically located in Aotearoa might appear to resolve this problem, data would at least be stored onshore. But the ownership, governance, and control of that infrastructure remain with foreign corporations. As Angelier (2026) argues in his reframing of digital sovereignty, it is a fundamental error to locate sovereignty only in infrastructure ownership but rather it should also be about data governance and control. Sovereignty does not reside in where the servers are located; it resides in who controls the data, under what conditions, and with what recourse (Angelier, 2026).

This distinction is critical for iwi. A data centre physically located in Murihiku, on or near an iwi takiwā, does not automatically give iwi sovereignty over the data held within it. Without enforceable data governance conditions, and better regulation and legislation covering access, storage, deletion, and use of the AI and hyperscale data centres that provide this infrastructure, this merely relocates foreign corporate control onto Māori landscapes. The environmental costs, water use, energy demand, land change, stay in Murihiku, while the economic and technological benefits mostly flow offshore, to the corporations and markets the data serves.

5.3 The CARE Principles and Indigenous data governance

The CARE Principles for Indigenous Data Governance, Collective Benefit, Authority to Control, Responsibility, and Ethics, developed through the Global Indigenous Data Alliance provide a complementary framework to the FAIR principles (Findable, Accessible, Interoperable, Reusable) that govern open data more broadly (Global Indigenous Data Alliance, 2020). The CARE principles insist that data governance must advance Indigenous innovation and self-determination, not merely technical interoperability (Te Mana Raraunga, 2018). Applied to the hyperscale data centre context, these principles would require that any data infrastructure proposed on or adjacent to Māori lands or waterways demonstrate: that it produces collective benefit for Māori; that Māori retains the authority to control what data is held and how; that the developer bears responsibility for all environmental and cultural harms; and that the project operates within a framework of ethical accountability to Māori communities over time.

Te Kāhui Raraunga has produced two instruments that give these principles practical effect for iwi. The Māori Data Governance Model, Tuia te Korowai o Hine Raraunga (Kukutai et al., 2023), sets out how iwi can assess their own readiness to govern data according to their tikanga, environments, and aspirations, and how government and other data holders can better support that governance. The Te Kāhui Raraunga Māori AI Governance Framework (Te Kāhui Raraunga, 2025) extends this to AI specifically, calling on agencies and organisations to embed culturally grounded safeguards and treat Māori data as a taonga requiring careful, ongoing governance. Both instruments give iwi a

practical basis for the CARE-aligned conditions they should require of any hyperscale data centre proposal.

Current resource consent processes do not, on their own, satisfy these requirements. While the Datagrid NZ Cultural Impact Assessment prepared by Te Ao Mārama Inc. (2026) represents an important and meaningful exercise of Mana Whenua authority, successfully securing a range of mitigation commitments and ongoing engagement conditions from the developer, it also demonstrates the limits of cultural impact assessment as a standalone instrument. The assessment is embedded in a consenting process that ultimately gives decision-making authority to statutory bodies, not to Mana Whenua. The recommendations of Te Ao Mārama Inc. are framed as conditions sought from the developer, not as expressions of independent Māori authority that precede and exceed the consent process.

6. Ētehi pononga (some truths for iwi)

Drawing together the environmental analysis and the Māori data sovereignty framework, we offer the following assessment of what iwi should know and do when presented a hyperscale data centre proposal.

6.1 What iwi should know: the myths and the facts

Developers will present hyperscale data centres as economic opportunities: jobs, infrastructure investment, and digital development for the region. The evidence from jurisdictions around the world, the United States, Chile, Uruguay, and Aotearoa, consistently contradicts this framing. There is no evidence that data centre job promises are being fulfilled: a facility employing 1,500 workers during construction may employ as few as 100 full-time permanent staff once operational (Honor the Earth, 2025). Energy prices for surrounding communities rise, not fall: Honor the Earth (2025) reports that hyperscale data centres have been associated with significant electricity price increases in some US states, with one cited figure of up to 267%, and with over USD$4 billion in additional consumer utility costs in 2024 attributed to grid connection for data centres. The primary source underlying these figures is not identified in that document; the claims are reported here as advocacy-sourced estimates and should be treated accordingly.

Hyperscale data centres carry financial risks of stranded assets: if AI investment cycles turn, as some analysts have warned, communities and environments bear the costs of facilities that no longer have commercial value.

Most critically for iwi: allowing data centres on Māori lands or near Māori waterways and engaging with generative AI is not, in itself, an exercise of data sovereignty. Data sovereignty requires enforceable control, over access, over use, over deletion, over the revenue and benefit flows generated by data. Without those controls, the facility may be on Māori land, but the rangatiratanga (sovereignty; chiefly authority) over what happens within it remains elsewhere (Honor the Earth, 2025).

6.2 Procedural rights under Te Tiriti and domestic law

Iwi and hapū have substantive procedural rights in relation to any large infrastructure development that affects their takiwā. Under the Resource Management Act 1991[2], Tangata Whenua must be consulted in relation to any activity that affects their values, sites, and relationships with the natural environment. The Treaty of Waitangi principles of partnership, participation, and protection require active Crown engagement with iwi in relation to decisions that affect Treaty interests, including decisions about the electricity grid, water allocation, and the designation of land for industrial development.

The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), to which Aotearoa is a signatory, asserts the right of Indigenous peoples to free, prior, and informed consent (FPIC) in relation to projects that affect their lands, territories, and resources (United Nations, 2007). FPIC is not a passive right to be consulted: it is an active right to consent or withhold consent, before a project is approved, on the basis of full and accurate information. The evidence from the Datagrid NZ case suggests that early and substantive engagement between developers and mana whenua, as occurred between Datagrid and Te Ao Mārama Inc., can produce meaningful mitigation conditions. However, FPIC goes further than consultation and mitigation: it requires that the decision itself, including the decision whether the project should proceed at all, be subject to

[2] Note as this paper is being written the Resource Management Act is currently in the process of being repealed and replaced by two new pieces of legislation; The Planning Bill and the Natural Environment Bill. These bills are expected to become law in 2027.

genuine Māori authority. It is worth noting that tino rangatiratanga and FPIC, while substantively compatible in their insistence on genuine Indigenous authority, derive from distinct legal traditions: tino rangatiratanga is grounded in Article 2 of Te Tiriti o Waitangi and is owed specifically by the Crown to Māori as a Treaty partner, while FPIC is a principle of international human rights law under UNDRIP, applicable to Indigenous peoples broadly and enforceable through different, and generally weaker, domestic mechanisms. In the Aotearoa context, tino rangatiratanga provides the stronger and more direct legal foundation; FPIC extends and internationalises that claim.

It is important, however, to recognise that FPIC is a contested instrument in practice. A substantial peer-reviewed literature documents the gap between FPIC as a rights framework and its implementation in extractive industry contexts. Klein et al. (2023) found that companies frequently conduct one-off assessments or sign private agreements that frame project impacts in terms of reputational and financial risk to the developer, rather than engaging in good faith with Indigenous peoples' own understanding of those impacts. Papillon and Rodon (2016) demonstrated that negotiated consent processes, including impact and benefit agreements, often deliver a truncated version of FPIC that undermines the deliberative intent at the framework's core. Hofbauer (2022) situates this pattern within international human rights law, observing that FPIC's full force as a decision-making right, rather than merely a procedural safeguard, remains resisted by states and proponents alike. The risk, in short, is that consultation processes designed to implement FPIC reproduce rather than disrupt existing power asymmetries, managing Indigenous dissent rather than enabling Indigenous authority. Iwi engaging with hyperscale data centre proposals should approach FPIC processes with this structural risk in view and insist on mechanisms that give effect to the right in substance, not merely in form.

6.3 Recommendations

On the basis of this analysis, at a minimum, we offer the following recommendations for iwi engaging with hyperscale data centre proposals:

First, demand full disclosure.

Any developer seeking to establish hyperscale infrastructure in your takiwā

should be required to provide complete disclosure of: projected water consumption by volume and source; projected energy consumption and its grid impacts; expected carbon emissions over the facility's operational life; plans for emergency generator use and the associated air quality impacts; and the ownership and governance structures governing data held within the facility. This information should be provided before any engagement process begins.

Second, require an iwi-led impact assessment, scoped and controlled by iwi Māori and funded in full by the developer.

The assessment should have two distinct components: first, an environmental component addressing the full range of physical, ecological, and cultural effects of the proposed facility, including effects on water, land, wāhi tapu, mahinga kai, air quality, and the wider taiao; and second, a Māori Data Sovereignty component addressing who controls the data held in the facility, under what conditions iwi Māori can assert rights over that data, and what enforceable protections exist for mātauranga Māori.

Third, insist on conditions of ongoing engagement as binding consent conditions, not merely as developer commitments.

Conditions should include regular reporting on water, energy, and emissions performance; a Mana Whenua-led kaitiaki monitoring plan for earthworks and construction; and a mechanism for Mana Whenua to require additional kōrero if cumulative effects become apparent over time (Te Ao Mārama Inc., 2026).

Fourth, connect with other Indigenous communities who have resisted or engaged with similar proposals.

The networks being built across the Indigenous world, from Aotearoa to Chile to the United States to Australia, represent a collective body of knowledge and strategy that no single iwi should have to develop alone.

Fifth, exercise the right to say no.

FPIC includes the right to withhold consent. If a proposed hyperscale development cannot demonstrate that it will protect the mauri of the surrounding environment, uphold the hauora of the community, and operate within a framework of genuine Māori data governance, that is a legitimate basis for declining to support the proposal. Rangatiratanga is not simply the right to

negotiate better terms: it is the ultimate right to determine what happens on and near your whenua.

We further encourage iwi to integrate more requirements contextualised to their tākiwa, special interests, histories, and kinship with the natural environment, including taonga species.

7. He kōrero whakakapi (conclusion)

The hyperscale data centre is an extractive facility that consumes water, land, energy, and, through the data it stores and processes, Indigenous knowledge. Its arrival in Aotearoa, and across the Indigenous world, is not accidental: it follows the same logic of resource extraction that Indigenous peoples have resisted for centuries. The elements, wai, whenua, hau, that are placed at risk by hyperscale data infrastructure are the same elements through which Māori identity, authority, and obligation are constituted. The material consequences extend beyond the operational life of these facilities: by 2030, AI infrastructure is projected to generate up to 2.5 million metric tonnes of electronic waste annually, roughly equivalent to discarding 250 Eiffel Towers every year, much of it processed in jurisdictions with weak environmental oversight and disproportionately affecting communities in the Global South (Aczel et al., 2026). The concentration of this infrastructure is itself a justice issue: as of 2025, only 32 countries host AI-specialised data centres, and over 90% of that capacity is concentrated in the United States and China, while more than 150 countries, including most of the Pacific, have no access to sovereign AI compute infrastructure (Aczel et al., 2026). The costs of this concentration fall on the countries and communities that host the infrastructure or absorb its waste, while the compute advantage sits with the handful of states that already have it.

At Te Kāhui Raraunga, we are clear that Māori data is a taonga. The infrastructure through which that data is stored, moved, and processed is therefore also a matter of taonga protection. A hyperscale data centre that sits on iwi takiwā, draws water from an aquifer over which iwi Māori exercise kaitiakitanga, and stores data that may include mātauranga Māori without adequate governance protections, is not a development that serves iwi interests, regardless of how it is presented.

The frameworks we need already exist. They are reflected in the natural world, and in ancestral wisdom handed down through generations and captured throughout history. Through traditional architecture, whakapapa, pūrākau, kai gathering practices – there are many examples of cultural frameworks that can inform technological innovation and stewardship of data. Kaitiakitanga, rangatiratanga, manaakitanga, whakapapa, Ki Uta Ki Tai, these are not merely cultural values. They are governance frameworks, and they are what is required to assess, engage with, or decline hyperscale data infrastructure proposals. The Māori Data Governance Model, the CARE Principles, and Te Kāhui Raraunga's AI Governance Framework provide the operational tools through which these values can be expressed in contemporary data governance terms.

What remains is the collective willingness, by developers, by Crown agencies, by local government, to accept that Māori authority over data and environment is not a matter of negotiation, but of right. Our work at Te Kāhui Raraunga is to ensure that iwi have the knowledge and the confidence to assert their rights in relation to data, wherever these decisions are being made.

Hei kōnei hei āpōpō – mō ngā whakatupuranga.

Glossary of te reo Māori terms

Aotearoa: New Zealand; the Māori name for New Zealand

hapū: subtribe; clan; a section of an iwi

hau: the vital essence or spirit of a thing; the mauri of the natural world

hauora: health; wellbeing

He Aha te Rerekē: What is the difference?

He Kōrero Whakakapi: Conclusion; closing words

He Kupu Whakataki: Introduction; opening words

He Parekura Taiao: Environmental harms of hyperscale data centres

He Tirohanga Ao Whānui: A global perspective; looking to the wider world

iwi: tribal nation; extended kinship group

kaitiaki: guardian; the person or people who exercise kaitiakitanga over a taonga or resource

kaitiakitanga: guardianship; environmental stewardship; the obligation to protect and care for the natural world

Ki Uta Ki Tai: from the mountains to the sea; an environmental governance principle expressing the holistic connectedness of all waterways

kotahitanga: unity; collective action; collective benefit

kōrero: discussion; conversation; to speak

kura: school

mahinga kai: food-gathering practices and places; the customary harvesting of natural resources

mana whenua / Mana Whenua: the Indigenous people with authority over a particular territory; those with chiefly standing in relation to the land

manaakitanga: hospitality; care; generosity; the nurturing of relationships and the ethics of care

mauri: life force; vital essence; the binding force that links all things

mātauranga: knowledge; expertise; understanding

mātauranga Māori: Māori knowledge systems; the body of Indigenous knowledge, values, and practices

rangatiratanga: sovereignty; chiefly authority; self-determination

taiao: the natural world; the environment; the living world

takiwā: tribal territory; district; region

Tangata Whenua: the people of the land; the Indigenous people of Aotearoa; Māori

taonga: treasure; something of great cultural, spiritual, or material value

tauparapara: incantation; chant; a form of oral poetry used to open proceedings or convey whakapapa

Te Kāhui Raraunga: the operating arm of the Data Iwi Leaders Group; the Māori data governance body established in 2019

Te Mana Raraunga: the Māori Data Sovereignty Network

Te Tiriti o Waitangi: the Treaty of Waitangi; the founding constitutional document between the Crown and Māori

tikanga Māori: Māori customs, values, and protocols; the correct way of doing things according to Māori tradition

tino rangatiratanga: absolute sovereignty; full chiefly authority; self-determination; the right of Māori to self-governance

tuna: freshwater eel; a taonga species of cultural and ecological significance

wai: water; freshwater

whakapapa: genealogy; the layering of relationships across time; a framework for understanding connections between people, places, and the natural world

whanaungatanga: relationships; kinship; a sense of belonging and obligation rooted in shared identity

whenua: land; earth; also placenta

whenua Māori: Māori land; land held under Māori customary title or ownership

whānau: family; extended family

wāhi tapu: sacred place; a site of spiritual, cultural, or ancestral significance that is subject to restriction

Ētehi pononga: Some truths for iwi

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Appendix: A Decision-Making Checklist for Iwi

The following questions are designed to help iwi and hapū systematically evaluate any hyperscale data centre proposal. They are not exhaustive, but cover the key areas where disclosure, scrutiny, and binding conditions are most critical.

1. Water

1.1 How much water will the facility use daily, and from which source?

1.2 What are the seasonal limits on water take, and what happens in drought conditions?

1.3 Will water be returned to the water cycle, and in what condition?

1.4 What are the risks to groundwater quality and adjacent waterways?

2. Land and Earthworks

2.1 What land area will be modified, and what ecosystems or habitats will be affected?

2.2 Will any wetlands, waterways, or coastal environments be disturbed?

2.3 What wāhi tapu and archaeological surveys have been completed, and by whom?

2.4 Who will conduct cultural monitoring during earthworks, and under what protocol?

3. Energy and Emissions

3.1 What is the projected electricity demand, and who pays for grid upgrades?

3.2 Will backup generation use diesel or gas, and how often will it operate?

3.3 What are the projected carbon emissions, including embodied carbon?

3.4 Are renewable energy commitments legally binding, or aspirational?

4. Noise and Air Quality

4.1 What noise levels are projected at the site boundary, and how will they be monitored?

4.2 What particulate and NOx emissions will backup generators produce, and what health monitoring is proposed for surrounding communities?

5. Data Governance

5.1 What data will be stored or processed in the facility?

5.2 Who owns and controls that data, and under whose legal jurisdiction?

5.3 Could foreign law, including the US CLOUD Act, compel access to data held in the facility?

5.4 What enforceable protections exist for mātauranga Māori held or processed in the facility?

5.5 What are the conditions for data access, deletion, and audit by iwi Māori?

6. Legal and Consent Rights

6.1 Has free, prior, and informed consent been sought before any approvals were lodged?

6.2 Which Treaty obligations apply, and how is the Crown ensuring they are met?

6.3 Are proposed conditions legally binding on the developer, or merely commitments?

6.4 What recourse does iwi have if consent conditions are breached?

7. Economic Claims

7.1 How many permanent jobs will be created, what skills are required, and are those jobs accessible to local iwi communities?

7.2 What are the electricity cost implications for surrounding communities?

7.3 What direct benefit flows to iwi Māori, and is it legally secured?

7.4 What happens to the facility, and who bears the costs, if the developer withdraws or the AI investment cycle turns?