

2024/25 Key Data Improvement Plan for Resilience and Climate Change



Acceptance

Role	Name	Signed	Date
Head of Location Information	Aaron Jordan	<u>Approved</u>	04/09/2024

Reference documents

Location	Description
Strategic intentions 2023–2027 Toitū Te Whenua - Land Information New Zealand (linz.govt.nz)	LINZ Strategic Intentions 2023-2027
https://storymaps.arcgis.com/stories/fd06c8aa37e74b6b910cf53e98414a58	Key data improvement programme achievements 2019 - 2023
Key datasets for resilience and climate change Toitū Te Whenua - Land Information New Zealand	Key Data Improvement Plans 2019 - 2023

Revision history

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17/07/2024	0.1	Susan Shaw	Draft priority improvements for 2024/25
05/08/2024	0.2	Lead agency representatives	Priorities approved by all data lead agencies
17/09/2024	0.3	Elizabeth Garlick	Reviewed by LINZ Communications Team

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Executive Summary

In the last twelve months there were six emergency declarations for severe weather, plus the Port Hills Fire. At the same time New Zealanders were still recovering from Cyclone Gabrielle's destruction, particularly in Wairoa, and documenting opportunities to improve our response to natural disasters.

Many of these opportunities focus on the need for decision makers to be well informed to make critical and timely decisions. One of the most effective ways to achieve this is to ensure consistent access to national datasets which are fit for purpose both for immediate response and long-term recovery.

In 2024/25 Toitū Te Whenua Land Information New Zealand (LINZ) will continue to work with the New Zealand Transport agency (NZTA), Stats NZ, Ministry of Business, Innovation and Employment (MBIE), National Institute of Water and Atmospheric Research (NIWA), and KiwiRail to ensure key data remains the authoritative, national source of truth which emergency management decision makers can rely on.

The geospatial emergency management community, in collaboration with the key data lead agencies, have agreed the following data improvement priorities for 2024/25:

Key data improvement plan 2024/25

NZTA to



- publish **road** status using consistent symbology recommended by GEMA, for both Journey Planner and TREIS by June 2025.
- investigate publishing a national view of road status for state highways and local roads by June 2025.
- publish the national network model of state highways and local roads by June 2025.



Stats NZ to publish the 2023 census **population** data at Statistical Area 1 level in December 2024.



LINZ to publish NZ Buildings to link **property** IDs to address, building and District Valuation Roll data by June 2025, available to all organisations with a govt.nz email.



LINZ to publish information for councils about the recommended positioning of **address** points and how to supply LINZ with address updates as a webservice by December 2024.



NIWA to identify funding opportunities to enable the creation of a national, easy to use GIS layer based on the latest River Environment Classification for named **rivers** and catchments by June 2025.



LINZ to publish 'NZ **Coastline** – Mean High Water Springs' by December 2024.



MBIE to work with LINZ to investigate using property information in the online **Rapid Building Assessment** forms by June 2025.



LINZ, MBIE and NEMA to investigate and present options for streamlined funding for **imagery** in an emergency by June 2025.



LINZ to update hospital and school **buildings** by June 2025.



LINZ to promote **suburbs** and localities change request process with councils by June 2025.



LINZ to publish a national hill shade and one metre national digital **elevation** model (DEM) on the LINZ Data Service by June 2025.



LINZ to publish Ngā Pou Taunaha o Aotearoa's New Zealand Gazetteer **place names** as an ArcGIS REST service by September 2024 and improve display of place names by June 2025.



KiwiRail to publish freight **rail** line and ferry disruptions and maintenance status and document process for using this data in an emergency by December 2024.



LINZ to make the **Topo50** Map Series easy to discover and access in ArcGIS Online by December 2024.

Background

The key data improvement programme began in 2017 when Toitū Te Whenua Land Information New Zealand (LINZ) began collaborating with other organisations on resilience and climate change issues to make a real difference for New Zealand.

Applying this resilience and climate change lens to our work enabled us to engage directly with our customers in the emergency management geospatial community, and to get a better understanding of what data improvements could add the most value.

LINZ's Strategic Intentions for 2023-2027 recognise the importance of geospatial and property information, which is trustworthy, reliable, freely available and well used and confirms our continued support for emergency services.

[Strategic intentions 2023–2027 | Toitū Te Whenua - Land Information New Zealand](#)

Purpose

The purpose of this document is to

- provide an update of key data improvements since July 2023
- assess whether the key data are fit for purpose for emergency management
- collate the latest customer requests for data improvements, and
- confirm the key data lead agency data improvement commitments for 2024/25.

Key Data for Resilience and Climate Change

Why are national key datasets important?

Significant emergency events such as Cyclone Gabrielle in 2023 and Kaikōura earthquake in 2016, which affected communities across multiple regions at the same time, demonstrate the need for a coordinated, national overview.

Our customers, particularly in local government, have done great work to capture data for their local area. For example, some councils have developed detailed river network and water catchment boundaries. These councils will likely continue to invest in their data for emergency management risk reduction, readiness, response, and recovery.

Accessing and combining data from numerous local sources is difficult and time consuming. National datasets which can provide a single, authoritative source adds real value to support reliable emergency planning and risk reduction, informed emergency response and efficient recovery. Collaboration between councils and the national data lead agencies is vital to ensure key data are accurate, reliable, trustworthy and ready to use for emergency management.

What are the national key datasets?

The 14 key datasets focus on people, property, transport, rivers, place, land and coasts.

Theme	Key Dataset	Lead Agency
Population	NZ Estimated Resident Population Grid 2023	Stats NZ
	Statistical Area 1 + population information	
Buildings	NZ Building Outlines	LINZ
Address	NZ Addresses	LINZ
Suburbs	NZ Suburbs and Localities	LINZ
Property	NZ Property Hybrid (Pilot)	LINZ
	NZ Property Titles including Owners	
	NZ Primary Parcels	
Rapid Building Assessments	Not currently available	MBIE
Roads	National Road Centreline	NZTA
Rail	NZ Railway Network	KiwiRail
	Railway Resilience	
Rivers & Catchments	River lines and catchments with names River Environment Classification 3	NIWA
Imagery	NZ Imagery Basemap and Index	LINZ
Elevation	Elevation Aotearoa	LINZ
	LiDAR and LiDAR Index	
Topo Maps	NZ Topographic Basemap	LINZ
	Topo50 and Topo250	
Coastline	NZ Coastline – Mean High Water	LINZ
Place Names	Ngā Pou Taunaha o Aotearoa New Zealand Geographic Board's	LINZ
	New Zealand Gazetteer	

Who is responsible for the national key datasets?

LINZ is collaborating with five lead agencies to improve the key datasets – New Zealand Transport Agency (NZTA), KiwiRail, Ministry of Business Innovation and Employment (MBIE), NIWA and Stats NZ.



Partner organisations

The key data improvement programme introduced partner organisations in 2023, to work alongside the lead agencies to support the key data improvements.

The National Emergency Management Agency (NEMA) is partnering with MBIE's New Zealand Space Agency and LINZ to look at options for coordinating imagery acquisition during a response. The Ministry for the Environment is working with NIWA and LINZ on named rivers and catchments. Ngā Pou Taunaha o Aotearoa New Zealand Geographic Board, custodian of the NZ Gazetteer, are supporting the work to improve access to place name data. NZ Post is a key stakeholder in the work to improve addressing and suburbs and the Natural Hazards Commission is considering the requirements for improving building data for insurance purposes.



Who are our customers?

The key data improvement work programme engages directly with the geospatial emergency management community, and we are in regular contact with individual customers.

There have been two significant customer consultations with the emergency management community which shapes this work programme, in 2019 and again in 2023. In 2023 seven workshops, 25 interviews and 89 survey responses were reviewed to hear our customer's stories and learn from their experiences. More information about who has represented the geospatial emergency management community is listed in [Appendix A](#).

In addition, the programme has ongoing engagement with three customer representative organisations – Geospatial Emergency Management Aotearoa (GEMA), Geospatial Special Interest Group (Geospatial SIG) and Fire and Emergency New Zealand.

GEMA represents geospatial practitioners in local and central government, the National Emergency Management Agency, Civil Defence Emergency Management groups, private companies, and academic researchers. GEMA reviewed the 2024/25 key data improvement priorities in August 2024.

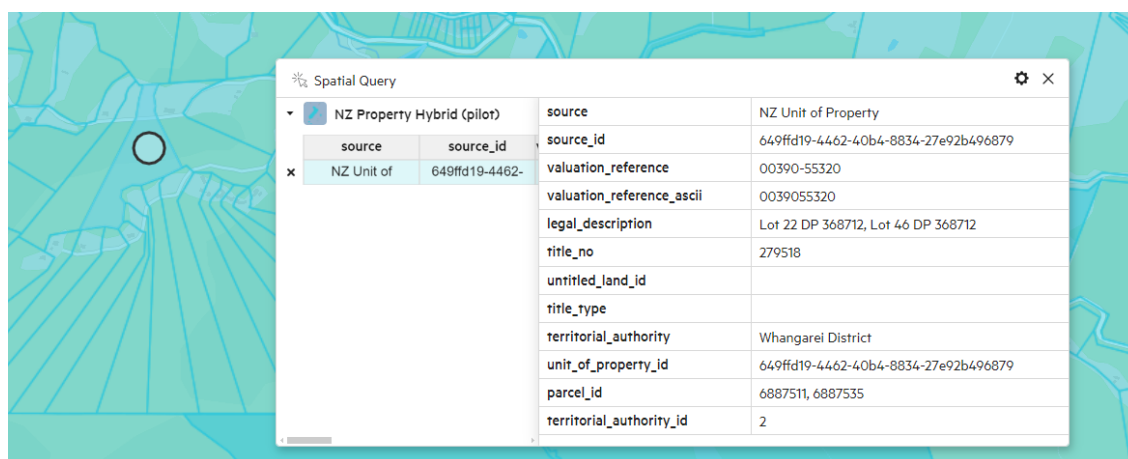
Geospatial SIG brings together geospatial experts from Regional Councils to enable geospatial collaboration, capability, and communication. The Geospatial SIG reviewed the key data criteria assessment in 2020 ([Appendix B](#)) and provide an annual review of the key data improvement priorities, most recently in August 2024.

Fire and Emergency NZ was previously a key data lead agency for suburbs and remains part of the key data improvement programme as a representative of a national response agency. Fire and Emergency NZ reviewed the key data improvement priorities in August 2024.



Review of Key Data Improvements 2023/24

During 2023/24 significant improvements have been made to **property** data. The NZ Property Hybrid (Pilot) layer was published under an open Creative Commons licence for the first time, removing the restriction to only share with government agencies. This is the result of extensive collaboration between the 67 Territorial Authorities working with LINZ. The Hybrid layer was also published as an ArcGIS REST service and the attribution was improved based on customer feedback. This resulted in property increasing the fit for purpose rating to good, with only three data improvement requests remaining.



Place names and **Rapid Building Assessments** were assessed against the key data improvement criteria ([Appendix B](#)) in 2023/24, with place names confirmed as relative fit for purpose with four data improvement requests. As there is not currently a national Rapid Building Assessment dataset, this is represented in the poor rating, with MBIE currently working towards improving this data.

Stats NZ improved the discoverability of **population** data, with the first 2023 census data release available from both the new Stats NZ ArcGIS Hub and Esri's Living Atlas. The population grids have also been formally published out of prototype.

LINZ published 50 **imagery** datasets on LINZ Basemaps and LINZ Data Service, including for the Port Hills Fire in February 2024 and Wairoa flood in June 2024 and 20 LiDAR **elevation** datasets, taking national LiDAR coverage from 55% to 70% in another example of the power of collaboration, this time between Regional Councils and LINZ. The requesting imagery during an emergency handbook was published and it now available for review. This second version including satellite imagery and LiDAR.

NIWA has used the elevation data to revise the **River** Environment Classification hydrological models, and LINZ is using the data to create a new mean high water springs **coastline**.

NZ Transport Agency continues to work with WSP and are making good progress towards creating a national **road** network by June 2025, to be published under Creative Commons licensing and enabling network analysis, and KiwiRail continue to work towards being able to share freight **rail** disruptions.

LINZ have processed 73,000 **address** updates, 11 **suburb** changes and published 3 **building** datasets, in addition to publishing NZ Property Boundary Hybrid.

Response agencies involved in Cyclone Gabrielle continue to report how critical hard copy **Topo50** maps were to inform the first days of response.

Key Data Improvement Partner Organisations

In addition to the key data lead agencies, our partner organisations have also made progress in 2023/24.

The **National Emergency Management Agency** (NEMA) became an Authorised User for the International Charter Space and Major Disasters in May 2024. The Charter provides satellite data to support major disasters. NEMA's Charter membership improves access to satellite data and derived products for New Zealand during a response and provides additional support from Charter member countries to help source, analyse and map the data. NEMA activated the Charter in May 2024 in support of the Papua New Guinea landslide. More info: disasterscharter.org

Ministry for Business, Innovation and Employment (MBIE) prepared a Remote Sensing Working Group Paper on cross agency remote sensing improvements for emergency events for the Space Senior Leadership Group, based on the Cyclone Gabrielle response. The final report was distributed to government agencies. MBIE, NEMA and LINZ are committed to working together on the report findings, with a focus on improving funding for imagery in an emergency in 2024/25.

The **Natural Hazards Commission**, formerly the Earthquake Commission, ran a National Building Dataset Requirements workshop in November 2023. The workshop identified future data requirements for a national building dataset suitable for risk modelling tools, such as RiskScope, to improve national risk reduction outcomes. The workshop discussed attributes, formats, schemas and building scope, and was attended by representatives from NEMA, Fire and Emergency NZ, NZ Police, MBIE, Ministry for Housing and Urban Development (HUD), LINZ, Stats NZ, GNS, NIWA, Ministry for the Environment, Wellington City Council, Auckland Council, Auckland University and Aon.

LINZ met with **NZ Post** several times during 2023/24 to discuss future opportunities for including postcodes in NZ Addresses, given a courier delivery requires a physical address plus a postcode.

2024/25 Key Data Improvement Plan

The August 2024 reviews with the geospatial emergency management community representatives resulted in the following assessment of the key data.

Feedback from the emergency management community remains unanimous ...

improving roads data provides the opportunity for adding the most value

There are a high number of requests for changes to rivers and imagery and the creation of a coordinated Rapid Building Assessments dataset.

Rail has only two requests, while property, buildings, address, suburbs, elevation, population, coastline, place names and topo have at least three improvement requests.

Each data improvement request relates to key data assessment criteria ([Appendix B](#)).

Summary of key data improvement requests at June 2024



Number of data improvement requests:



< 3
Very Good



< 5
Good



< 9
Average



10+
Poor



Stats NZ
Tatauranga Aotearoa

Population



Agreed data improvement for 2024/25

Stats NZ to publish the 2023 census population data at Statistical Area 1 level in December 2024.



User story

Eagle Technology prepared a view of population data specifically for emergency management based on Statistical Area 1 2018 Census data and the Index of Multiple Deprivation by Ministry of Health and University of Otago. This layer is well used because it is easy to understand, but as Eagle Technology is not an authoritative data source this introduces doubt and hesitation at a critical time.

The 250-metre statistical grid is a significant achievement, which helps inform the transport required to evacuate an area or how many essential supplies need to be prepared for an isolated community. Adding a daytime population estimate to the grid is critical. For example, the residential population estimate for central Christchurch is approximate 3,000, which increases to closer to 30,000 during business hours. In addition, information about the number of dwellings would enable resourcing estimates, for example how many responders are required to door knock individual homes during an urgent evacuation.



Other data improvements requests

1. Publish an easy to use GIS layer of census 2023 data, with simplified attribution.
2. Publish a GIS layer of census 2023 data combined with deprivation index.
3. Add estimated daytime population and dwelling count to Statistical Grids.
4. Attribution - Remove decimals from population estimate and use full names.
5. Update programme – publish a current layer to ensure latest data is being used.
6. Topology – use hexagons rather than square grids to minimise sampling bias.



Recent data improvements

First release of 2023 Census data published at Territorial Authority/Local Board level.

Census available from Stats NZ [ArcGIS Hub](#) site, [Living Atlas](#) and [DataFinder](#)

2022 Estimated Resident [Population Grid](#) 250 metres published November 2023.

Data improvement status of national population data is **Good**

Buildings



Agreed data improvement for 2024/25

LINZ to update hospital and school buildings by June 2025.



User story

More time and resource are required to evacuate a rest home in an emergency. Rest homes are usually evacuated early and need extra resource to support the residents. Temporary accommodation needs to be carefully considered as an overnight stay in a welfare centre would not be appropriate. Being able to identify and prioritise rest homes is therefore critical.

Identifying which buildings are dwellings would save significant time when time is most critical during an emergency evacuation. This would help prioritise deploying Urban Search and Rescue teams for evacuations, assigning building inspectors to carry out Rapid Building Assessments and for Red Cross to collect welfare needs assessments.

Individual datasets about building types are available, but dispersed across multiple agencies in different formats, making it difficult to assess the complete picture and harder to analyse. An example is the Earthquake Prone Register of buildings is maintained by MBIE.



Customer data improvement requests

1. Attribution – add building use.
Identify dwellings and rest homes and update schools, hospitals and supermarkets to assist with readiness planning and response.
2. Attribution – add an address.
Enable first responders and building inspectors to confirm the correct property.
3. Attribution - add building height.
Fire and Emergency NZ send different appliances to buildings over nine metres tall.
4. Attribution – identify earthquake prone building from MBIE's register.
Knowing earthquake prone status before entering a property would improve safety.
5. Update – publish update programme as some areas appear out of date.
6. Update – enable councils to submit building updates to ensure data is current.
7. Extent – Capture buildings for all of New Zealand including populated islands.



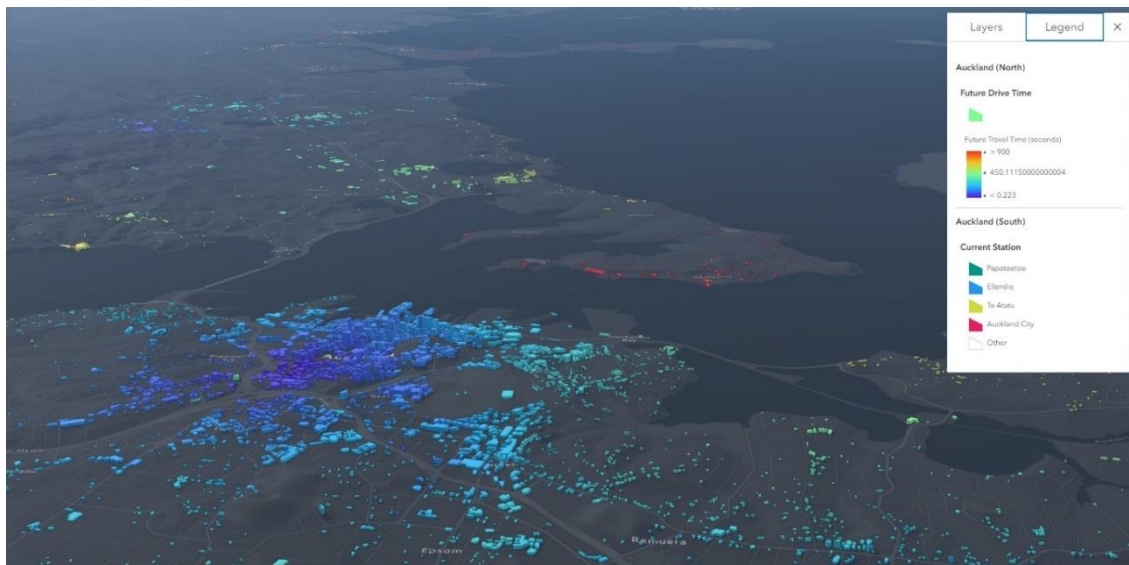
Recent data improvements

Three building datasets, for Kapiti, Upper Hutt and Hutt City have been verified and published since June 2023.

10 building datasets have been verified and are awaiting publication due to a database upgrade currently in progress.

The specification used by LINZ for contracting organisations to capture building outlines from aerial imagery was updated and published in November 2023. This will enable Councils to compare the specification with their own building outline capture programme when considering whether to adopt NZ Building Outlines as the preferred data source.

Data improvement status of national buildings data is **Good**.



Fire and Emergency New Zealand have conducted a pilot study to combine LiDAR and building outlines data to identify buildings with an area over 1000m² or nine metres in height. These buildings typically require a specialised aerial appliance to battle fires. Road network analysis then identified the estimated response times to these buildings.



Address



Agreed data improvement for 2024/25

LINZ to publish information for councils about the recommended positioning of **address** points and how to supply LINZ with address updates as a webservice by December 2024.



User story

Councils have requested clear information to help position a new address point to improve data consistency. Most information collected about a property during a response relates to a building. Geocoding information against NZ Addresses means this information is often manually edited and placed over the correct building to be meaningful, as happened during Cyclone Gabrielle. Having address points consistently placed on buildings would resolve this issue, saving time, and improving data accuracy.



Customer data improvement requests

1. Accuracy – locate address points over buildings.
Standardise address point locations over buildings and provide an additional address for entrances or driveways to improve geocoding.
2. Attributes – add postcode
A courier delivery uses a physical address plus the postcode. It is important to provide this accurate information when delivering essential services.
3. National source of truth – work with NZ Post to align addresses
Having two distinct addresses to represent a physical and postal address for the same property creates confusion when processing welfare needs during evacuations. This also results in significant geocoding issues with many hours spent attempting to clean address data during a response.
4. Update – enable online edits of NZ Addresses
Direct editing of NZ Addresses would increase the data reliability and confidence of users during a response that new developments are included.



Recent data improvements

Over 73,000 updates have been made to NZ Addresses in the past 12 months.

LINZ met with NZ Post several times over the last twelve months to discuss addressing, suburbs and opportunities for future collaboration.

Data improvement status of national address data is **Good**.



Suburbs



Agreed data improvement for 2024/25

LINZ to promote the NZ Suburbs and Localities change request process with councils by June 2025.



User story

NZ Suburbs and Localities was published in June 2023, and further work is required to ensure organisations including councils and NZ Post are aware of the online change request process to help improve this dataset.

Customers have requested improved suburb boundary alignment with property boundaries, for example in Marlborough where suburb boundaries have not been corrected after earthquakes impacted the region. This introduces doubt about data accuracy and provides incorrect results when using suburbs are used to filter data for example in an emergency response dashboard, as identified during Cyclone Gabrielle.



Customer data improvements requests

1. Accuracy – Align NZ Suburb and Localities boundaries with property boundaries.
2. Attributes – Add an estimate of day time population and dwelling counts to help better understand the resourcing required during an emergency.
3. Attributes – removing the named bays, originally provide by Fire and Emergency NZ would reduce the amount of detail in the suburbs and localities data and ensure a consistent approach is taken to recording water bodies.
4. Ready to respond – Creating a national geocoder, which can easily be used in ArcGIS Online, would support data cleaning and geocoding, and reduce the amount of work and time required at present. It would also support a national approach to geocoding.
5. Ready to respond – Work with emergency response agencies to create sector boundaries as a subset of suburb and locality boundaries.



Recent data improvements

LINZ hosted the first NZ Suburbs and Localities Change Request Review Panel in June 2024, which approved six minor changes and five major data changes.

Data improvement status of national suburbs data is **Good**.

Property



Agreed data improvement for 2024/25

LINZ to publish NZ Buildings to link property IDs to address, building and District Valuation Roll data by June 2025, available to all organisations with a govt.nz email.



User story

Rapid Building Assessments (RBAs) are carried out on all buildings impacted by a flood or earthquake. The RBA confirms whether the building is safe to enter and whether an owner can return to their home. Approximately 10,000 RBAs were carried out in the last 12 months, including 310 in Tairāwhiti. Building Inspectors, often brought in from other regions, are required to manually enter information including address, area, number of storeys, construction age, structure type and cladding type while onsite. This information is already collected by councils in their District Valuation Roll (DVR) and held by LINZ as a national dataset. Publishing DVR data and pre-populating the RBA forms will save time and improve data accuracy.



Customer data improvements requests

1. Ready to respond - Publish NZ Buildings (Pilot) to link property IDs to address, building and District Valuation Roll to improve accuracy and linking of data collected during a response, available to all organisations with a govt.nz email.
2. Accuracy – Resolve missing parcels in NZ Properties Hybrid (pilot) layer. Create a reliable national source of truth for property boundaries.
3. Attributes – identify farm boundaries to support rural communities in an emergency.



Recent data improvements

All 67 territorial authorities are now sharing their District Valuation Roll data with LINZ which has enabled the creation of NZ Property Hybrid (Pilot) data. In the last 12 months this data has been published

- with an open Creative Commons CC-BY licence on the [LINZ Data Service](#),
- with improved attribution including adding a Territorial Authority, and
- as an [ArcGIS REST service](#)

The Property Squad has also been working on property sales data.



Data improvement status of national property data has improved and is now **Good**.



Rapid Building Assessments



Agreed data improvement for 2024/25

MBIE to work with LINZ to investigate using property information in the online Rapid Building Assessment forms by June 2025.



User story

Rapid Building Assessments (RBAs) are carried out on all buildings impacted by a flood or earthquake. The RBA confirms whether the building is safe to enter. Approximately 10,000 RBAs were carried out in the last 12 months, with 310 in Tairāwhiti following Cyclone Gabrielle. Often building inspectors are brought in from other regions to carry out the RBAs. While onsite they are required to manually enter information including address, building ID, building area, number of storeys, construction age, structure type and cladding type. This information is already collected by councils in the District Valuation Roll (DVR) and held by LINZ as a national dataset. Publishing DVR data and pre-populating the RBA forms will save time and improve data accuracy.



Customer data improvements requests

MBIE's Rapid Building Assessments is a new dataset added to the key data improvement programme in October 2023. Feedback from the emergency management geospatial community identified the critical need to enable linking between RBAs, property IDs and the District Valuation Roll as providing significant improvements in terms of efficiency and accuracy.

Customer feedback also identified the need for access to a national Rapid Building Assessments dataset to provide an overview of both current and historic assessment results.



Recent data improvements

Online Rapid Building Assessment forms are now [available](#).

Data improvement status of national Rapid Building Assessments data is **Poor**.

Roads



Agreed data improvement for 2024/25

New Zealand Transport Agency (NZTA) to

- publish road status using consistent symbology recommended by GEMA, for both Journey Planner and TREIS by June 2025.
- investigate publishing a national view of road status for state highways and local roads by June 2025.
- publish the national network model of state highways and local roads by June 2025.



User story

Creating a national overview of unplanned road closures during an emergency is the biggest key data improvement opportunity. A national overview, including both state highways and local roads, is vital to identifying isolated communities, understanding potential evacuation routes and planning detours for essential services and fast moving consumer goods. Multiple datasets with no consistent approach across the 68 Road Controlling Authorities results in poor information to support first responders.

During Cyclone Gabrielle Road Controlling Authorities, road contractors and CDEM Intelligence Teams spent an unprecedented amount of time and effort attempting to piece together information about road status from texts, emails and marked up screenshots of Google Maps without knowing how current, accurate or reliable the information was. It took the NZ Herald to provide the first overview of the whole road network, combining state highways and local roads. This information was published on 23rd February, nine days after the national state of emergency had been declared.

The consequences of road closures to public safety and delivery of essential services across the country should not be underestimated. In one example where the Ashburton Bridge was closed during the Canterbury floods, lorries were detoured off the state highway and along local roads which were already closed, with the lorries stuck for hours without the ability to turn around.

Public officials refer to NZTA's Journey Planner website as providing the latest information on road closures in an emergency. The problem is the public are likely to interpret Journey Planner as identifying all local roads as open. The emergency management community report the status of state highways as being timely and accurately, but the data becomes inaccurate because it does not include local roads.

NZTA's Journey Planner is sets the standard of reporting closed roads as a black line. This is contrary to international emergency management standards which adopt the

traffic light system, with red being the colour used for identifying serious issues. Local CDEM groups have to adopt black for closed roads to maintain consistency, despite black not being visible when viewed over an aerial imagery.



Customer data improvement requests

1. Ready to respond - Combine state highway and local road unplanned road closures and publish with GEMA's recommended symbology.
2. Source of truth – provide guidance on how to capture unplanned road closures in an emergency to improve data accuracy and reduce the resourcing required for maintaining the data.
3. National coverage – requires both road centrelines and attributes for state highways and local roads to identify alternative and safe road detours.
4. Attribution – heavy vehicle status confirms if detours are appropriate for all vehicles.
5. Accuracy – rural roads are often not accurate which reduces the value of the data.
6. Update – update programme is not known which reduces confidence in the data.
7. Topology – routable network would enable analysis to identify safe evacuation routes
8. Licence – adopt CC-BY licence to enable data sharing with all response agencies.
9. Services – ArcGIS REST and OGC WFS webservice road data would be easier to share.
10. Metadata – publish with agreed metadata for emergency management ([Appendix C](#)).



Recent data improvements

Good progress has been made with the creation of the multi modal transport network, with the first 17 Road Controlling Authority data becoming available on the NZTA Open Data Portal by July 2024, with the remainder scheduled for June 2025.

GEMA guidance for [road status](#) in an emergency has been shared with NZTA and the AMDS Team.

Data improvement status of national roads data is **Poor**.



Rail



Agreed data improvement for 2024/25

KiwiRail to publish freight line and ferry disruptions and maintenance status and document process for using this data in an emergency by December 2024.



User story

The rail network datasets published by KiwiRail remains the key dataset considered most fit for purpose by the emergency management community. This is in large part due to the GIS team at KiwiRail being very responsive to customer requirements and using the data within their own organisation.

The remaining improvements focus on providing additional information specific to emergency events. An indication of track status is important for logistics planning to move essential goods between main ports in the North and South Islands to ensure continuity of the supply chain to all regions of New Zealand.



Customer data improvement requests

1. Ready to respond – provide rail track status and passenger numbers as useful information to inform emergency responders considering evacuation of passengers.
2. Accuracy – provide additional information about the location of rail buildings



Recent data improvements

Have federated internal data to build an interactive schedule dashboard for KiwiRail freight and Interislander commercial vehicle customers, which is currently going through user acceptance testing.

No recent data improvements, noting the rail network data is already considered very good and KiwiRail's priority is reinstating the rail network following Cyclone Gabrielle.

Data improvement status of national rail data is **Very Good**.

Rivers & Catchments



Agreed data improvement for 2024/25

NIWA to identify funding opportunities to enable the creation of a national, easy to use GIS layer based on the latest River Environment Classification for named rivers and catchments by June 2025.



User story

Rivers and catchments provide important points of reference during most emergency events as they define physical access and help describe where people are and how they are connected. It is one of the first datasets used by Search and Rescue to help identify a missing person.

One of the worst hit areas during Cyclone Gabrielle was flooded by the Esk River. Without river names it is impossible for someone outside the area to search for and locate this priority area.

The May 2021 Canterbury floods impacted the smaller catchments in lowland areas, including Ashburton and Selwyn, where there was heavy, localised rain. The larger catchments including the Rakaia, with headwaters in the Southern Alps were less affected, and so it was important to know catchment names and their extents.

NIWA's latest river data – River Environment Classification REC3 - does not have a name, and the pilot river name layer provided by LINZ is a cartographic product with many gaps in the linework. Without named rivers and catchments there is a missing link in key information used to inform a common operating picture.

Regional councils often hold detailed river and catchment data, but the wide range of data sources, formats and access means it is difficult and time consuming to build and maintain a national picture.

An easy-to-use GIS layer for both rivers and catchments, based on the hydrological modelling of NIWA's River Environment Classification, which including names is one of the most significant opportunities for improvement for the key datasets.



Customer data improvement requests

1. Ready to respond - Create easy to use GIS layers based on REC3 with names for national rivers and catchments
2. Attribution – add territorial authority name to enable filtering of river and catchment data.

3. Accuracy – Update named river network and catchments based on REC3 and LiDAR to provide the most accurate and current river network.
4. Update – Update programme is not known.
5. Download – Named river network and catchments are not available for download.
6. National coverage – include all rivers and catchments, including offshore islands
7. Source of truth – Council river and catchments data are used more frequently than NIWA data.

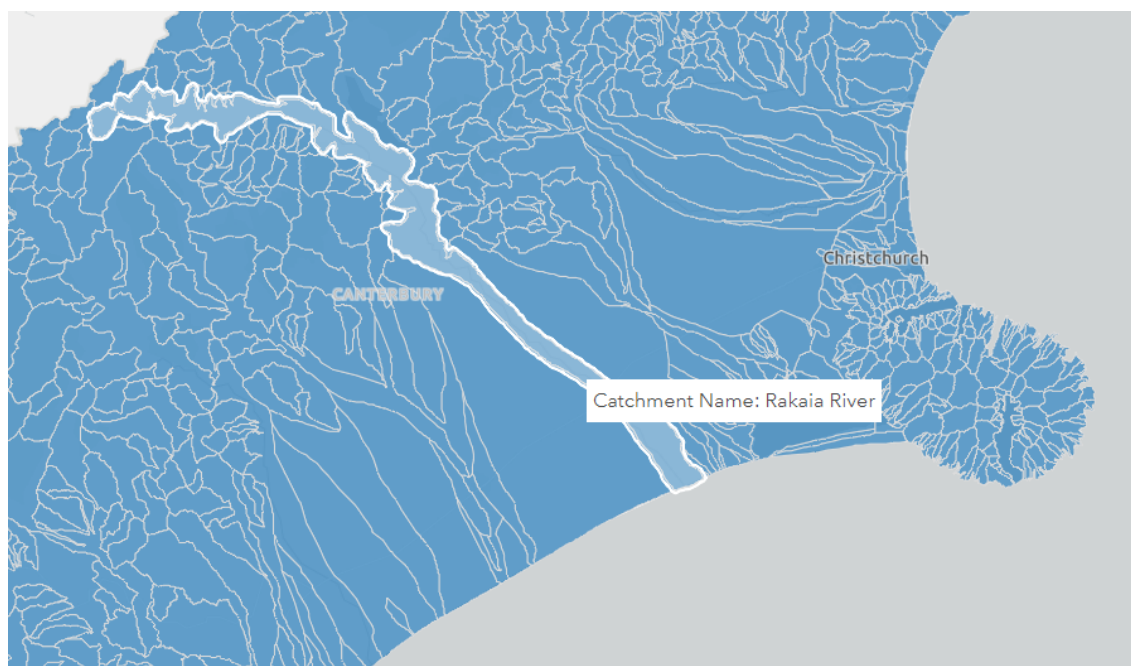


Recent data improvements

NIWA have created and published an improved hydrological model (REC3) based on the latest LiDAR, however river and catchment names have not been transferred.

Named rivers remains available for REC2 from the NIWA data portal.

Data improvement status of national river and catchment data is **Average**.



The Rakaia River catchment was less impacted during the Canterbury Floods in May 2021 because the catchment stretched back into the Southern Alps and only had a small area in the lowlands, compared to the neighbouring Selwyn Plains. Named catchments are critical to understanding this picture. Data supplied by Environment Canterbury.



Imagery



Agreed data improvement for 2024/25

LINZ, MBIE and NEMA to investigate and present options for streamlined funding for imagery in an emergency by June 2025.



User story

Satellite imagery can provide an important source of information in the early stages of a response, particularly when it is used to extract information such as flood extents. There are many considerations a first responder needs to be aware of including cost, resolution, frequency, extents, optical or radar, processing and hosting options. A guidance document which provides an overview of potential suppliers and the different options depending on the type of emergency event would help improve the capability and confidence to use and fund satellite imagery capture during an emergency.



Customer data improvements requests

1. Ready to respond - guidance for requesting imagery, including satellite imagery during an emergency has been published in draft and is currently being reviewed.
2. Funding – centralised, coordinated funding for imagery in an emergency would save a significant amount of time during a response, ensuring data is captured during critical weather windows to support response and recovery.
3. Webservices – provide instructions for adding LINZ Imagery Basemap to ArcGIS Online to ensure it is easy to use imagery captured during a response.
4. Accuracy – align the LINZ and Eagle imagery basemaps, ordering by date and resolution to ensure consistency and to avoid doubt in an emergency.
5. Attributes – Add place name, road name and river name labels to LINZ Basemaps to provide important context.
6. Attributes – Imagery is collected with infrared band, but LINZ only publish RGB. RGBI would enable analysis of change assessments following an event.
7. Update – a known aerial imagery update programme would improve confidence in decision making if there is certainty that the latest information is being used.
8. Metadata – publishing the LINZ Imagery Basemap index as an ArcGIS REST service would improve confidence in decision making to better understand the likelihood of change since the imagery was captured.

9. Discoverable – add further historical imagery from RetroLens to LINZ Basemap to enable assessments of land change and help inform response and planning.
10. National source of truth – many agencies refer to the Eagle Technology imagery basemap as the source of truth. It may help agencies to know the Eagle Technology imagery is sourced from Regional Councils and LINZ.



Recent data improvements

Guidance for requesting imagery during an emergency has been published and is currently being reviewed.

Emergency Imagery Catalogue has been created in ArcGIS Online to make imagery easier to discover and add to ArcGIS.

50 aerial imagery datasets and three satellite imagery datasets have been published on the LINZ Data Service and/or LINZ Basemaps since June 2023. This includes over 68,000 sq. km of imagery captured as part of the North Island Severe Weather Events recovery.

226 historical imagery datasets have been sourced from RetroLens, georeferenced for Ministry for Primary Industries and published on LINZ Basemaps.

Anyone can now access the original imagery via Amazon Registry of Open Data. This includes Eagle Technology which is helping maintain the Esri NZ Imagery basemap.

Four Regional Councils set up to share data with LINZ via SFTP in an emergency and LINZ ran an imagery road show to connect with individual Regional Councils.

Data improvement status of national imagery data is **Average**.

Opoitiki Harbour Development

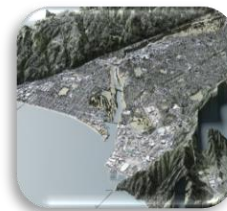


Eagle basemap 0.1m 2018



LINZ basemap 0.2m 2022

Customer screenshots highlight the different LINZ and Eagle Technology imagery basemaps.



Elevation



Agreed data improvement for 2024/25

LINZ to publish a national hillshade and one metre national Digital Elevation Model (DEM) on the LINZ Data Service by June 2025.



User story

The emergency management community need easier access to the latest LiDAR data available. Preparing a national Digital Elevation Model (DEM), Digital Surface Model (DSM), contours and hill shades of the best available information, would give emergency responders the confidence they were making decisions based on the latest information when understanding the slope of land within an area of interest. As an example, Fire and Emergency NZ have compared the DEM and DSM to determine building heights to help deploy appropriate appliances for buildings over nine metres.



Customer data improvements requests

1. Webservices - Publish a national Digital Elevation Model, Digital Surface Model, contours and hillshade derived from the latest data, for use in ArcGIS Online.
2. National coverage – Good progress with capturing national coverage of LiDAR in New Zealand, but funding must be identified to complete the gaps in Manawatū-Whanganui, Otago and Southland.
3. Update – maintenance programme is not known or resourced beyond additional areas impacted by Cyclone Gabrielle with funding provided as part of the recovery.



Recent data improvements

Twenty LiDAR datasets have been published since June 2023, taking national coverage from 55% to 70% over this time. This includes over 14,000 sq. km of additional LiDAR captured as part of the North Island Severe Weather Events recovery.

LiDAR is included in the requesting imagery during a response guidance [document](#).

The latest information on LiDAR availability, case studies, user guides and visualisations are available via [Elevation Aotearoa](#), which is recognised as a valued resource by the emergency management community.

Data improvement status of national elevation data is **Good**.



Topo Maps



Agreed data improvement for 2024/25

LINZ to make the Topo50 Map Series easy to discover and access in ArcGIS Online by September 2024.



User story

Topo50 and Topo250 maps remain highly trusted by the NZ Defence Force as a dataset which is authoritative and consistent across New Zealand, which form the base standard for planning, operations and exercises.

Topo50 maps were widely used at the start of Cyclone Gabrielle to provide an overview of the scale of the event, and to quickly provide important context at a regional level from a single data source. In Tairāwhiti and Hawkes Bay where power and communications were an issue in the first days of the response, paper topo maps were marked up to build a picture of the impact.

The current LINZ Topographic Basemap tile service cannot currently be used in ArcGIS Online, and does not have sufficient detail and labels at a regional scale to be as effective as the Topo50 maps. The Esri Topo Basemap is widely used by the emergency management geospatial community to help inform their decision makers.



Customer data improvements requests

1. Create a Topographic Basemap that is easy to use in ArcGIS Online
2. Publish greyscale version of the Topographic Basemap to make it easy to display and interpret operational data during an emergency.



Recent data improvements

126 NZTopo50 map sheets and four NZTopo250 map sheets have been updated during 2023/24.

The Topo team have also completed the road spatial accuracy improvement project. [NZ Road Centrelines](#) (Topo, 1:50k) is now available at close to two metre accuracy.

Looking ahead, LINZ is considering the future of topo maps to ensure they remain fit for purpose for emergency response, as the current technology platform is replaced.

Data improvement status of national topo data is **Good**.



Coastline



Agreed data improvement for 2024/25

LINZ to publish NZ Coastline – Mean High Water Springs by December 2024.



User story

An accurate and reliable national coastline which is maintained using the latest available information is critical to improving our understanding of the impacts of climate change and inundation across the country, and to improve modelling and forecasting, for example to inform managed retreat.

Mean High Water Springs is the preferred coastline definition as it is referenced in resource management planning and cadastral surveying and most likely to be used by Councils and CDEM groups, for example when creating tsunami evacuation zones.



Customer data improvements requests

1. Accuracy – Publish Mean High Water Springs as this is the coastline used most frequently to model climate change, sea level rise and inundation.
2. Ready to respond – Publish nautical charts as an ArcGIS REST service. A number of agencies, including [Maritime NZ](#), NIWA, multiple Regional Councils, universities, and the Australian Hydrographic Office, publish New Zealand navigation charts in ArcGIS Online. These duplicate copies are confusing with no authoritative source.
3. Attribution – improve attribution of coastal environment. NZ Coastline Mean High Water has some attribution to describe the type of coastline e.g. rocky or sandy shoreline. This should be extended around the whole coastline to inform marine search and rescue deployment options and oil spill responses.
4. Update – NZ Coastline – Mean High Water does not currently have a data maintenance programme. Frequent updates are critical for areas with high rates of change to better understand the consequences of climate change.



Recent data improvements

The process for capturing Mean High Water Springs has been revised to enable customers to generate a local coastline while the national coastline is prepared.

LINZ has received \$30.2 million funding to capture improved data for up to 40% of the New Zealand coastline as part of the 3D Coastal Mapping [programme](#).

Data improvement status of national coastline data is **Good**.

Place Names



Agreed data improvement for 2024/25

LINZ to publish Ngā Pou Taunaha o Aotearoa’s New Zealand Gazetteer place names as an ArcGIS REST service by September 2024 and improve display of place names by June 2025.



User story

Defining an area of interest provides important intelligence during an emergency response, when it is vital to be able to share the location of impacted areas, damaged infrastructure and isolated communities with multiple agencies. Place names help to quickly and accurately identify a location, and to communicate directions to support deployment from out of town with no local knowledge.

The Place Names Gazetteer contains official and unofficial place names under the jurisdiction of the New Zealand Geographic Board Ngā Pou Taunaha o Aotearoa (the Board). Official place names are those that have been assigned, altered, adopted, approved, and validated under the Board’s Act 2008 or through other statutes that assign official names, for example, Treaty settlement legislation. Unofficial recorded place names are those that have not been processed under the Board’s Act 2008 or through other relevant statutes. Data is extracted from ‘New Zealand Gazetteer of Official Geographic Names’, which is maintained by the Board’s Secretariat.

The emergency management geospatial community have requested access to the NZ Gazetteer as an ArcGIS REST service. LINZ publishes other place name datasets on the LINZ Data Service, for example NZ Geographic Names (Topo 1:50k) and the emergency management geospatial community have also requested support with how and when to use the different place name datasets.

Customer data improvements requests

1. Format - Publish NZ Gazetteer place names as an ArcGIS REST service.
2. Attribution – Publish NZ Gazetteer place names with attribution that establishes a drawing hierarchy scale.
3. Discoverability – Publish NZ Gazetteer place names on Esri’s Living Atlas or data.govt.nz.



Recent data improvements

An ArcGIS REST service of NZ Gazetteer place names has been prepared, however presenting this at an appropriate scale requires further investigation.

Data improvement status of national place names data is **Good**.

Next Steps

Regular updates on the key data improvement priorities outlined in the Executive Summary will be prepared in collaboration with the lead agencies and shared with the LINZ Location Information Leadership Team, LINZ Kaihautū Leadership Team, Minister for Land Information, key data lead agencies, partner organisations and customer representatives.

An annual report collating the data improvements over the previous 12 months will be prepared in July 2025 and will be available from the LINZ website.

Please share any feedback on the key data improvement programme with the team at resilience@linz.govt.nz

Appendix A: Geospatial Emergency Management Community Engagement

Workshops

- Top of the South flood debrief (Aug 2022) and key data workshop - 10/05/23
- Geospatial Special Interest Group key data update - 12/05/23
- Hawke's Bay Cyclone Gabrielle debrief (Feb 2023) and key data workshop - 08/06/23
- Tairāwhiti Cyclone Gabrielle debrief (Feb 2023) and key data workshop – 01/08/23
- Geospatial Special Interest Group data improvement plan review - 18/09/23
- GEMA data improvement plan review - 21/09/23
- Key data lead agency data improvement plan review - 21/09/23

Interviews and Conversations

Regional

- Northland Regional Council – Anya Duxfield – 21/08/23
- Auckland CDEM - Camilo Roja Sorrego - 12/07/23
- Waikato Regional Council and CDEM – Derek Phyn and Jeff Graham - 05/09/23
- Bay of Plenty Regional Council - Glen Clarkin and Kate Waterhouse - 27/07/23
- Hawke's Bay Regional Council – Tim Farrier – 02/08/23
- Hawke's Bay CDEM – Teira Cowan – 07/08/23
- Gisborne District Council – Orlo Dennison – 23/08/23
- Taranaki CDEM - Val de Feo - 13/07/23
- New Plymouth District Council - Jake Hechter - 13/07/23
- Horizons Regional Council – Nathan Batchelor – 24/08/23
- Marlborough District Council - Malcolm Jacobson and Matt Henderson - 17/07/23
- Tasman District Council – Sam Flewitt – 14/08/23
- Environment Canterbury – Maurice Wills – 14/08/23
- Canterbury CDEM – Steve Ferris – 24/08/23
- Otago Regional Council – Ingrid Darragh and Gareth Andrews – 10/08/23

National

- NEMA – Charlie Blanch and Kate Burns – 04/09/23
- Fire and Emergency NZ – Hamish McEwen and Phil Woods – 08/08/23
- NZ Police – Sarah Hodgson – 08/09/23
- Defence – John Donaldson – 16/05/23
- Ministry of Primary Industries – Phillip Lubeck – 07/08/23
- Toka Tū Ake Earthquake Commission (EQC) – Richard Woods – 21/08/23
- Kainga Ora – Sam Keast – 01/08/23

Stakeholders

- Eagle Technology - Ed Cook - 06/07/23
- Tonkin + Taylor – John Carter – 16/08/23
- Transpower – Blaine Morch and Leo Lui – 21/08/23

Appendix B: Key dataset assessment criteria

Criteria	Definition
complete national coverage	Complete national coverage includes North Island, South Island, Stewart/Rakiura Island, Chatham Islands and populated coastal islands of New Zealand.
relevant data attributes	Information associated with a spatial feature, which is necessary to inform decision making related to emergency management and climate change
adequate level of accuracy	The scale of data capture is known and recorded, which is appropriate to inform decision making related to emergency management and climate change
acceptable update programme	A known and planned update frequency, which is appropriate for emergency management and climate change given the expected frequency of change.
suitable topology	The data is available as point, line or polygon. Lines are contiguous and can form a network, polygons are discrete and do not overlap.
relevant metadata	All metadata fields are recorded to meet the agreed Metadata Content Guidance (Appendix C)
free to access	Cost is not a barrier to accessing the data.
Creative Commons License - CC BY	Licensing is not a barrier to accessing, and reusing the data, including for commercial purposes.
suitable formats for download	Data is available to download in a minimum of two formats. Preferred formats are Esri and an open format.
webservice	Vector data as both OGC WFS and ArcGIS REST service Raster data as both OGC WMTS and ArcGIS Imagery Tile Service
discoverable	Data is easily identified and described after a keyword search on data.govt.nz or Esri's Living Atlas
performance	Speed of download or speed of webservice is acceptable.
national source of truth	The authoritative, reference dataset at a national scale. Local versions may be more uptodate, but the best available data for the whole of New Zealand.
ready to respond to an event	Data has been prepared specifically to enable an efficient and effective response to an emergency event

Appendix C: Metadata

Minimum requirements for metadata for resilience and climate change key datasets

Metadata element required	Definition	Example
Dataset name	Name by which the data is known.	NZ Property Titles
Unique identifier	Unique reference ID specific to the metadata record, often automatically assigned.	2d28e0af-c177-628b-d667-22b15b648d55
Source	Name of organisation responsible for the metadata.	LINZ - Land Information New Zealand
Source contact information	Contact details for enquiries relating to the data. Include name, phone number or email.	customersupport@linz.govt.nz
Date created - dataset	Date data was first created.	2018-11-20
Date created – metadata	Date metadata record was created / last updated.	2018-11-20
Last updated - dataset	Date the data was last updated.	2024-08-20
Description	An abstract of additional information about the content of the data used to assess usefulness of the resource.	This dataset provides title information (excluding ownership) where there is a relationship to one or more primary parcels. Refer to full description of this data. https://data.linz.govt.nz/layer/50804-nz-property-titles/

Extent	The geographic location the data applies to, often defined by the coordinates of the 4 corners of the bounding box that covers the extent of the dataset.	166.688755883 -175.833301833 -47.2899925167 -34.12963565
Coordinate (reference) system	Name or identification code for the coordinate reference system to which the data is associated. New Zealand Geodetic Datum (NZGD) 2000 is: 4167	4167
Spatial representation type	The method used to spatially represent the data e.g. point, line, polygon, polyline, raster, vector, TIN (Triangulated Irregular Network).	polygon
Method of collection	Description of the sources and processes used to produce the data.	The function of the Registrar-General of Land is to provide a system, whereby the ownership of land can be legally evidenced, under which dealings with it can be affected and recorded Refer to method of collection example https://data.linz.govt.nz/layer/50804-nz-property-titles
Purpose	Summary of the intended use of the data, including why it was created and the uses it has been designed for.	This layer provides title information (excluding ownership) where there is a data link to one or more primary parcels.
Dataset attribution	Description of each attribute.	This information is provided in the accompanying document: property-and-ownership-simplified-tables-data-dictionary.pdf
License	Access and use constraints applied to the data	Creative Commons Attribution 4.0 International

Appendix D: 2023 Key Data Assessment



More information about data improvements introduced since 2019 available from Key Data Improvement [Story Map](#).

Number of data improvement requests:



< 3
Very Good



< 5
Good



< 9
Average



10+
Poor



New datasets
not scored