MINISTRY OF EDUCATION
TE TĀHUHU O TE MĀTAURANGA

An introduction to the updated Isolation Index for schools and kura

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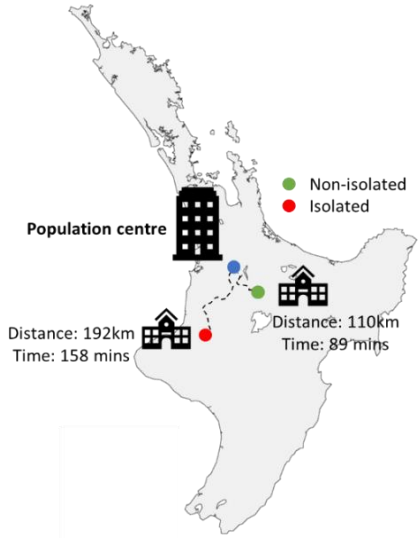
What is the Isolation Index?

First introduced in 2002, the Isolation Index determines the relative isolation of schools and early learning services. It tells us how isolated each school and service are by measuring how far away they are from population centres of up to three different sizes that have a range of goods and services required to operate and deliver the curriculum.

New Zealand's geography means that schools and early learning services are widely dispersed, and some are long distances from population centres. Isolation can mean that there are additional costs that schools and services face. For example, it can be further for staff and learners to travel and there are additional costs for accessing goods and services such as an electrician, a plumber and professional development services. To recognise these additional costs, we provide additional funding so that these schools and services can operate and deliver the curriculum. The Isolation Index helps us identify these schools and early learning services.

The Isolation Index for schools is being updated in 2023 to reflect changes in New Zealand over the last 20 years

Figure 1. Example of an isolated and non-isolated school relative to a population centre



We are updating the Isolation Index for schools in 2023. The Ministry is currently reviewing isolation funding for early learning services, and the new Isolation Index formula will apply to early learning in the future.

The Isolation Index has been calculated based on 2001 population and road data since it was first introduced. Since 2001, New Zealand's population has increased, and infrastructure improvements have made travel faster and easier. This has lessened the relative isolation of some schools. Moderate sized towns are now better able to provide the goods and services needed by schools and some services that previously required travel time can be conducted digitally. However, isolation has also increased for some schools, especially in small towns when the services they rely on are no longer available locally.

Schools receive an Isolation Index between 0.1 and 6.63[1]. The higher the number, the higher the relative isolation of the school.

How does the Isolation Index relate to school funding?

A school's Isolation Index number determines their eligibility and affects the funding calculations for some school funding components. These include Targeted Funding for Isolation and a top up for some property related funding, including 5 Year Agreement Funding and the Property Maintenance Grant. You can find more information about these components on our website.

The Isolation Index is also used to determine eligibility for the Voluntary Bonding Scheme. Some other allowances in teacher collectives (for example, the Isolation Allowance) use isolation as a form of eligibility, however these are not linked to the Isolation Index and will not be changing as a result of the updated Isolation Index.

[1] This is based on the updated scale of the Isolation Index in place from 2023. It excludes the three Chatham Island schools which are allocated notional Isolation Index values outside of the range of the index for other schools due to their extremely isolated location.

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What are the changes to the Isolation Index?

The latest available population data is used

The Isolation Index is being updated with 2018 population data from the census. The Isolation Index will be recalculated following each census so that the latest available population data is used.

Travel time is now included as a measure of isolation

We are now able to include travel time as well as distance when calculating isolation. We know that steep windy roads increase isolation and tradespeople providing services to isolated schools often charge for both time and distance. The previous version of the Isolation Index only used distance as a measure of isolation, and the inclusion of travel time is a significant change which will better reflect the actual isolation experienced by schools and kura.

Updated road data is used to calculate distance and travel time

Distance and travel time analysis is being updated using 2020 road data. This means new roads and road changes are included to reflect the significant changes in infrastructure over the last 20 years. Road data will be updated alongside population data after each census.

The largest population centre size is reducing from 100,000 to 60,000

The Isolation Index recognises that a schools' isolation increases relative to its distance and travel time from population centres of 5,000, 20,000 and 60,000. The revised population centre sizes better reflect where isolation is more strongly felt.

Many towns and cities have grown over the last 20 years, and we now have more population centres with over 100,000 people. The link to the 100,000 sized population centre in the old version of the Isolation Index meant that some schools appeared isolated, even though there were relatively large population centres nearby. This had the effect of skewing resourcing away from the most remote schools and kura. For example, areas such as Nelson / Richmond appeared to be isolated as the closest population centre over 100,000 is Christchurch. Population centres of 60,000 are generally considered to be able to provide all the goods and services needed by schools (more so than 20 years ago).

The minimum eligibility threshold for isolation-based resourcing for schools is updating to 1.27 to reflect the new scale of the Isolation Index

Due to the updates to the Isolation Index formula as described above, the scale of the index has changed. This means old and new isolation numbers are not directly comparable. For example, a 1.5 under the old Isolation index is not the same as a 1.5 under the updated Isolation index. A lower Isolation Index does not necessarily mean that a school has become less isolated. However, in some cases, population growth and roading and infrastructure improvements over the last 20 years since the Isolation Index was last updated mean some schools' level of isolation has reduced.

The eligibility threshold for Targeted Funding for Isolation, a school operational grant component of approximately $9.1m per year is being updated to 1.27 to reflect the new scale. This ensures that a similar number (approximately 20 per cent) of schools are eligible for this funding.

We are currently working through how the updated Isolation Index will apply to the Property Maintenance Grant, 5 Year Agreement Funding and the Voluntary Bonding

Table 1. Isolation Index comparison of scale, average and minimum eligibility threshold

	Old Isolation Index	New Isolation Index
Scale	0.01 – 7.10	0.01 – 6.63
Mean	0.91	0.75
Median	0.71	0.41
Minimum eligibility threshold	1.65	1.27

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Transition to the updated Isolation Index and the Equity Index

The Equity Index (EQI) and updated Isolation Index are being implemented at the same time to reduce the burden of change on schools. We have developed a specific transition approach for these indices because:

- Similar to previous decile or Isolation Index recalculations, a schools' operational funding is likely to change as a result of the updates. This shift can be significant and exacerbated by how old both the current deciles and Isolation Index values are.
- The EQI is an entirely new methodology creating an additional shift, as we consider more variables at the individual level.
- As outlined above, the Isolation Index also includes significant methodological changes, which mean we have a different understanding of where the effects of isolation are most strongly felt.
- Similar to previous decile recalculations, we are putting transition arrangements in place to ensure the change is manageable, sustainable and feasible for schools and kura.
- This transitions support is phased over a longer period of time than previous decile recalculations (up to four years for some schools based on current modelling). This recognises the large change that has been many years in the making.

What will happen when both Indices are implemented?

When these Indices are implemented, it will impact a number of schools' operational grant funding components:

1. Targeted Funding for Educational Achievement
2. Targeted at Risk Grant
3. Special Education Grant (being renamed Support for Inclusion Funding from 2023)
4. Careers Information Grant
5. Targeted Funding for Isolation
6. Property Maintenance Grant (isolation component)

Where can schools and kura find out more about the transition?

You can find out more about the transition approach on our website. Schools and kura will also receive letters in September 2022 about what the changes mean for their 2023 funding rates and, if applicable, the details of any transition support they will receive.

Note that the transition to using the updated Isolation Index for the Property Maintenance Grant, 5 Year Agreement Funding and the Voluntary Bonding Scheme will be managed separately from other operational grant changes. There will be a plan in place to transition schools to their new level of funding where applicable. Schools will hear more about these changes later in 2022.

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How is the Isolation Index calculated?

The Isolation Index formula

The Isolation Index is calculated for schools on the North and South Islands using the formula below.

$$\frac{(0.8 \times d5) + d20 + (0.4 \times d60) + (0.8 \times t5) + t20 + (0.4 \times t60)}{200} = \text{Isolation Index}$$

Where:

d5 = distance in km to population centre of at least 5,000 people

t5 = driving time in minutes to population centre of at least 5,000 people

d20 = distance in km to population centre of at least 20,000 people

t20 = driving time in minutes to population centre of at least 20,000 people

d60 = distance in km to population centre of at least 60,000 people

t60 = driving time in minutes to population centre of at least 60,000 people

Other notes

- Where the nearest population centre to a school (or the population centre it is located in) has 60,000 inhabitants it is counted as the 5,000, 20,000 and 60,000 population centres.
- If the nearest population centre has 20,000 inhabitants it counts as both the 5,000 and the 20,000 population centres.
- A school could be measured to up to three different population centres.

Information on road data and travel time and distance calculations

How are distance and travel time calculated?

Distance and time are calculated independently by a specialist Geographic Information Systems company. Distance is measured on the fastest route over navigable public roads, and time reflects an average of the actual speed when driving between locations using the same roads as the distance calculation. It does not take into account time of day differences or day to day changes in road conditions.

Both travel time and distance are given equal value in calculating isolation. This is to reflect the fact that some roads are much more difficult to drive on, and therefore the effective isolation is higher.

In general, when considering roads with lower travel speeds, alternate routes with higher speeds will be chosen instead unless the route represents a significant short-cut and shorter travel time.

Where are the measurements to and from?

The location of each school is defined by its longitude and latitude. Distance and travel time are measured to the centre point (usually the central post office or its former location) of the closest population centre of the appropriate size.

Where is road data sourced from?

The road data used to calculate distance and travel time is sourced from local authorities across New Zealand and also government agencies including NZTA. A series of business rules are applied to ensure data is treated consistently. It is managed by the specialist Geographic Information Systems company.

Road speed classifications

Roads are classified into five speeds. The nominal speed is always less than the speed limit. Road sections are allocated to the groups according to a combination of the road surface, the windy-ness, the type of road (motorway, roundabout, back road etc.). In general, in urban areas the speed is calculated at an average of 35 km/h unless there are motorways. Typically, in rural areas, the following principles apply:

- Straight, sealed, roads will have an average speed = 80 km/h
- Windy, sealed, roads will have an average speed = 60km/h
- Straight, metalled roads will have an average speed = 60km/h
- Windy, metalled roads will have an average speed = 35 km/h

Other information

- Forestry roads are excluded from the calculation.
- Private roads are also excluded in most cases. However, there may be cases where a school site is accessed from a private road. In these cases, the necessary connecting private roads will be added to ensure routing to the population centres is possible.

Information on population centres

How is a population centre defined?

The phrase “population centre” is used rather than “town” or “city” as local authority administrative boundaries vary across the country. In the first instance, the population centres used in the Isolation Index are defined as the urban areas from census 2018[2]. Additionally, the following are treated as single urban areas:

- Nelson / Richmond (1 reference point)
- Napier / Hastings (2 reference points)
- Auckland (4 reference points)
- Wellington (4 reference points)

Please refer to Appendix 1 for the full list of population centres used in the Isolation Index.

Larger urban areas are broken into zones for the purposes of the Isolation Index

The urban areas have been broken into zones mostly based on former or current administrative boundaries. When schools are measured to the urban areas broken into zones, they are measured to the central point of the zone nearest to them. Table 2 overleaf shows the urban areas that have multiple zones.

[2] Statistics NZ defines urban areas as “statistically defined areas without administrative or legal basis”.

Table 2. Urban areas with multiple measurement points

Urban Area	Measurement points
Wellington Four zones:	Lower Hutt Porirua Upper Hutt Wellington
Auckland Four zones:	Central Auckland Zone Northern Auckland Zone Southern Auckland Zone Western Auckland Zone
Hawkes Bay Two zones:	Hastings Napier

Other information

- There is consistent treatment of outlying communities across the country. Outlying communities are not included in the population count of the combined urban area, even if they are within the city or regional boundaries. If they are large enough, they will count as population centres of 5,000 or 20,000. This avoids more remote communities being defined as not isolated due to their relative proximity to the outlying communities of an urban area.
    - For example, Cambridge and Te Awamutu are treated as separate population centres from Hamilton due to their small size combined with their distance from Hamilton. This is consistent with the treatment of outlying communities for Wellington for example, where Kāpiti is a separate population centre.
    - Places that are often thought of as separate towns may legally be part of a larger city or urban area. For example, Havelock North is part of Hastings. Other smaller towns may be separate towns in a regional council area and have their population listed separately. The population areas grouped together in councils and the population areas that are separate is based on history rather than a consistent policy based on size.
- These settings are managed independently by a specialist Geographic Information Systems company to ensure the consistency of the definition of population centres across New Zealand.

The Isolation Index calculation for schools on offshore islands

Schools on offshore islands are allocated a notional Isolation Index value

The Isolation Index calculation is only performed for schools in the North and South Islands. Therefore, the schools on the following offshore islands are allocated a notional Isolation Index value:

- Chatham Island and Pitt Island
- Great Barrier Island
- Matakana Island
- Rakiura Stewart Island
- Waiheke Island

When the Isolation Index was first introduced in 2002, notional values were set for offshore islands. The values were set based on an assessment of the costs, time, and distances involved in accessing the goods and services schools need to operate and deliver the curriculum. This information was benchmarked against mainland schools that experience similar additional costs because of their isolation, where they exist.

We do not consider that there have been significant changes in the relative isolation levels of schools on offshore islands compared to mainland schools over the last 20 years. However, as the updated Isolation Index uses different size population centres, this means the scale of the index has changed, and school index values are different.

As a result, offshore islands have been allocated a new notional Isolation Index value. This was calculated by looking at the difference between the old and new Isolation Index values for similarly isolated mainland schools. This difference was then applied to the old Isolation Index values for offshore islands.

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Appendix 1 - List of population centres used in the Isolation Index calculation

Population centre (urban area)	Population centre measurement point	Urban area: size	Size for Isolation Index
Auckland	Central Auckland Zone	457,665	60,000+
Auckland	Southern Auckland Zone	451,533	60,000+
Auckland	Northern Auckland Zone	293,142	60,000+
Auckland	Western Auckland Zone	216,120	60,000+
Christchurch	Christchurch	380,715	60,000+
Wellington	Wellington Zone	201,774	60,000+
Hamilton	Hamilton Zone	170,337	60,000+
Tauranga	Tauranga	140,439	60,000+
Dunedin	Dunedin	115,503	60,000+
Wellington	Lower Hutt Zone	103,530	60,000+
Palmerston North	Palmerston North	80,175	60,000+
Nelson	Nelson	64,284	60,000+
Hawkes Bay	Hastings Zone	64,125	60,000+
Hawkes Bay	Napier Zone	62,628	60,000+
Rotorua	Rotorua	59,088	20,000+
New Plymouth	New Plymouth	55,503	20,000+
Wellington	Porirua Zone	55,209	20,000+
Whangarei	Whangarei	52,425	20,000+
Invercargill	Invercargill	47,625	20,000+
Kapiti	Kapiti	43,161	20,000+
Upper Hutt Zone	Upper Hutt Zone	41,313	20,000+
Wanganui	Wanganui	39,732	20,000+
Gisborne	Gisborne	34,533	20,000+
Blenheim	Blenheim	30,768	20,000+
Pukekohe	Pukekohe	28,935	20,000+
Timaru	Timaru	27,504	20,000+
Taupo	Taupo	24,117	20,000+
Masterton	Masterton	19,821	5,000+
Ashburton	Ashburton	19,287	5,000+
Levin	Levin	19,188	5,000+
Whakatane	Whakatane	18,993	5,000+

Cambridge Zone	Cambridge Zone	18,642	5,000+
Rangiora	Rangiora	17,853	5,000+
Rolleston	Rolleston	17,535	5,000+
Feilding	Feilding	15,990	5,000+
Te Awamutu Zone	Te Awamutu Zone	15,009	5,000+
Queenstown	Queenstown	14,664	5,000+
Tokoroa	Tokoroa	13,575	5,000+
Oamaru	Oamaru	13,101	5,000+
Hawera	Hawera	11,037	5,000+
Wanaka	Wanaka	9,552	5,000+
Gore	Gore	9,543	5,000+
Waiuku	Waiuku	9,180	5,000+
Greymouth	Greymouth	9,153	5,000+
Te Puke Community	Te Puke Community	8,697	5,000+
Waiheke Island	Waiheke Island	8,454	5,000+
Motueka	Motueka	8,007	5,000+
Huntly	Huntly	7,914	5,000+
Matamata	Matamata	7,812	5,000+
Morrinsville	Morrinsville	7,755	5,000+
Thames	Thames	7,278	5,000+
Kerikeri	Kerikeri	7,158	5,000+
Kawerau	Kawerau	7,140	5,000+
Waitara	Waitara	6,930	5,000+
Lincoln	Lincoln	6,516	5,000+
Otaki	Otaki	6,321	5,000+
Kaitaia	Kaitaia	5,859	5,000+
Stratford	Stratford	5,781	5,000+
Cromwell	Cromwell	5,619	5,000+
Warkworth	Warkworth	5,583	5,000+
Dannevirke	Dannevirke	5,508	5,000+
Whitianga	Whitianga	5,499	5,000+
Alexandra	Alexandra	5,466	5,000+
Waihi	Waihi	5,388	5,000+
Carterton	Carterton	5,334	5,000+
Marton	Marton	5,259	5,000+
Katikati	Katikati	5,001	5,000+