

**Climate Change Working Party**  
**Wednesday 23 February 2022 at 9.30am**

# **AGENDA**

## Climate Change Working Party Agenda

Meeting to be held in the Remotely via Zoom link  
on Wednesday 23 February 2022, commencing at 9.30am

**Please note: working parties and working groups carry NO formal decision-making delegations from council. The purpose of the working party/group is to carry out preparatory work and discussions prior to taking matters to the full council for formal consideration and decision-making. Working party/group meetings are open to the public to attend (unless there are specific grounds under LGOIMA for the public to be excluded).**

### MEMBERSHIP OF THE CLIMATE CHANGE WORKING PARTY

Chairperson, Councillor Amy Macdonald

Councillor Joce Yeoman	Councillor Jack Craw	Councillor Marty Robinson
Councillor Penny Smart	TTMAC representative Thomas Hohaia	TTMAC representative Rowan Tautari
TTMAC representative Nora Rameka	Te Rūnanga o Whāingaroa Rihari Dargaville	

### KARAKIA

### RĪMITI (ITEM)

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### **Opening Karakia**

Whakataka te hau ki te uru,  
Whakataka te hau ki te tonga.  
Kia mākinakina ki uta,  
Kia mātaratara ki tai.  
E hī ake ana te atākura he tio,  
he huka, he hauhunga.  
Tuturu whakamaua kia Tina (Tina)  
Haumi e! Hui e! Tāiki e!

### **Closing Karakia**

Unuhia, unuhia  
Unuhia ki te uru tapu nui  
Kia wātea, kia māmā, te ngākau, te tinana, te wairua i  
te ara tangata  
Koia rā e Rongo, whakairia ake ki runga  
Kia tina! TINA! Hui e! TĀIKI E!



**TITLE:** **Record of Actions – Minutes from 10 October 2021**

**From:** Erica Wade, Personal Assistant - Environmental Services

**Authorised by** Victoria Harwood, Pou Tiaki Hapori - GM Community Resilience, on 04  
**Group Manager/s:** February 2022

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### **Whakarāpopototanga / Executive summary**

The purpose of this report is to present the Record of Actions of the last meeting (attached) held on 10 October 2021 for review by the meeting.

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### **Attachments/Ngā tapirihanga**

Attachment 1: Climate Change Working Party Minutes - Unconfirmed [↓](#) 

Climate Change Working Party  
10 November 2021

## Climate Change Working Party Record of Actions

Meeting held via audiovisual link  
on Wednesday 10 November 2021, commencing at 1.30pm

### Tuhinga/Present:

Chairperson, Councillor Amy Macdonald  
Councillor Joce Yeoman  
Councillor Jack Craw  
Councillor Marty Robinson – *joined at 1.45pm*  
Councillor Penny Smart

### I Tae Mai/In Attendance:

#### Full Meeting

NRC Pou Tiaki Hapori – GM Community Resilience, Victoria Harwood  
NRC Pou Tiaki Taiao – GM Natural Resources Jonathan Gibbard  
NRC Working Party Secretariat, Laura Exton  
NRC Natural Resources Policy Manager, Alison Newell  
NRC Strategic Policy Specialist, Justin Murfitt  
NRC Rivers and Natural Hazards Manager, Joseph Camuso  
NRC Natural Hazards Advisor, Jan van der Vliet

#### Part Meeting

NRC CEO, Malcolm Nicolson – *joined at 2.34pm*

The meeting opened with a karakia at 1.38pm.

### Ngā Mahi Whakapai/Housekeeping (Item 1.0)

Victoria Harwood, newly appointed Group Manager – Pou Tiaki Hapori Community Resilience, was introduced.

### Ngā Whakapahā/Apologies (Item 2.0)

Apologies were received from:

- TTMAC representative Thomas Hohaia.
- Councillor Marty Robinson for late arrival.
- TTMAC representative Rowan Tautari's apologies were received after the meeting.

Climate Change Working Party  
10 November 2021

### **Record of Actions – Minutes from 8 September 2021 (Item 4.1)**

**Presented by:** Councillor Amy MacDonald

**Agreed action points:**

No agreed action points.

### **Receipt of Action Sheet (Item 4.2)**

**Presented by:** Councillor Amy Macdonald

**Agreed action points:**

- Working Party Secretariat to remove completed items from the action sheet, and items completed from now on must remain on the tracker for 2 meetings before being removed.
- NRC Staff to undertake a review of the action sheet to ensure it consists of meeting-only actions.
- GM Community Resilience to catch up with NTA Transport Manager regarding electric buses and provide an update at the next Climate Change Working Party meeting.
- Action item *RMA Reform (Item 4.4, Mar-21)* can be marked as completed.

### **Update on NRC Climate Change Strategy Implementation (Item 4.3)**

**Presented by:** Group Manager - Community Resilience, Victoria Harwood

**Agreed action points:**

- GM Community Resilience to provide an update at the next Climate Change Working Party meeting so we know how we are progressing with Year 1 deliverables, and whether we will be able to meet the KPIs and deadlines of the Annual Plan.
- GM Community Resilience to communicate to the Working Party whether we have a contingency plan in place in case we can't recruit the staff we need.
- Rivers and Natural Hazards Manager to circulate the student pre-feasibility study for EV charging station requirements, received November 2021.
- NRC Biosecurity & Biodiversity staff to go through the ongoing programmes list and highlight all items that are related to biosecurity and biodiversity, and present them at the Biodiversity & Biosecurity Working Party. The Working Party Secretariat is to communicate this with the Group Manager - Biosecurity.

Climate Change Working Party  
10 November 2021

### **Emissions reduction discussion document - Draft NRC submission (Item 4.4)**

**Presented by:** Strategic Policy Specialist Justin Murfitt

**Agreed action points:**

- The Council Working Party agreed that if any subsequent changes to the draft submission are major, it should go to Councillor Only Time to be workshopped, however if the changes are minor, the marked up version can be distributed prior to being presented at the Council meeting on 16 November 2021.

### **Climate Change Recruitment Update (Item 4.5)**

**Presented by:** Group Manager - Community Resilience, Victoria Harwood

**Agreed action points:**

- No actions required.

### **2022 Meeting Dates (Item 4.6)**

**Presented by:** Committee Secretariat Laura Exton

**Agreed action points:**

- Working Party Secretariat to confirm that the proposed date swap suits the TTMAC members on all Working Parties affected.

### **Whakamutunga (Conclusion)**

The meeting concluded at 2.52pm.

**TITLE:**                   **Receipt of Action Sheet**

**From:**                    Erica Wade, Personal Assistant - Environmental Services

**Authorised by**        Victoria Harwood, Pou Tiaki Hapori - GM Community Resilience, on 04  
**Group Manager/s:**   February 2022

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**Whakarāpopototanga / Executive summary**

The purpose of this report is to enable the meeting to receive the current action sheet.

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**Nga mahi tutohutia / Recommendation**

That the action sheet be received.

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**Attachments/Ngā tapirihanga**

Attachment 1: Climate Change Working Party Schedule of Actions [↓](#) 

Climate Change Working Party Schedule of Actions							as at 14/01/2022
#	Meeting date	Agenda Item	Action	Responsible staff	Status	Date completed	Notes
	17-Jun-20	NRC CARBON FOOTPRINT (Item 9.0)	Investigate online area to store meeting documents to enable access for Councillors and TTMAC members.	Group Manager - Community Resilience	In Progress		17/06/2020 - Raised again re access of documents for councillors and TTMAC
	Sep-21	Intergovernmental Panel on Climate Change (IPCC) AR6 report update (Item 4.6)	IPCC report update to be presented to council workshop and to TTMAC.	Natural Hazards Advisor Monitoring Manager	In Progress		02/11/2021 - NRC staff are applying for Environ Link funding to organise NIWA to update the report using the latest IPCC figures.
	Sep-21	Verbal updates (Item 4.7)	Look at adding a climate change focus (the hazards work and the strategy) in future rate brochures.	Climate Change Resilience Coordinator / Natural Hazards Advisor	Completed	12/01/2021	COMPLETED 12/01/2021 - this is part of the Communications Strategy for the Natural Hazard River Flood Maps.
	Nov-21	Receipt of Action Sheet (Item 4.2)	Working Party Secretariat to remove completed items to-date from the action sheet, and items completed from now on must remain on the action sheet for 2 meetings before being removed.	Working Party Secretariat	Completed	12/01/2021	COMPLETED 12/01/2021 - completed items have been transferred to a separate Schedule of Completed Actions. Working Party Secretariat will maintain the tracker moving forward, removing completed items from the tracker after 2 meetings.
	Nov-21	Receipt of Action Sheet (Item 4.2)	NRC Staff to undertake a review of the action sheet to ensure it consists of meeting-only actions.	NRC Staff	Completed	14/01/2021	COMPLETED 14/01/2021
	Nov-21	Receipt of Action Sheet (Item 4.2)	GM Community Resilience to catch up with NTA Transport Manager regarding electric buses and provide an update at the next Climate Change Working Party meeting.	GM Community Resilience	In Progress		
	Nov-21	Update on NRC Climate Change Strategy Implementation (Item 4.3)	GM Community Resilience to provide an update at the next Climate Change Working Party meeting so we know how we are progressing with Year 1 deliverables, and whether we will be able to meet the KPIs and deadlines of the Annual Plan.	GM Community Resilience	In Progress		
	Nov-21	Update on NRC Climate Change Strategy Implementation (Item 4.3)	GM Community Resilience to communicate to the Working Party whether we have a contingency plan in place in case we can't recruit the staff we need.	GM Community Resilience	In Progress		14/01/2021 - Group Manager - Community Resilience will provide a recruitment update at the next hui (23 February 2022).
	Nov-21	Update on NRC Climate Change Strategy Implementation (Item 4.3)	Rivers and Natural Hazards Manager to circulate the student pre-feasibility study for EV charging station requirements, received November 2021.	Rivers and Natural Hazards Manager	In Progress		
	Nov-21	Update on NRC Climate Change Strategy Implementation (Item 4.3)	NRC Biosecurity & Biodiversity staff to go through the implementation strategy and highlight all items that are related to biosecurity and biodiversity, and present them at the Biodiversity & Biosecurity Working Party. The Working Party Secretariat is to communicate this with the Group Manager - Biosecurity.	Working Party Secretariat NRC Biosecurity & Biodiversity Staff	Not Started		
	Nov-21	2022 Meetings Dates (Item 4.6)	Working Party Secretariat to confirm that the proposed date swap suits the TTMAC members on all Working Parties affected.	Working Party Secretariat	Completed	21/12/2021	COMPLETED 21/12/2021 - the NRC Policy & Planning Manager delegated the Planning and Policy Administrator, to ensure TTMAC members will be able to attend despite these working parties despite the change of date.

**TITLE:** Recruitment update and introduction of new staff

**From:** Victoria Harwood, Pou Tiaki Hapori - GM Community Resilience

**Authorised by** Victoria Harwood, Pou Tiaki Hapori - GM Community Resilience, on 11  
**Group Manager/s:** February 2022

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### **Whakarāpopototanga / Executive summary**

This report is an update on the Climate Change department recruitment of staff.

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### **Ngā mahi tūtohutia / Recommended actions**

1. New staff are welcomed into their roles
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### **Background/Tuhinga**

Climate change projects for Northland were led through the council long-term plan (LTP) by the previous Natural Hazards Advisor. After the organisational change process in 2021, the new Climate Change department was created. Roles in the new department were vacant and due to organisational changes, loss of existing staff and a Group Manager retirement, recruitment was delayed until November 2021.

Once the new Group Manager for Community Resilience started in late October, the recruitment process began. Three roles were advertised in November 2021 as aligned with Year 1 of the LTP, Climate Change Manager, Zero Carbon Transition Advisor and Hapū and Iwi Climate Change Facilitator.

The Climate Change Manager and Zero Carbon Transition Advisor roles were successfully recruited. The new staff are as follows:

Tom FitzGerald – Climate Change Manager – starts 23<sup>rd</sup> February 2022

Natalie Newson – Zero Carbon Transition Advisor – starts 1 day per week from Friday 4 March for 1 month and full time from Monday 4 April 2022.

The Hapū and Iwi Climate Change Facilitator role was not filled and will be readvertised once the Climate Change Manager has started in the role.

The Climate Change Manager will lead the councils Ngā Taumata o te Moana Implementation Plan, supported by climate change department staff and other staff from across the organisation and will take a lead role in the work of the Joint Climate Change work programme. Further Climate Change roles are set for year-3 of the LTP.

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### **Ngā tapirihanga / Attachments**

Nil

**TITLE:** **Progress Year 1 of Ngā Taumata o Te Moana**

**From:** Victoria Harwood, Pou Tiaki Hapori - GM Community Resilience

**Authorised by** Victoria Harwood, Pou Tiaki Hapori - GM Community Resilience, on 11  
**Group Manager/s:** February 2022

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### **Whakarāpopototanga / Executive summary**

This update outlines the progress made to date of the Ngā Taumata o Te Moana Implementation Plan which can be read in conjunction with the implementation plan and its associated notes.

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### **Ngā mahi tūtohutia / Recommended actions**

1. The Climate Change Manager will bring further updates on progress on Year 1 deliverables at the next Climate Change Working Party and provide any available information on further funding for Year 2.
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### **Background/Tuhinga**

An assessment of the ongoing and Year 1 projects of the implementation plan has been undertaken and good progress has been made. The implementation plan remains on track, despite the challenges of 2021 (which includes COVID and organisational change and staff recruitment).

Staff from the wider council continue to lead, support and complete projects from the Ngā Taumata o Te Moana Implementation Plan through Year 1 of the delivery of council's strategy. The Climate Change department and recruitment update is outlined in a separate agenda item which explains staff availability in further progressing some Year 1 projects.

Ongoing projects and those expected to be completed in Year 1 requiring progress and future updates are:

- The development of the corporate climate change positive transition plan, including optimised greenhouse gas emissions reduction plan and carbon removal / offset investment plan.
- Several adaptation projects being led or supported by the Natural Hazards Advisor.
- Other adaptation projects not yet started which will be progressed by the Climate Change Manager and the Hapū Iwi Climate Change Facilitator, including working with the council land management teams and the development of the hapū-led adaptation planning facilitation programme. The outcomes of the Whangarei District Councils work on Te Ao Māori Climate Adaptation Framework will assist with this.

The Climate Change Managers priority in the role is to follow up on each ongoing and Year 1 project to formulate overall situational awareness of the progress of the implementation plan.

Some Year 2 and Year 3 projects are already underway and progressing well.

Funding for Year 1 projects is still available and looking ahead to Year 2, most of the funding required will be supplied by existing funding sources or Long-Term Plan funding, so no known annual plan business cases are required for 2022-2023 projects.

Any future annual plan funding for 2023-2024 will be assessed next year and aligned with the priorities of the work programme as required.

Additional funding for Year 2 is required for:

- Ecosystems, habitat and biodiversity (could be sourced through Enviro Link).
- Biosecurity threats (the biosecurity Group Manager and Deputy Group Manager are aware of the projects and funding requirements)
- Peatlands and Wetlands carbon storage stocktake (funding will need to be explored)

The latest working version of the implementation plan is attached, and progress updates of each project included.

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### **Ngā tapirihanga / Attachments**

Attachment 1: NRC Climate Change Strategy Implementation Plan - working version [↓](#) 

NRC Climate Change Strategy Nga Taumata o te Moana – CCWP update

# Ongoing programmes

Not started In progress Completed

Project #	Priority	Area	Project	Brief project description	Timeframe	Responsible	Funding source	Status notes
1	-	Internal climate change planning	Governance support	Support and provide technical advice to NRC and regional governance, including Joint Climate Change Adaptation Committee and Climate Change Working Party. Includes preparing agendas, presentations, reports, workshops etc.	Ongoing programme	Climate Change Manager	Existing resourcing	<b>31/01/2022</b> - Climate Change Manager due to start 23 February 2022. <b>07/11/2021</b> - Recruitment to fill Climate Change positions is underway, including Climate Change Manager.
2	YES	Internal climate change planning	Climate change communications	Support ongoing public engagement on climate change, outlined in a rolling 12-month communications plan, highlighting the work we are doing around climate change, publicising milestones, and supporting engagement with various projects that arise from the implementation plan. Also supporting the development of community initiatives to reduce emissions through providing website information, environmental awards and promoting successes.	Ongoing programme		Existing resourcing	<b>13/01/2022</b> - Final Climate Change Strategy going to all councils in April 2022. <b>08/11/2021</b> - Hazard Maps end of November 2021. Climate Change Strategy being completed March 2022.  Website updated. Media releases re CC strategy. Comms team delivering comms plan.
3	-	Internal climate change planning	Review of external-facing RMA policies and plans	Review of key NRC external plans and policies such as the Regional Plan and Regional Policy Statement, to ensure alignment with legislative requirements and updates, and any new information on climate risks and emissions reduction requirements. Also to test alignment with NRC's climate change strategy, find areas for improvement and identify areas of potential inconsistency. Potential to embed rules and policies enabling better adaptation, emissions reduction and carbon removal across the region. Existing resources to undertake initial reviews, but may require additional funding depending on scale of revision required.	Ongoing programme		Policy	RPS Review initiated (will inform change to the RPS if needed).
4	-	Adaptation	River flood management infrastructure	Continue to deliver flood-risk reduction programme across the region, using a prioritised approach. Continue working with WDC on aligning projects in the Whangārei Blue-Green Network programme.	Ongoing programme	Natural Hazards Advisor	Existing resourcing	Work is ongoing and on-track
5	-	Adaptation	Water resilience project	Water-tank assistance programme delivered to support communities to catch, store and treat water for domestic use, to improve water resilience during drought. Potential to align with projects being delivered by the new hapū-focused climate change programme.	Ongoing programme	Contractor	FY21-24 LTP funding	<b>13/01/2022</b> - Tony Phipps has been assigned as the Contractor to carry out this work for FY21/22. He is presenting the proposed FY21/22 project and allocations to Council on 22 February 2022.  NRC have established a \$500k per year fund for grants to community-based providers to improve water resilience for the most vulnerable communities. Process and priorities are under development.
6	YES	Adaptation	CoastCare programme	Improved alignment of the CoastCare programme with regional adaptation planning programme. Identify areas of high erosion risk and develop natural solutions as interim measures during adaptive pathways planning process.	Ongoing programme		FY21-24 LTP funding	Work underway. Recruitment of new Coastcare position

NRC Climate Change Strategy Nga Taumata o te Moana – CCWP update

Project #	Priority	Area	Project	Brief project description	Timeframe	Responsible	Funding source	Status notes
7	-	Adaptation	Community resilience coordination	Coordinating and engaging with a range of community resilience-building programmes including multiple agencies, e.g. CDEM, FENZ, water resilience group, marae resilience (DIA, TPK), remote rural communities resilience (MPI), also funding partners and NGOs.	Ongoing programme	All agencies	Existing resourcing	All agencies working together. Currently focused on COVID-19 response.  Ongoing – refer to CDEM work programme.
8	-	Adaptation	Adaptation community engagement - technical support	Coordination and technical support for the regional adaptation programme, delivered with district councils as proposed in the Te Taitokerau Joint Adaptation Strategy. May include development of engagement methodology and materials/resources, support for technical hazards investigations where required, and assistance with adaptation community engagement, options development and analysis, and adaptation plan drafting.	Ongoing programme	Natural Hazards Advisor	FY21-24 LTP funding	Work ongoing. Project underway working with Raupo drainage board and KDC to improve flood maps for Ruawai.
9	YES	Adaptation	Hapū-focused climate resilience programme	Development of the hapū-led adaptation planning facilitation programme. Will likely include identification of community needs, partnership with hapū, development of engagement methodology, facilitation of adaptation/resilience plans, and identification of potential funding opportunities.	Ongoing programme	Hapū and Iwi Climate Change Coordinator	FY21-24 LTP funding	Recruitment for the Hapū and Iwi Climate Change Coordinator (LTP-funded) position will commence after the Climate Change Manager commences on 23 February 2022.
10	-	Adaptation	On-farm adaptation support	Promote activities that enable adaptive management in a changing climate, while meeting goals of soil conservation, water resilience, freshwater management and animal welfare. This may include targeted hill-country soil conservation programmes, building demand for poplars and willows for integrated farm forestry, encouraging resilient pasture, aligning with NES-FWM farm plan implementation, and encouraging the provision of stock shelter and shade.	Ongoing programme	Climate Change Manager  Land Management Team	Existing resourcing	Work ongoing. Further definition of programme required. Work being undertaken by land management
11	-	Adaptation	Rain radar and flood forecasting	Access to rain radar data to provide high-resolution rainfall records in near real-time, increasing spatial coverage currently missed by existing rain gauges. Will enable three-hour 'now-casting' to assist flood hazard management and civil defence responses, as well as improving river flood models and improving projections for engineering standards for infrastructure planning, etc.	Ongoing programme	Monitoring Manager	Existing resourcing	<b>13/01/2022</b> - DNI have been engaged to commence work. Kaitiāia flood forecast model workshops have been held.  Rain radar project progressing. Contract arranged and staff workshops planned.
12	-	Adaptation	River flood hazards	Complete region-wide river flood modelling and develop a community flood-hazard risk assessment that identifies future prioritised work programme.	Ongoing programme		Existing resourcing	<b>13/01/2022</b> - comms plan is being implemented.  Region-wide river flood model completed and will be published late 2021. Risk assessments to be undertaken 2022. Workshops with all councils and TTMAC complete.
13	-	Adaptation	Coastal hazards	Ongoing development of coastal hazard assessment, including the development of hydrodynamic models for Whangārei and other large harbours and estuaries, as well as developing a region-wide coastal erosion risk assessment. Ongoing technical support for regional adaptation planning programme with districts and communities, including additional local hazard assessments where required.	Ongoing programme	Natural Hazards Advisor	Existing resourcing	Work ongoing. Whangarei hydrodynamic model 95% complete. Support for TA's adaptation projects by Natural hazards advisor continues.

NRC Climate Change Strategy Nga Taumata o te Moana – CCWP update

Project #	Priority	Area	Project	Brief project description	Timeframe	Responsible	Funding source	Status notes
14	-	Adaptation	Coastal aquifer saline ingress	Installation of additional monitoring sites and long-term monitoring of salinity levels in coastal aquifers. Investigations and improvements to our understanding of at-risk aquifers and community supplies from sea level rise-related saline ingress. Commissioning of a research report with climate scenario projections may require external funding.	Ongoing programme	Science team	Existing resourcing	<p><b>1/02/2022</b> - NRC (Christiaan Delport, Groundwater Scientist) have identified 3 borehole sites to implement the monitoring of saline ingress. The plan is for these boreholes to be drilled during February and the necessary monitoring equipment installed to start collecting data.</p> <p>As of 4/11 pending update from NRC Science Team.</p> <p>Contract is signed, due to covid-19, operational go live date has been delayed to 01 October 2021.</p>
15	-	Emissions reduction	NRC buildings	Continue to include LED lighting, solar power and other 'easy' low-carbon drivers in new builds. Investigation of further options for reducing embodied carbon in new buildings, such as using structural timber. Continue to invest in renewable energy infrastructure, efficiency and investigate efficiencies of alignment with EV charging. Align emissions reporting and forecasting methodology with UN Race to Zero criteria.	Ongoing programme	Strategic Projects and Facilities Manager	Existing resourcing	<p><b>4/11/2021</b> - all council owned office buildings include low-carbon options (LED lighting, solar power inclusion and/or expansion planned, vehicle fleet charging, etc).</p> <p>Strategic Projects &amp; Facilities team doesn't report on carbon.</p>
16	-	Emissions reduction	NRC bus fleet	Investigation of options for improvements in bus fleet efficiency and delivery modes; further develop optional analysis, business cases and timelines for complete transition to e-buses in alignment with emissions reduction targets. Align emissions reporting and forecasting methodology with UN Race to Zero criteria.	Ongoing programme	Group Manager – Community Resilience NTA Transport Manager	Existing resourcing	<p>Work ongoing. No specific plans for bus fleet replacement – expect replacement with e-buses at end of current contract (2027) Central government approached for funding support.</p>
17	-	Carbon removal	On-farm carbon removal support	<p>Providing advice to landowners to support on-farm carbon removal activities such as afforestation, soil carbon and wetland restoration. This may include:</p> <ul style="list-style-type: none"> <li>- supporting and promoting appropriate private native afforestation projects that provide co-benefits such as biodiversity and soil conservation</li> <li>- helping landowners understand options for afforestation that support good land management practices, and providing information on opportunities to access the ETS</li> <li>- help build demand for poplars and willows for integrated farm forestry</li> <li>- ensuring council's land and catchment management programmes align with government and industry programmes (e.g. He Waka Eke Noa) to document and reduce on-farm emissions</li> <li>- using spatial planning to identify land with high potential for afforestation to reduce erosion risk and capture carbon.</li> </ul>	Ongoing programme	Zero Carbon Transition Advisor	Existing resourcing	<p><b>01/02/2022</b> - Strategic Policy Specialist attended the 'He Waka Eke Noa' update on Tuesday 1 February.</p> <p><b>13/01/2022</b> - Zero Carbon Transition Advisor will commence work full-time on 4 April 2022.</p> <p>Work ongoing. Further definition of programme required</p>

NRC Climate Change Strategy Nga Taumata o te Moana – CCWP update

# Year 1

Project #	Priority	Area	Project	Brief project description	Timeframe	Responsible	Funding source	Status notes
18	YES	Internal climate change planning	Corporate climate positive transition plan	Development of corporate climate positive transition plan including an optimised greenhouse gas emissions reduction plan and carbon removal/offset investment plan. Will define organisational GHG emissions reduction and carbon removal targets using standard approach (UN Race to Zero criteria) and set out prioritised actions for council to become net-zero emissions before 2050, with an end goal of reaching climate positive (i.e. net negative emissions). Dependent on completion of NRC emissions reduction projects.	Deliverable Year 1	Climate Change Manager	FY21-24 LTP funding	13/01/2022 - Climate Change Manager commencing work 23 February 2022.
19	YES	Internal climate change planning	Annual Plan business cases	Development of Annual Plan business cases following adoption of NRC's climate change strategy, recognising that some projects may require additional funding outside the Long Term Plan process. Annual Plan business cases will be coordinated to align with the corporate zero-carbon plan and prioritise those requiring urgent investment in zero-emissions technology or investigations.	Deliverable Year 1	Climate Change Manager	Existing resourcing	13/01/2022 - Climate Change Manager commencing work 23 February 2022.
20	-	Internal climate change planning	NRC policy review - internal	Review of key NRC internal policies to test alignment with NRC's climate change strategy, find areas for improvement and identify areas of potential inconsistency to embed adaptation, emissions reduction and carbon removal policies and standards across the organisation	Deliverable Year 1	Climate Change Manager	Existing resourcing	13/01/2022 - Climate Change Manager commencing work 23 February 2022.
21	-	Internal climate change planning	Zero-carbon procurement policy	Develop/amend policy to require all business cases involving significant investments that have associated emissions to show evidence that zero-emissions options or other alternatives have been sufficiently considered. Investigate potential for including cost of high-quality carbon offsets in procurement lifecycle cost forecasts, where emissions-generating purchases are being considered against zero-/low-emissions options.	Deliverable Year 1	Zero Carbon Transition Advisor	FY21-24 LTP funding	13/01/2022 - Climate Change Manager commencing work 23 February 2022. Zero Carbon Transition Advisor commencing work 4 March 2022.
22	YES	Adaptation	Te Taitokerau Joint Adaptation Strategy	Coordination and drafting of Te Taitokerau Joint Adaptation Strategy and associated reports with joint staff group Climate Adaptation Te Taitokerau. Includes reports such as climate risk overview; coastal community profiles; adaptation toolbox; adaptive pathways engagement framework; and the adaptation strategy's implementation plan. Strategy to be presented to the Joint Climate Change Adaptation Committee in August 2021.	Deliverable Year 1	Climate Adaptation Te Taitokerau Working Group members	Existing resourcing	13/01/2021 - final version of the Strategy was endorsed at the November Joint Committee meeting. It will be presented to all 4 councils for adoption in April 2022.  Draft strategy presented to joint committee Aug 9 and 30 <sup>th</sup> . Further feedback to be sought from councils, with final version presented for endorsement to the November joint committee meeting.
23	-	Adaptation	Te Taitokerau Joint Adaptation Strategy - climate risk and Māori engagement report	Commissioning of research report to improve council's understanding of appropriate and successful engagement approaches when working with hapū and iwi on climate change issues. Will involve literature review and interviews. Outputs will provide guidance for hapū-focused climate change programme. Conducted by local tangata whenua researcher.	Deliverable Year 1	Contractor	Existing resourcing	11/02/2022 - report deadline has been extended to mid-February.  Researcher contracted – report due November 2021

NRC Climate Change Strategy Nga Taumata o te Moana – CCWP update

Project #	Priority	Area	Project	Brief project description	Timeframe	Responsible	Funding source	Status notes
24	YES	Adaptation	Te Taitokerau Joint Adaptation Strategy - communications and engagement plan	Communications and engagement plan for the Te Taitokerau Joint Adaptation Strategy, to help promote conversations with our communities about developing adaptive pathways plans.	Deliverable Year 1	Joint Communications Group (Climate Adaptation Te Taitokerau Working Group members)	FY21-24 LTP funding	Joint comms group formed with staff from all four Northland councils. Adaptation comms plan to be presented with joint strategy at the November joint committee meeting.
25	-	Adaptation	Coastal habitat and sea level rise	Investigation of threats to coastal habitats, especially limits to landward migration with sea level rise. GIS analysis of existing mangrove, saltmarsh and seagrass habitat and expected impacts of sea level rise. Identification of potential areas for migration, and investigation of potential policy framework to enable land use change to allow landward habitat migration under sea level rise. (Also see Carbon removal - coastal blue carbon project.)	Deliverable Year 1	Natural Hazards Advisor	FY21-24 LTP funding	Being scoped by external parties, Natural Hazards Advisor NRC supporting. Waiting on Climate Change Manager to commence work.
26	YES	Emissions reduction	Corporate carbon footprint audit and emissions reduction options	Commissioning of corporate carbon footprint audit and verification using accredited provider. Investigate corporate emissions reduction options across major emissions sources (see below projects in emissions reduction section). Implement consistent and verifiable emissions reporting and forecasting methodology across organisation, using standard protocols (e.g. UNFCCC Race to Zero criteria).	Deliverable Year 1		FY21-24 LTP funding	<b>13/01/2022</b> - Climate Change Manager commencing work 23 February 2022.
27	-	Emissions reduction	NRC vehicle fleet	Investigate options to decarbonise NRC's vehicle fleet in line with zero-carbon transition plan and emissions reduction plan. Includes identification of viable alternatives, life-cycle assessments, options assessments and development of business cases. Possible short-term options may include transition of some vehicles toward EVs and hybrids; options for alternatives to replace some/all 4WD Hiluxes; optimising vehicle use behaviour; considering a shared EV fleet with WDC. Implement consistent and verifiable emissions reporting and forecasting methodology.	Deliverable Year 1	NRC Strategic Projects and Facilities Manager	Existing resourcing	Work underway (see CCWP agenda item for 8 Sept meeting – reduction in fleet carbon footprint through vehicle efficiency improvements). Planning for full transition of fleet to EV's waiting on new LTP staff.
28	-	Emissions reduction	NRC maritime fleet	Investigation of options for improving the efficiency of vessels, transition of vessels to high-performance hulls and electric/hybrid engines as well as fuel-saving trip programming and behaviour. Improvements in monitoring and reporting of vessel emissions. Implement consistent and verifiable emissions reporting and forecasting methodology.	Deliverable Year 1	Maritime Manager	FY21-24 LTP funding	Work underway. Detailed programme required – may require new LTP staff to progress.
29	-	Emissions reduction	Consents and GHG emissions	Professional development and training to support resource consent team to develop capacity to assess new consent requirements re: GHG emissions in RMA from 2022. May include improving technical literacy for consent considerations such as process heat standards and processes, alternative low-carbon heat methods, greenhouse gas emissions reduction plans, etc.	Deliverable Year 1		Existing resourcing	No action undertaken to date. Once a consent application received that requires this assessment, likely to engage external expert in first instance to assist.

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30	-	Carbon removal	Coastal blue carbon	Undertake a carbon stocktake of coastal blue carbon ecosystems using existing GIS data (including mangroves, saltmarsh, seagrass, kelp beds). Develop a risk assessment of the impact of sea level rise on these ecosystems and investigate the carbon removal potential of coastal blue carbon ecosystems, considering projected landward migration potential and limitations such as physical or planning barriers. Investigate options for conservation, restoration and re-establishment of blue carbon habitats, and estimate future carbon storage potential under different policy settings. Consider blue carbon ecosystem carbon values in adaptation planning programmes (see above adaptation engagement project - Awanui stopbanks).	Deliverable Year 1		FY21-24 LTP funding	<p>Not started. Waiting on new LTP staff.</p> <p>NRC has provided information to a PhD student investigating carbon storage potential of saltmarsh in Northland sites. Large NIWA research bid for coastal ecosystems research in Rangaunu pending (NRC involved in developing proposal).</p>
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NRC Climate Change Strategy Nga Taumata o te Moana – CCWP update

# Year 2

Project #	Priority	Area	Project	Brief project description	Timeframe	Responsible	Funding source	Status notes
31	-	Adaptation	Adaptation community engagement - Awanui coastal stopbanks	Adaptive pathways planning project with FNDC, as per Te Taitokerau Joint Adaptation Strategy. Scoping, data collection, hazard analysis and pre-engagement during 2022, with community engagement beginning 2023 once additional adaptation staff are on board.	Deliverable Year 2		FY21-24 LTP funding	Not started. Waiting on new LTP staff.
32	-	Adaptation	Climate impacts - scientific review	Revision and update of Northland's climate change impact report (NIWA 2017) following release of the upcoming IPCC AR6 report in 2022.	Deliverable Year 2		Existing resourcing	Not started.
33	-	Adaptation	Drought vulnerability	Development of further information on drought risk to community and rural water supplies with climate change. Development of climate vulnerability assessment of community and primary industry water supplies, drawing on information from Three Waters review process. Investigation of approaches for communicating drought as a natural/climate hazard.	Deliverable Year 2		Existing resourcing	Not started.
34	-	Adaptation	Freshwater resilience	Resilience of Northland's freshwater ecosystems in response to climate change, including maintaining/improving resilience of freshwater environments in Northland, including highly vulnerable areas; ensuring we are meeting NPS-FM and NES-FW objectives regarding accounting for climate change aspects; a study in the form of guidance/monitoring strategy by investigating historic information for identifying the risks associated with climate change on Northland's freshwater environments, and associated ecological and human health implications; continuous long-term water quality monitoring is undertaken in at least two reference river sites and one outstanding dune lake.	Deliverable Year 2		FY21-24 LTP funding	01/02 awaiting update from Science team.
35	-	Adaptation	Ecosystems, habitat and biodiversity	Commission literature review of at-risk ecosystems (e.g. lakes, terrestrial, freshwater and marine communities, coastal/estuarine habitats) and species threatened by climate impacts. May need to separate topics, limit scope and stage reports over time. (Funding likely to be both externally through Envirolink funding (research support grants) with some support via the new adaptive pathways LTP budget.)	Deliverable Year 2		Requires external funding	Not started. Requires external funding. Could speak with Lisa Forrester (suggested at 10 Nov CCWP)
36	-	Adaptation	Biosecurity threats	Preliminary review of high-risk sleeper and offshore biosecurity threats under future climate change scenarios, potentially including human health, agricultural and environmental threats. Project will support and align with a nationwide regional sector programme aiming for consistent methodology, and provide a gap analysis and identify areas requiring further investigation.	Deliverable Year 2		Requires external funding	Not started. Requires external funding. Also waiting on national review work by Biosecurity SIG
37	-	Emissions reduction	Regional economy and industry leadership	Investigation of options to support the transition to a zero-carbon economy in Northland, including working with regional economic development partners, industry and the primary sector alongside government agencies and research groups. Investigate alternative funding	Deliverable Year 2		FY21-24 LTP funding	Not started.

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				possibilities to incentivise uptake of zero-emissions technologies and R+D.				
38	-	Carbon removal	Peatland/wetlands carbon storage	Commission a carbon stocktake of wetlands and peatlands using existing GIS data, with the objective to understand the carbon emissions and removal potential of peatlands/wetlands in Northland; also investigate possible approaches to enable conservation, restoration and re-establishment including changes to land management practices.	Deliverable Year 2		Requires external funding	Initial conversations with Manaaki whenua re research project to investigate wetlands and carbon storage in Northland

## Year 3+

Project #	Priority	Area	Project	Brief project description	Timeframe	Responsible	Funding source	Status notes
39	-	Internal climate change planning	NRC policy review - external	Review of key NRC external plans and policies such as the Regional Plan and Regional Policy Statement, to test alignment with council's climate change strategy, find areas for improvement and identify areas of potential inconsistency to embed adaptation, zero emissions and carbon removal rules and policies, in line with legislative requirements, other updates and new information on climate risks and emissions reduction requirements.	Deliverable Year 3+		Requires future AP/LTP funding	Not started.
40	-	Adaptation	Wildfire hazards	Understand council's responsibilities and the availability of data regarding increase in wildfire risk under climate change scenarios.	Deliverable Year 3+		Existing resourcing	Not started.
41	-	Adaptation	Geotechnical hazards	Understand council's responsibilities and the availability of data regarding increase in risk of slips and landslides under climate change scenarios.	Deliverable Year 3+		Existing resourcing	Not started.
42	-	Emissions reduction	Regional EV charging network	Investigation of options for how NRC can support the development of a comprehensive regional EV charging infrastructure alongside other agencies, district councils and industry partners.	Deliverable Year 3+	Rivers and Natural Hazards Manager (currently)	Requires future AP/LTP funding	Student engaged to develop initial pre-feasibility study for EV charging station requirements. Report due November 2021.
43	-	Carbon removal	NRC carbon removal and emissions offset programme	Investigate approaches for emissions offsetting and carbon removal for council, including biological options such as wetland and coastal blue carbon restoration and afforestation projects. Consider options for measuring, reporting and verifying carbon removal including co-benefits such as biodiversity, water and social. Adopt best-practice approach for carbon offsets such as the 'Oxford principles for net-zero aligned offsetting'.	Deliverable Year 3+	Zero Carbon Transition Advisor	FY21-24 LTP funding	Not started.

**TITLE:** **Electric vehicle survey report summary**

**From:** Joseph Camuso, Rivers & Natural Hazards Manager

**Authorised by** Victoria Harwood, Pou Tiaki Hapori - GM Community Resilience, on 11  
**Group Manager/s:** February 2022

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### **Whakarāpopototanga / Executive summary**

The purpose of this report was to identify the current Electric Vehicle Charging Infrastructure shortcomings in Northland and recommend how to prepare Northland for the future uptake of EVs. This was prompted from the committee in anticipation of potential future Government funding and to have Northland positioned with first mover advantage.

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### **Ngā mahi tūtohutia / Recommended actions**

1. That the Climate Change Working Party receive this report and support recommendations of the report when Government funding becomes available
  2. Work closely with Northpower and Top Energy to identify areas that can support fast and hyper chargers.
  3. Plan for heavy transport hubs trucks, buses and ferries.
  4. Plan for fast and hyper chargers along State Highways (50kW to 300kW).
  5. Plan for medium to fast chargers on destination routes, i.e., Matapouri Coast Road (25kW to 50kW).
  6. Plan for slow to medium chargers at hotels and restaurants (3kW to 25kW).
  7. Provide redundancy (more than one charger) where possible and alternative circuits where possible.
  8. Plan for charging stations to be close to amenities i.e., toilets, have accessibility 24/7 and safe at night.
  9. Future proof new construction by adding additional electrical capacity and placing in-ground conduit during construction, like Kensington shopping centre and NRC Dargaville.
- 

### **Background/Tuhinga**

Improving EV uptake will help Aotearoa reduce Green House Gas (GHG) emissions (approximately 48% of total) and provide a massive economic boost for the country by reversing the flow of money going offshore to buy oil (approximately \$8 billion annually). Kiwis make 100 percent of NZ electricity. Most of the generation, distribution and electric retail is owned by Kiwis. Using electric transport makes economic and environmental sense.

Fast and hyper chargers 50kW to 300kW should be located on the main highways and should be redundant more than one charger at each location. If possible, they should be wired to different circuits in case there is damage to one circuit. Future proofing the sites by ensuring extra capacity and easy expansion, i.e., plan for eight chargers and build two now and allow buildout in the future.

Install smaller capacity chargers off main highways and plan on redundancy and future proofing where possible.

Encourage territorial authorities to support independent charging network providers with long term parking agreements and license to occupy for chargers.

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## Ngā tapirihanga / Attachments

Attachment 1: EV Survey Report - V1 Draft [↓](#) 

*Draft as of 4 November 2021*

## **Survey of Current and Intending EV Drivers on Public Electric Vehicle Charging Infrastructure in Northland, New Zealand**

**Julian Hansen**

**November 2021**

*Draft as of 4 November 2021*

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## Summary

### Introduction

This report analyses data from a survey of 273 current and intending Northland electric vehicle (EV) drivers about regional public EV charging infrastructure. This data relates to current and expected future charging needs; assessment of existing public charging stations (CSs); recommended locations for CSs; and reasons for uptake of EVs. The survey's overall objective was to provide data to assist Northland Regional Council (NRC) to identify optimal locations for establishing or upgrading EV charging stations in the region, with CS design considering users' expressed needs and preferences.

### Background

Improving EV uptake will help New Zealand to reduce greenhouse gas emissions. International experience shows that establishing appropriate and visible public EV charging infrastructure reduces range anxiety, enables journeys to more destinations, and increases EV uptake. Various research models for determining optimal CS location focus on users, destinations and travel routes. Others focus on existing statistical data or existing travel data, or on surveying drivers on their travel intentions and preferences. There are virtually no studies on methods for optimally locating CSs in rural areas. All approaches have their limitations. This survey attempts to identify some priority CS locations around Northland, and tentative criteria for selecting urban and rural CS locations across the region.

### Discussion

This survey, about the actual preferences and perceptions of current and intending EV users in Northland relating to EV public charging infrastructure and associated issues, yielded many new and useful insights. Respondents' assessments of existing public fast chargers provided particularly useful indications of what EV users want from a CS location, and what design pitfalls should be avoided. The results show that user assessments such as these are useful in establishing CS location criteria.

### Conclusions

The survey identified the need for additional public EV CSs in the region. Favoured locations for CSs tend to be concentrated around major population centres with high EV ownership, and major routes between popular destinations. Inductive analysis generated a set of tentative criteria for the location and design of fast public CSs, relating to access, visibility, EV range, safety, desired nearby amenities, charger numbers and appropriate layout.

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## 1. Introduction

The purpose of this report is to analyse several aspects relating to existing and potential public electric vehicle (EV) charging infrastructure in Northland, New Zealand, based on a survey of current and intending EV drivers from the region. These aspects include (among others) current and expected future charging needs; assessment of existing public charging stations (CSs); recommended locations for CSs; and reasons for uptake of EVs. The survey's overall objective was to provide data to assist NRC to identify optimal locations for establishing or upgrading EV charging stations in the region, with CS design considering users' expressed needs and preferences.

## 2. Background

Transport accounts for 48% of New Zealand's energy-related emissions and 20% of its total emissions (EECA, 2021a). According to New Zealand's Energy Efficiency & Conservation Authority (EECA), relative to an equivalent petrol vehicle, an EV used in New Zealand reduces CO<sub>2</sub> emissions by 80%, and reduces CO<sub>2</sub> emissions by 60% across its lifecycle. EECA (2021b) states that "[b]y the end of this decade more than 50% of monthly vehicle sales in New Zealand need to be electric in order to meet our emissions reductions targets".

The New Zealand Transport Agency (NZTA) states that "it is important that electric vehicle drivers feel confident to roam across New Zealand's state highways" (NZTA, 2020). NZTA launched a plan in 2017 for installing DC fast / rapid charging stations every 75 km across state highways. The network is still being rolled out and is currently serving a relatively small number of EVs. However, localised needs exist that are not covered by this network, and there will be ongoing needs for expansion of public charging infrastructure as EV numbers increase.

Regular EECA surveys of New Zealand consumers about their attitudes to EVs since 2016 have shown increasing favourability, confidence and consideration (EECA, 2021b). This confidence is expected to help improve EV uptake. Consumer concern about driving range is still a significant barrier to purchasing an EV. Increasing public EV charging infrastructure will reduce range anxiety (Philp, n.d.) and enable journeys to most destinations in New Zealand by EV. Psychologically, the visible presence of EV charging infrastructure has a recognised impact on EV uptake (Ndevr Environmental Pty Ltd, 2017).

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More than 85% of New Zealand dwellings have garages or carports that provide a safe place for vehicle charging. Seventy percent of new car buyers have access to off-street parking (Barton & Schütte, 2015). Nevertheless, there is still a need for public charging away from home.

Northland Regional Council (NRC) is working towards achieving greater EV uptake in the region by improving and expanding public EV charging infrastructure. The survey reported on here aims to provide information and analysis that will help support NRC in removing barriers to EV uptake. The findings will form part of a subsequent pre-feasibility study for a staged, prioritised rollout of additional electric vehicle public charging infrastructure in Northland. That study for NRC will collect and analyse information on several other aspects surrounding public EV charging infrastructure (see Table 1, Appendix 1). NRC will use the survey findings as supporting evidence of Northland's needs when making funding applications to central government for investment to expand and future-proof Northland's public EV charging network (NRC email communication with author, June 2021).

While the pre-feasibility study will be cognisant of existing international and domestic experience, NRC wishes to keep the process of selecting additional potential CS locations and / or upgrading existing ones relatively simple. It sees the Northland context as relatively straightforward, with quite small urban population centres and small rural settlements. However, the regional road network does include routes far away from the main highway that include tourist and holiday destinations popular with large numbers of people from outside the region (especially Auckland). It is also important that installed charging infrastructure be optimally used and profitably operated, and generate significant downstream economic benefits for local communities.

While bearing in mind the Northland context, below is a brief overview of some of the main international approaches and insights relating to locating EV charging infrastructure that may be worthy of consideration.

The study by Pagany et al. (2019) appears to provide the most comprehensive recent review of the numerous existing studies on how to optimally locate EV charging stations. One of its key findings is that the overwhelming majority of proposed or implemented CS locating concepts have been developed for urban areas. Rural areas have been largely neglected. This means that some caution needs to be exercised when considering the lessons of other studies for the Northland context, which is quite sparsely populated.

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The above study identifies three main research models developed for locating CSs, focusing on 1) users, 2) destinations, and 3) travel routes. These are elaborated below.

**Users.** Some CS localisation studies rely on vehicle users' data, and even sometimes on the people themselves, characterised by their age, social status, daily activities, and spatial (residential) distribution. Such data is extrapolated to the wider population to predict the number of EV users in a given area.

**Destinations** are places that people stop where there is an opportunity for charging. Studies focusing on this aspect analyse the destination type, and which type relates to people's daily activities. Dwelling times (time spent parked), as well as visit frequency and volume, are also taken into account.

**Travel routes.** Most studies focus on travel routes. These use existing traffic network data for simulating the traffic movements and node-based demand. Vehicle drivers reside at one node and need to travel to another node for a certain service or activity. The location and quantity of CSs are optimised to accurately satisfy each node's demand, which is affected by what routes drivers choose, and where and for how long they stop.

Many CS localisation studies have very heavy statistical analysis, but the value is often limited by the data sources. Studies variously draw upon the following data sources:

1) statistics, e.g. census data; 2) travel data of EVs, and measured CS data; 3) travel data of fossil-fuel vehicles; 4) surveys / questionnaires; 5) simulation or test data (Pagany et al., 2019).

Statistics such as census data are frequently used in user-focused localisation models. Such statistics may be used, for example, to evaluate demand density in a residential population (Wirges et al., 2012); or to estimate willingness to buy an EV based on income levels and the spatial distribution in a city (Efthymiou et al., 2012). However, such area-based statistics have low granularity, and are unable to do detailed spatial distinction. Wirges (2016) found that in general, predicting future numbers of EVs relative to the total number of vehicles or residents is very problematic.

CS-locating methods not relying on this type of statistical data tend to use existing travel data. Many studies have lacked extensive empirical EV traffic data due to the low numbers of EVs (especially tracked ones) on the roads, and have instead mostly used data from GPS-tracked Internal Combustion Engine (ICE) vehicles. Such approaches are based on an

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assumption that EV driving behaviour is the same as (or similar to) that for ICE vehicles (e.g. Dong et al., 2014). This assumption has probably been unfounded until only recently. This is due to the relatively short range of many EVs — which limits distances, number of trips, total travel time, etc — and the low number of EVs, making it hard to extrapolate behaviour for a whole EV fleet. With the quite recent advent of EV models with considerably greater range, ICE vs EV user behaviour may be expected to converge.

Surveys of EV drivers about their travel intentions and preferences are another way to collect information about potential demand for CSs. Such surveys can be used to complement other research methods (Wirges, 2016). However, such data relies on hypothetical journeys or stated preferences, which may not necessarily reflect actual behaviour (Pagany et al., 2019).

A selection of empirical research studies use the following criteria for CS location: **1) user-destination oriented studies** — demand density; distance of user from CS, distance of destination from CS, dwell time; and **2) route-oriented studies** — traffic density (density of vehicles per route section), travel time, queueing at a CS, EV range (State of Charge), CS range (spatial coverage in all directions), finance cost (CS installation and operation) (Pagany et al., 2019).

The Pagany study also identifies gaps in the research on locating CSs. As mentioned earlier, there are virtually no studies on methods for optimally locating CSs in rural areas. Moreover, only a few studies link origin and destination of travel with existing Points of Interest (POI) in neighbourhoods, or the documented purpose of trips. CS charging speed, time-related issues, and user types and their behaviours are also identified as needing further study. There are thus opportunities for the Northland study to contribute to understanding of some of these issues.

The overall Northland EV study, of which this survey is a part, will attempt to identify some relevant criteria that can be used for selecting potential CS locations. Schmidt et al. (2021) provide in Appendix A of their study an excellent overview of criteria used in various studies relating to CS location. They are too numerous to be listed here in their entirety, but are a useful reference source. Some criteria that may be relevant to the Northland context are as follows: CS construction cost; annual operation and maintenance cost; investment pay-back period; harmonisation of CSs with the development planning of urban road network and power grid; traffic convenience; and number of trips that cannot be made due to lack of CSs within EV battery range.

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Anderson et al.(2018) conducted a large survey-based study of actual EV users' preferences for CS location. The study identified: 1) a preference for semi-fast charging stations; 2) that slow charging is acceptable for frequently used stations, whereas fast charging is desired for infrequently used stations; and 3) slow charging is acceptable for locations where vehicles are parked for a longer period. Providing a range of CSs with a mix of these characteristics is important. CSs should also be provided where people already park, with an additional backup fast network for infrequent charging. Users want stations not just at stop-to-charge locations, but also stations at work, shopping, and leisure locations. Publicly accessible locations are also important (e.g. car parks, supermarket car parks, service stations, public streets) — thus the private sector and public sector should be jointly involved in CS infrastructure planning. Also, public charging infrastructure must allow for multiple frequencies of use. The study recommended largely avoiding a stop-to-charge infrastructure model used for the distribution of fossil-fuel stations, except as fast-charging backup facilities on major highways. Many of these insights could have relevance to the Northland study.

Ndevr Environmental Pty Ltd (2020) developed a very useful Decision Tree Tool in the Australian state of Victoria to be used by municipal councils when assessing the feasibility of potential CS locations (p. 7). It was created on the basis of case studies and stakeholder consultation and is very practically oriented. This tool could be useful to consider as a model for selecting CS locations in Northland.

Evidently, the above brief overview of the CS location literature demonstrates many valuable insights and lessons to be gained for the overall Northland EV study.

## **Research methodology**

The pre-feasibility study for NRC will be broken into three research and reporting stages (see Table 5, Appendix 1). It will use a mixed-method approach to data collection and analysis. Stages 1-3 of the research will together inform the final report to NRC (comprising the whole “pre-feasibility study”). The survey reported on here is but one component of Stage 1. It focused on the collection of primary data relating to the Stage 1 task to “*survey EV users and potential users living in Northland on current and expected future charging needs, perceived advantages and disadvantages of existing public CSs, preferred CS locations and characteristics, and reasons behind intentions to buy an EV in the next three years*”. Data was collected via an online questionnaire (see Appendix 4). This instrument was chosen due to the ability to reach respondents in a targeted way throughout Northland, and the

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availability of online survey software (Alchemer) facilitating questionnaire delivery, data processing and analysis.

This survey aimed to fill some gaps in knowledge about the needs of current and potential future EV drivers in the Northland region. It investigated a range of aspects related to EV charging needs. These included vehicle range limitations; typical EV driving distances on weekdays and weekends; charging session behaviour; at-home vs away-from-home charging; and reasons for away-from-home charging. It also solicited EV driver assessments of existing CS infrastructure, and perceived bottlenecks; and proposals for CS location and number of chargers at the proposed locations. The survey also obtained respondent insights into the speeds of chargers needed for different types of locations / Points of Interest, related to activities in those areas and time spent there by EV users and potential users. Also considered were respondent perceptions of their own changing future charging needs.

This survey had a very practical approach, without being overly technical. Its focus on user preferences for CS locations resembled that of the online survey by Anderson et al. (2018); however, that study was done with quite sophisticated interactive mapping software on which the respondent could mark CS locations and fill in detailed preferred use information for each location. In contrast, the Northland online survey could not utilise such technology, instead relying on respondent descriptions of existing and desired CS locations and their charging capacity. A key assumption of this survey's approach is that respondent-proposed locations for CSs reflect EV drivers' actual and desired travel routes and destinations in Northland, as well as their perception of other users' needs.

### **Respondent selection**

Due to NRC's focus on receiving feedback on existing and potential CSs, the questionnaire used the following criteria for respondent selection:

- Living in Northland
- Aged 16 or above
- Currently drive an EV, or likely to drive an EV in the next three years.

This type of respondent was deemed most likely to have knowledge or interest in public CSs in Northland. Eligibility screening questions were placed at the start of the questionnaire.

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One limitation is that because the sample was self-selected and non-stratified, it cannot be deemed to be fully representative of the Northland population. However, due to the purposive targeting process, respondents' views and experience are highly relevant to the study's purpose.

### **Participant consent**

Respondents were informed before starting the questionnaire (see Appendix 4) that 1) all personally identifiable information would be kept confidential, 2) all information collected would be anonymised when reported on, and 3) that they could withdraw their participation at any time. Survey participants were also given the option to request the researcher's contact details by email. They were also given the option to provide their contact details to the researcher should he need to contact them for additional clarification.

### **Question application**

Different questions were asked of respondents depending on respondent categories, and their preceding responses. **Eligible respondents currently driving EVs** were asked a range of questions about their EV type and range, typical daily driving distances, charging behaviour, assessments / proposals relating to existing and potential EV charging locations, anticipated changes in future charging needs, their assessment of charger facility types for different locations, and general comments relating to improving Northland's public EV charging infrastructure (Q8-41, 47-49). Those **respondents who said they did not drive an EV but were "likely" or "very likely" to do so in the next three years (intending EV drivers)** were asked a smaller subset of questions (Q42-49). These questions focused on their intention to buy / not buy an EV in the next three years and their reasons, their assessment of charger facility types for different locations, and general comments relating to improving Northland's public EV charging infrastructure. Those who said they **did not drive an EV and were "unlikely" or "very unlikely" to do so in the next three years** were thanked, and the questionnaire terminated.

### **Questionnaire preparation, promotion and data collection**

The questionnaire was prepared and delivered using the Alchemer online survey platform. Questions were developed in consultation with NRC, a representative of the electricity distribution company Northpower, and a representative of a Northland EV users group who has collaborated to develop charging infrastructure in the region (see Acknowledgements).

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Promotion of the survey took place via twelve Facebook community noticeboards from all around Northland (up to three times each), the NRC Facebook page and website, and an article in the Northern Advocate newspaper. The full list of promotion channels is provided in Table 6, Appendix 2. The text of each promotion is presented in Appendix 3.

Data collection took place between 14 September and 3 October 2021. The original deadline of 30 September was extended until 3 October due to the Kerikeri Notice Board administrator only finally granting access on 30 September.

### **Data preparation and analysis**

Those respondents not meeting the eligibility criteria, failing to complete the screening questions, or not answering any questions after Q5, were disqualified. Partially completed questionnaires containing data from Q15 onwards were included in the dataset.

In two cases where more than one questionnaire was filled in about a vehicle with the same number plate, one duplicate questionnaire each was deleted. Both had been only partially completed.

The Alchemer software and Excel were used to prepare graphs and result tables, using filters and data subsets where appropriate, according to the questionnaire logic and aspects of interest. Open-text responses were exported to Excel, sorted, manually parsed for key and commonly mentioned points, allocated to categories, and tallied if needed. To enhance clarity, all open-text responses reported on were edited for spelling, grammar and punctuation, without changing the original meaning.

## **Results**

### **Sample demographics and categorisation**

A total of 333 eligible persons participated in the survey, among whom 300 people (90.1%) fully completed the questionnaire, and 33 (9.9%) only partially completed it. The median time taken to complete the questionnaire was 7m 43s.

Respondents' areas of residence were well spread around the Northland region. Sample versus population percentages are shown in Table 1.

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Table 1 Sample distribution

	Sample %	Population % (2018 Census)	Estimated population (2018 Census)
Far North District	28.9	36.4	65,250
Whangārei District	59.5	50.8	90,960
Kaipara District	11.7	12.8	22,869

The sample is roughly proportionate to Northland’s population, although Whangārei had somewhat higher representation. This may be due to the availability of more survey promotion channels in Whangārei, but also likely because of a higher incidence of EV drivers and intending drivers, as Whangārei hosts head offices of several organisations using EVs in their fleets (e.g. Northland District Council, Whangārei District Council, Northland DHB).

Respondents’ gender identification is presented in Fig. 1. There was an approximately even split of respondents who identified as “man” or “woman” (combined total 98.5%), while the remaining 5 persons (1.5%) identified as “non-binary” or preferred to self-describe. Men made up a majority (55.9%) of those who drive an EV in the sample, while women comprised a majority (58%) of respondents likely to drive an EV in the next three years.

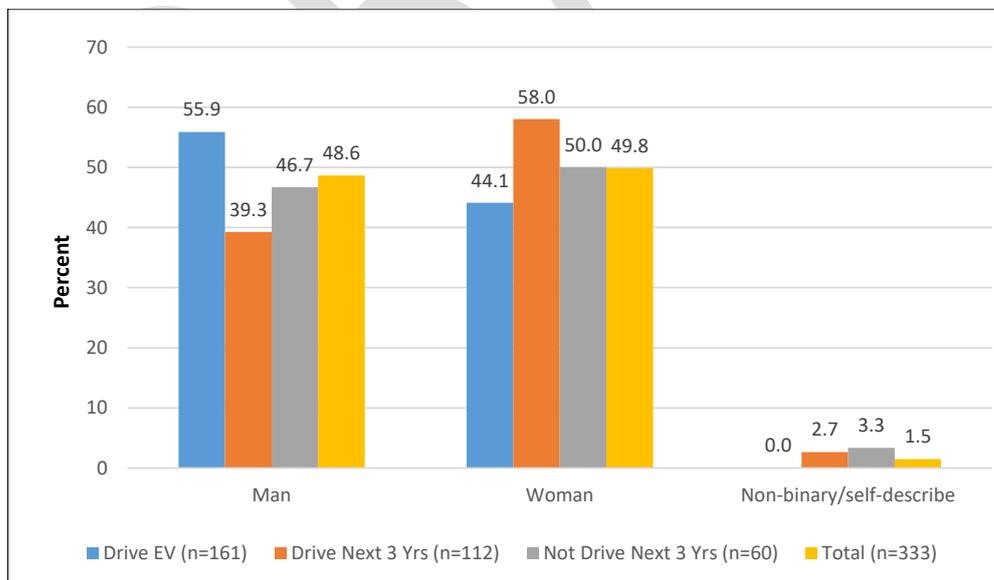


Fig. 1 Gender identification of respondents (n=333)

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The age profile of all respondents is shown in Fig. 2 broken down into categories (respondents who currently drive EV; likely / very likely to drive EV in next 3 years; unlikely / very unlikely to drive EV in next 3 years; all respondents).

There were no respondents in the 16-24 bracket who drive EVs. The incidence of respondents who drive EVs increases markedly with age, especially after 35. Those most likely to drive an EV in the next three years are in the 55-64 age group. Those least likely to drive an EV in the next three years are aged 45-54.

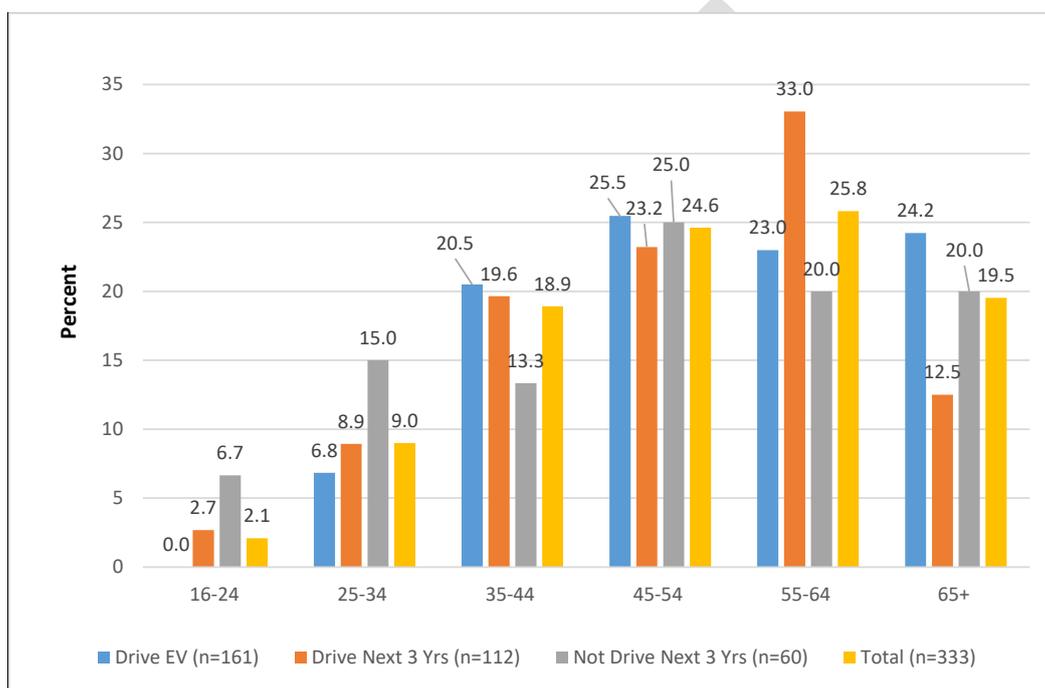


Fig. 2 Age of respondents

In answer to Q5 of the questionnaire, a total of 161 out of 333 respondents (48.3%) said they currently drive an EV — i.e. a Battery Electric Vehicle (BEV) or a Plug-in Hybrid Electric Vehicle (PHEV), but not a conventional hybrid vehicle. These respondents were asked the most extensive and detailed set of questions about Northland’s EV charging infrastructure (see **Question application** section above for details). This was because they were presumed to have the most knowledge of (and interest in) the topic.

The remaining 172 respondents (51.7%) did not currently drive an EV. When asked in Q6 about the likelihood that they would become an EV driver in the next three years, 112 of these respondents (65.1%) said they were likely or very likely to do so (see Fig. 3). These

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respondents went on to answer a smaller subset of questions (see **Question application** section above for details). The 60 respondents (34.8%) who responded “unlikely” or “very unlikely” were thanked and the questionnaire was terminated, as they were presumed to have little knowledge about (or interest in) EV charging infrastructure.

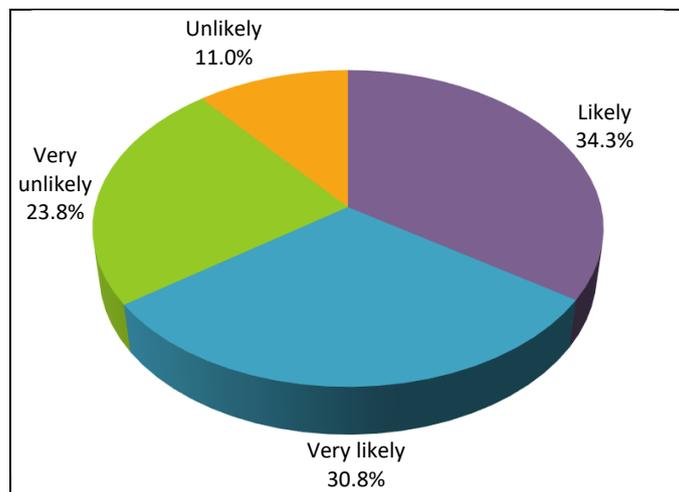


Fig. 3 Likelihood of becoming EV driver in next 3 years ( $n=172$ )

### Results for EV drivers

In Q7, respondents were asked about the type of EV they drive. This was used to screen respondents to ensure that they were in fact EV drivers, as well as to focus their subsequent responses on one specific vehicle. Battery size information was collected to give an indication of their vehicle’s range. The EVs driven by respondents are shown in descending order of frequency, in Table 7, Appendix 5.

Among the respondents, Nissan Leafs were the most numerous, followed by Tesla Model 3, Hyundai Kona, and Mitsubishi Outlander PHEV. A smattering of other makes and models made up the rest. Most Nissan Leafs were low-range, older models. Some 62% of the 137 vehicles for which battery size was specified were 30kWh or lower, although several of these were PHEVs, the range of which is not limited by battery capacity.

Question 9 enquired about the typical travel range of the respondent’s EV when charged to 100%. The responses are shown in Fig. 4.

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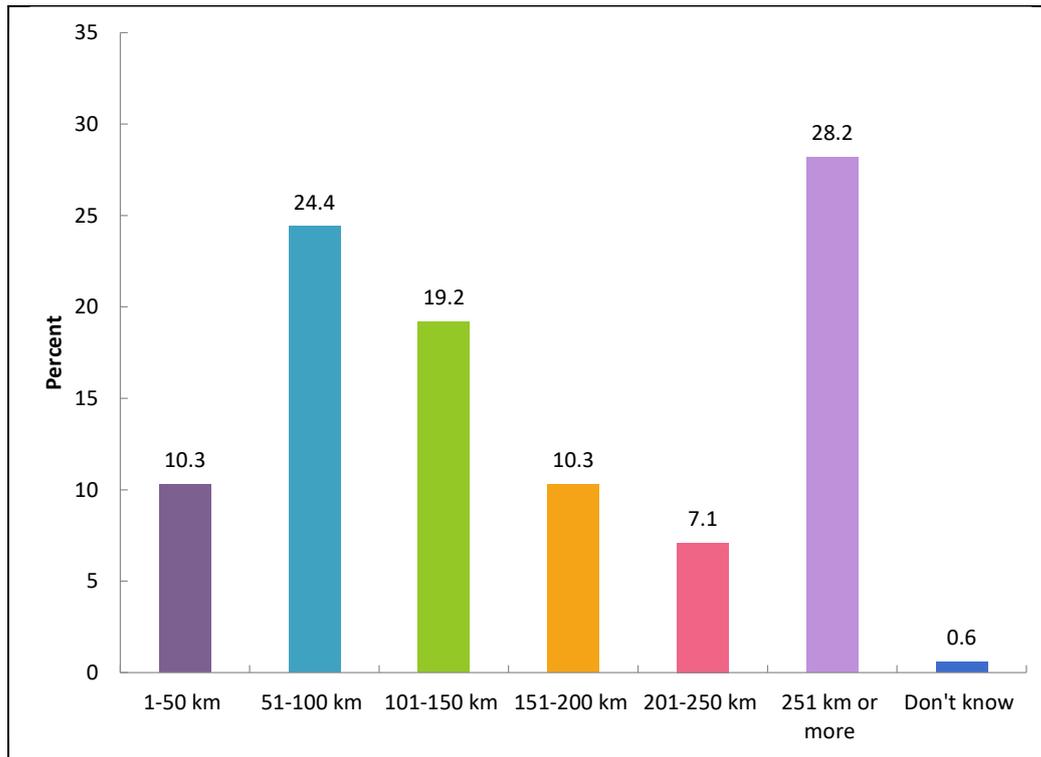


Fig. 4 Travel range on full charge ( $n=156$ )

As could be expected from battery size, 53.8% of vehicles were within the 1-150 km range. Nearly a quarter (24.4%) could only manage 51-100km on a full charge. However, there were also many higher-range vehicles (28.2%) that could travel 251 km or more. This corresponds with battery sizes of approximately 44 kWh capacity and higher.

Respondents were asked in Q10 and Q11 how far their EV is driven on 1) a typical weekday, and 2) a typical weekend day, including driving by any household member. Their answers are presented in Fig. 5 and Fig. 6.

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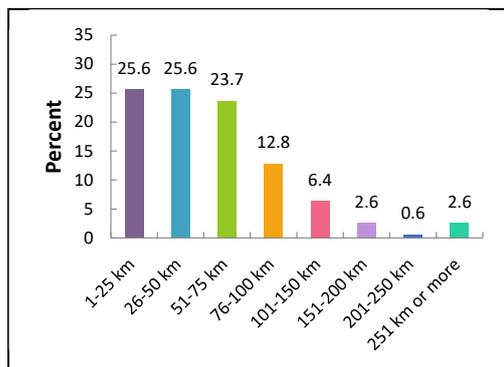


Fig. 5 Distance driven on typical weekday ( $n=156$ )

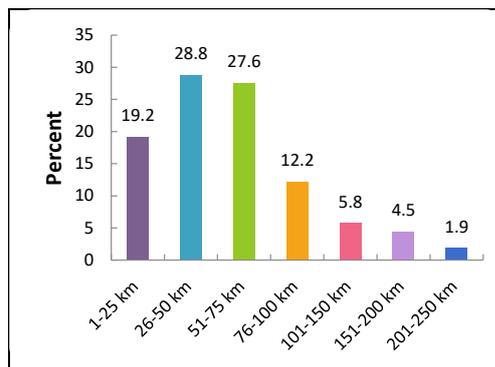


Fig. 6 Distance driven on typical weekend day ( $n=156$ )

On weekdays, respondents tend to do more short trips (1-25 km), while during weekends they do more medium-range trips (26-75 km). The number of longer-range trips is about the same (39 and 38 respondents respectively doing 76+ km), but on weekends slightly more people are doing trips of between 101 and 200 km. There were four respondents who said they do 251 km or more on a typical workday — presumably these are work-related.

Question 12 asked respondents to identify locations where their EV is charged. More than one response was possible for this question. Fig. 7 shows that EVs are charged “at home” in almost all cases (97.4%), but “away from home” is also common (60.3%). Some 57.7% of respondents chose both options. A further 39.7% said their EV was exclusively charged “at home”, while just 2.6% said entirely “away from home”.

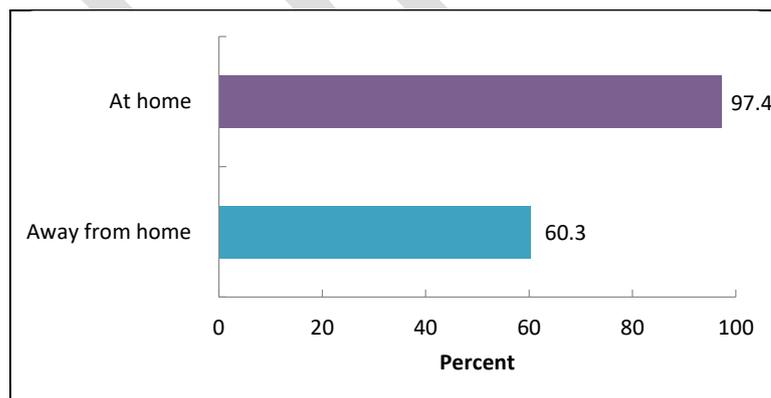


Fig. 7 Locations where EV is charged ( $n=156$ )

Question 13 asked respondents about the number of sessions charged per typical month (30 days) in each location. The results are shown in Fig. 8.

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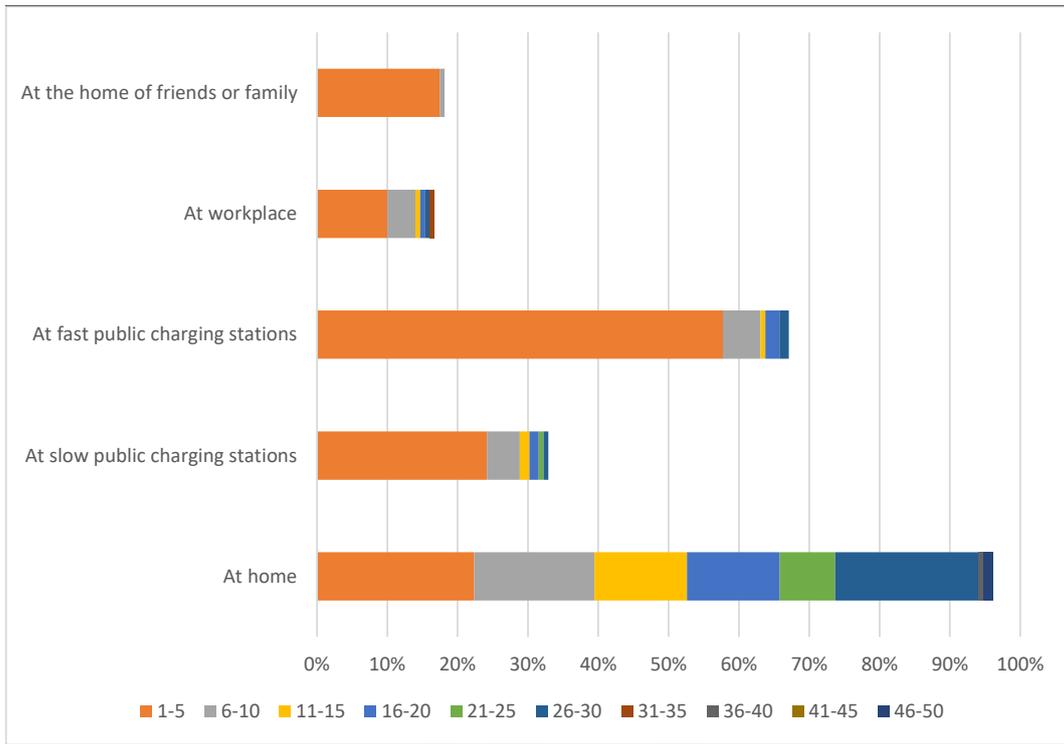


Fig. 8 Number of charging sessions at different locations

The table below shows the detailed data for Fig. 8.

Table 2 Number of charging sessions at different locations

No. of charging sessions	At home (%) n=152	At slow public charging stations (%) n=149	At fast public charging stations (%) n=149	At workplace (%) n=150	At the home of friends or family (%) n=149
1-5	22.4	24.2	57.7	10.0	17.4
6-10	17.1	4.7	5.4	4.0	0.7
11-15	13.2	1.3	0.7	0.7	-
16-20	13.2	1.3	2.0	0.7	-
21-25	7.9	0.7	-	-	-
26-30	20.4	0.7	1.3	0.7	-
31-35	-	-	-	0.7	-
36-40	0.7	-	-	-	-
41-45	-	-	-	-	-
46-50	1.3	-	-	-	-
<b>TOTAL</b>	<b>96.1</b>	<b>32.9</b>	<b>67.1</b>	<b>16.7</b>	<b>18.1</b>

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“At home” (96.1% of respondents) and “at fast public charging stations” (67.1%) are the two places where the greatest number of charges are done every month. “At slow public charging stations” (32.9%) comes a distant third. “At the home of friends or family” (18.1%) and “at workplace” (16.7%) are less common places, but also fill a niche. Some 94.1% of all respondents charge at home 1-30 times. “Fast public charging stations” are mostly used 1-5 times per month (57.7% of respondents), while “slow public charging stations” are used 1-5 times per month by 24.2% of respondents. Another 17.4% charge 1-5 times per month “at the home of friends or family”. Approximately 4-5% charge 6-10 times per month at slow and fast public charging stations or their workplace.

Question 14 requested respondents to identify their main reason for charging away from home on **weekdays** (see Fig. 9).

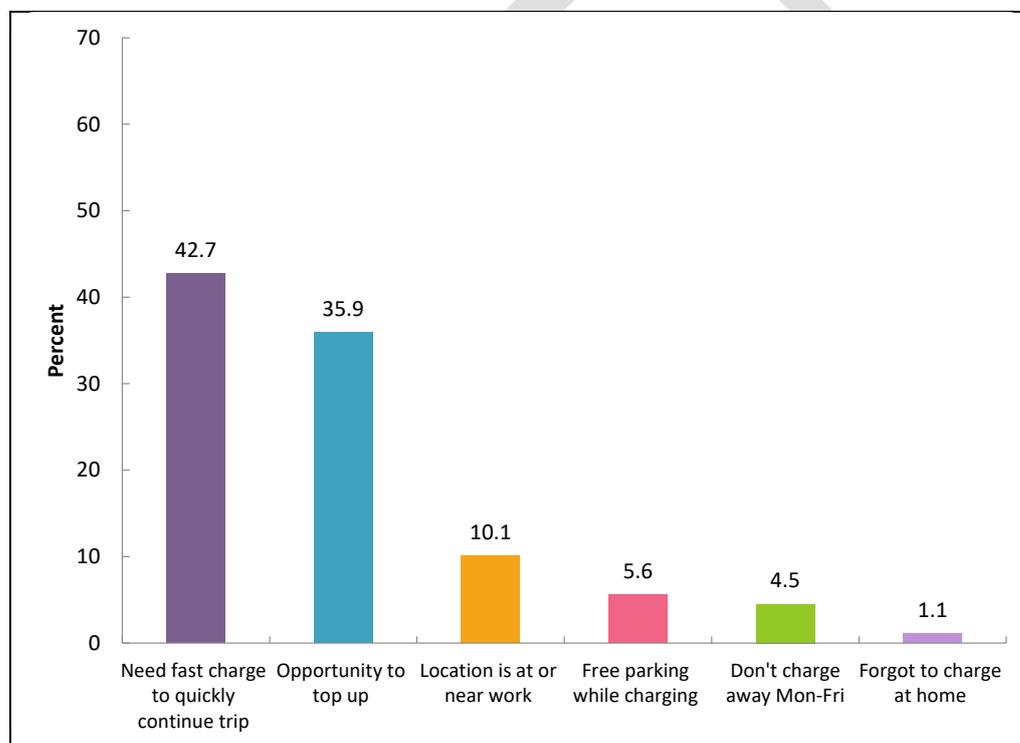


Fig. 9 Reasons for charging away from home on weekdays (n=89)

The two most common reasons given for charging away from home on weekdays were “need fast charge to quickly continue trip” (42.7% of respondents) and “opportunity to top up” (35.9%). “Location is at or near work” came a distant third (10.1%).

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For comparison, Q15 asked respondents to specify the main reason for charging away from home on **Saturdays or Sundays** (see Fig. 10).

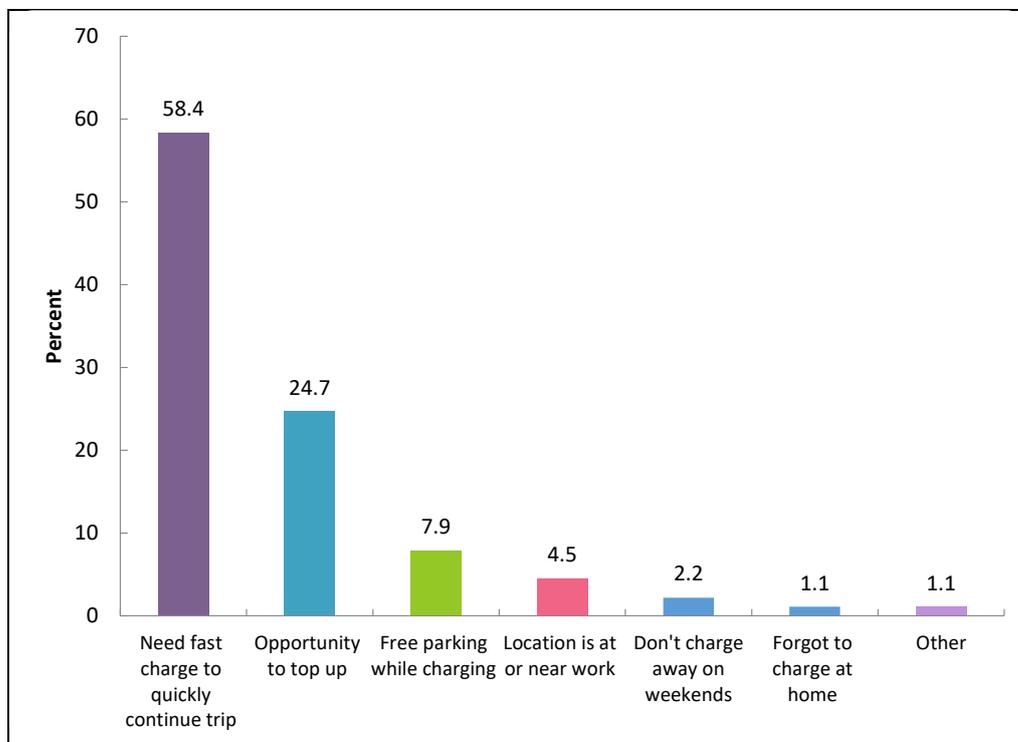


Fig. 10 Reasons for charging away from home on weekends ( $n=89$ )

The two most frequent reasons given for charging away from home on weekends were “need fast charge to quickly continue trip” (58.4% of respondents) and “opportunity to top up” (24.7%). “Free parking while charging” (7.9%) was third — but lagged well behind. EV users are apparently taking longer trips on weekends and therefore need a fast charge to continue their trip more than during weekdays. Taking the opportunity to top-up is more important for EV drivers during weekdays.

**Note: the following question was answered by EV drivers as well as intending drivers.**

All respondents who currently drive an EV ( $n=161$ ) or said they were likely or very likely to drive one in the next three years ( $n=112$ ) had the option of answering Q47, which due to its length was placed near the questionnaire’s end to mitigate against survey dropout. As expected, some respondents did “disappear” at this point, with 33 out of the 273 potential respondents not answering. The question’s phrasing was: *“People may have different charging needs for different locations. Please tell us what you think is the best type of charging facility for each possible public charging location type listed below. Think about*

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*how long people might spend in such locations. (Please select an option for each row)."*

Table 3 summarises the results. Darker cells indicate the more frequently selected options.

Table 3 Respondent assessment of best type of charging facility per location type

<b>CS location types</b> <i>(n=240. Rows total 100%, except for rounding errors)</i>	<b>Slow charger</b>	<b>Fast charger</b>	<b>Mix of slow/fast chargers</b>	<b>NO chargers needed</b>
Public carpark	8.8%	30.0%	58.8%	2.5%
Service station	-	80.8%	14.6%	4.6%
Specialised EV charging station on major route	0.8%	77.1%	21.3%	0.8%
Outside large ("big box") retail store	7.1%	46.3%	42.1%	4.6%
Shopping centre carpark	7.9%	41.7%	49.2%	1.3%
Library / civic centre / theatre	16.7%	25.8%	50.4%	7.1%
Workplace	41.7%	8.3%	42.1%	7.9%
Tourist attraction	7.9%	35.0%	47.9%	9.2%
Hospital	12.5%	27.1%	51.7%	8.8%
Sport and recreation area	17.9%	20.8%	50.8%	10.4%
Popular beach or walking track	20.7%	17.5%	47.9%	14.2%

**Solely slow chargers** were most frequently selected for the "workplace", "popular beach or walking track", "sport and recreation area", or "library / civic centre / theatre". **Exclusively fast chargers** were deemed most appropriate for "service station", "specialised EV charging station on major route" and "outside large ('big box') retail store". **A mix of slow and fast chargers** were thought the most suitable for quite a wide range of locations, including "public carpark", "hospital", "sport and recreation area" "library / civic centre / theatre", "shopping centre carpark", "tourist attraction", and "popular beach or walking track". There

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were very few instances where **NO chargers** were considered necessary, although “popular beach or walking track” was the most likely location type to be assessed in this way.

A plausible supposition is that a couple of key criteria behind the above choices are 1) the time spent at the location (which can vary according to people’s purposes and activities on discrete trips); and 2) whether the location is a destination, or en route to one. Slow chargers are favoured for destinations where people will be spending more time, while fast chargers are preferred for a quick stop during a trip, and for a relatively quick visit to a single big box store. Locations where a mix of charger speeds are chosen appear to be those that serve general needs (e.g. public carpark), or that intrinsically entail a longer-duration activity (e.g. hospitals, sports and recreation areas, library / civic centres / theatres, popular beach or walking tracks, tourist attractions). A shopping centre carpark may be visited for a short or long duration depending on the number of shops that the person wishes to visit.

Asked in Q16 about whether they currently use any public **slow** chargers in Northland (see Fig. 11), less than a third of respondents (32.4%) said they do.

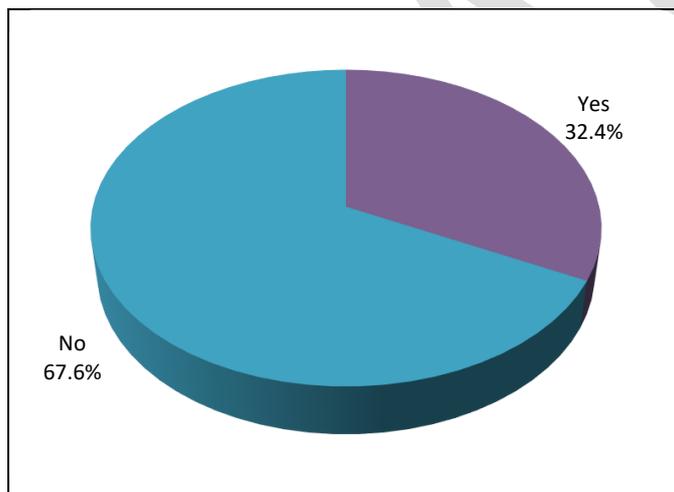


Fig. 11 Use of public slow chargers in Northland ( $n=148$ )

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In Q17-19 respondents described the location of up to three public slow chargers they use, and assessed the pros and cons of each. A full set of results is presented in Table 8, Appendix 6. In summary, common **advantages** (pros) of existing slow chargers mentioned by respondents included:

- Free
- Close to town and amenities such as library, cafes
- Central location
- Can top-up while shopping
- Good for a top-up while doing an activity such as exercise
- Safe and secure location
- Enables people with low-range EVs to get back home.

Typical **disadvantages** (cons) of existing slow chargers that respondents highlighted included:

- Too slow
- Insufficient number of chargers
- Often unavailable due to others using them
- EVs often park in the charging spot for extended periods, long after their vehicle is charged, blocking access to others
- Some locations are far from places that people can do any activity while they wait for charging
- Sometimes the EV charging spots get “ICEd” (vehicles with internal combustion engines park there too, or block entry / exit)
- Chargers are not well maintained, and some are frequently out of service.

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Question 20 asked respondents whether they currently use any paid public **fast** chargers in Northland (see Fig. 12). More than two-thirds (70.3%) said they do.

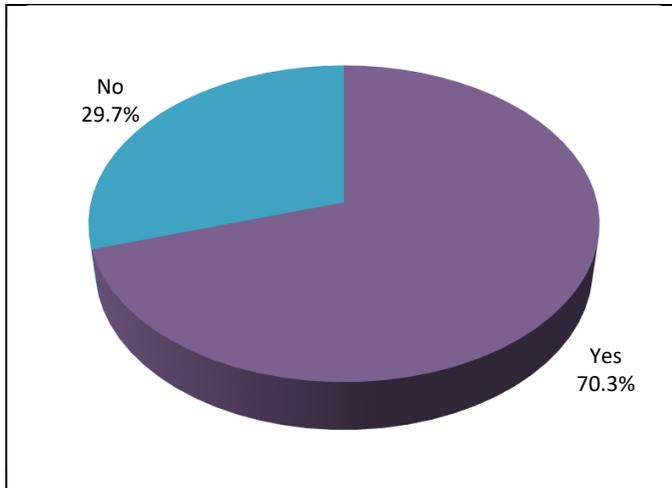


Fig. 12 Use of public fast chargers in Northland ( $n=145$ )

In Q21-23 respondents described the location of up to three paid public fast chargers they use, and assessed the pros and cons of each. A full set of results is presented in Table 9, Appendix . In summary, common **advantages** (pros) of existing fast chargers that respondents mentioned included:

- Fast
- Convenient
- Easy access
- Easy to find
- Near the main road
- Central location
- Safe location
- Close to shops / supermarket (this was especially noted for Whangārei PAKŪSAVE)
- Close to activities
- Close to toilets
- Close to refreshments such as food and coffee
- Good location for a top-up
- Good location in terms of vehicle's range, opening up access to destinations that would otherwise be out of reach
- Good location for a stop en route
- Free charging appreciated (at The Warehouse Whangārei).

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Typical **disadvantages** (cons) of existing fast chargers that respondents raised included:

- Too expensive
- Hard to find due to being tucked away somewhere
- Better and larger signposting needed
- Poor exit and entry access
- Difficult to get back onto highway, due to positioning or heavy traffic
- Sometimes gets ICed
- Insufficient number of chargers reduces availability
- Need to wait for other car to finish charging, or find another charger, especially in summer
- Location doesn't feel safe or secure, because poorly lit or not in public view
- No place to shelter from rain.

Respondents were asked in Q24 whether there are currently enough paid public fast chargers in Northland. A clear majority (66.2%) said “No” (see Fig. 13).

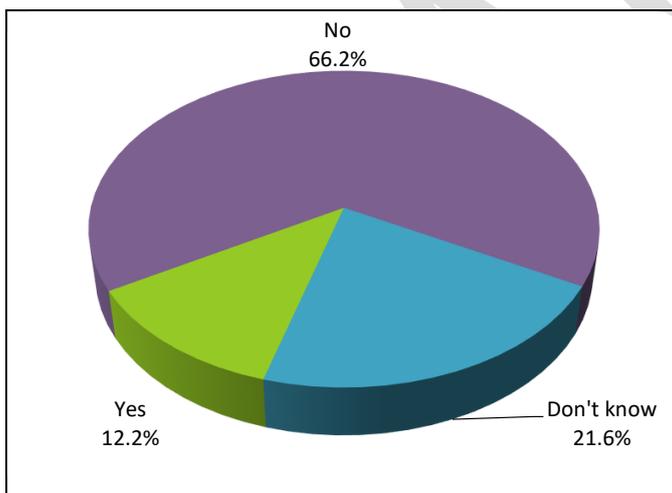


Fig. 13 Opinion regarding whether there are enough paid public fast chargers in Northland ( $n=139$ )

*Draft as of 4 November 2021*

Those 139 respondents saying in Q24 that there not enough chargers — i.e. more chargers are needed — also said in Q25 that they could suggest charger locations. They were then asked in Q26, 30 and 34 to suggest first-, second- and third-priority locations for paid public fast chargers to be installed around Northland, or for more chargers to be installed if a CS already existed in that location. The list of proposed locations is presented in Table 10, Appendix 8. These results will be discussed shortly, after highlighting some summary results from the sub-questions related to each identified location.

If respondents suggested upgrades to an existing charging location, they were also asked to identify the “typical waiting time until a charger is available for use at this location”. For all suggested charging locations, respondents were asked to identify the number of chargers they thought were needed at that location.

In most cases, respondents of Q27, 31 and 35 proposed new charging locations rather than upgrading existing ones. For first-, second- and third-priority locations, new suggested charging locations comprised 77.9%, 82.8% and 87.2% of all locations mentioned, respectively.

Responses to Q28, 32 and 36, relating to waiting times at existing fast public CSs, are presented in Fig. 14. This shows perceived typical waiting times, combined from existing first-, second- and third-priority locations where respondents think paid public fast chargers are needed, or where more chargers should be installed.

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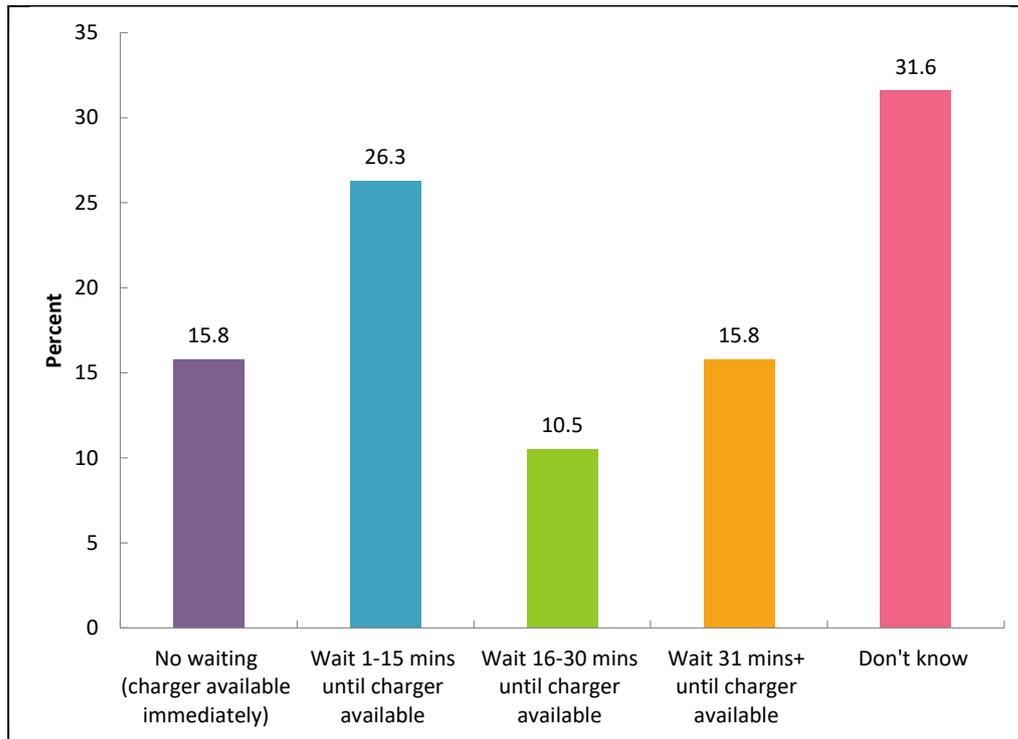


Fig. 14 Typical waiting time until charger available at existing fast public charging stations in Northland ( $n=38$ , combined from first-, second- and third-priority locations identified)

A wait of 1-15 minutes is most common (26.3% of locations); this is followed by 31 minutes or more, or no waiting (15.8% each). This indicates that bottlenecks are already being experienced at some CSs. Only a small number of respondents answered the questions on this topic, so this data should be treated with caution.

Respondents of Q29, 33 and 37 considered that in most existing and proposed new fast public charging locations, 1-2 chargers would be sufficient (56.6% of locations), but a significant minority of locations (32.7%) were felt to need 3-4 chargers. These combined results from first-, second- and third-priority existing and proposed locations where respondents think paid public fast chargers are needed, or where more chargers should be installed, are presented in Fig. 15.

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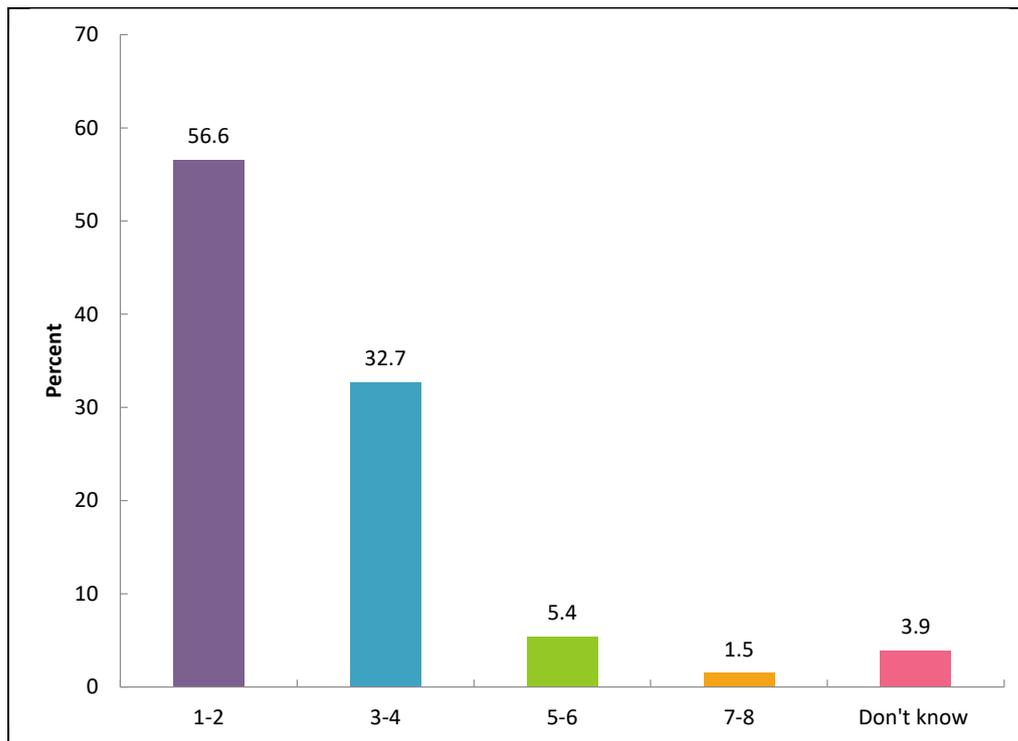


Fig. 15 Opinion on how many chargers should be at each existing and proposed fast public charging location ( $n=205$ , combined from first-, second- and third-priority locations identified)

Returning to the proposals for CS locations, Table 10 in Appendix shows all responses to Q26-27, 30-31, and 34-35. The table identifies specific locations around Northland where respondents think paid public fast chargers are needed, or where more chargers should be installed. Wellsford is also included, despite being outside the region, due to its location en route to Auckland, a major destination / point of origin for Northland. Each location was assigned a priority by each respondent. Chosen priorities and total number of mentions for each location are likely influenced by where respondents themselves live, their own EV's range, and an assessment of other EV drivers' needs, among other things.

For ease of analysis, locations were categorised by the researcher into 18 "Areas", based on major roads in the Northland region, potential node locations, or popular destinations. Firstly, based on the priority assigned to each CS location, the researcher calculated an average priority score for each area in which CSs might be situated. The priorities are 1-3 (first, second and third). The lowest average priority "scores" tend to indicate areas that are of

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higher priority overall. However, due to small numbers of mentions of CS locations within some areas, these average scores must be interpreted judiciously.

Based on average priority scores, top-priority areas for CS installation or expansion might be:

1. Kerikeri (Average priority score = 1.0)
2. Bay of Islands (1.42)
3. Kaiwaka-Waipū via Mangawhai (1.5)
4. SH1 Whangārei-Kawakawa (1.5)
5. Kawakawa (1.5)
6. SH5 Otaika-Kaikohe (1.6)
7. Whangārei including Onerahi (1.69).

Another indicator of the importance of an area for CS installation or upgrade is simply the total number of mentions by respondents. This appears to be a more reliable analytical approach than the average priority scores above. Based on this approach, top priority areas for charging station installation or expansion would appear to be:

1. SH1 Kaiwaka-Whangārei (42 mentions)
2. Whangārei including Onerahi (35)
3. Whangārei Heads (15)
4. SH10 Kerikeri-Awanui (13)
5. Bay of Islands (12)
6. Tutukākā Coast (11).

Respondents were asked in Q38 “If you could choose one or two locations in Northland to have 6-8 paid public FAST chargers in each location right now, where would those be? (Please provide a clear description e.g. X location on Y street / road in Z town).” Some 87 respondents provided one or more suggestions. Table 11 in Appendix presents all suggestions, providing a tally for each town or settlement in which locations were mentioned. The most-mentioned towns or cities preferred for installing a CS with 6-8 fast chargers right now were as follows:

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1. Whangārei (48 mentions)
2. Kaiwaka (17)
3. Kawakawa (6)
4. Waipū (6)
5. Kerikeri (5)
6. Paihia (5)

These locations are all located on highways with high traffic volume, and are considered important because they open up access to other areas. Many suggestions addressed upgrading and expanding existing specific CSs (e.g. Kaiwaka Four Square, Whangārei McDonalds Raumanga, Whangārei Forum North carpark, Kawakawa, Kerikeri). Key new suggested CS locations included Whangārei CBD / Town Basin, Okara Park Shopping Centre in Whangārei, and Waipū (either in town or on SH1). Most responses did not provide a specific street location as requested — just the town's name. Some follow-up with those respondents who provided their contact details might help to yield more details.

Revisiting the data from Q29, 33 and 37 on the suggested number of chargers at proposed public fast charger locations (see Fig. 15 for summary), 1-2 chargers were suggested for smaller towns and settlements such as Maungatāpere, Matakohe, Dargaville, Mangamuka, Kaitaia, Awanui, and Kaeo, as they are needed by local EV users as well as people travelling on the main tourist routes. These locations also help to relieve range anxiety for low-range EV drivers. The 65 mentions of proposed locations for 3-4 chargers were mainly in Mangawhai, Kaiwaka, Waipū, Ruakākā / Bream Bay GAS station SH1, Whangārei CBD and Whangārei SH1. There were just 11 mentions of proposed locations for 5-6 chargers, scattered among Wellsford, Mangawhai, Waipū, Whangārei and Paihia. There were only three mentions of proposed locations for 7-8 chargers in this set of questions. In contrast, Q38 yielded a much better response, as it focused on eliciting suggestions of locations specifically for 6-8 chargers (see earlier discussion on p. 30).

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When respondents were asked in Q40 whether they expected their away-from-home charging needs in Northland would change in the next five years, most (68.1%) said yes (see Fig. 16).

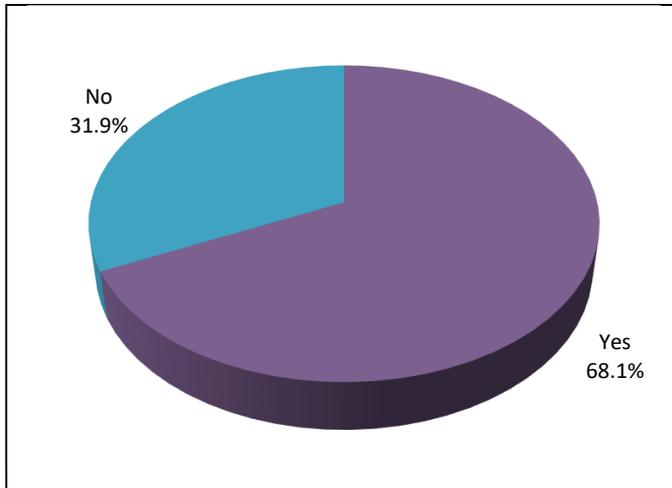


Fig. 16 Expectation of changing charging needs in the next five years away from home ( $n=135$ )

When respondents were asked to explain in Q41 how they expected their away-from-home charging needs to change, their answers reflected several main themes:

- As EVs become more widely used, more chargers will need to be installed in more locations, with multiple chargers at heavily used locations (32 mentions).
- Will do more travel, including to more remote locations (18 mentions).
- Likely to get EV with greater range, that will allow travel further with less charge stops (10 mentions).
- Battery degradation in existing EV will require more frequent charging at reduced distances (11 mentions).
- Will need more fast chargers, including hyper chargers e.g. 300 kW (4 mentions).
- More adaptor options will need to be provided for those with different types of charging ports (4 mentions).

Several current EV drivers mentioned that they were likely to get a second EV, which would increase their use of chargers away from home.

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The full list of responses is provided in Table 12, Appendix . It seems that EV drivers will be divided into two main groups for the near future:

- **Those with low-range EVs** such as older Nissan Leafs, the batteries of which will further degrade over time. These people will need more access to chargers in town (for those who travel from out of town, or do several trips in a day), and chargers at shorter intervals for travel away from their normal area of residence.
- **Those with medium or high-range EVs.** They will need to charge less often when travelling longer distances, but because of their greater range will want — and feel able — to do trips more often for greater distances. They will thus need to charge away from home more than before. Such people will rarely use public chargers away from home if only doing short trips for work, shopping, errands, etc. Note that around 47% of EV drivers surveyed here were aged 55+, and this group presumably have more time and resources for travel.

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### Results for intending EV drivers

Questions 42-46 were targeted at respondents who currently do not drive an EV, but said they are “likely” or “very likely” to do so in the next three years. Question 42 asked whether respondents had ever driven an EV before. Some 58.9% said they had (see Fig. 17). Note that the whole EV questionnaire was targeted at current EV drivers or those intending to drive an EV in the next three years, so the result below should **not** be extrapolated to the general Northland population.

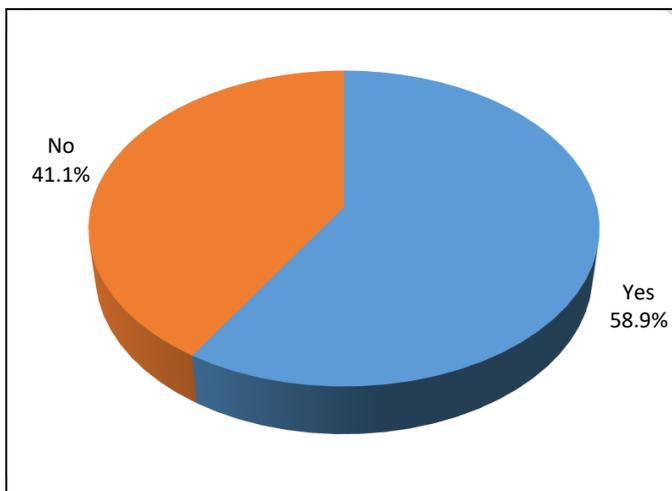


Fig. 17 Respondents who had “ever driven an EV” ( $n=112$ )

When asked in Q43 how they would rate their previous experience of driving an EV, respondents were overwhelmingly positive (see Fig. 18). Some 86.2% of these 112 people said they were “satisfied” or “very satisfied” with the experience. Just 10.8% were neutral, and a tiny minority (3%) were “dissatisfied” or “very dissatisfied”. These results are not surprising, given that this subset of respondents had already indicated that they were likely to drive an EV in the next three years.

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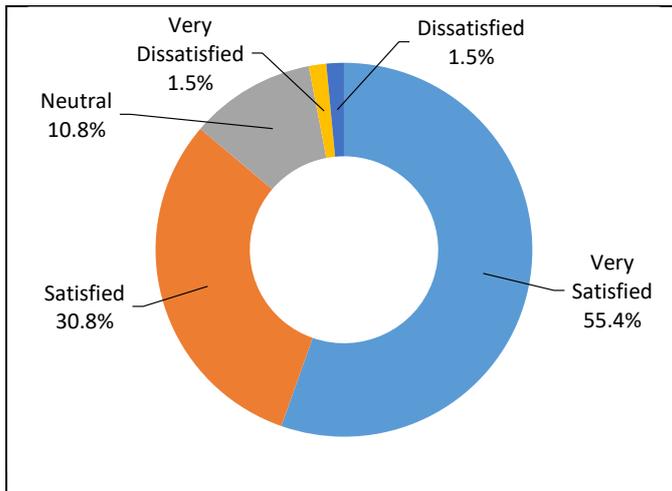


Fig. 18 Rating of previous EV driving experience ( $n=65$ )

Respondents likely to drive an EV in the next three years were also asked in Q44 whether they were considering **buying** an EV in the next three years. Unsurprisingly, the overwhelming majority (95.5%) said they were considering doing so (see Fig. 19).

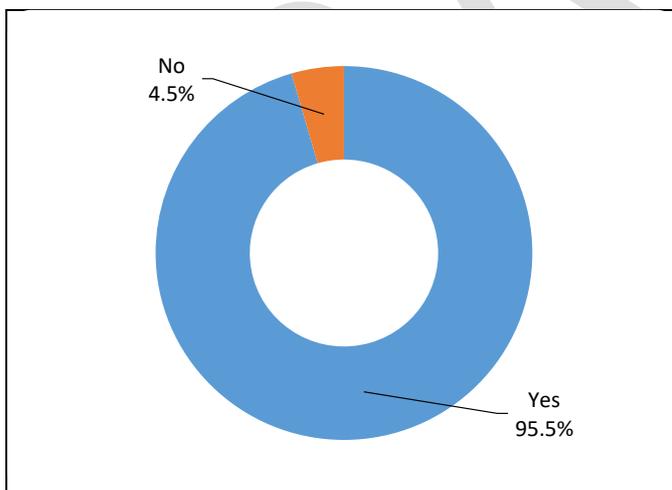


Fig. 19 Respondents likely to drive an EV in the next 3 years who are considering **buying** an EV in next 3 years ( $n=111$ )

The respondents' most important reasons for considering buying an EV in the next three years (Q46) are shown in Fig. 20. Each respondent had to choose three reasons. In first place, a majority of respondents (62.9%) cited "Environmental reasons", in second place was

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“acceptable range (distance) before recharging” (51.4%); and virtually tied in third place were “Operating cost is acceptable” (38.1%) and “I am able to charge it at home” (37.1%).

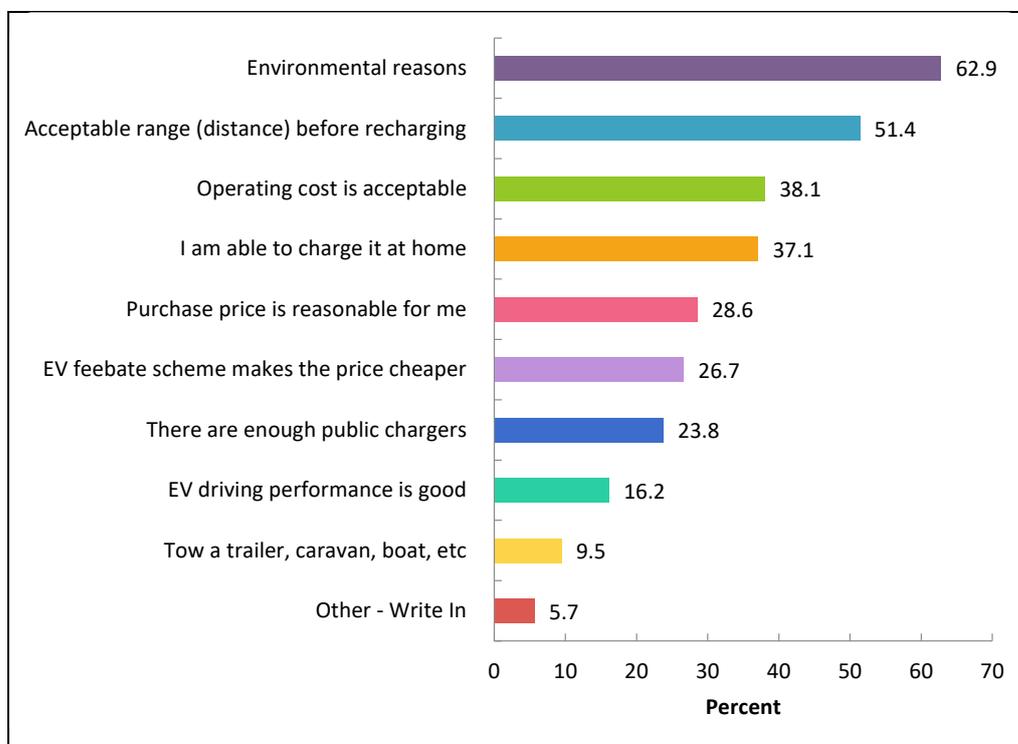


Fig. 20 Main reasons for considering buying an EV ( $n=105$ , three responses per respondent)

As only five Q44 respondents said they were **not** considering buying an EV, the sample is too small to draw reliable conclusions, thus their responses to Q45 about their reasons are not reported in detail here. One notable point was that all five respondents cited “the purchase cost is too high” as their most important reason.

### **Suggestions for improvement of charging infrastructure**

The last two survey questions (Q47 and Q48) elicited suggestions from all EV drivers and potential drivers relating to “improving Northland’s public EV charging infrastructure”, and any “other comments ... relating to Northland's public EV charging infrastructure”.

Responses from both questions were analysed together, and are listed under topic and sub-topic categories in Table 13, Appendix 11. A total of 175 respondents offered 268 topic-mentions. Their texts were edited for clarity, spelling and punctuation, but meanings remained unchanged. If one respondent gave the same response for both survey questions,

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one was deleted to avoid duplication. Where practical, responses that included more than one topic were generally broken into their individual topics to enable separate categorisation, but in some cases, the broader comment was kept intact to preserve context and aid comprehension. Table 4 summarises the topics and sub-topics mentioned.

Table 4 Summary of suggested improvements to Northland's public charging infrastructure, and general comments

<ul style="list-style-type: none"> <li>• More chargers, and more chargers per station needed (76 mentions) <ul style="list-style-type: none"> <li>○ More fast chargers needed (44)</li> <li>○ Make fast chargers the priority, not slow chargers (5)</li> <li>○ More chargers at each station (18)</li> <li>○ Need to roll out the infrastructure faster, for environmental reasons (2)</li> <li>○ More charging stations will encourage EV uptake (6)</li> <li>○ Other (1 mention)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Fill gaps, especially for lower-range vehicles (17)</li> </ul>
<ul style="list-style-type: none"> <li>• Specific types of locations needed (54) <ul style="list-style-type: none"> <li>○ On main routes (7)</li> <li>○ Auckland to Whangarei (4)</li> <li>○ On secondary routes (2)</li> <li>○ Rest areas and service stations (2)</li> <li>○ Tourist areas (5)</li> <li>○ Major towns, smaller centres (5)</li> <li>○ Rural areas, smaller centres (8)</li> <li>○ Beaches and coastal areas (6)</li> <li>○ Near facilities, shopping (8)</li> <li>○ Hospitals, large employers (3)</li> <li>○ At carparks (2)</li> <li>○ Other (2)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• More slow charging needed (4)</li> </ul>
<ul style="list-style-type: none"> <li>• Incentives and disincentives (4)</li> </ul>
<ul style="list-style-type: none"> <li>• Overstaying and getting 'ICE'd (17) <ul style="list-style-type: none"> <li>○ Time limits and penalties (6)</li> <li>○ Parking etiquette (2)</li> <li>○ Reduce EVs getting ICE'd (9)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Charging station signage, visibility, app / website (20) <ul style="list-style-type: none"> <li>○ Signage and signposting, easy access (6)</li> <li>○ Visible location (3)</li> </ul> </li> </ul>

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○ App / website to find appropriate CS, ascertain availability (11)
• Charging station design, access, facilities (7)
• Charging station safety (4)
• Technical aspects of charging stations (10)
• Renewable energy, increased generation capacity (5)
• Make EVs cheaper (1)
• Cheaper or free charging (10)
• No more free charging (2)
• Incentivise home charging, make it cheaper (3)
• Planning and coordination, anticipating demand (9)
• Technical support (1)
• Improve roading infrastructure (1)
• Improve public transport (1)
• Miscellaneous negative (5)
• Miscellaneous positive (17)

Around 56% of topic mentions specifically focused on the need for more chargers, more chargers per station, and specific locations for chargers. Respondents' emphasis seemed to be on fast chargers, due to their convenience, speed, and greater peak-demand capacity. Only a few people specifically favoured increasing the number of slow chargers. The need for a good spread of chargers around the region was recognised, to fill gaps in the network (especially important for lower-range EVs), reduce congestion, and provide redundancy to allow people to charge at an alternative location if their preferred site was unavailable or out of service. Increasing the number of chargers at existing locations was regarded as being an efficient way to increase capacity and reduce congestion, and to allow for expansion as demand increases. Several respondents mentioned that boosting the number of CSs was important for promoting EV uptake.

Respondents suggested a variety of areas needing more CSs. More stations along the major highways, as well as on secondary routes, were felt to be important. Major towns (especially Whangārei) as well as rural areas / smaller centres were also identified as targets, including the more remote areas, those popular with tourists, and coastal areas. Where possible, placing CSs near facilities such as cafes, supermarkets and shops was felt to be convenient for EV users as well as boosting the clientele for local businesses. Hospitals and other high-employment locations were also believed to be good candidates for CSs.

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Two significant issues of concern for EV drivers were overstaying (EVs remaining parked at chargers well after they were fully charged), and getting 'ICE'd (being physically blocked by a non-EV). Time limits and stricter enforcement such as overstay fees, fines, and vehicle removal were proposed as solutions. Clearer signage and markings, as well as education to improve driver etiquette, were also believed to be helpful in dealing with these issues.

Some comments proposed better signposting and signage, as well as more visible locations, to make it easier to find CSs and check their availability. Having a safe, well-lit location was another highlighted issue. Several respondents proposed an app and/or website that covered all CSs, or at least the non-ChargeNet stations. Ensuring that all CSs be shown on Google Maps would also be helpful. Ease of access and good layout of CSs would help to reduce congestion and make them easier to use.

Some technical aspects of CSs were raised, including the need for maintenance to ensure operability, and for compatibility with a wider range of adaptors. Using electricity from renewable sources was also felt by a few respondents to be desirable, for environmental reasons.

Charging cost seemed to be a concern for some respondents. They proposed cheaper — and even free — public charging (sponsored if possible). In contrast, a couple of respondents wanted to end free charging, as it would free up spaces for more (fast) chargers. A few respondents also felt that home charging rebates or incentives were needed.

Several respondents mentioned the need for better planning and funding of charging infrastructure rollout in Northland, and for it to be ongoing, rather than a series of one-off projects. One respondent believed that it is unclear who is responsible for charging infrastructure — government, councils or business — and that alignment between road planning, district planning and EV charging needs to be achieved.

Overall, there was enthusiastic support and appreciation for the past and ongoing efforts to improve the EV charging infrastructure in Northland, and encouragement to continue its development.

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## **Discussion**

### **Relevance and application of survey results**

These survey results on the actual preferences and perceptions of current and intending EV users in Northland relating to EV public charging infrastructure and associated issues provide many new and useful insights. This research is particularly relevant due to the dearth of region-specific data for Northland, and scarce funds for the further development of charging infrastructure. The information gathered will help regional decision-makers, especially NRC and its collaborating partners, to conduct a staged, prioritised rollout of CSs when resources progressively become available. The survey results will be useful supporting evidence for NRC proposals to central government for CS infrastructure development funding, such as the Low Emission Vehicles Contestable Fund of the Energy Efficiency & Conservation Authority (EECA).

### **Need for public charging infrastructure**

Overall, the survey results demonstrate a need for more public charging infrastructure in Northland, with 66.2% of respondents saying there are not enough paid public fast chargers. Most respondents were able to suggest three locations where new CSs are needed, or where additional chargers need to be installed. While the number of charges away from home needed by each respondent each month is not especially high (typically 1-5), these sessions enable EV users to more effectively use their EV while reducing their reliance on conventional vehicles. As noted earlier, visibility and availability of EV charging infrastructure has been noted by international studies to be important in promoting uptake of EVs (Ndevr Environmental Pty Ltd, 2017).

### **Factors limiting EV use**

Currently a large proportion of Northlanders' EVs have limited range, which constricts their travel options. Long trips within Northland are generally not practical for such EV drivers given the current EV charging infrastructure. While some EV drivers are considering upgrading to a newer, longer-range model, or adding it to their "fleet", for many this is not affordable. The reality is that many low-range vehicles will still be on the road for some years to come, until battery degradation renders their continued use impractical. To alleviate these

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limitations, drivers of low-range EVs say they need fast chargers at relatively short distances apart, along the major travel routes and at key destinations in the region, as well as more fast chargers within their immediate locality.

Meanwhile, a growing number of EV drivers with newer medium- or long-range models want to travel around the region, and need sufficient fast- or hyper-chargers at strategic locations along major routes and at key destinations to avoid serious bottlenecks. They have little need for fast chargers close to home, except for recharging their vehicle upon “return to base” from longer trips.

Congestion is also a concern for many EV drivers. Bottlenecks are already being experienced at many CSs. Based on respondent comments, reasons for this include the small number of chargers relative to users, periodic malfunctions / outages of some chargers, and the CS parking layout not enabling switching of charging cables over to another EV when one has already reached full charge. The problem is becoming more acute during holiday periods, when people visit Northland from outside the region in their EVs, and when more and more people (Northlanders and outsiders) go on longer weekend trips around the region.

### **Away-from-home charging behaviour, preferences and needs**

The current need for away-from-home charging is relatively low, but important. While reported charging sessions per month at fast and slow CSs are typically only 1-5 sessions per month, such charging is nevertheless needed to supplement home charging, as evidenced by the reasons given for charging. The number of fast charging sessions is currently more than double that of slow charging sessions. EV users are apparently taking longer trips on weekends, and thus have a greater need to do a fast charge to continue their trip than during weekdays. Taking the opportunity to top-up is more important for EV drivers during weekdays.

Respondent assessments of the best charger speed for different types of locations / Points of Interest yielded valuable insights. A couple of key criteria behind the choice of charger speed may be 1) the time spent at the location (which may vary according to people’s purposes and activities on discrete trips); and 2) whether the location is a destination, or en route to one. Choosing the appropriate charger speed is important when deciding how to deploy charging resources. Given that slower chargers are less expensive to procure and install, knowing the right locations for them could help to cater for some EV drivers’ needs in a more cost-

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effective way. It is also important to recognise that usage scenarios will vary from trip to trip, so there is a case for a mix of slow and fast chargers in some locations.

Away-from-home EV charging needs will change in the next five years, according to more than two-thirds of current EV drivers. Reasons include wider EV use in general; use of more EVs with greater range, and thus more travel in the region for longer distances; or conversely, for those with low-range degraded batteries, more trips for shorter distances per charge. This will require more fast- and hyper-chargers to be installed in more locations, with multiple chargers at heavily used locations. Such locations focus on CBDs, shopping areas as well as along major regional routes.

### **Criteria for location of CSs**

A further insight from this survey is that respondents' assessments of the pros and cons of existing slow and fast chargers can help in establishing criteria for locating new ones, and for ensuring that they are accessible and usable. The assessments of existing fast chargers provide particularly useful indications of what EV users want from a CS location, and what design pitfalls should be avoided. Based on respondents' assessments of existing CSs, tentative criteria may be induced for location and design of fast public CSs, as follows:

- Easy to find, well signposted
- Near the main road, or in a central location
- Easy / safe entry and exit (especially getting back onto highway)
- Good location in terms of common EV ranges, and enabling anxiety-free access to common destinations
- Good location for a stop en route, including rest stops
- Near refreshments such as food and coffee (that are open)
- Close to toilets (that are open)
- Safe location, in public view, well-lit
- Close to shops / supermarket
- Have nearby activities to do while charging
- Sufficient chargers, with layout conducive to switching charging cables between cars
- Away from ICE vehicles that might block charging spaces
- Sheltered from rain.

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### **Proposed CS locations and charging capacity**

Respondents' suggested priority locations for CSs around Northland were mostly for new infrastructure rather than upgrading or expanding existing CSs. This likely reflects the fact that current CS infrastructure provision is still well behind the perceived need. Favoured locations tend to be concentrated around major population centres where there is high EV ownership, and major routes between destinations popular among Northlanders as well as travellers from outside the region. These areas include: SH1 Kaiwaka-Whangārei; Whangārei including Onerahi; Whangārei Heads, SH10 Kerikeri-Awanui, Bay of Islands, and the Tutukākā Coast.

Just 1-2 chargers were thought to be needed by respondents for smaller towns and settlements such as Maungatāpere, Matakohe, Dargaville, Mangamuka, Kaitaia, Awanui, and Kaeo, as they are needed by local EV users as well as people travelling on the main tourist routes. They also help to relieve range anxiety for low-range EV drivers.

Some 38.1% percent of existing and proposed CSs should have between 3 and 6 chargers, in respondents' opinion. Proposed locations for 3-4 chargers were mainly in Mangawhai, Kaiwaka, Waipū, Ruakākā / Bream Bay GAS station SH1, Whangārei CBD and Whangārei SH1. Proposed locations for 5-6 chargers were scattered among Wellsford, Mangawhai, Waipū, Whangārei and Paihia.

Towns or cities preferred for prioritising installation of 6-8 fast chargers were Whangārei, Kaiwaka, Kawakawa, Waipū, Kerikeri, and Paihia. These locations are all located on the major highways where there is a high level of traffic, and are considered important because of their role in opening up access to surrounding areas.

### **EV uptake**

There appears to be a significant number of people who are considering buying an EV in the next three years in Northland, based on the numbers of such people participating in the Northland EV survey. However, this survey does not establish their proportion within the overall driving population of Northland, as the questionnaire sample was purposively selected rather than being a stratified population sample. Intentions to buy an EV are mainly based on environmental reasons, acceptable range and operating cost, and being able to charge at

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home. Purchase prices are also becoming more attractive, due partly to the government feebate scheme.

### **Suggestions for improving Northland's public EV charging infrastructure**

Respondent comments and suggestions for improving Northland's public EV charging infrastructure broadly reflected the results of the more specific survey questions, while providing additional very useful insights and perspectives. Most agreed that there was a need for further investment in expanding the region's charging infrastructure, and that it needed to be well planned and in line with regional priorities.

### **Limitations and future research**

This research was based on a purposively selected sample of EV drivers and those intending to drive an EV in the next three years. It relies on reported behaviour, perceptions and preferences. While it provides useful insights and suggestions from Northland EV users themselves regarding location and design of CSs throughout the region, further research will need to be done to supplement this knowledge. Issues that need to be studied in more detail are described in Appendix 1. These issues include a stocktake of existing CS infrastructure and pipeline projects; regulatory, consent and land ownership requirements or issues; parking space availability; transmission network characteristics and requirements; opportunities for collaboration with the private sector; and cost estimates for equipment, installation and associated infrastructure.

## **3. Conclusions**

Transport accounts for twenty percent of New Zealand's total greenhouse gas emissions. Improving the uptake of electric vehicles is an important contribution to reducing these emissions. The rollout of additional public EV charging infrastructure in Northland is highly likely to reduce range anxiety and enable more journeys to be done by EV, encouraging greater EV uptake and use. This survey obtained responses from 273 current and intending EV drivers around Northland, New Zealand. The survey's overall objective was to provide data to assist NRC in identifying optimal locations for EV charging stations around Northland, and ensuring that their design considers users' expressed needs and preferences. Specific survey aims included identifying current and expected future charging needs; assessing existing CSs; identifying recommended locations for CSs; and understanding reasons for uptake of EVs.

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This survey identified a need for additional public EV charging stations. Drivers of low-range EVs say they need fast chargers at relatively short distances apart, along the major travel routes and at key destinations in the region, as well as more fast chargers within their immediate locality. Drivers of medium- or long-range EVs want to travel around the region, and need sufficient fast- or hyper-chargers at strategic locations along major routes and at key destinations to avoid serious bottlenecks. They have little need for fast chargers close to home, except for recharging their vehicle upon “return to base” from longer trips.

The current need for away-from-home charging is relatively infrequent for most EV drivers, but nevertheless important to enable EV drivers to “fast charge to quickly continue” their trip, and give them an opportunity to “top-up”. It is important in reducing range anxiety and encouraging further EV uptake. Respondents prefer different charger speeds at different types of locations / Points of Interest. This may be related to the time spent at the location (which may vary according to people’s purposes and activities on discrete trips); and whether the location is a destination, or en route to one.

Favoured locations for CSs tend to be concentrated around major population centres where there is high EV ownership, and major routes between destinations popular among Northlanders as well as people from outside the region. These areas include: SH1 Kaiwaka-Whangārei; Whangārei including Onerahi; Whangārei Heads, SH10 Kerikeri-Awanui, Bay of Islands, and the Tutukākā Coast.

Congestion is also a concern for many EV drivers. Bottlenecks are already being experienced at many CSs. The number of chargers proposed per location varied widely according to perceived congestion / user volume. Just 1-2 chargers were thought to be needed for certain smaller towns and settlements on key routes. It was felt that 38.1% percent of existing and proposed CSs should have between 3 and 6 chargers. Locations for such chargers are along busy routes (especially between Auckland and Whangārei, in Whangārei’s CBD, and in Paihia. Towns or cities preferred for prioritising installation of 6-8 fast chargers were Whangārei, Kaiwaka, Kawakawa, Waipū, Kerikeri, and Paihia.

It seems to be a valid approach to develop tentative criteria for location and design of fast public CSs based on respondents’ assessments of existing CSs. Many useful criteria were able to be induced from the survey responses obtained.

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## Recommendations

- Further refinement of the CS location criteria should take place following consultation with regional / district council officers and other key stakeholders, and upon further consideration of relevant international and domestic literature on the subject.
- Consider creating a Decision Tree Tool for CS location like that elaborated in Ndevr Environmental Pty Ltd (2020), including the refined criteria obtained from this survey and the above additional consultation.
- A staged, prioritised rollout of charging infrastructure should consider the projected changing mix of EV range over the next several years. The right balance needs to be struck to cater for drivers of low-range as well as medium / high-range EVs. Thus, the rollout could initially prioritise:
  - location of significantly more fast chargers on major routes into and out of towns
  - location of a limited number of destination fast chargers in towns' CBDs or at commonly used areas such as shopping centres, supermarkets, and community facilities.
- Further study of other relevant issues related to location of charging infrastructure in Northland should proceed as planned in Stages 1-3 of the Research Tasks. These issues include such factors as
  - electricity infrastructure / transmission characteristics
  - regulatory, consent, land ownership requirements
  - parking space availability
  - interest in business sector partnership
  - associated infrastructure needs around potential CSs
  - estimated set-up costs for specific locations.

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## Appendix 1

Table 5 Research tasks, data collection and analysis methods, and information sources for NRC pre-feasibility study

Research tasks	Proposed methods / info sources
<b>Stage 1: study of context, demand for CS infrastructure, regulatory issues, criteria for CS selection</b>	
1) Conduct stocktake of existing CS infrastructure and potential / confirmed pipeline CS projects (e.g. Meridian, ChargeNet), in terms of locations, charger types and speeds, numbers of chargers, etc.	NRC documents and maps; online maps of CS operators; communication with other CS operators.
2) Identify the locations of existing fossil-fuel service stations in Northland and assess their potential value as CS facility hosts, from the point of view of CS operators. Ask selected domestic CS operators around New Zealand to share their assessment of their use of such facilities so far.	NRC / district council mapping software (if such data included); maps and information from fuel retailers; Google Maps; NRC and regional council officers.  Interviews or phone / email communication with CS operators.
<b>3) Investigate the stated current and expected future charging needs of EV users / potential users, including their assessment of the advantages and disadvantages of existing public CSs they currently use (if used).</b>	<b>a) Online questionnaire.</b>  b) Key respondent interviews (e.g. with representatives of EV user groups).
4) Identify general regulatory, consent, land ownership requirements or issues associated with installation of CS infrastructure. Consider the District Plans, and national legislation / standards.	Study of existing documents available online or on request from relevant authorities; interviews / communication with council officers.

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Research tasks	Proposed methods / info sources
5) Identify issues related to the potential further allocation by district councils in Northland of parking spaces for CSs. Review experience from regional councils in other parts of the country (e.g. Wellington) in how such issues are resolved.	Semi-structured in-person interviews with council officers, email communication.  Phone interviews or emails with council officers in other regions.
6) Establish key criteria for choosing optimal CS locations. For example, these might include (among others): a) demographic trends; b) EV user needs; c) key destinations; d) transmission network characteristics and requirements; e) parking availability; f) capacity for future CS expansion; g) business / economic sector needs; h) urban growth.	Review of relevant international and domestic literature available on the web and via online research-sharing platforms such as EBSCOhost, Sci-Hub and Research Gate; discussion with NRC / district council officers and key stakeholders, including EV users.
<b>Stage 2: assess potential CS locations, technical requirements, business cases</b>	

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Research tasks	Proposed methods / info sources
<p>7) Identify and prioritise potential CS location opportunities with reference to the criteria established. Include the following preliminary information for each site:</p> <ul style="list-style-type: none"> <li>• Identification of enabling / supporting factors, and hindrances / obstacles, to installation of CSs in identified potential locations. Proposed potential solutions.</li> <li>• GIS map and preliminary site information;</li> <li>• Potential CS types (e.g. CCS, CHAdEMO, AC Type 2 or 1);</li> <li>• Charger speed (slow / rapid);</li> <li>• Number of chargers (to minimise queueing, provide for failover / backup charging needs);</li> <li>• Estimated timing for installation of EV chargers to meet projected needs;</li> <li>• Details of significant businesses / venues in the surrounding area.</li> </ul>	<p>Information gathered in Stage 1.</p> <p>Existing GIS maps; available traffic data; census data (for demographics); national-level data on EV ownership and EV composition.</p> <p>Identification of significant businesses / venues in the area, based on existing council / Chamber of Commerce information, maps, local officials and community representatives.</p>
<p>8) Investigate the interest of businesses in Northland's major population centres in investing in charging equipment, with reference to specific locations where relevant.</p>	<p>Interviews and phone / email communication with businesses / venues around potential CS locations, council-organised consultation meetings.</p>
<p><b>Stage 3: assess infrastructure requirements and cost</b></p>	
	<p>Information gathered in Stage 2.</p>

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Research tasks	Proposed methods / info sources
<p>9) Identify preliminary requirements for associated electrical infrastructure (e.g. transformers, cable to CS, etc).</p> <p>10) Carry out preliminary rough cost estimation for charging equipment and associated electrical infrastructure.</p>	<p>Discussion with electricity distribution network companies in region (Northpower, Top Energy). Study (by their technicians) of equipment needs and costs for potential CS locations. Results to be incorporated into report.</p>
<p>11) Identify associated infrastructure needs (e.g. parking spaces, vehicle access, lighting, signage, etc).</p> <p>12) Carry out preliminary rough cost estimation for the associated infrastructure needs.</p>	<p>Discussion with NRC and district council officers. Study (by their specialists) of infrastructure requirements and costs for potential CS locations. Results to be incorporated into report.</p>

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## Appendix 2

Table 6 List of channels used for online questionnaire promotion

Channel description	No. of members	1 <sup>st</sup> post	2 <sup>nd</sup> post	3 <sup>rd</sup> post
Northland EV Group (FB group)	273	14/09/21	18/09/21	24/09/21
Whangārei Noticeboard (FB group)	14.7K	14/09/21	18/09/21	24/09/21
Whangārei Community Info (FB group)	4.1K	14/09/21	18/09/21	24/09/21
Whangārei Community Page (FB group)	10.6K	18/09/21	24/09/21	
Whangārei Heads People (FB group)	3.1K	20/09/21	24/09/21	01/10/21
Whangaroa District Noticeboard (FB group)	3.4K	15/09/21	18/09/21	24/09/21
Dargaville & Area Community Forum (FB group)	574	15/09/21	18/09/21	24/09/21
Kaikohe Community Noticeboard (FB group)	11.7K	15/09/21	18/09/21	24/09/21
Kaitaia Noticeboard (FB group)	12.2K	15/09/21	18/09/21	24/09/21
Kaiwaka Community (FB group)	4.1K	25/09/21	29/09/21	03/10/21
Mangawhai Community Group (FB group)	11.9K	15/09/21	18/09/21	24/09/21

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Kerikeri Notice Board (FB group)	22.9K	30/09/21	02/10/21	03/10/21
Northland Regional Council (FB page) <a href="http://www.facebook.com/NorthlandRegionalCouncil">www.facebook.com/NorthlandRegionalCouncil</a>	10.5K	20/09/21 pinned post		
Northland Regional Council website <a href="https://www.nrc.govt.nz/evsurvey">https://www.nrc.govt.nz/evsurvey</a>	N/A	20/09/21 linked from FB page		
Northland Regional Council intranet	N/A	17/09/21		
Northern Advocate article <a href="http://www.nzherald.co.nz/northern-advocate/news/northland-news-in-brief-ev-infrastructure-survey-and-school-in-lockdown-over-fight/DXZ6QQS5ZA6NQZLNAXWR2F4M2A/">www.nzherald.co.nz/northern-advocate/news/northland-news-in-brief-ev-infrastructure-survey-and-school-in-lockdown-over-fight/DXZ6QQS5ZA6NQZLNAXWR2F4M2A/</a>	N/A	30/09/21		
<b>Total reach, all channels (approx) — (some may be multiple members)</b>	<b>110K group members or followers</b>			

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## Appendix 3

### Online survey promotion texts

#### **First Post**

Living in Northland? Do you drive an electric vehicle, or plan to in the next three years? Northland Regional Council wants your input. Please fill in the Northland Electric Vehicle Questionnaire!

<https://survey.alchemer.com/s3/6524747/Northland-Electric-Vehicle-Questionnaire-FINAL>

Your views and experience will help NRC and its partners to further develop Northland's public EV charging network.

#### **Second Post**

Living in Northland? Do you drive an electric vehicle, or are you considering doing so? Northland Regional Council wants your input. Please fill in the Northland Electric Vehicle Questionnaire!

<https://survey.alchemer.com/s3/6524747/Northland-Electric-Vehicle-Questionnaire-FINAL>

Your views and experience will help NRC and its partners to further develop Northland's public EV charging network.

#### **Third Post**

Living in Northland? Already driving an electric vehicle, or you're thinking of doing so? Northland Regional Council wants to hear from you. Take the survey here:

<https://survey.alchemer.com/s3/6524747/Northland-Electric-Vehicle-Questionnaire-FINAL>

Help shape the future of Northland's electric vehicle charging network.

**The survey closes on 30 September.**

You can also find the survey through the NRC website:

<https://www.nrc.govt.nz/transport/northland-electric-vehicle-survey>

#### **Fourth Post (Kerikeri Notice Board)**

Living in Northland? Already driving an electric vehicle, or you're thinking of doing so? Northland Regional Council wants to hear from you. Take the survey here:

<https://survey.alchemer.com/s3/6524747/Northland-Electric-Vehicle-Questionnaire-FINAL>

Help shape the future of Northland's electric vehicle charging network.

**The survey closes on 3 October.**

You can also find the survey through the NRC website:

<https://www.nrc.govt.nz/transport/northland-electric-vehicle-survey>

*Draft as of 4 November 2021*

### **NRC Facebook page post on 20 September**

EV Owners - We want to hear from you!

We're surveying current and keen-to-be electric vehicle drivers across Te Taitokerau, to help inform the development of our charging network.

Help shape the future of Northland's electric vehicle charging network.

▶ More information here: <https://www.nrc.govt.nz/evsurvey>

### **Post on NRC website on 20 September**

Northland electric vehicle survey

Help shape the future of Northland's electric vehicle charging network.



#### **About the survey**

Northland Regional Council, and its partners, need community input to work out the needs and opportunities for electric vehicle infrastructure in our region.

We already have a lots of electric vehicle users in Te Taitokerau, and plenty more will make the switch in coming years as we move to a low-carbon future. We also have some serious distances to travel around the region.

To make sure our charging network evolves in a way that'll work best for our current and future electric vehicle owners, it needs to happen in a prioritised and planned way.

Northland Regional Council has commissioned this research which is being undertaken by Julian Hansen as part of a Graduate Diploma in Sustainable Management at Open Polytechnic.

**The survey closes on 30 September 2021.**

*Draft as of 4 November 2021*

## Appendix 4

### Northland Electric Vehicle Questionnaire

---

#### About this Questionnaire

Northland Regional Council (NRC) wants to better understand the needs for public EV charging infrastructure in Te Tai Tokerau / Northland.

The information gathered will help NRC and its partners to further develop Northland's public EV charging network.

This questionnaire will take 10 - 25 minutes to complete. It's best if you do it on a computer or tablet, but you can also do it on a smartphone.

---

#### Participant Consent

##### I understand that:

- all personally identifiable information collected in this questionnaire will be kept confidential;
- all information collected will be anonymised when reported on; and
- I can withdraw my participation at any time, by requesting the researcher's contact details at the end of this questionnaire.

**Note:** If you are under 16 years of age, you are not eligible to answer this questionnaire.

---

#### Participant Consent

**Page exit logic:** If do not wish to continue, skip to end.**IF:** #1 Question "I have read and understood the above, and voluntarily agree to answer this questionnaire.

I am **at least 16 years** of age." is one of the following answers ("No") **THEN:** Jump to [page 64 - End of Questionnaire](#)

*1) I have read and understood the above, and voluntarily agree to answer this questionnaire.*

*I am at least 16 years of age.\**

- Yes
- No
-

*Draft as of 4 November 2021*

### Participant verification

First, we need to check that we are asking you the right questions.

---

#### Participant info

2) *Gender: how do you identify?\**

- Man
  - Woman
  - Non-binary
  - Prefer to self-describe (write in):
- 

#### Participant info

3) *What is your age?\**

- 16-24
  - 25-34
  - 35-44
  - 45-54
  - 55-64
  - 65+
- 

#### Place of residence

4) *What is the name of the area where you live?  
(Please include suburb, if you live in a town that has suburbs).\**

---

*Draft as of 4 November 2021*

### Electric Vehicle Definition

Let's just make sure that we have the same understanding of what is an EV.

An electric vehicle (EV) has an electric motor powered by a battery which is charged by connecting to an external electricity source.

---

### Electric Vehicle Definition

There are two main types of electric vehicle:

- **Battery electric vehicles (BEVs)** – 100% electric, with an electric motor powered only by a battery charged by connecting to an external electricity source.
  - **Plug-in hybrid electric vehicles (PHEVs)** – have an electric motor as well as a fuel engine. The electric motor is powered by a battery charged by connecting to an external electricity source. The fuel engine generally uses petrol or diesel.
- 

### Electric Vehicle Definition

**Note:** Conventional petrol hybrids are NOT electric vehicles, as they are not charged by 'plugging in'.

Their batteries are only charged by re-capturing energy when braking or from electricity generated by the engine.

(Source: NZTA)

---

### EV driver?

**Logic:** Show/hide trigger exists.

*5) Based on the above definitions, do you currently drive an electric vehicle (EV) at all?*

By EV, we mean a Battery Electric Vehicle (BEV) or a Plug-in Hybrid Electric Vehicle (PHEV), but NOT a conventional hybrid vehicle.\*

Yes

No

---

### Potential EV driver?

**Page exit logic:** Skip / Disqualify Logic**IF:** #6 Question "What is the likelihood that you will become a driver of an electric vehicle (EV) during the next three years?"

*By EV, we mean a Battery Electric Vehicle (BEV) or a Plug-in Hybrid Electric Vehicle (PHEV), but NOT a conventional hybrid vehicle."* is one of the following answers

("Likely", "Very likely") **THEN:** Jump to [page 52 - Ever driven an EV?](#)

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**Page exit logic:** Skip / Disqualify Logic**IF:** #6 Question "What is the likelihood that you will become a driver of an electric vehicle (EV) during the next three years?"

*By EV, we mean a Battery Electric Vehicle (BEV) or a Plug-in Hybrid Electric Vehicle (PHEV), but NOT a conventional hybrid vehicle.*" is one of the following answers ("Very unlikely", "Unlikely") **THEN:** Jump to [page 14 - Sorry, but ...](#)

**Logic: Show/hidden trigger exists. Hidden unless: #5 Question "Based on the above definitions, do you currently drive an electric vehicle (EV) at all?"**

*By EV, we mean a Battery Electric Vehicle (BEV) or a Plug-in Hybrid Electric Vehicle (PHEV), but NOT a conventional hybrid vehicle.*" is one of the following answers ("No")

*6) What is the likelihood that you will become a driver of an electric vehicle (EV) during the next three years?*

**By EV, we mean a Battery Electric Vehicle (BEV) or a Plug-in Hybrid Electric Vehicle (PHEV), but NOT a conventional hybrid vehicle.\***

Very unlikely     Unlikely     Likely     Very likely

---

**Sorry, but ...**

**Page exit logic:** Skip / Disqualify Logic**IF:** #7 Question "Sorry, but this questionnaire is for Northland residents aged 16 years plus who (a) currently drive an EV, or (b) intend to become a driver of an EV during the next three years.

It seems that you don't fit this description.

**BUT ... could you please help us to find others** who might like to respond?

Please click below to finish. And you will get a chance to share the questionnaire too." is one of the following answers ("Finish (and share if you want to)") **THEN:** Jump to [page 64 - End of Questionnaire](#)

**Logic: Hidden unless: #6 Question "What is the likelihood that you will become a driver of an electric vehicle (EV) during the next three years?"**

*By EV, we mean a Battery Electric Vehicle (BEV) or a Plug-in Hybrid Electric Vehicle (PHEV), but NOT a conventional hybrid vehicle.*" is one of the following answers ("Very unlikely", "Unlikely")

*7) Sorry, but this questionnaire is for Northland residents aged 16 years plus who (a) currently drive an EV, or (b) intend to become a driver of an EV during the next three years.*

*It seems that you don't fit this description.*

**BUT ... could you please help us to find others** who might like to respond?

*Please click below to finish. And you will get a chance to share the questionnaire too.\**

Finish (and share if you want to)

---

*Draft as of 4 November 2021*

**Vehicle info**

**8) Please provide details of the EV that you drive.**

a) Make (e.g. Nissan)\*:

b) Model (e.g. Leaf)\*:

Validation: Max = 2022 Must be numeric

c) Year (e.g. 2015):

Validation: Must be numeric

d) Battery kWh (e.g. 24):

e) Number plate (e.g. MPM001)

*(Optional: we ask this to ensure that only one person per specified EV answers this questionnaire.):*

---

**This questionnaire relates to one EV only**

**For the rest of this questionnaire, please answer for only the EV that you specified above.**

*(If someone else in your household also fills in this questionnaire, please ensure that they answer about a different EV, not the same vehicle that you chose.)*

---

**Vehicle info**

**9) How far can your EV typically travel when fully charged to 100%, based on your actual experience?\***

- 1-50 km
  - 51-100 km
  - 101-150 km
  - 151-200 km
  - 201-250 km
  - 251 km or more
  - Don't know
-

*Draft as of 4 November 2021*

**Driving distance - weekday**

**10) How far is this EV driven on a typical weekday (Monday to Friday, one day only)?  
This includes driving by any household member.\***

- 1-25 km
  - 26-50 km
  - 51-75 km
  - 76-100 km
  - 101-150 km
  - 151-200 km
  - 201-250 km
  - 251 km or more
  - Don't know
- 

**Driving distance - weekend day**

**11) How far is this EV driven on a typical day of the weekend (one day only)?  
This includes driving by any household member.\***

- 1-25 km
  - 26-50 km
  - 51-75 km
  - 76-100 km
  - 101-150 km
  - 151-200 km
  - 201-250 km
  - 251 km or more
  - Don't know
-

*Draft as of 4 November 2021*

**Charging**

Validation: **Min. answers = 1** (if answered) Max. answers = 2 (if answered)

Logic: Show/hide trigger exists.

**12) Please tick the location(s) where this EV is charged.  
(More than one answer is possible.)\***

- At home
- Away from home

**Charging**

Validation: **Min. answers = 5** (if answered)

**13) Thinking of all charging sessions for this EV in a typical month (30 days), how many sessions are done at each of the location types below?  
(Each time the EV is plugged in = one charging session. For any location NOT used for charging, select "0".)**

\*

↳ At home ↳	0 (no sessions)	1	... 50
↳ At slow public charging stations ↳	0 (no sessions)	1	... 50
↳ At fast public charging stations ↳	0 (no sessions)	1	... 50
↳ At workplace ↳	0 (no sessions)	1	... 50
↳ At the home of friends or family ↳	0 (no sessions)	1	... 50

*Draft as of 4 November 2021*

### Charging - weekday

**Logic: Hidden unless: #12 Question "Please tick the location(s) where this EV is charged.**

***(More than one answer is possible.)***" is one of the following answers ("Away from home")

***14) When charging this EV away from home on weekdays (Monday to Friday), what is the main reason?\****

- Forgot to charge at home
  - Opportunity to top up
  - Free parking while charging
  - Need fast charge to quickly continue trip
  - Location is at or near work
  - Other - Write In:
- 

### Charging - weekend day

**Logic: Hidden unless: #12 Question "Please tick the location(s) where this EV is charged.**

***(More than one answer is possible.)***" is one of the following answers ("Away from home")

***15) When charging this EV away from home on Saturdays or Sundays, what is the main reason?\****

- Forgot to charge at home
  - Opportunity to top up
  - Free parking while charging
  - Need fast charge to quickly continue trip
  - Location is at or near work
  - Other - Write In:
-

*Draft as of 4 November 2021*

**Public slow chargers**

**Logic: Show/hidden trigger exists.**

**16) Do you yourself currently use any public SLOW chargers in Northland?\***

- Yes
- No

---

**Public slow chargers**

**Logic: Hidden unless: #16 Question "Do you yourself currently use any public SLOW chargers in Northland?" is one of the following answers ("Yes")**

**Please list, in the boxes on the next three screens, the locations of up to three public SLOW chargers in Northland that you currently use.  
Please identify where each facility is, and describe its pros and cons.**

---

**Public slow chargers - Location #1**

**Logic: Hidden unless: #16 Question "Do you yourself currently use any public SLOW chargers in Northland?" is one of the following answers ("Yes")**

**17) Please describe (below) the location of one public SLOW charger you use.  
What are its pros? What are its cons?  
(If you can't think of a location, write "None" in the box.)**

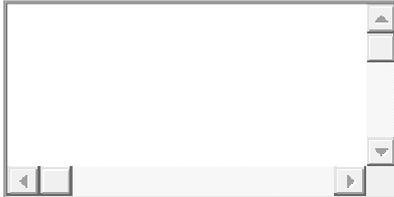
---

*Draft as of 4 November 2021*

**Public slow chargers - Location #2**

**Logic: Hidden unless: #16 Question "Do you yourself currently use any public SLOW chargers in Northland?" is one of the following answers ("Yes")**

**18) Please describe (below) the location of a second public SLOW charger you use. What are its pros? What are its cons?  
(If you can't think of a second location, write "None" in the box.)**



---

**Public slow chargers - Location #3**

**Logic: Hidden unless: #16 Question "Do you yourself currently use any public SLOW chargers in Northland?" is one of the following answers ("Yes")**

**19) Please describe (below) the location of a third public SLOW charger you use. What are its pros? What are its cons?  
(If you can't think of a third location, write "None" in the box.)**



---

**Public fast chargers**

**Logic: Show/hide trigger exists.**

**20) Do you yourself use any paid public FAST chargers in Northland?\***

- Yes
- No

*Draft as of 4 November 2021*

### Public fast chargers

**Logic: Hidden unless: #20 Question "Do you yourself use any paid public FAST chargers in Northland?" is one of the following answers ("Yes")**

**Please list, in the boxes on the next three screens, the locations of up to three paid public FAST chargers in Northland that you currently use.**

**Please identify where each facility is, and describe its pros and cons.**

---

#### Public fast chargers - Location #1

**Logic: Hidden unless: #20 Question "Do you yourself use any paid public FAST chargers in Northland?" is one of the following answers ("Yes")**

**21) Please describe (below) the location of one paid public FAST charger you use.**

**What are its pros? What are its cons?**

*(If you can't think of a location, write "None" in the box.)*

---

#### Public fast chargers - Location #2

**Logic: Hidden unless: #20 Question "Do you yourself use any paid public FAST chargers in Northland?" is one of the following answers ("Yes")**

**22) Please describe (below) the location of a second paid public FAST charger you use.**

**What are its pros? What are its cons?**

*(If you can't think of a second location, write "None" in the box.)*

---

*Draft as of 4 November 2021*

**Public fast chargers - Location #3**

**Logic: Hidden unless: #20 Question "Do you yourself use any paid public FAST chargers in Northland?" is one of the following answers ("Yes")**

**23) Please describe (below) the location of a third paid public FAST charger you use. What are its pros? What are its cons?  
(If you can't think of a third location, write "None" in the box.)**



---

**Public fast chargers**

**24) In the Northland region, are there currently enough paid public FAST chargers?\***

- Yes
- No
- Don't know

---

**Public fast chargers**

**Logic: Show/hide trigger exists.**

**25) Are you able to suggest specific locations in Northland where you think paid public FAST chargers are most needed, or where more chargers should be installed?  
(If you select "Yes", you can provide details in the next questions).\***

- Yes
  - No
-

*Draft as of 4 November 2021*

**Public fast chargers - Priority location #1**

**Logic: Show/hidden trigger exists. Hidden unless: #25 Question "Are you able to suggest specific locations in Northland where you think paid public FAST chargers are most needed, or where more chargers should be installed?"**

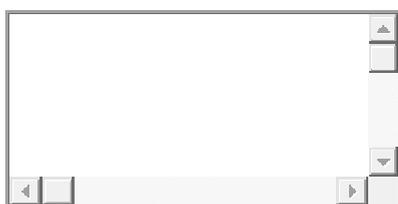
**(If you select "Yes", you can provide details in the next questions)." is one of the following answers ("Yes")**

**26) Please identify the TOP priority location in Northland where you think paid public FAST chargers are needed, or where more chargers should be installed.**

**(Please provide a clear description e.g. X location on Y street/road in Z town).**

**This is the first of up to three locations that we will ask you to identify.**

***If you can't think of a location, please leave the box blank.***



---

**Public fast chargers - Priority location #1**

**Logic: Show/hidden trigger exists. Hidden unless: #26 Question "Please identify the TOP priority location in Northland where you think paid public FAST chargers are needed, or where more chargers should be installed.**

**(Please provide a clear description e.g. X location on Y street/road in Z town).**

**This is the first of up to three locations that we will ask you to identify.**

***If you can't think of a location, please leave the box blank.***

**27) Does this charging location already exist, or are you proposing a new one?\***

- Location already exists
- Proposing new location

*Draft as of 4 November 2021*

**Public fast chargers - Priority location #1**

**Logic: Hidden unless: #27 Question "Does this charging location already exist, or are you proposing a new one?" is one of the following answers ("Location already exists")**

**28) What is the typical waiting time until a charger is available for use at this location?\***

- No waiting (charger available immediately)
  - Wait 1-15 mins until charger available
  - Wait 16-30 mins until charger available
  - Wait 31 mins+ until charger available
  - Don't know
- 

**Public fast chargers - Priority location #1**

**Logic: Hidden unless: #26 Question "Please identify the TOP priority location in Northland where you think paid public FAST chargers are needed, or where more chargers should be installed.**

**(Please provide a clear description e.g. X location on Y street/road in Z town).**

**This is the first of up to three locations that we will ask you to identify.**

***If you can't think of a location, please leave the box blank.***

**29) How many chargers do you think are needed at this location?\***

- 1-2
  - 3-4
  - 5-6
  - 7-8
  - Don't know
-

*Draft as of 4 November 2021*

**Public fast chargers - Priority location #2**

**Logic: Show/hide trigger exists. Hidden unless: #25 Question "Are you able to suggest specific locations in Northland where you think paid public FAST chargers are most needed, or where more chargers should be installed?**

**(If you select "Yes", you can provide details in the next questions)." is one of the following answers ("Yes")**

**30) Please identify the SECOND priority location in Northland where you think paid public FAST chargers are needed, or where more chargers should be installed.**

**(Please provide a clear description e.g. X location on Y street/road in Z town).**

***If you can't think of a location, please leave the box blank.***



---

**Public fast chargers - Priority location #2**

**Logic: Show/hide trigger exists. Hidden unless: #30 Question "Please identify the SECOND priority location in Northland where you think paid public FAST chargers are needed, or where more chargers should be installed.**

**(Please provide a clear description e.g. X location on Y street/road in Z town).**

***If you can't think of a location, please leave the box blank."***

**31) Does this charging location already exist, or are you proposing a new one?\***

- Location already exists
- Proposing new location

*Draft as of 4 November 2021*

**Public fast chargers - Priority location #2**

**Logic: Hidden unless: #31 Question "Does this charging location already exist, or are you proposing a new one?" is one of the following answers ("Location already exists")**

**32) What is the typical waiting time until a charger is available for use at this location?\***

- No waiting (charger available immediately)
  - Wait 1-15 mins till charger available
  - Wait 16-30 mins till charger available
  - Wait 31 mins+ till charger available
  - Don't know
- 

**Public fast chargers - Priority location #2**

**Logic: Hidden unless: #30 Question "Please identify the SECOND priority location in Northland where you think paid public FAST chargers are needed, or where more chargers should be installed.**

**(Please provide a clear description e.g. X location on Y street/road in Z town).**

***If you can't think of a location, please leave the box blank.***

**33) How many chargers do you think are needed at this location?\***

- 1-2
  - 3-4
  - 5-6
  - 7-8
  - Don't know
-

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**Public fast chargers - Priority location #3**

**Logic: Show/hide trigger exists. Hidden unless: #25 Question "Are you able to suggest specific locations in Northland where you think paid public FAST chargers are most needed, or where more chargers should be installed?**

**(If you select "Yes", you can provide details in the next questions)." is one of the following answers ("Yes")**

**34) Please identify the THIRD priority location in Northland where you think paid public FAST chargers are needed, or where more chargers should be installed.**

**(Please provide a clear description e.g. X location on Y street/road in Z town).**

***If you can't think of a location, please leave the box blank.***



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**Public fast chargers - Priority location #3**

**Logic: Show/hide trigger exists. Hidden unless: #34 Question "Please identify the THIRD priority location in Northland where you think paid public FAST chargers are needed, or where more chargers should be installed.**

**(Please provide a clear description e.g. X location on Y street/road in Z town).**

***If you can't think of a location, please leave the box blank."***

**35) Does this charging location already exist, or are you proposing a new one?\***

- Location already exists
- Proposing new location

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**Public fast chargers - Priority location #3**

**Logic: Hidden unless: #35 Question "Does this charging location already exist, or are you proposing a new one?" is one of the following answers ("Location already exists")**

**36) What is the typical waiting time until a charger is available for use at this location?\***

- No waiting (charger available immediately)
  - Wait 1-15 mins till charger available
  - Wait 16-30 mins till charger available
  - Wait 31 mins+ till charger available
  - Don't know
- 

**Public fast chargers - Priority location #3**

**Logic: Hidden unless: #34 Question "Please identify the THIRD priority location in Northland where you think paid public FAST chargers are needed, or where more chargers should be installed.**

**(Please provide a clear description e.g. X location on Y street/road in Z town).**

***If you can't think of a location, please leave the box blank."***

**37) How many chargers do you think are needed at this location?\***

- 1-2
  - 3-4
  - 5-6
  - 7-8
  - Don't know
-

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### Public Fast Chargers

Logic: Show/hide trigger exists.

38) If you could choose one or two locations in Northland to have 6-8 paid public FAST chargers in each location right now, where would those be?  
(Please provide a clear description e.g. X location on Y street/road in Z town).  
*If you can't think of any locations, please leave the box blank.*



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### Public fast chargers

Logic: Hidden unless: #38 Question "If you could choose one or two locations in Northland to have 6-8 paid public FAST chargers in each location right now, where would those be?  
(Please provide a clear description e.g. X location on Y street/road in Z town).  
*If you can't think of any locations, please leave the box blank.*"

39) *Does this charging location already exist, or are you proposing a new one?\**

- Location already exists
- Proposing new location

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### Future charging needs

Logic: Show/hide trigger exists.

40) *Do you expect that your away-from-home charging needs in Northland will change in the next five years?\**

- Yes
  - No
-

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### Future charging needs

**Logic: Hidden unless: #40 Question "Do you expect that your away-from-home charging needs in Northland will change in the next five years?" is one of the following answers ("Yes")**

**41) In what ways are your away-from-home charging needs likely to change in the next five years?**



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### Ever driven an EV?

**Logic: Show/hide trigger exists. Hidden unless: #6 Question "What is the likelihood that you will become a driver of an electric vehicle (EV) during the next three years? By EV, we mean a Battery Electric Vehicle (BEV) or a Plug-in Hybrid Electric Vehicle (PHEV), but NOT a conventional hybrid vehicle." is one of the following answers ("Likely", "Very likely")**

**42) Have you ever driven an electric vehicle (EV) before?\***

- Yes
- No

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### Rating of EV-driving experience

**Logic: Hidden unless: #42 Question "Have you ever driven an electric vehicle (EV) before?" is one of the following answers ("Yes")**

**43) How would you rate the previous EV-driving experience that you had?\***

- Very Dissatisfied
- Dissatisfied
- Neutral
- Satisfied
- Very Satisfied

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### Considering buying an EV?

**Logic: Show/hide trigger exists. Hidden unless: #42 Question "Have you ever driven an electric vehicle (EV) before?" is one of the following answers ("Yes","No")**

**44) Are you considering buying an EV in the next three years?\***

- Yes
- No

---

### Reasons why not

Validation: **Min. answers = 3** (if answered) Max. answers = 3 (if answered)

**Logic: Hidden unless: #44 Question "Are you considering buying an EV in the next three years?" is one of the following answers ("No")**

**45) What are the THREE (3) most important reasons you are NOT considering buying an EV in the next three years?**

**(Three options must be ticked.)\***

- Purchase cost is too high
- Feebate scheme doesn't make price cheap enough
- Unacceptable range (distance) before recharging
- Charging an EV at my home is difficult or impossible
- There are not enough public chargers
- Need to tow a trailer, caravan, boat, etc
- Operating cost is too high
- EV driving performance may not be good
- Environmental reasons
- Resale value
- Other - Write In:

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### Reasons why

Validation: **Min. answers = 3** (*if answered*) Max. answers = 3 (*if answered*)

Logic: Hidden unless: #44 Question "Are you considering buying an EV in the next three years?" is one of the following answers ("Yes")

**46) What are the THREE (3) most important reasons you ARE considering buying an EV in the next three years?**

**(Three options must be ticked.)\***

- Purchase price is reasonable for me
  - EV feebate scheme makes the price cheaper
  - Acceptable range (distance) before recharging
  - I am able to charge it at home
  - There are enough public chargers
  - Need to tow a trailer, caravan, boat, etc
  - Operating cost is acceptable
  - EV driving performance is good
  - Environmental reasons
  - Other - Write In:
-

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**Charging facility types for different locations**

Validation: **Min. answers = 11** (if answered)

**47) People may have different charging needs for different locations. Please tell us what you think is the best type of charging facility for each possible public charging location type listed below. Think about how long people might spend in such locations. (Please select an option for each row).\***

	Slow charger	Fast charger	Mix of slow/fast chargers	NO chargers needed
Public carpark	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Service station	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Specialised EV charging station on major route	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Outside large ("big box") retail store	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shopping centre carpark	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Library/civic centre/theatre	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Workplace	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tourist attraction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hospital	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sport and recreation area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Popular beach or walking track	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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**Suggestions for improvement**

**48) What suggestions (if any) do you have for improving Northland's public EV charging infrastructure?**



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**Comments**

**49) Please make any other comments you may have relating to Northland's public EV charging infrastructure.**



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**Your contact details**

**Logic: Show/hide trigger exists.**

**50) *Would you be happy for us to contact you to discuss issues relating to public EV charging infrastructure, if necessary?\****

- Yes
- No

---

**Your contact details**

**Logic: Hidden unless: #50 Question "Would you be happy for us to contact you to discuss issues relating to public EV charging infrastructure, if necessary?" is one of the following answers ("Yes")**

**51) Please provide your contact details below if you are happy for us to contact you for further information.\***

First name\*:

Last name:

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Validation: Must be numeric

Phone - e.g. 02012345678\*:

Validation: %s format expected

Email address:

---

#### **Request researcher contact details**

**Logic: Show/hide trigger exists.**

**52) Do you want us to send you the researcher's contact details by email?\***

- Yes  
 No
- 

#### **Your email**

Validation: %s format expected

**Logic: Hidden unless: #52 Question "Do you want us to send you the researcher's contact details by email?" is one of the following answers ("Yes")**

**53) What email address do you want us to send this information to?\***

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#### **End of Questionnaire**

**Thanks very much for taking part. You have reached the end of the questionnaire. Please share this questionnaire with friends or relatives who live in Northland:**

- if they currently drive an EV, or
- if they intend to become an EV driver in the next three years.

**\*\*\* Below are an introduction and link to the questionnaire that you can use to share by email or any social media \*\*\***

**Living in Northland? Drive an electric vehicle, or plan to in the next three years? Northland Regional Council wants your input. Please fill in the Northland Electric Vehicle Questionnaire! Your views and experience will help NRC and its partners to further develop Northland's public EV charging network.**

**<https://survey.alchemer.com/s3/6524747/Northland-Electric-Vehicle-Questionnaire-FINAL>**

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## Appendix 5

Table 7 EV makes and models

Make	Model	Year	Battery kWh	Quantity
Nissan	Leaf	2011-2019	24, 30, 36, 40	79
Tesla	Model 3 (incl. LR)	2019-2021	50-82	20
Hyundai	Kona	2018-2021	39, 64, 75	14
Mitsubishi	Outlander PHEV	2013-2021	6-24	12
MG	ZS	2019-2021	44.5	5
BMW	i3	2014-2019	22, 33, 43	4
Nissan	e-NV200	2015, 2016	20, 24	4
Hyundai	Ioniq	2017, 2019	28	3
Kia	Niro	2019, 2021	64, 150	3
Mitsubishi	i-MiEV	2010, 2011	16, 36	2
Renault	Zoe	2017, 2018	41	2
Toyota	Prius PHEV	2012, 2020	4.4	2
Audi	Etron 55 Quattro	2019	94	1
Energica (motorbike)	Eva107	2020	13.4	1
Jaguar	I pace	2019	60	1
Mercedes	EQC	2022	80	1
MG	HS	2021		1
Mini Cooper	Countryman SE	2020	10	1
Mitsubishi	Eclipse	2021		1
Peugeot	Ion	2012	14	1

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<b>Make</b>	<b>Model</b>	<b>Year</b>	<b>Battery kWh</b>	<b>Quantity</b>
Tesla	Model SR+	2019	55	1
Volkswagen	Golf	2018	36	1
Volkswagen	ID3	2020	58	1

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## Appendix 6

Table 8 Perceived pros and cons of slow public EV chargers around Northland

<p><b>THE WAREHOUSE, WAIPAPA (2 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Close to lots of shops.</li> </ul>
<p><b>TUTUKĀKĀ (3 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Next to our business.</li> <li>• Close to home when my charge level is not sufficient for my trip.</li> </ul>
<p><b>FORUM NORTH CARPARK WHANGĀREI (25 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Free, several chargers, central location.</li> <li>• Very handy to the library / town.</li> <li>• It is very helpful for us to be able to charge when we can if we drive to Whangārei, as we live so far away.</li> <li>• Close to work. Central location. Good chance of an available charger.</li> <li>• Convenient for Saturday market.</li> <li>• Central location.</li> <li>• Convenient to town.</li> <li>• Good location.</li> <li>• Good availability normally, no cost, good access to CBD and library.</li> <li>• Free parking on a busy day.</li> <li>• Convenient location.</li> <li>• Need more of these around the city, they currently provide preference to people who live or work near the slow chargers.</li> <li>• Near the Library and Saturday Market.</li> <li>• Safe and secure.</li> <li>• Close to work.</li> <li>• Convenient to Saturday market.</li> <li>• Close to workplace; free; people generally courteous.</li> <li>• Free, close to center of town.</li> <li>• Walking distance to town and cafes and is free.</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>• Often full of cars, too slow.</li> <li>• Always very busy with often the same cars parked there, so is not available.</li> <li>• Often in use.</li> <li>• Quite often cars parked there beyond charging time of for extended hours.</li> <li>• The parks are always full from 8am-3pm, the CBD needs a lot more chargers.</li> <li>• Very often blocked for the whole day.</li> <li>• Often busy.</li> </ul>

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- Heavily used, not always a free space.
- The adaptors available aren't suitable for Hyundai.
- Slightly further away from work.
- Often busy.
- Get pinged for parking sometimes - rules have been unclear.
- Difficult to find parking nearby before / after charging; high demand (sometimes hard to get a charger); on weekends often non-EVs in there during market time on Saturday morning.
- Can be busy, only 2 of the cables are 7kw which we can use 3.5kw is good just not as much kwh added per time.
- Frequently in use / no chargers available.

**TOWN BASIN WHANGĀREI (27 mentions)**

**Pros:**

- Free parking, close to cafés and walkway.
- Great position.
- Central parking.
- Can go around the loop while charging.
- Good location for frequenting cafes and restaurants, some nearby offices. Often available.
- Convenient location.
- Convenient.
- Free. Can shop while charging.
- Good access for waterfront, easy walk to CBD.
- Convenient to loop and playground.
- It's the only easy to access one near places I want to be.
- Free, and free parking.
- Convenient.
- Super close to restaurants, free.
- Convenient and next to amenities.

**Cons:**

- Only one available.
- Slow.
- Often either not working or already in use.
- Often full, often charger isn't working, only one park, sometimes iced.
- Never seems to be working.
- Hard to get.
- Have to use own type 2 cable, and am nervous about leaving it and it being unplugged by member of the public. Unsure about time to charge, and no text notifications available.
- Can but a bit buggy, hard to get a spot.
- Sometimes doesn't work.
- Often busy.
- Often can't get a park as someone else is charging.
- Very often blocked by non-electric vehicles.

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- Sometimes not available.
- Sometimes out of order.
- It's often busy, could do with another park.
- Usually full.
- There is only one park by the charger so if their car is full I can't take it out and charge my car while they wine and dine.
- Nowhere near enough of free ones like this.
- Often occupied.
- It's always busy so lucky to get on.
- Only one station available so frequently in use.
- Sometimes the park is available, but the cable is either not connected or there is no power coming from cord.

#### **ALEXANDER ST WHANGĀREI (11 mentions)**

##### **Pros:**

- Usually a little quieter than the rest, and it is free parking.
- Often not in use.
- Close to work & free to me.
- Central location.
- Private and good location to town.
- Free, convenient to both home and work. Safe, secure. Access via swipe card after hours.
- Great and by far the most central public charger, not usually full, secure, and reasonably close if I'm on that side of town.
- Convenient and close to my work.

##### **Cons:**

- Very awkward to park in.
- Quite a walk to & from main shopping centres.
- If I'm going to Auckland after work, a 100% charge from town is essential for me to make it to Kaiwaka. I can't do it from Hikurangi.
- Sometimes full and many people don't leave contact details so their car can be moved when done.
- Only close to one side of town.
- It's not by the beach! There are none by the beach — I can't drive to the beach because it's too far.
- Multiple charging options for free.

#### **ROCK AND ROLL CLUB POHE ISLAND, WHANGĀREI (6 mentions)**

##### **Pros:**

- Great for top-ups while walking Huarahi o te Whai - the Loop.
- There is no charge.
- Convenient when walking the loop.
- Close to our house if we don't have enough charge to get up the hill.
- Close to Stumpys, free.
- Good place to meet a friend to walk the Loop.
- Very accessible.

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<p><b>Cons:</b></p> <ul style="list-style-type: none"><li>• There is no possible activity while you wait.</li><li>• It is a bit isolated from any services.</li><li>• Requires type 2 adapter.</li><li>• Miles from anywhere I want to go (except Stumpys).</li><li>• Needs two chargers.</li><li>• I need to leave a note with my contact as the loop takes 50 mins.</li><li>• The no parking except for Rock and Roll members needs to be removed.</li></ul>
<p><b>THE WAREHOUSE WHANGĀREI (2 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"><li>• Great for a top up while shopping.</li><li>• Convenient to shopping centre.</li></ul>
<p><b>TOTARA PARK CAFÉ WHANGĀREI (1 mention)</b></p> <p><b>Pros:</b></p> <p>We can park here as often they are otherwise full. I really appreciate it being there. It's just opportune top up for us.</p>
<p><b>MARSDEN POINT MARINA (2 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"><li>• Free.</li></ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"><li>• Often not working.</li></ul>
<p><b>KAURI MUSEUM MATAKOHE (1 mention)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"><li>• Twenty minutes from home and free.</li></ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"><li>• Too slow.</li></ul>
<p><b>MANGAWHAI (THE HUB) (3 mentions)</b></p> <p><b>Cons:</b></p> <ul style="list-style-type: none"><li>• Very slow.</li><li>• Usually unavailable due to one car that parks there for extended periods like 12 hours.</li></ul>
<p><b>WELLSFORD LIBRARY (2 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"><li>• En route to Auckland, free, convenient while shopping or getting takeaways.</li><li>• This opportunity makes sure I'll get home safe. It's also for free.</li></ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"><li>• It is slow and takes time.</li></ul>

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## Appendix 7

Table 9 Perceived pros and cons of paid fast public EV chargers around Northland

<p><b>CABLE BAY (1 mention)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Good when going to Kaitaia.</li> </ul>
<p><b>COOPERS BEACH (7 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Only been once, was good, got park, no hassle.</li> <li>• Near a shop, easy access, safe location.</li> <li>• Easy access.</li> <li>• Close to shops.</li> <li>• Handy.</li> <li>• Fast and needed if travelling further north.</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>• Costly.</li> <li>• Too expensive.</li> <li>• Sometimes have to wait for other car to finish.</li> </ul>
<p><b>DOUBTLESS BAY (1 mention)</b></p> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>• The cord is too short to reach - the tyre bumper stops the car too far away for our charging port. So we need to park diagonally and take up two spaces in order to charge.</li> </ul>
<p><b>PAKŪSAVE KAITAIA (1 mention)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Handy.</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>• Costly.</li> </ul>
<p><b>THE WAREHOUSE KAITAIA (1 mention)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Free (for now).</li> <li>• Cord is long enough to reach our plug.</li> </ul>
<p><b>TE AHU, KAITAIA (3 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>• Convenient.</li> </ul> <p><b>Cons:</b></p>

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<ul style="list-style-type: none"><li>• The cord is too short to reach - the tyre bumper stops the car too far away for our charging port. So we need to park diagonally and take up two spaces in order to charge.</li><li>• Costly.</li></ul>
<b>ŌPONONI FOUR SQUARE (3 mentions)</b> <b>Pros:</b> <ul style="list-style-type: none"><li>• Need to top up when visiting the Hokianga.</li><li>• Conveniently located beside the Landing Thai Cafe that has good food and coffee; good parking and close to the beach to wait for the charge to complete.</li><li>• Convenient.</li></ul>
<b>ŌMĀPERE (1 mention)</b> <b>Pros:</b> <ul style="list-style-type: none"><li>• Charge to get back home, usually available.</li></ul>
<b>KAEO (1 mention)</b> <b>Pros:</b> <ul style="list-style-type: none"><li>• Usually available.</li></ul>
<b>WAIPAPA (9 mentions)</b> <b>Pros:</b> <ul style="list-style-type: none"><li>• Easy access.</li><li>• Easy to find and access.</li><li>• Near shops, near main road.</li><li>• Convenience and speed.</li><li>• Close to shops and home for when I didn't charge enough at home.</li></ul> <b>Cons:</b> <ul style="list-style-type: none"><li>• Cost.</li></ul>
<b>KERIKERI COUNTDOWN (13 mentions)</b> <b>Pros:</b> <ul style="list-style-type: none"><li>• Close to shops and home for when I didn't charge enough at home.</li><li>• Only fast charger in Kerikeri that I know of (other local one is in Waipapa).</li><li>• Close to centre of activity.</li><li>• Easy to find, good location.</li><li>• Convenient top up sometimes.</li><li>• Near shops.</li><li>• Opens up trips North for us. Close to the Supermarket.</li></ul> <b>Cons:</b> <ul style="list-style-type: none"><li>• Not the most secure feeling location being out of public view behind council building.</li><li>• Too close to home charging to be used extensively by us.</li><li>• Very narrow access.</li></ul>

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<ul style="list-style-type: none"><li>• Sometimes already in use.</li><li>• Hard to back out of — can't drive through.</li><li>• Too expensive.</li><li>• Exposed to the weather, doesn't feel like a safe place at night-time. Awkward park to get into over curb.</li><li>• Parking is a bit tight. Entry and exit is not great.</li></ul>
<p><b>PAIHIA (2 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"><li>• Convenient for our journey.</li></ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"><li>• Too expensive.</li><li>• Only one charger so have to wait or find another charger at times, esp in the summer. Half the speed of the Kawakawa charger.</li></ul>
<p><b>KAIKOHE (6 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"><li>• Opens up the hokianga.</li><li>• Easy parking.</li><li>• On the way to Hokianga, usually available.</li></ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"><li>• Hard to find.</li><li>• Slowest of the fast chargers.</li><li>• Hard to find (hidden away from main road).</li><li>• Too slow.</li><li>• Security an issue, open to rain, toilets usually locked at night. Nothing open, a long way to Ōpononi.</li><li>• Hard to find for people who don't know about it.</li></ul>
<p><b>KAWAKAWA (29 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"><li>• Very fast.</li><li>• Handy for a quick topup. Op shops across the road!</li><li>• Essential for travel to mid- or far-north.</li><li>• Good location to stop when travelling from Kerikeri to Whangārei.</li><li>• Good when heading north.</li><li>• Good distance from Whangārei, shops and cafe nearby.</li><li>• essential for 24 kWh going to Bay of Islands area.</li><li>• Very good access, good positioning for fast top-up.</li><li>• Good.</li><li>• Handy to toilets and refreshments.</li><li>• No problems, never had to wait.</li></ul>

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<ul style="list-style-type: none"><li>• Close to main road, handy to coffee shop.</li><li>• Very good.</li><li>• Easy location, good distance between home and couple of relatives' homes.</li><li>• Good for trips further north.</li><li>• Great location if driving to Kerikeri.</li><li>• Convenient location.</li><li>• Good on our trips north like Kerikeri.</li><li>• Good convenient location. Can grab some food while waiting.</li><li>• Good when travelling north beyond my car's range.</li><li>• Good distance from Whangārei for my EV; generally available.</li><li>• Easy to drive into and out of.</li><li>• Fast and necessary to make it to Whangārei.</li><li>• Convenient for our journey.</li><li>• Convenient for longer trips for the mid north.</li></ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"><li>• Expensive.</li><li>• Not many services available while charging out of business hours.</li><li>• Heavy traffic can make it difficult to get back on the road at times.</li><li>• Only one, and a busy place.</li><li>• All fast chargers I have used need better and larger signposting as don't have smartphone or GPS in car.</li><li>• Open to rain.</li><li>• A walk to any toilet which is locked out of hours.</li><li>• Was out of order a while back for several days.</li><li>• Only one charger so have to wait or find another charger at times, esp in the summer.</li><li>• Cost of use.</li></ul>
<p><b>DARGAVILLE (3 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"><li>• Used while shopping, one charge gets me all the way back home.</li></ul>
<p><b>WHANGĀREI - TIKIPUNGA PARAMOUNT PLAZA (22 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"><li>• Often available.</li><li>• Location is fine and it's convenient.</li><li>• Convenient if north of Whangārei.</li><li>• Quiet, usually able to plug straight in.</li><li>• Handy to shops. Handy to home if I need a bit extra kms to get up over Vinegar Hill.</li><li>• On the way home. Usually available.</li></ul>

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- Quick charge to get home if I need it. Convenient location for me as it's between town and home. Often available.
- Good location with shops to visit while charging.
- Closer to home.
- Fast & easy to find.
- Near home.
- Great location for people living on the Tutukākāka Coast.
- On the way back from Tutukākā coast — top up to get home.
- Only one that's actually close to a supermarket! Usually empty.
- Good on our trips to Tutukākā coast. Ok location.
- Good when I have insufficient charge to get home.
- Usually a free space; handy to pop into supermarket while charging.
- 20km from home. Use for a quick top up when heading home. Peace of mind when battery is getting low and worried if battery will last. Also use to charge up if forgotten to plug in at home before leaving.

**Cons:**

- Not close enough.
- Should be two or the ability to charge two vehicles at once.
- No good coffee nearby.
- Feel unsafe at night although it's well lit, but because it's around the corner from the supermarket it feels a bit isolated.
- Can be busy.
- Business vehicles hogging it.
- Could be wait times as demand increases.
- Pricey.
- Recently the charger has been busy more often than not; there is definitely a need for more chargers there.
- Only one charger. Long way from the supermarket, so not usually enough time to nip in and do a quick shop.

**WHANGĀREI - ALEXANDER ST (15 mentions)**

**Pros:**

- Safe place to charge.
- Great location.
- Convenient to the public Library.
- Often not in use.
- Centrally located and feels safer at night due to it being behind gates.
- Convenient to both home and work.
- In the city.
- Good location if have done a lot of running around and need to charge before getting home, have a ChargeNet account so easy to access.

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- Only one that's actually close to town!
- Usually empty.
- Central location is a plus.
- In town, so convenient.
- Handy for town.
- Close to town, usually available. Easy access.
- Usually easy to get a charger; central-ish.

**Cons:**

- Often occupied.
- Locked at weekends.
- Rarely needed as close to home.
- Only during business hours.
- It's under lock and if you're from out of town and have not ordered a RFID tag, you can't use it.
- Need a key for after hours (not an issue for me as I have one, but would be a pain if I didn't - there aren't any other fast chargers in central Whangārei that I know of).

**WHANGĀREI - PAKŪSAVE (15 mentions)**

**Pros:**

- Convenient while shopping.
- Very handy so can charge while we go to the supermarket and playground.
- Very convenient.
- Great to top up while shopping.
- Convenient for shopping.
- Can do whilst shopping, central to town.
- Convenient when shopping there.
- Handy when shopping and needing top up.
- I can do my shopping and park near the store.
- I don't shop at PAKŪSAVE, but can take dogs for a walk while the car charges.
- Convenient to shopping.
- Limited hours of access.

**Cons:**

- ICE vehicles are often parked in the charging station.
- Often can't get to the charging station. Non-EV's park in them, only 2 spots anyway. Some EVs think it is ok to park there even when not charging!!! Hmmm.
- Pricey.
- Lots of bird poop!
- People block the park even though it's for EV charging.
- Only one charger so have to wait or find another charger at times. Can be ICed by shoppers who want the parking space.

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<p><b>WHANGĀREI - TESLA SUPERCHARGER FORUM NORTH (11 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"><li>• Perfect as "return-to-base fast charge.</li><li>• REALLY fast.</li><li>• Still free for me with bundled Tesla km.</li><li>• Reasonably central.</li><li>• Great location, usually available.</li><li>• Convenient location and fast charging.</li><li>• Fast. Easy to park. Availability is great.</li><li>• Super charger speeds.</li></ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"><li>• Running out of free Kms soon!</li><li>• Not well lit and safe at night.</li><li>• Expensive to charge at so only use if necessary.</li><li>• Costs.</li><li>• Expensive.</li></ul>
<p><b>WHANGĀREI - THE WAREHOUSE (5 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"><li>• Fast &amp; free. Perfect for a top up before heading home if I'm pushing range.</li><li>• Free off peak.</li><li>• Technically it is free (for now) with the Warehouse covering the cost.</li><li>• Handy location for top-up charge whilst shopping.</li><li>• Free.</li></ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"><li>• Non-EV cars sometimes park in the parking space preventing charging.</li></ul>
<p><b>WHANGĀREI – MCDONALD'S RAUMANGA (26 mentions)</b></p> <p><b>Pros:</b></p> <ul style="list-style-type: none"><li>• Places to shop nearby while charging.</li><li>• Regularly use to top up heading south.</li><li>• Handy location at food outlet.</li><li>• The easiest charger to get to after a trip to Whangārei to charge up for the trip home.</li><li>• Good when heading into town low on kms.</li><li>• Good option for emergencies.</li><li>• I use it for a quick charge when I limp into town from Kaiwaka ( on my way back from Auckland). I TOTALLY appreciate it being on the edge of town!</li><li>• Good for top-up on trips to the south of town.</li><li>• Good for quick charge before heading south to Auckland.</li><li>• Close to toilets and refreshments.</li></ul>

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- Good for trips south.
- Easy to access due to main road.
- Great location for a top-up on a trip south.
- Available when driving.
- Fast.
- Convenient when heading for a long trip.
- Handy location.
- Convenient for top-up at start or end of road trip.
- Only one that's actually close to State Highway 1 before Kaiwaka heading south.
- Close to shops on Highway 1.
- Easy to find and access.
- Good when I need to drive further south than Waipū.
- Handy for return trip.
- Useful for Bunnings and coffee stop.

**Cons:**

- Often occupied.
- It needs to allow for multiple charges at once.
- As a biker, I think it should have a small roof covering the chargers that allows to be stood under in rain.
- An awkward spot to pull back onto the highway.
- Sometimes iced, but not lately.
- Since it is a popular stop a second charger would be helpful to avoid waiting delays.
- Could be wait time as demand increases.
- Harder to turn right onto main road to go South.
- Being next to McDonalds, as kids always want it!
- Only one charger - occasionally have to wait.
- Very busy at times as the other Alexander St ChargeNet is locked — for all the out-of-towners it's their only option as Tikipunga is a long way off State Highway 1!
- Usually busy and have to wait to charge.

**KAIWAKA (33 mentions)**

**Pros:**

- Good location in terms of my car's range, for getting to and from Auckland.
- On the main road on the way to Auckland.
- It's getting a rapid charger that can do multiple vehicles at the GULL which is good.
- Handy location when returning from Auckland if I need a bit of extra charge to get home.
- Very close to the highway and our house, so it's good if we need to top up on the way home from a long trip, or if we need to quickly charge after a big trip before going out again.

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- Perfect for trip South.
- Essential for travel to Auckland in Leaf.
- Essential for me to get to Auckland in my degraded Leaf.
- Necessity for getting this far south of town.
- Handy location for me.
- Good position.
- Essential for 24 kWh going to Auckland.
- Used while shopping and necessary to get me to Auckland.
- Close to toilets and refreshments.
- On my way back from dropping off kids at school.
- En route to Auckland.
- Great location if travelling south.
- Used for trips to Auckland.
- Location on the trip to / from Auckland if we need a top up. Public toilets across the road. Playground across the road. Coffee and shop handy.
- Very convenient location beside SH1.
- Very convenient for travelling south.
- Good on our trips to Auckland or Mangawhai. Convenient location. Good with kids.
- On the way to Auckland. Public toilets opposite.
- Easy to find and access.
- Opportunity to get a bit more power quickly to drive home.
- Handy toilets, grocery store while charging.
- Access to Auckland.

**Cons:**

- Only one charger.
- Please include something COVERED to stand under!
- Always very busy so often have to wait 30 mins with the children in the car.
- Often in use.
- Often busy.
- Often in use so the new hyper chargers will be great for emergency top ups.
- Only one.
- Often busy.
- Only one spot and sometimes gets blocked by non-EV cars.
- Needs more than one there.
- It is a detour when going to Warkworth or Whangārei.
- Only one charger so often a queue to get a charge. Only one EV carpark at Four Square so waiting takes up shoppers' carparking options.
- Only one charger, sometimes have to wait.

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<ul style="list-style-type: none"><li>• Could really do with a flat white!</li><li>• Not usually a place would stop, minimal things to do while charging.</li><li>• Paid and often the spot is taken.</li><li>• Bottleneck, need to wait often and nowhere else to go.</li></ul>
<b>WELLSFORD (1 mention)</b> <b>Pros:</b> <ul style="list-style-type: none"><li>• Both very good.</li></ul>
<b>WARKWORTH (6 mentions)</b> <b>Pros:</b> <ul style="list-style-type: none"><li>• In the town close to shops and eating places.</li><li>• Convenient en route.</li><li>• On route to Auckland.</li><li>• Very convenient for travel to Auckland and has many shops to use and is free so all good.</li><li>• Charging up fast so I can continue.</li></ul> <b>Cons:</b> <ul style="list-style-type: none"><li>• Just one station so often full.</li><li>• Wish there were more.</li><li>• Availability.</li></ul>

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## Appendix 8

Table 10 Locations respondents think paid public fast chargers are needed, or where more chargers should be installed, with priority assessment

01. SH1 Auckland-Kaiwaka		Wellsford		1	
01. SH1 Auckland-Kaiwaka		Wellsford		1	
01. SH1 Auckland-Kaiwaka		Wellsford	New	2	
01. SH1 Auckland-Kaiwaka		Wellsford	New	2	
01. SH1 Auckland-Kaiwaka	5	Wellsford	New	3	1.80
02. SH1 Kaiwaka-Whangārei		Brynderwyn	New	2	
02. SH1 Kaiwaka-Whangārei		Brynderwyn		2	
02. SH1 Kaiwaka-Whangārei		Kaiwaka	Existing	1	
02. SH1 Kaiwaka-Whangārei		Kaiwaka - anywhere adjacent to SH1.	Existing	1	
02. SH1 Kaiwaka-Whangārei		Kaiwaka - anywhere in the village that is easy to find.	Existing	1	
02. SH1 Kaiwaka-Whangārei		Kaiwaka - Caltex gas station SH1.	New	2	
02. SH1 Kaiwaka-Whangārei		Kaiwaka - Eutopia Café.		2	

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Area	Area tally	Location	New / existing location	Priority	Average priority by area
02. SH1 Kaiwaka-Whangārei		Kaiwaka - Four Square.	Existing	1	
02. SH1 Kaiwaka-Whangārei		Kaiwaka - Four Square.	Existing	3	
02. SH1 Kaiwaka-Whangārei		Kaiwaka - Four Square.	Existing	3	
02. SH1 Kaiwaka-Whangārei		Kaiwaka-Whangārei SH1	New	1	
02. SH1 Kaiwaka-Whangārei		Ruakākā	New	3	
02. SH1 Kaiwaka-Whangārei		Ruakākā	New	1	
02. SH1 Kaiwaka-Whangārei		Ruakākā - Bream Bay GAS station. Marsden Highway roundabout Ruakākā. SH1	New	1	
02. SH1 Kaiwaka-Whangārei		Ruakākā - Bream Bay GAS station. Marsden Point / Ruakākā. Applies to only short range EVs like mine as I struggle to do the return trip from Poroti. Upcoming in Waipū would not help in these scenarios.	New	1	
02. SH1 Kaiwaka-Whangārei		Ruakākā - Bream Bay GAS station. More would be welcome in the Bream Bay area, especially given how busy it gets there in the summer.	New	1	
02. SH1 Kaiwaka-Whangārei		Ruakākā - Bream Bay GAS station. Right on SH1, so no detour needed. Would be a good spot to charge for Leaf drivers who can struggle to get between Whangārei and Kaiwaka chargers.	New	1	

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Area	Area tally	Location	New / existing location	Priority	Average priority by area
02. SH1 Kaiwaka-Whangārei		Ruakākā - centre near shops.	New	2	
02. SH1 Kaiwaka-Whangārei		Ruakākā -SH1.	New	3	
02. SH1 Kaiwaka-Whangārei		Ruakākā. To provide a buffer for anyone struggling to make it into Whangārei on a charge. Also helps spread demand away from the busier chargers in Whangārei.		3	
02. SH1 Kaiwaka-Whangārei		Ruakākā. Bream Bay GAS station.	New	2	
02. SH1 Kaiwaka-Whangārei		Waipū	New	1	
02. SH1 Kaiwaka-Whangārei		Waipū	New	1	
02. SH1 Kaiwaka-Whangārei		Waipū	New	1	
02. SH1 Kaiwaka-Whangārei		Waipū	New	1	
02. SH1 Kaiwaka-Whangārei		Waipū	New	1	
02. SH1 Kaiwaka-Whangārei		Waipū	Existing	2	
02. SH1 Kaiwaka-Whangārei		Waipū	New	3	
02. SH1 Kaiwaka-Whangārei		Waipū	New	3	
02. SH1 Kaiwaka-Whangārei		Waipū	New	1	

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Area	Area tally	Location	New / existing location	Priority	Average priority by area
02. SH1 Kaiwaka-Whangārei		Waipū - all in the centre near shops.	New	1	
02. SH1 Kaiwaka-Whangārei		Waipū - I understand this is on track. Hugely helpful for the AKL- Northland travellers. Kaiwaka is often overloaded.	Existing	3	
02. SH1 Kaiwaka-Whangārei		Waipū - main street.	New	3	
02. SH1 Kaiwaka-Whangārei		Waipū - public toilets, opposite the vet centre (approximately).	New	3	
02. SH1 Kaiwaka-Whangārei		Waipū - somewhere on main street.	New	3	
02. SH1 Kaiwaka-Whangārei		Waipū Cove	New	2	
02. SH1 Kaiwaka-Whangārei		Waipū, on The Centre.	New	1	
02. SH1 Kaiwaka-Whangārei		Waipū.	New	1	
02. SH1 Kaiwaka-Whangārei		Waipū. Potentially some in Waipū on way to Whangārei would be good too.		1	
02. SH1 Kaiwaka-Whangārei		Waipū. Somewhere in the town.	New	2	
02. SH1 Kaiwaka-Whangārei	42	Whangārei-Brynderwyn. Somewhere between Whangārei and the Brynderwyns easily accessible to SH1.	New	1	1.74
03. Kaiwaka-Waipū via Mangawhai		Mangawhai	Existing	1	

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Area	Area tally	Location	New / existing location	Priority	Average priority by area
03. Kaiwaka-Waipū via Mangawhai		Mangawhai	New	1	
03. Kaiwaka-Waipū via Mangawhai		Mangawhai	New	3	
03. Kaiwaka-Waipū via Mangawhai		Mangawhai - outside Hub.	Existing	3	
03. Kaiwaka-Waipū via Mangawhai		Mangawhai - on main Kaiwaka-Mangawhai road, by garage.	New	1	
03. Kaiwaka-Waipū via Mangawhai		Mangawhai - or Mangawhai Heads. Maybe the new New World in Mangawhai Central.	New	1	
03. Kaiwaka-Waipū via Mangawhai		Mangawhai -Right now we could use one in Mangawhai, however when Mangawhai Central opens there should and I guess you will install some there.	New	1	
03. Kaiwaka-Waipū via Mangawhai	8	Mangawhai -There is a new development going in "Mangawhai Central", will have New World and other big stores. It really needs a charging point as well.	New	1	1.50
04. Whangārei incl. Onerahi		Whangārei	Existing	2	
04. Whangārei incl. Onerahi		Whangārei - on SH1.	New	1	
04. Whangārei incl. Onerahi		Whangārei - Alexander Street Substation Whangārei needs more. Or in the car parks, e.g. Farmers.	Existing	2	
04. Whangārei incl. Onerahi		Whangārei - CBD.	New	3	

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Area	Area tally	Location	New / existing location	Priority	Average priority by area
04. Whangārei incl. Onerahi		Whangārei - central - shopping area, Forum North carpark.	New	1	
04. Whangārei incl. Onerahi		Whangārei - central CBD.	New	1	
04. Whangārei incl. Onerahi		Whangārei - central.	New	2	
04. Whangārei incl. Onerahi		Whangārei - easy access to main road.	Existing	1	
04. Whangārei incl. Onerahi		Whangārei - every main shopping area. At beaches.	New	1	
04. Whangārei incl. Onerahi		Whangārei - every petrol station.	New	1	
04. Whangārei incl. Onerahi		Whangārei - Forum North carpark, or near there.	New	2	
04. Whangārei incl. Onerahi		Whangārei - General. So if I'm in town, I can find a charger but there are not enough. I have to go across town so rather than me suggesting exact locations think of the places that there are no chargers - an even distribution approaching and exiting town from all sides! If I'm out of town I can't charge anywhere! Here are my suggestions of mid-points: i.e. Ngunguru, Parua Bay, Ruakākā roundabout, Hikurangi, McCleods bay, Onerahi, Kamo, on the way to Dargaville is "too far for my car", so anywhere that is a day trip so I can drive most of the way, then charge a bit to not stress the battery to 95% and then go to the beach and back and top up some more. More small charges are way easier	New	1	

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Area	Area tally	Location	New / existing location	Priority	Average priority by area
		and less boring for the kids than long battery-straining big ones.			
04. Whangārei incl. Onerahi		Whangārei - Hospital. If not already installed, chargers should be put in at the Whangārei Hospital or anywhere that people may have to get to in a hurry.	New	3	
04. Whangārei incl. Onerahi		Whangārei - Kensington area, simply anywhere in that chargerless side of town that's on the way to places, not off course from going to town.	New	2	
04. Whangārei incl. Onerahi		Whangārei - McDonald's carpark, Tauroa St.	Existing	3	
04. Whangārei incl. Onerahi		Whangārei - McDonald's carpark, Tauroa St. - more chargers.	Existing	2	
04. Whangārei incl. Onerahi		Whangārei - more chargers near town basin. Lots of people visit and not many chargers available.	Existing	1	
04. Whangārei incl. Onerahi		Whangārei - more in the town basin area.	New	1	
04. Whangārei incl. Onerahi		Whangārei - New World supermarket.	New	2	
04. Whangārei incl. Onerahi		Whangārei - Okara Park shopping centre (Warehouse chargers often busy).	Existing	1	
04. Whangārei incl. Onerahi		Whangārei - on SH 1 possibly at the I-centre. The charging stations at the town basin NEVER seem to be	New	3	

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Area	Area tally	Location	New / existing location	Priority	Average priority by area
		operational and when travelling south we do not want a detour into the city of Whangārei.			
04. Whangārei incl. Onerahi		Whangārei - On SH1 not the ones that are never working at the town basin and in some other place I have never managed to find.	New	1	
04. Whangārei incl. Onerahi		Whangārei - Onerahi, and also the airport should have one.	New	2	
04. Whangārei incl. Onerahi		Whangārei - Onerahi, by the shops.	New	1	
04. Whangārei incl. Onerahi		Whangārei - Onerahi.	New	2	
04. Whangārei incl. Onerahi		Whangārei - Onerahi.		3	
04. Whangārei incl. Onerahi		Whangārei - Pipiwai Road near the Gas station (near intersection of Three Mile Bush Rd).	New	1	
04. Whangārei incl. Onerahi		Whangārei - Public car parks.	Existing	1	
04. Whangārei incl. Onerahi		Whangārei - Schnappa Rock restaurant and bar.	Existing	2	
04. Whangārei incl. Onerahi		Whangārei - shopping areas.	New	2	
04. Whangārei incl. Onerahi		Whangārei - supermarkets, library / civic centre, and central town areas.	Existing	1	
04. Whangārei incl. Onerahi		Whangārei - supermarkets, work.	New	1	

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Area	Area tally	Location	New / existing location	Priority	Average priority by area
04. Whangārei incl. Onerahi		Whangārei - Visitor centre.	Existing	1	
04. Whangārei incl. Onerahi		Whangārei - Z Station Kamo Road.	New	3	
04. Whangārei incl. Onerahi	35	Whangārei- Okara Park shopping centre.	New	2	1.69
05. Whangārei Heads		Whangārei - (within 20km of).	New	1	
05. Whangārei Heads		Whangārei Heads - near beach areas	New	2	
05. Whangārei Heads		Whangārei Heads - Ocean Beach	New	3	
05. Whangārei Heads		Whangārei Heads - Ocean Beach	New	3	
05. Whangārei Heads		Whangārei Heads - Parua Bay (at shops).	New	2	
05. Whangārei Heads		Whangārei Heads - Parua Bay (gas station area).	New	3	
05. Whangārei Heads		Whangārei Heads - Parua Bay (shops).	New	1	
05. Whangārei Heads		Whangārei Heads - Parua Bay (shops).	New	1	
05. Whangārei Heads		Whangārei Heads - Parua Bay (shops).	New	2	
05. Whangārei Heads		Whangārei Heads - Parua Bay.	New	1	
05. Whangārei Heads		Whangārei Heads - Parua Bay.	New	1	
05. Whangārei Heads		Whangārei Heads - Parua Bay.	New	2	
05. Whangārei Heads		Whangārei Heads - Parua Bay.	New	3	

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Area	Area tally	Location	New / existing location	Priority	Average priority by area
05. Whangārei Heads		Whangārei Heads - Parua Bay. Because we have a large number of EV owners in Whangārei Heads, many workers commute daily to Whangārei up to 40km each way so if a town top-up is not available, anxiety results. The same reason can also keep visitors to this area away.	New	1	
05. Whangārei Heads	15	Whangārei Heads. Parua Bay by the four square.	New	1	1.80
06. Tutukākā Coast		Tutukākā	New	1	
06. Tutukākā Coast		Tutukākā	New	1	
06. Tutukākā Coast		Tutukākā	Existing	2	
06. Tutukākā Coast		Tutukākā - at Oceans complex.	New	1	
06. Tutukākā Coast		Tutukākā - at Oceans complex.	New	3	
06. Tutukākā Coast		Tutukākā - at Oceans complex.	New	3	
06. Tutukākā Coast		Tutukākā - Matapouri Beach.	New	2	
06. Tutukākā Coast		Tutukākā - more chargers.	Existing	2	
06. Tutukākā Coast		Tutukākā - Ngunguru.	New	2	
06. Tutukākā Coast		Tutukākā - or Ngunguru - near shops.	New	1	
06. Tutukākā Coast	11	Tutukākā - Scenic Route.	New	2	1.82

*Draft as of 4 November 2021*

Area	Area tally	Location	New / existing location	Priority	Average priority by area
07. SH1 Whangārei-Kawakawa		Hikurangi - by the shops.	New	1	
07. SH1 Whangārei-Kawakawa		Hikurangi - to provide a buffer for anyone struggling to make it into Whangārei on a charge. Also helps spread demand away from the busier chargers in Whangārei.	New	3	
07. SH1 Whangārei-Kawakawa		Hukerenui	New	2	
07. SH1 Whangārei-Kawakawa		Hukerenui - Hukerenui Cafe SH1	New	1	
07. SH1 Whangārei-Kawakawa		Hukerenui - Towai.	New	1	
07. SH1 Whangārei-Kawakawa	6	Whangārei-Kawakawa. Somewhere between Whangārei and Kawakawa.	New	1	1.50
08. SH1 Kawakawa		Kawakawa	Existing	2	
08. SH1 Kawakawa		Kawakawa	Existing	2	
08. SH1 Kawakawa		Kawakawa	Existing	1	
08. SH1 Kawakawa	4	Kawakawa - I'd double up the 50KW DC at Kawakawa. It's a node and a lot of EVs use it as a top-up.	Existing	1	1.50
09. Whakapara-Russell Road		Oakura - anywhere would do.	New	2	
09. Whakapara-Russell Road	2	Oakura. - I don-t know where, but something on the back roads to Russell would be ideal to open up that	New	1	1.50

*Draft as of 4 November 2021*

Area	Area tally	Location	New / existing location	Priority	Average priority by area
		route. Oakura is a good location for a stop and is a popular holiday location.			
10. Russell		Russell	New	1	
10. Russell		Russell	New	1	
10. Russell		Russell	New	1	
10. Russell		Russell	New	2	
10. Russell		Russell	New	3	
10. Russell		Russell	New	3	
10. Russell	7	Russell or Paihia	New	3	2.00
11. SH11 Bay of Islands		Paihia	New	1	
11. SH11 Bay of Islands		Paihia	New	1	
11. SH11 Bay of Islands		Paihia	New	2	
11. SH11 Bay of Islands		Paihia	New	1	
11. SH11 Bay of Islands		Paihia	New	1	
11. SH11 Bay of Islands		Paihia	New	2	
11. SH11 Bay of Islands		Paihia - (Opuia ferry).	New	2	

*Draft as of 4 November 2021*

Area	Area tally	Location	New / existing location	Priority	Average priority by area
11. SH11 Bay of Islands		Paihia - fill the gaps between existing fast chargers for cars with low range and / or when several EVs are waiting to charge.	Existing	1	
11. SH11 Bay of Islands		Paihia - main street	New	1	
11. SH11 Bay of Islands		Paihia - needs a full 50kW charger with more charging bays.	Existing	3	
11. SH11 Bay of Islands		Paihia - or Waitangi.	New	1	
11. SH11 Bay of Islands	12	Paihia - perhaps in the public carpark back behind the main street (multiple chargers).	New	1	1.42
12. SH10 Kerikeri		Kerikeri		1	
12. SH10 Kerikeri		Kerikeri - opposite Countdown - more needed.	Existing	1	
12. SH10 Kerikeri		Kerikeri - SH1 on turnoff to Kerikeri.	New	1	
12. SH10 Kerikeri		Kerikeri- extra chargers at the existing site.	Existing	1	
12. SH10 Kerikeri	5	Kerikeri- more Tesla-specific chargers in Kerikeri.	New	1	1.00
13. SH10 Kerikeri-Awanui		Kaero	New	1	
13. SH10 Kerikeri-Awanui		Kaero	New	3	
13. SH10 Kerikeri-Awanui		Kaero	New	3	

*Draft as of 4 November 2021*

Area	Area tally	Location	New / existing location	Priority	Average priority by area
13. SH10 Kerikeri-Awanui		Kaeo	New	3	
13. SH10 Kerikeri-Awanui		Kaeo	New	1	
13. SH10 Kerikeri-Awanui		Kaeo - (perhaps). From Coopers Beach there is quite a distance north before the next one.	New	1	
13. SH10 Kerikeri-Awanui		Kaeo - Four Square, 12 Leigh St.	New	3	
13. SH10 Kerikeri-Awanui		Kaeo - just off SH1.		1	
13. SH10 Kerikeri-Awanui		Karikari Peninsula	New	1	
13. SH10 Kerikeri-Awanui		Mangōnui		1	
13. SH10 Kerikeri-Awanui		Mangōnui - Near the Four Square.	New	1	
13. SH10 Kerikeri-Awanui		Mangōnui - Near the Four Square.	New	2	
13. SH10 Kerikeri-Awanui	13	Taipa	New	3	1.85
14. SH1 Awanui-Cape Reinga		Awanui		3	
14. SH1 Awanui-Cape Reinga	2	Te Kao - main street.	New	2	2.50
15. SH1 Kawakawa-Kaitaia		Kawakawa-Kaitaia SH1 midway between between Kawakawa and Kaitaia. Currently this stretch would be hard to do with a lower-range EV.	New	2	

*Draft as of 4 November 2021*

Area	Area tally	Location	New / existing location	Priority	Average priority by area
15. SH1 Kawakawa-Kaitaia		Kawakawa-Kaitaia. Umawera SH1 (maybe), between Kawakawa and Kaitaia, as it's a long haul in an old Leaf.	New	2	
15. SH1 Kawakawa-Kaitaia		Mangamuka - SH1	New	3	
15. SH1 Kawakawa-Kaitaia		Mangamuka	New	2	
15. SH1 Kawakawa-Kaitaia		Mangamuka		1	
15. SH1 Kawakawa-Kaitaia		Mangamuka - to connect a large gap on SH1 between Kawakawa and Kaitaia.	New	2	
15. SH1 Kawakawa-Kaitaia		Mangamuka - would help for older Leafs with poor range.	New	2	
15. SH1 Kawakawa-Kaitaia		Ōkaihau	New	1	
15. SH1 Kawakawa-Kaitaia		Ōkaihau	New	1	
15. SH1 Kawakawa-Kaitaia	10	Ōkaihau	New	2	1.80
16. SH12 Kaiwaka-Dargaville		Matakohe	New	2	
16. SH12 Kaiwaka-Dargaville		Matakohe - at the Kauri Museum.	Existing	1	
16. SH12 Kaiwaka-Dargaville		Matakohe - at the Kauri Museum.	Existing	1	
16. SH12 Kaiwaka-Dargaville		Maungatūroto	New	3	
16. SH12 Kaiwaka-Dargaville		Maungatūroto	New	3	

*Draft as of 4 November 2021*

Area	Area tally	Location	New / existing location	Priority	Average priority by area
16. SH12 Kaiwaka-Dargaville		Maungatūroto - centre near shops.	New	3	
16. SH12 Kaiwaka-Dargaville		Maungatūroto - or Paparoa.	New	1	
16. SH12 Kaiwaka-Dargaville		Maungatūroto - or Paparoa.	New	1	
16. SH12 Kaiwaka-Dargaville		Maungatūroto - or Paparoa.	New	1	
16. SH12 Kaiwaka-Dargaville		Maungatūroto - or Paparoa.	New	2	
16. SH12 Kaiwaka-Dargaville	11	Maungatūroto - outside Four Square. Or Paparoa corner SH12 and Franklin Road.	New	2	1.82
17. SH12 Dargaville-Rawene-Ahipara-Kaitaia		Ahipara	New	2	
17. SH12 Dargaville-Rawene-Ahipara-Kaitaia		Dargaville	New	3	
17. SH12 Dargaville-Rawene-Ahipara-Kaitaia		Dargaville	New	1	
17. SH12 Dargaville-Rawene-Ahipara-Kaitaia		Dargaville - and up. Seems there is nothing on the North West of the country.	New	2	
17. SH12 Dargaville-Rawene-Ahipara-Kaitaia		Kaitaia	New	3	
17. SH12 Dargaville-Rawene-Ahipara-Kaitaia		Kaitaia	New	2	

*Draft as of 4 November 2021*

Area	Area tally	Location	New / existing location	Priority	Average priority by area
17. SH12 Dargaville-Rawene-Ahipara-Kaitaia		Rawene - because it is a hospital destination and need to refuel before ferry to Kaitaia. Kaeo so can access the coast around Whangaroa harbour. Matauri Bay as there and back with a load of people is just manageable. Russell as a jump off to the east coast to Whangārei..	New	2	
17. SH12 Dargaville-Rawene-Ahipara-Kaitaia		Rawene - Hokianga ferry. Actually on the Hokianga ferry! Or At either side where the ferry disembarked or at the very least, Rawene.	New	2	
17. SH12 Dargaville-Rawene-Ahipara-Kaitaia		Rawene - near public toilets away from ferry parking.	New	2	
17. SH12 Dargaville-Rawene-Ahipara-Kaitaia		Waipoua Forest	New	1	
17. SH12 Dargaville-Rawene-Ahipara-Kaitaia	11	Waipoua Forest - Trounson Kauri Park just off SH12. Very big hills on this route and can't be done in one go in an old Leaf.	New	3	2.09
18. SH15 Otaika-Kaikohe		Kaikohe - near the shops.	New	2	
18. SH15 Otaika-Kaikohe		Kaikohe - this should really be at least a 50kW charger; 25kW is too slow in a mid-way location such as Kaikohe.	Existing	2	
18. SH15 Otaika-Kaikohe		Maungatāpere	New	1	
18. SH15 Otaika-Kaikohe		Maungatāpere	New	2	
18. SH15 Otaika-Kaikohe	5	Maungatāpere - SH15 or SH14.	New	1	1.60

*Draft as of 4 November 2021*

Area	Area tally	Location	New / existing location	Priority	Average priority by area
19. General		General. At least every 50K on SH network and a variety throughout the various towns.	New	1	
19. General		General. I'm in Hikurangi. I'm afraid to go north. I haven't been further than Kawakawa. I'm aware there is a plan to get chargers every 75kms for degraded Leafs since they seem to be the most common car and I TOTALLY support that! Thank you.	New	3	
19. General		General. I'm in rural Kaipara, there are no fast chargers in the South-West corner. Dargaville is still pretty far away especially for those with less range.			
19. General		General. More chargers directly on SH1 between Whangārei and Auckland.	Existing	1	
19. General	5	General. North Northland.	New	1	

*Draft as of 4 November 2021*

## Appendix 9

Table 11 Proposed locations for 6-8 paid public fast chargers

Location	Tally	New / existing location
Auckland-Whangārei - fill in more gaps	1	New
Awanui - as intersection or Ohaeawai as main line between Kawakawa and Kaitaia	1	New
Brynderwyn		New
Brynderwyn - SH1-SH12 intersection	2	New
Kaeo	1	New
Kaitaia - expand site. Most fast chargers are only needed for longer journeys, so most of those will end up going past those locations at some point, anyway.		Existing
Kaitaia - PAKŌSAVE or Old The Warehouse carpark	2	Existing
Kaiwaka		Existing
Kaiwaka - Eutopia Café		New
Kaiwaka - Eutopia Café		New
Kaiwaka - Four Square		Existing
Kaiwaka - Four Square		Existing

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Location	Tally	New / existing location
Kaiwaka - Four Square		Existing
Kaiwaka - Four Square		Existing
Kaiwaka – SH1	17	Existing
Kawakawa		Existing
Kawakawa - alongside the existing one		Existing
Kawakawa - expand site. Most fast chargers are only needed for longer journeys, so most of those will end up going past those locations at some point, anyway.	6	Existing
Kerikeri		Existing
Kerikeri	5	Existing
Mangawhai		New
Mangawhai	2	New
Mangōnui	1	New
Ōhaeawai - at the junction of SH1 and SH12	1	New
Ōmāpere - next to existing charger	1	Existing
Paihia		Existing
Paihia		NOT SPECIFIED
Paihia		NOT SPECIFIED
Paihia		NOT SPECIFIED
Paihia	5	NOT SPECIFIED
Ruakākā - Bream Bay GAS station	1	New

*Draft as of 4 November 2021*

Location	Tally	New / existing location
Tutukākā or Ngunguru		New
Tutukākā or Ngunguru	2	New
Waipapa	1	Existing
Waipū		New
Waipū		New
Waipū		New
Waipū - main street		New
Waipū - main street		New
Waipū - SH1	6	New
Warkworth	1	NOT SPECIFIED
Warkworth - north of	1	New
Wellsford		New
Wellsford		New
Wellsford		New
Wellsford	4	New
Whangārei		Existing
Whangārei		Existing
Whangārei		New
Whangārei		Existing
Whangārei		Existing
Whangārei		NOT SPECIFIED
Whangārei - at sports grounds		New
Whangārei - Blue Goose sports grounds south of Whangārei -build a carpark		New
Whangārei - CBD		Existing
Whangārei - CBD		Existing

*Draft as of 4 November 2021*

Location	Tally	New / existing location
Whangārei - CBD		New
Whangārei - CBD		New
Whangārei - CBD		New
Whangārei - CBD - Farmers carpark		New
Whangārei - CBD - Farmers carpark		New
Whangārei - CBD - near shared shopping street or bus station		New
Whangārei - Central - somewhere near intersection of Western Hills and Rust Ave. e.g. at the petrol station there. Reasonably central to town; also good for those passing through; got shops / food while you're charging.		New
Whangārei - Forum North Carpark		Existing
Whangārei - Forum North Carpark		Existing
Whangārei - Forum North carpark		Existing
Whangārei - Forum North carpark		New
Whangārei - I-Site		New
Whangārei - I-Site		New
Whangārei - McDonalds Raumanga		Existing
Whangārei - McDonalds Raumanga		Existing
Whangārei - McDonalds Raumanga		Existing
Whangārei - McDonalds Raumanga		Existing
Whangārei - McDonalds Raumanga		Existing
Whangārei - Okara Park shopping centre		Existing
Whangārei - Okara Park shopping centre		New
Whangārei - Okara Park shopping centre		New
Whangārei - Okara Park shopping centre		New
Whangārei - Okara Park shopping centre		New
Whangārei - Okara Park shopping centre		New

*Draft as of 4 November 2021*

Location	Tally	New / existing location
Whangārei - Okara Park shopping centre		New
Whangārei - Onerahi		New
Whangārei - Paramount Plaza Tikipunga		Existing
Whangārei - Porowini Avenue		New
Whangārei - shopping centres		New
Whangārei - should be more SLOW chargers. This will help smaller BEVs from clogging up fast chargers		NOT SPECIFIED
Whangārei - supermarket in Regent		New
Whangārei - Town Basin		NOT SPECIFIED
Whangārei - Town Basin		NOT SPECIFIED
Whangārei - Town Basin		Existing
Whangārei - Town Basin		Existing
Whangārei - Town Basin		New
Whangārei - Town Basin		NOT SPECIFIED
Whangārei - Town Basin - near PAKŪSAVE	48	Existing
Whangārei Heads		New
Whangārei Heads		New
Whangārei Heads - Parua Bay	3	New
MISC - All main towns	1	N/A
MISC - Along twin coast highway	1	N/A
MISC - I wouldn't. I would have more spread-out locations with 1-2 chargers. If people are congregating e.g. shopping - it will be close to their home, and they should be able to get back on a single charge. But if they are travelling - they will HAVE to charge and having more options spread out opens up much more of the country to EV drivers. Also - congestion at these stations is already happening. So if there are more stations, closer together - if one is being used then a driver will be able to make it to the NEXT station. Ideally one every 30 km.	1	N/A

*Draft as of 4 November 2021*

<b>Location</b>	<b>Tally</b>	<b>New / existing location</b>
MISC - Needs to be answered for those with shorter range vehicles. They are the ones who are the heros of the EV revolution.	1	N/A
MISC - Petrol stations	1	N/A
MISC - The problem is that all the fast chargers are DC - My car cannot charge on DC - only AC - there is a desparate shortage of three-phase AC chargers in Northland - there is only one north of Whangārei.	1	N/A
MISC - The problem is the TYPE of charger.	1	N/A

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*Draft as of 4 November 2021*

## Appendix 10

Table 12 Ways respondents expect their away-from-home charging needs to change in the next five years

<b>RESPONSES BY TOPIC</b>
<b>EVs with greater range will allow travel further with less charge stops (10 mentions)</b>
I will have a second EV with greater range, so I will be able to travel further within the region. So I won't need chargers so close to Whangarei.
Hopefully better range so less charge stops.
When we update our Leaf, we will have much better range, therefore will not need so many fast charging requirements.
If I upgrade to a car with more range I won't need to charge as often.
Greater range (e.g. 50-60 kWh) implies longer trips possible, also increasing EV traffic suggests prospect of longer waits at charging stations.
Would like to think I would have a better ev which could do greater distances, hence my charging requirements would change.
May need to do longer trips.
I may have to travel further for work.
Upgrading km range of car, but I will be using the car battery to charge my house in non-sunny periods as off grid.
Hope the to get another EV with better range capabilities, and make better use of the Leaf with the decreasing capacity.
<b>More travel, including to more remote locations (18 mentions)</b>
More travelling in general, also to more remote locations.
Plan to travel more and for longer periods.
Intend to travel more around Northland when our Tesla Model 3 arrives to replace our Leaf. It would be good to have many much more powerful fast chargers than the 50kW fast chargers we currently use.
As get used to new electric car will want to travel further i.e. not have to use petrol car. So would like charging stations along main routes
Hopefully getting to travel more with weekends away.

*Draft as of 4 November 2021*

More common to be in transit with an EV. My experience to date has been bad from a travel time perspective when driving beyond the range of the vehicle. Adding wait time and charging time to my overall travel time.
More longer distance trips, more need to fast charge.
Going to buy a PHEV so will drive further.
More likely to take longer trips in the Leaf.
I will be travelling more throughout Northland.
At the moment we own an old Nissan Leaf that we use for short journeys around town so we don't currently charge away-from-home. In the next five years we want to buy a better EV so we can use it for longer journeys so we will use a lot more away-from-home charging stations.
Probably will have a different car with longer range - hard to know what my needs will be. But I'd expect I'd be wanting to use the car for longer trips than I currently do, so I might want to be charging further up north in places like Kaitaia, Doubtless Bay etc.
I am keen to drive an electric car out of town instead of driving it just within the city. Currently, limited charging options along NZ roads make it difficult to drive EVs for longer distances. I hope to travel more out of town that will change my needs of charging stations.
More frequent, cost effective.
On regular basis.
We will travel around the region more meaning we need to charge when away from home.
Having retired will allow more travel away from home.
We take longer trips, but less than monthly.
<b>Will be doing less driving</b>
Will be doing less driving.
<b>Battery degradation will require more frequent charging at reduced distances (11 mentions)</b>
Battery degradation, more reliance on EV for transport.
We will need to charge more as our battery health gets lower.
More often.
As car gets older it won't be able to go so far so will need charging in town. But if I have a newer electric car with better range, I won't need an away from home charger so much.

*Draft as of 4 November 2021*

Battery degradation of 24 kWh.
Reduced range so needing closer fast chargers along main routes.
The battery on my Leaf will deteriorate. Also if wanting to travel to Auckland, there needs to be good access to fast charger to make the trip feasible.
Battery life diminishing over 2 years since owned car, would be reassuring to know that I could recharge at work on cold, wet days (heating / lights / windscreen wipers). Need to talk to my employer about installing some charging points, colleagues have already talked to me about this as a barrier to them moving to an EV.
Probably upgrade my PHEV to a BEV, but unlikely to be able to afford one with long range. Hence, charging when going to town will be important. Also for trips to Auckland will need to plan route for charging needs.
More likely to be in town with low charge level as we get used to ownership.
As my incredibly small battery degrades - I will need more charging stations closer by, in order to travel any significant distance. It will also mean that when the few stations are in use, I can go on to the next one.
<b>As EVs become more widely used, more chargers will need to be installed in more locations, with multiple chargers at heavily used locations (32 mentions)</b>
As more electric vehicles become widely used, more chargers will need to be installed.
I would hope there are more stations.
There will be more available chargers and probably more variety of providers.
There will be more charging stations & more variety of providers.
Hopefully the infrastructure will increase so I can go away more without freaking out about making it to the next charger.
I'm expecting to replace both cars at home to EV in the future, more and more people are going EV and having places that can fast-charge five cars at once is going to be needed.
My need for destination chargers will increase as more and more EVs are in Northland. Given the many tourist attractions, I would expect 2-4 chargers in most locations so that it encourages other tourists and me to visit more locations in one day. Places like Russell or Mangonui have no chargers at all, and are probably better served by 4-8 * 25kw chargers than 1-2 fast chargers.
Looking at an EV for work & will need more charging outlets around Northland - for myself mostly from Mangawhai to Bay of Islands mainly on the East coast.
As more EVs are on the road, the demand for chargers will grow so there will need to be more.

*Draft as of 4 November 2021*

<p>There are so many new PHEVs and EVs already here now in Mangawhai in 4 years, so if our small town has so many, I am sure it's growing in every town in Northland.</p>
<p>More needed than now since we plan to buy a second EV.</p>
<p>I sure hope so. I hope that we get more free rapid chargers.</p>
<p>Increase.</p>
<p>More chargers required.</p>
<p>More chargers and cheaper.</p>
<p>We hope to be able to drive around to all the Beaches Whangarei has, but often take our petrol car as not enough fast chargers at the beach locations. With hopefully more EV vehicles on the road, the demand for charging stations should be increasing.</p>
<p>More stations, more plugs.</p>
<p>More driving, more charging requirements. I expect there will be more EVs on the road all requiring charging / top-ups so we would wish for more charging options (locations and fast options).</p>
<p>We will need more charger access and have less time spare to be able to wait as the kids get older and more drop offs are needed in one night. And I foresee our town chargers being full at the same times we need. We currently get away with 3 trips to town on a battery - if they have to be successive it's a bit risky with no top-up in the middle on the last one and then the time is short to do a drive to the other side of town to then sit and wait for someone else to charge and then wait for our own charge time etc. That adds up to 30 mins easily sometimes – that's a lot of time! When I say a charge, that's a top-up: we don't need to do a whole cycle - that's unnecessary. We just grab 20-30 kW more etc.</p>
<p>Many more chargers, akin to petrol pumps.</p>
<p>More chargers required as there will be more vehicles requiring charging, so more competition for chargers.</p>
<p>Our away-from-home charging needs will increase. We are soon buying another PHEV and are likely to move to BEV over the next 5 years.</p>
<p>Many more options for charging, encourage fuel stations to all have chargers as well.</p>
<p>More cars so more charging stations required.</p>
<p>In five years, we hope to have a longer range EV and will be using it to do all of our travelling (holidays, etc) using it as opposed to our ICE car which we still use for our longer trips currently. To achieve this, we will need a good supply of paid fast chargers easily accessed along the main routes, as well as slow destination chargers in the smaller locations, tourist facilities, beach locations etc.</p>
<p>More EVs will be on the road in next 5 years requiring more public charging.</p>

*Draft as of 4 November 2021*

More EVs, more need for chargers spread throughout the region.
We will be moving to all electric, many others will be buying EVs. There will be more demand at existing locations and new locations will be needed.
Longer-range EVs will mean less charging needed at home. Even cheaper EVs have ~200km of range so wouldn't need fast charging around home as often. Many more people with EVs and larger EVs that take more time to charge will mean more congestion at charging sites so when it is needed, there will be more of a wait. Also more holiday / tourist traffic with EVs.
Likely to get another EV, having seen benefits with current vehicle.
A second EV.
We are likely to purchase another EV for longer trips.
<b>Will need more fast chargers, including hyper chargers e.g. 300 kW (4 mentions)</b>
We will have an EV with faster charging ability. We will want fast chargers faster than 50 kW - e.g. 300kW
More fast chargers available. Maybe at every gas station or supermarket parking.
More long-range fast-charging cars so more hyper-chargers needed – four or six at 300kw.
Our family will likely move from a PHEV to a BEV and would still like the freedom to travel Northland using fast chargers.
<b>More adaptor options will need to be provided for those with different types of charging ports (4 mentions)</b>
There need to be more types of adapters - there are currently no local stations where I can plug my car in.
I need 3 Phase AC chargers desperately. There is only one such charger north of Whangarei and only one operational one between Whangarei and Auckland, and this will be removed when the Snells Beach Warehouse relocates.
I need a Type 2 plug charger and there are none available anywhere. When I retire, I would like to be able to charge my car in Kerikeri or Kaitaia when I need to go to a bigger town.
I would charge more if I could. As it is at the moment, I can't find the right chargers.
<b>Miscellaneous, unclear meaning, or didn't really address the question</b>
Small chargers at shopping stops.
I travel from Auckland to Waipu often. Wellsford needs solid charging solutions. Also Mangawhai, Waipu, Whangarei.

*Draft as of 4 November 2021*

Actually use the charging stations. The car is still new to us, so we have yet to need to use a public charging station. Pandemic has also stopped us from going further than work.
It depends really on what happens with Covid and how much travel we are able to do.
Different locations.
If I replace my Nissan Leaf for a newer model ...
Would like the charging stations to be free and or solar powered.

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*Draft as of 4 November 2021*

## Appendix 11

Table 13 Suggestions for improving Northland’s public EV charging infrastructure, and other general comments

<b>ALL RESPONSES BY TOPIC AND SUB-TOPIC</b>
<b>More chargers, and more chargers per station (76 mentions)</b>
<b>More fast chargers needed (44 mentions)</b>
More fast chargers required in Northland.
Please increase the EV charging locations within Northland.
Rollout of more sites as soon as possible.
EV is going to be the future so invest in providing EV chargers as many possible.
Commit to the infrastructure now. EVs are part of today's society.
There needs to be a lot more charging stations than we have now.
Ramp up available infrastructure significantly.
Watch out for the growth of the EV fleet to arrange additional chargers over time.
Needs to expand dramatically in capacity to meet central government desire / mandate for EV.
Just a few more fast chargers that can be used by domestic tourists visiting the area.
More of them, more spread around Northland.
Great, keep adding random chargers spread out.
A good spread.
More fast charging options, particularly along SH1, and any other heavily trafficked roads.
Good network so far, but needs to keep up with growing demand and tourist numbers over summer.
Glad it was proactive here, but with more BEVs coming, we need to get ahead of the curve and put in more DCFC units (fast chargers) very quickly!
Lots of room for improvement and better to invest in infrastructure now to encourage more people to switch to EVs. With govt subsidy, there could be a significant increase in demand for charging stations.

*Draft as of 4 November 2021*

A number of chargers throughout the country in convenient locations will be needed. Similar to the variety of fuel stations now.
More stations.
More needed.
Need more.
Make it more available.
Continuing developing more charging stations.
More charging stations.
Number of electric chargers need to be increased.
More stations needed.
More fast chargers at a reasonable cost.
More charging stations.
More chargers!
More, more, more.
More fast charging stations.
More charging points.
Just more chargers.
Get more.
More fast chargers.
More please!
More of them.
Increased number of stations.
Bring it on!
Increase more stations.
Have more available.
Definitely needs to increase and improve.
Make more available, in more locations.
More chargers available.

*Draft as of 4 November 2021*

<b>Make fast chargers the priority, not slow chargers (5 mentions)</b>
Be careful that your yardstick for charging is not the old low-range Nissan Leaf. More modern cars are likely to be 95% charge at home, and except for tourism, the locals won't need to charge when out, as their range will be 300km.
As most electric vehicles coming out now are 250km plus, fast chargers are the required infrastructure.
Making sure the EV infrastructure expands to meet expanding needs for more EVs over time. EVs are getting bigger batteries, so more fast chargers will be required.
I used to have an EV. The big issue in Northland is distances and rural roads drain car range a lot more, therefore, you need to stop and charge. Current chargers are way too slow, so super-fast ones are needed.
Slow chargers shouldn't be considered as they take up valuable space and expensive infrastructure for long periods of time. EV owners wanting to slow charge should do it at home or work (bring your own charger). The public shouldn't have to pay for slow EV chargers.
<b>More chargers at each station (18 mentions)</b>
We just need a few more locations as well as a few more chargers at some existing locations, to ensure people are not getting caught out when travelling longer distances. More fast chargers need to be installed at existing key locations (along SH1).
More fast chargers, spread-out locations, with 1-2 charging ports. Having more options spread-out would open up much more of the country to EV drivers. Congestion is already happening, so if there are more stations, closer together, then if one is being used then a driver will be able to make it to the <b>next</b> station. Ideally one every 30km. If people are congregating e.g. shopping, <b>many</b> slow charging options would be great. No need for a fast charge here.
The first thing to address is the fact that most places have one charger. If used or broken, then this is a major issue to current EV owners and will slow adoption. So I would recommend a minimum of 2, with a target 'normal' of 3 or 4.
More chargers at each site are the best improvement. Having more chargers available so that waiting is less likely, or a shorter wait, is the most important thing.
More charging stations at existing locations.
More fast chargers alongside existing fast chargers, on main routes, to prevent queueing.
More chargers at each station.
More charging bays to reduce waiting, especially during summer holidays and on weekends.
Add more chargers in existing locations to avoid congestion.

*Draft as of 4 November 2021*

Add lots more charging locations and chargers.
As the number of electric cars increases, we will need multiple charging units at each charging point.
More stations, more than 2 chargers at stations.
More charging stations in the more popular locations. Most are single EV only at present.
Having multiple charging options will become more important as the numbers of cars increase.
Probably need double the number of both sites and chargers — double up or more at key locations on main routes, expand as / when usage increases.
More chargers at existing locations. More locations.
Increasing number of fast chargers, and number of charger locations.
Expand the number of locations and be ready to increase capacity at existing locations.
<b>Need to roll out the infrastructure faster, for environmental reasons (2 mentions)</b>
Appreciate all that has been provided so far but need to do more, faster, to reduce carbon and improve air quality in urban areas.
Hurry up. Climate change isn't waiting.
<b>More charging stations will encourage EV uptake (6 mentions)</b>
Need as many options for recharging as possible. The more stations available, the better the uptake will be. Cost isn't a major issue as I presume it will always be cheaper than petrol.
The more fast charging stations around Northland, the more likely people will have the confidence to purchase or use EV fleet vehicles for work.
Keep going with making EV charging available as many places possible. Only then will the change to EV driving be faster and easier for EV drivers.
Seems to slowly be improving, as we see more charging stations we would be more likely to get an EV.
Infrastructure is essential if EVs are to become more popular.
Not much [charging infrastructure] available now. Hence why I won't buy a EV.
<b>Other (1 mention)</b>
Encourage fuel stations to take on the business of supplying chargers.
<b>Fill gaps, especially for lower-range vehicles (17 mentions)</b>

*Draft as of 4 November 2021*

Make more fast chargers available, as often have to travel longer distance to get to charger, which is difficult with low-range vehicles.
More coverage so people with low-range EVs can do bigger / more frequent trips.
More sites will continue to make it feasible to take our little EV further.
Need to be more evenly spaced, especially in the Far North.
Make sure they are spaced approximately 75 km apart, especially along SH1 and the coastal route via Dargaville
Fast track those 75km apart chargers and then just identify chokepoints and increase numbers.
I think there should be a charging station in every 50-80 km radius.
For everyone to feel comfortable, you need a charger every 25 km.
We need more fast chargers in the rural small towns, for people who live in the area and have smaller-range cars, to allow people to top-up quickly and enable round trips between homes / farms and smaller service centres.
Fill gaps between existing fast chargers to accommodate lower range vehicles, including secondary routes.
Fill in the gaps on main routes, and add some on secondary routes such as Mangakahia Rd, SH16 Kaipara Highway etc.
So far it's pretty good, but it does get a little limiting for an older, shorter range EV.
Need to be spaced so there is a redundancy option when one critical charger is out of action, i.e: very hard to get from Pungaere to Whangarei with a 24Kwh battery if Kawakawa is down.
I can go from Russell to Auckland without stopping. Many other EVs with shorter ranges will have problems requiring preplanning to not get caught short. On holidays I have found the fast chargers do have waiting times which will get worse when long-range cars need charging. Mine can take an hour to fully charge so pairing up fast chargers could help if power is available
To increase uptake of more affordable EVs with limited range, free slow charging is very helpful. Chargers in places like Ocean Beach or Mount Manaia would make them accessible, where there are limited public transport options.
We don't drive long distances in EV because it seems too hard to plan multiple stops for our very infrequent out-of-region travel. Our other vehicle is petrol.
More questionnaires like this — great! And consider the people who can't afford long-range cars. Even long-range cars will drop and continue to be driven in the future as they would still be good for short trips. With more people getting EVs, long weekends on state

*Draft as of 4 November 2021*

<p>highways are a serious concern. I don't ever take my EV on SH1 (south anyway) on a weekend! Kawakawa is ok if it's not broken. I see the politicians / important decision-making people get EVs etc — that's great, but they get the ones with 1-400 km range and would never see the dramas I do as a daily 24kwh battery and 80 "safe k's". They may never have to charge at a busy charger and have to wait 30 mins each time. With bigger batteries, they could drive to Auckland and back on one charge. I have to charge 3 times to get to Auckland. Now I drive the ICE to Auckland (even though a charge is 5-10 mins and I can email or call the wife and kids), because the wait for the charger is too hard to allow for.</p>
<p><b>Specific types of locations (54 mentions)</b></p>
<p><b>On main routes (7 mentions)</b></p>
<p>Include more fast charging stations from the lower Northland area, up to Cape Reinga with sufficient overlap between each station. This can ensure tourists and locals can have adequate charging coverage up and down Northland, without the worry of potentially not making it between charging stations.</p>
<p>Ensure more fast charging stations are located around the region near main arterials to help provide certainty and confidence for people driving EVs to the more remote locations Northland is renowned for.</p>
<p>More specialised stations on major routes.</p>
<p>More charging on SH1.</p>
<p>More fast charging stations along the SH network.</p>
<p>Trips to Whangarei are hard without more chargers along the way on SH1.</p>
<p>It's pretty good. To future proof need to look at hyper-chargers at key nodes. Kaitiaia? Kawakawa? Definitely Whangarei in the next 5 years.</p>
<p><b>Auckland to Whangarei (4 mentions)</b></p>
<p>Wellsford needs more, often have to wait.</p>
<p>It's great we have one charger in Mangawhai but we need more in current shopping centres. And more en route to Whangarei.</p>
<p>Need more on the road to Auckland e.g. Wellsford, Waipu. At some locations there is only one charger — there should be more as quite often there is a queue.</p>
<p>More varied types of chargers at more locations and multiple fast chargers on main highway pinch-points.</p>
<p><b>On secondary routes (2 mentions)</b></p>

*Draft as of 4 November 2021*

Make chargers easily available but not on main arterial routes, and try to situate them close to points of interest so drivers can go and do something while the vehicle charges - eg: cinemas, cafes, etc.
Maybe more charging spots on the west coast and SH10 routes?
<b>Rest areas and service stations (2 mentions)</b>
Chargers at rest areas etc.
Encourage service stations to have charging infrastructure.
<b>Tourist areas (5 mentions)</b>
Destination chargers at tourist hotspots and faster chargers regularly on the main routes to these hotspots. 25kw works well at places where most people are likely to spend 1-2 hours anyway, otherwise 50kw for main routes.
More chargers in hub areas or tourist areas.
Definitely needed in all tourist areas to encourage and attract visitors to feel safe, confident and comfortable travelling around Northland in EVs.
Include rural charging stations next to tourism hotspots.
The more charging stations the better. The Hokianga ferry is a perfect location (technical difficulties notwithstanding) for an electrical vehicle charger. You'd get a near full charge on the trip.
<b>Major towns, smaller centres (5 mentions)</b>
More charging stations in Whangārei CBD and suburbs.
More charging points on major routes and towns.
Charging stations at all major towns in Northland.
Install at least 4 fast / slow chargers in each major town.
Kerikeri airport and marina need chargers.
<b>Rural areas, smaller centres (8 mentions)</b>
More in rural areas and smaller towns.
More charging options in smaller centres.
Continue to roll out more locations for charging, including far-flung ones (Peria, Mitimiti, Karikari Peninsula etc.), so people can genuinely confidently travel the length and breadth of Northland and especially the Far North.

*Draft as of 4 November 2021*

More chargers in the smaller destination towns, allowing people to stop and visit the town while charging.
Enough chargers in remote areas like all the small towns Kaeo, Rawene, etc, not just main centers like Kerikeri, Whangarei, Kaitaia.
Ensure you consider the rural population sufficiently, as well as how many tourists go on that route in peak seasons.
Install at least 2 fast / slow chargers in smaller towns.
Chargers needed in all Hokianga townships to encourage uptake of EVs.
<b>Beaches and coastal areas (6 mentions)</b>
More chargers are needed in towns surrounding Kaitaia. Beaches are a huge part of our lives yet no chargers are available in Ahipara.
Need to get more along the east corner coast, in and around Russell.
We need a fast charger on the Tutukākā coast.
More needed in coastal areas.
Bring chargers to the beach car parks.
Could consider putting more stations in different locations, cannot find any in the beaches / hospital / clinic.
<b>Near facilities, shopping (8 mentions)</b>
Need to have facilities (shopping, café, etc) near the chargers.
More pod fast chargers at useful locations (near supermarkets, cafes, etc).
Chargers located where there are services nearby will always be useful.
Choose cafes. EV owners love stopping in and patronising business owners that provide these charging stations.
Have the charging points close to other facilities so that there are things to do while waiting e.g. cafes, shops.
Great to see the Kerikeri Warehouse on board.
They do not need to be in the closest parks to the stores! Leave these parks for elderly / disabled parking!
Would be good if supermarket, libraries, council and other places of interest would be involved.
<b>Hospitals, large employers (3 mentions)</b>

*Draft as of 4 November 2021*

EV charge points at the hospital and high-employment locations for patients/shoppers and workers - council, supermarkets, car parks around town.
Whangarei hospital also needs at least a few charging stations.
Large employers should have them in their staff car parks. Take the average distance per charge and ensure there are chargers within that range.
<b>At carparks (2 mentions)</b>
More EV spots in some of the more popular car parks.
Priority needs to be given to areas where most people park, so there is easy access and no waiting.
<b>Other (2 mentions)</b>
Put them into every marae that wants them.
Needs to be many more public recharging and street-side options (for where people don't have garage / driveway options).
<b>More slow charging (4 mentions)</b>
Move fast chargers out of populated main areas. Replace with slow chargers everywhere.
More slow charging.
There are no slow chargers at all. That needs changing.
More free slow chargers.
<b>Incentives and disincentives (4 mentions)</b>
Incentives for companies to provide charging stations would be beneficial.
Free parking in town to incentivise EV ownership.
Put a big tax on petrol and diesel.
Provide events and incentives to get public to switch to EVs.
<b>Overstaying and getting 'ICE'd (17 mentions)</b>
<b>Time limits and penalties (6 mentions)</b>
Penalties for overstayers. Tow away, and / or heavy fines.
Enforce ticketing / fines for vehicles overstaying parking time limits or leaving cars plugged in that have finished charging and are blocking access.
There needs to be a time limit, maybe with an overstay charge doubling the cost so other users have a chance to recharge without having to drive around looking for spots.

*Draft as of 4 November 2021*

Ban business vehicles from existing free chargers.
Limited parking times.
Quick turn-around is the key. If someone has their car on a charger and goes shopping, nobody else can get into that charging bay until owner returns. What if they use it as a parking spot as well?
<b>Parking etiquette (2 mentions)</b>
Promote correct charging etiquette to lessen frustrations at public chargers.
Need to improve charging etiquette. It is great that some of the chargers are free, as they have incentivised and encouraged uptake. But now EVs are gaining popularity, and unfortunately the charging etiquette has deteriorated.
<b>Reduce EVs getting ICEd (9 mentions)</b>
Have a system whereby if people leave their cars on charge when the charge has completed, they are encouraged to move them so others can charge.
Have high infringement costs for those who park their ICE cars in EV charging spots.
As charging stations are more in demand, may need more signage / other ways to encourage non-charging vehicles not to park in that spot.
Clear markings. Fines for non-EV parking in those spaces.
Other ways of keeping people from parking in EV charging carparks.
Better enforcement of removing non-EV vehicles from EV charging spots.
Non-EV drivers should be penalised for parking in EV charge parks.
Need to stop petrol cars taking the parking space.
Ensure regular CCTV surveillance of charging sites so non-EV cars parked in charging sites can be sent a fine!
<b>Charging station signage, visibility, app / website (20 mentions)</b>
<b>Signage and signposting, easy access (6 mentions)</b>
Charging stations need to be well sign-posted so they are easily found, a national, universal sign perhaps utilised like the rest area sign that everyone recognises.
Better signposting.
Better signage showing where charging stations are.
Much more signage, publicity for all locations, existing and new.
Better signage before charging stations.

*Draft as of 4 November 2021*

Providing visibility to know where these services are and easy access.
<b>Visible location (3 mentions)</b>
Make as public and obvious as petrol stations, to help with adoption.
Rather than hide them away, do dedicated stations for charging on main routes, like a petrol forecourt with cameras monitoring (and tow trucks to tow away people who don't like EVs).
More of them being seen would encourage more people to buy an EV, and not need to buy such a big battery / expensive EV.
<b>App / website to find appropriate CS, ascertain availability (11 mentions)</b>
Abundant information online regarding location of these stations, including Google Maps.
Communication about where they are.
Publicity about the charging stations available in one site so people can refer to it easily.
For charging stations other than ChargeNet, then having a user-friendly mobile app and Google or website location map for them is quite important. The app or location website should also show the status (working or under service) of the charger.
Develop an app where users can see the spots available, the price, and maybe being able to book a spot regardless of whether the spot belongs to the council or to another entity.
There are a number of charger types, and nowhere to easily find information. A good app that shows locations & types would be great.
Make sure chargers are on automatic apps we can check whether they are busy or not, etc. not requiring the user to update the app. as lots don't have time to do that.
Maybe an app so can determine if charging space available, etc.
If it's free then it needs to clearly alert people when their time is up to encourage people to clear off the chargers.
Provide a waiting system telling your number in the queue if many users.
Having the ability to be told via text that your charging is finished will become vital to improve occupancy i.e. not waiting for owner to come back.
<b>Charging station design, access, facilities (7 mentions)</b>
More charging stations where <b>only EVs</b> can park.
Design for driving in and out, and enabling queuing.

*Draft as of 4 November 2021*

Better parking layout like mirror image where four vehicles could face another four vehicles so cables can be changed over when completed if car driver hasn't returned to car (but for some vehicles, the plug won't release anyway).
Ease of access could be improved.
Access for towed vehicles, i.e., pedestal drive-by chargers, that will discourage overstayers.
Sheltered charge stations — roof covering.
Water available, for window washing. Air pumps for tyres.
<b>Charging station safety (4 mentions)</b>
Safer locations for charging at night. Well-lit areas.
Needs to be easy to find and be well-lit at night.
Ensure it is safe.
Ensure adequate access and security at each location.
<b>Technical aspects of charging stations (10 mentions)</b>
Charging stations need to be operational. Whangarei is the worst.
Ensure they are working all the time.
Ensuring all chargers report accurately their status (out of order, real time availability etc).
All plugs should be universal, so I don't have to look for a specific charger for my car.
More compatible adaptors.
More 3-Phase AC chargers.
More Type 2 chargers.
Put in more Tesla fast chargers in more places than Whangarei.
Consider installing Tesla supercharger network.
Allow businesses a way to easily measure the charge taken by EVs even if they do not have a special designated charge station.
<b>Renewable energy, increased generation capacity (5 mentions)</b>
It would be ideal if the EV charging infrastructure was powered 100% by renewable energy, e.g. the currently proposed solar farm etc.
Making sure all the public EV charging infrastructure is powered by renewable energy.

*Draft as of 4 November 2021*

Would be awesome to see investment in solar to support free public charging at prominent locations, e.g. Whangarei town basin area.
Ensure that all the electricity is generated by renewable sources and that none of NZ's electricity used for charging vehicles comes from places like the Huntly coal-fired station.
Fix the lack of generation capacity in New Zealand to cope with demand that will be needed in the possible future.
<b>Make EVs cheaper (1 mention)</b>
EVs are very expensive to buy. If the government is real about getting people to change, then the price needs to reflect that. Extra charge ports won't matter if people can't afford to buy the car in the first place.
<b>Cheaper or free charging (10 mentions)</b>
Is there a way to incentivise EV travel by providing top-up stations at a cheaper rate? Currently it costs around 50c per kWh (including the time charge) at a paid public charger, whereas it costs a little over 20c per kWh on night rate at home.
Fast charge stations free or discounted.
Cheaper rates.
Lower cost per kWh.
Keep the costs down.
Make it extremely accessible and affordable.
Find a sponsor and make it free.
Free charging like Vector.
There are free ones in Auckland that Vector pays for, and I am sure Northpower can do the same at some locations. Pay as you go can be an option, but costs should be reasonable.
Consider cheaper rates for Northland residents.
<b>No more free charging (2 mentions)</b>
Please don't add any more free chargers.
It could be time for there to be an end to the free charging — and that may free up more chargers, thus reduce some of the need for additional charging facilities.
<b>Incentivise home charging, make it cheaper (3 mentions)</b>
Encourage electricity providers to provide low-cost charging at home.

*Draft as of 4 November 2021*

Rebate / incentives on new homes for EV charging.
Incentivise home charging systems from solar.
<b>Planning and coordination, anticipating demand (9 mentions)</b>
Needs to be alignment between road planning, district planning and EV charging. Who is responsible for the charging infrastructure — government, council or business?
This needs to be treated as an ongoing project, not a series of one-off projects.
I do not know your plan. Things seem to be pretty haphazard at the moment. It would be good to have an idea of the rollout because if I had a BEV (I have a PHEV) I would be very nervous about locations and reliability of charging stations.
We were the first region to have fast charging infrastructure, but the last few years have seen very little investment.
The requirements will change with uptake of EVs, so you can only guess at what will be required in 5 or 10 years' time. Crystal ball required.
So far so good, but needs to grow to cater for growth — the uptake of EV cars in the past few months has been <b>huge</b> due to the rebates.
It is going to happen eventually. Be ahead of the trend.
I am glad we already have an ok network, however we need to ensure we future-proof it.
We need to continue to be competitive at a National level in the rollout of infrastructure. Major Northland centres being well provided allows vehicles with good range to conveniently navigate the broader district, and to Auckland. The system will need to factor in all types of vehicular transportation needs, such as increased use by heavy haulage, public and private transport, including buses, private coaches, and taxis. If 'clean energy' infrastructure improves, public transport may become more popular if costs can be reduced / subsidised. A more sustainable future should allow factoring in bicycles and other ultra-light networks. Carbon emissions <b>must</b> be drastically reduced.
<b>Technical support (1 mention)</b>
Charging is not the only issue. We need technicians that can repair or service the cars, install home charging systems, and do other maintenance.
<b>Improve roading infrastructure (1 mention)</b>
Improve the roads, put boat ramps on all the beaches so that 2WD EVs can launch and retrieve.
<b>Improve public transport (1 mention)</b>

*Draft as of 4 November 2021*

Ultimately we will need more than EVs — public transport has to increase. Maybe the revenue collected could go towards subsidising public transport as well as additional chargers?
<b>Miscellaneous negative (5 mentions)</b>
Currently pretty poor.
Not very obvious to see!
Only Jaffas using them.
Few and far between.
Still yet to be established where it is known and there is common use.
<b>Miscellaneous positive (17 mentions)</b>
What you are doing, 😊👍 asking those who have EV experience what their thoughts are. Straight from the horse's mouth as they say!
Thanks for asking. Ready when you are
Keep up the great work, love this forward thinking.
Fantastic that it was rolled out so quickly thanks to a few enthusiastic volunteers.
It's amazing in comparison to other parts of NZ. Thanks to NRC and Northpower and specifically our amazing EV champions up here.
I totally appreciate the effort that has gone into supporting the adoption of EV cars by Northpower and Joe Camuso and Chargenet. I look forward to the removal of polluting ICE vehicles quite soon. Fingers crossed.
Appreciate the effort certain NRC staff have made to boost Northland's uptake of EVs, and the results achieved.
Thanks for supporting us!
Many thanks to the folk who have created the existing network. Please keep going
Keep going.
Do nothing.
I appreciate the current infrastructure and use it.
There seems adequate spots around, until there's more uptake.
EV use likely to increase, so good to be considering.
It is OK at the moment, but I feel there is a huge surge in demand coming, so it is great to see you are planning.

*Draft as of 4 November 2021*

Much better than equivalent regions in the UK.
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Great to see options are evolving.
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DRAFT

**TITLE: Funding Business Cases for Pilot Adaptation Projects (Te Tai Tokerau Climate Adaptation Strategy) at District Councils**

**From:** Jan van der Vliet, Natural Hazards Advisor

**Authorised by Group Manager/s:** Victoria Harwood, Pou Tiaki Hapori - GM Community Resilience, on date 11 February 2022

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**Whakarāpopototanga / Executive summary**

Northland Councils are developing a work programme to address climate change risk to coastal communities. The programme will set out guidance for ways councils, communities, tangata whenua and key stakeholders can co-develop community adaptation plans.

The preferred best practice engagement and decision-making approach to be used in the coastal adaptation programme is dynamic adaptive pathways planning, described in the 2017 Ministry for the Environment Coastal Hazards and Climate Change Guidance for Local Government. This process enables communities to be intimately involved in developing adaptation plans for their own communities through a structured process that uses community panels to collaboratively determine adaptive pathways using risk assessment, engineering designs, options assessment, and prioritisation processes.

The result will be a flexible, long-term adaptation plan for each community, signed-off by a governance body and the relevant communities and councils. While this approach will be appropriate for larger communities, we also work with smaller communities to develop and implement community-led adaptation plans at the local or hapū scale.

Funding for pilot community engagement projects has been allocated in the 2021-31 Long Term Plans for all Northland councils (priority actions 29 and 30 of the draft Strategy).

The Climate Change Adaptation Te Taitokerau (CATT) working group has developed the draft Coastal Adaptation Programme – Coastal Community Adaptation Profiles to support the pilot community engagement projects.

This coastal adaptation programme is the third in a series of technical chapters contributing to the Te Taitokerau Climate Adaptation Strategy. In the previous chapter, Climate risk overview, the risks posed by coastal hazards were identified as a key gap in council responses to date, presenting an opportunity to develop community adaptation responses to the projected impacts of climate change.

A priority action recommended in the Strategy is the Coastal adaptation programme, a 10-year programme of adaptation planning with coastal communities across the region.

The Coastal Adaptation Profiles Technical report helps develop this future adaptation planning work program by describing the range of coastal risks, and community needs and opportunities in different coastal community across the region.

The intent of the report is to provide data on the different levels of risk projected for different communities, guidance on appropriate adaptation planning approaches that might be appropriate for different communities, and community attributes to consider when planning adaptation engagement.

Through the Te Roopu Tiaki Hapori – Community Resilience Climate Change 2021-22 budget, Northland Regional Council has made financial funding support available to a maximum of \$45,000, for each district council towards their respective pilot projects; targeted budget to support and implement Adaptive Pathways Planning in our region.

Respective District Councils were requested to put a ‘business case’ together using the following criteria, i.e., process and rules of applying:

- Submission of your business case which should reflect the purpose, objectives, methodology, outcomes and risks (and opportunities of course).
- Your business case should be no longer than three A4 pages
- Funding support for short / long term council staff is however not eligible under this financial support model. Engagement of consultants (or other outside sources), for example, to support the scoping, management and implementation is supported.
- A report, following the end of the current financial year, on the progress / outcome of the support element of your programme would be appreciated.

Below is Kaipara District Council’s (KDC) business case, which was reviewed, and funds were awarded. Business Case applications by Whangarei District Council (WDC) and Far North District Council (FNDC) are expected during the month of February. FNDC however, have indicated that their application might be delayed towards the end of this financial year.

#### Kaipara District Council: Business case for Adaptive Pathway Planning Programme – Pilot Projects funding

Kaipara District Council has committed to starting an adaptive pathways pilot project in early 2022. In December 2021, Council decided on the Raupo / Ruawai area as the location for the adaptive pathways pilot project. The pilot project is anticipated to take three years.

Adaptive pathways planning is a part of Council’s new climate change work programme. The pilot project also supports the draft Te Tai Tokerau Adaptation Strategy, which identifies adaptive pathways planned as the preferred, best-practice approach to adaptation decision-making.

#### Purpose

NRC funding will help secure project management and / or community engagement support to achieve the following deliverables:

• Confirm project scope	Confirm hazards in scope, scale and spatial extent, timing, budget, strategic and community context, external support requirements
• Establish project architecture	Identify and establish governance, community panel, council team, branding etc
• Opportunity + Gap analysis	Confirm existing information on hazards, values, vulnerability etc - identify gaps, opportunities

<ul style="list-style-type: none"> <li>Develop detailed work programme</li> </ul>	Identify tasks, timeframes, deliverables
<ul style="list-style-type: none"> <li>Develop Comms + Engagement Plan (CEP)</li> </ul>	Stakeholder mapping, approach, engagement methods, timing, responsibilities
<ul style="list-style-type: none"> <li>Output reporting</li> </ul>	Produce scoping report + CEP

### Methodology

The deliverables identified above come from the Coastal Adaptation Te Taitokerau Costing Methodology Report. NRC contracted CMC and Traverse Environmental to draft this report to scope and cost the adaptive pathways planning programme for Long Term Plan budgeting. The deliverables are for Step 1 – Context and Preparation under an internally resourced model, where council staff primarily lead the project.

KDC has identified some potential consultants who have strong relationships with the Ruawai community and / or have existing relationships with Council and who have previously provided high quality project management and planning support work. KDC is currently scoping potential support with these consultants based on the deliverables identified above.

KDC staff will confirm external support and finalise a contract by mid-January. Consultant work will begin February 2022. Step 1: Context and Preparation deliverables identified above are due to be complete by March 2022.

Risks	Opportunities
<ul style="list-style-type: none"> <li>Project timeframes are not met due to external service procurement delay over the holiday period.</li> </ul>	<ul style="list-style-type: none"> <li>To align adaptive pathways project management across all three District Councils.</li> <li>Agree on external service standards and requirements and/or create a 'shared services' agreement.</li> </ul>

### Attachments/Ngā tapirihanga

Attachment 1: Coastal Adaptation Programme and Community Adaptation Profiles [↓](#) 



# Coastal adaptation programme

## Coastal community adaptation profiles

Te Taitokerau Climate Adaptation Strategy

**Date:** September 2021 – Draft v01

**Authors:** Matt de Boer, Jan van der Vliet

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# Introduction

## Te Taitokerau Climate Adaptation strategy and the regional context

This report is the third in a series of technical chapters contributing to the Te Taitokerau Climate Adaptation Strategy (the Strategy). In the previous chapter 'Climate risk overview', the risks posed by coastal hazards were identified as a key gap in council responses to date, presenting an opportunity to develop community adaptation responses to the projected impacts of climate change.

A priority action recommended in the Strategy is the *Coastal adaptation programme*, a 10-year programme of adaptation planning with coastal communities across the region. The *Coastal adaptation profiles* technical report help develop this future adaptation planning work program by describing the range of coastal risks, and community needs and opportunities in different coastal community across the region. The intent of the report is to provide data on the different levels of risk projected for different communities, guidance on appropriate adaptation planning approaches that might be appropriate for different communities, and community attributes to consider when planning adaptation engagement.

## What are coastal adaptation profiles?

The aim of the profiles is to assist councils in deciding who, how, and when:

- Who – which are the communities with the highest risks from coastal hazards?
- How - what kind of adaptation engagement approach is appropriate for different coastal communities?
- When - what is the most appropriate timeframe for adaptation engagement?

Part one of the report presents a GIS analysis of coastal hazard assessments and other spatial data to describe the potential for coastal risks at a selected number of coastal sites under different climate change scenarios.

Part two of the report suggests a process that councils can use to define appropriate engagement approaches and timeframes using information drawn from existing documents and local knowledge.

## Part One. First pass exposure assessment

A 'first-pass risk assessment' approach<sup>1</sup> is used to develop an overview of the coastal risks likely to affect discrete communities over a 100-year timeframe. It draws on data made up of several spatial hazard layers and a limited number of 'exposure indicators'. Exposure indicators include elements like building footprints, marae, roads and community buildings. This provides a preliminary quantitative dataset to understand at a high level the kind of exposure faced by each community. It

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<sup>1</sup> MfE (2017) Coastal Hazards and Climate Change: a guide for local government

is not intended to be a comprehensive analysis or risk assessment – this will happen at a detailed local level during the adaptive pathways planning process. We acknowledge that some values (like ecological significance) will not be captured here; this is because the existing datasets were not sufficient to provide meaningful analysis.

## What did we do?

Northland Regional Council staff undertook a visual assessment of the entire Northland coastline, using recently developed coastal hazard maps, and identified a preliminary list of 58 sites. A spatial analysis of exposure to hazards was undertaken by consultants, with the results delivered as GIS spatial data and tables. The sites are shown in figures 1-3 below.

This information was used to help guide workshops with district council staff, where community attributes and processes to choose adaptation planning sites were discussed.



**Figure 1. Far North District Council sites**

Whangaruru North/Tuparehuia	Rangiputa
Russell/Long Beach	Kaimaumu
Opuā	Awanui
Paihia/Waitangi/Haruru	Ahipara
Te Tii	Owhata/Herekino
Taronui Bay	Mitimiti
Matauri Bay	Whangape harbour
Te Ngāire	Panguru
Tauranga Bay	Motukaraka
Totara North	Kohukohu
Taupo Bay	Whirinaki
Taemaro	Omanaia
Hihi	Horeke/Maraeroa
Coopers beach/Cable bay	Pakanae
Taipa	Opononi/Omapere
Tokerau/Whatuwhiwhi	Rawhiti



Figure 2. Whangarei district sites

- |                     |                         |
|---------------------|-------------------------|
| Whangarei           | Pataua                  |
| Takahiwai           | Outer Whangarei harbour |
| Marsden             | Ngunguru                |
| Ruakaka             | Tutukaka                |
| Waipu               | Matapouri               |
| Waipu cove          | Wooleys/Sandy Bay       |
| Langs Beach         | Whananaki               |
| Waikaraka/Tamaterau | Helena Bay              |
| Taiharuru           | Whangaruru South/Oakura |



Figure 3. Kaipara District Sites

Raupo/Ruawai  
Dargaville  
Bayley's beach  
Awakino Pt

Turiwiri/Mititai  
Wairoa west bank  
Mangawhai  
Omamari

## Methodology

### Hazard Layers

We used a subset of existing spatial hazard layers, developed in recent years by consultants for NRC. The data represents the best coastal hazard information currently available for Northland and is publicly available via NRC's website.

We grouped the hazards into two types: periodic inundation events (coastal flooding) and permanent loss of land (coastal erosion and permanent tidal inundation).

Different scenarios were used to illustrate changing risk over time. For periodic inundation events, present day, 60-year (2080) and 110-year (2130) timeframes were used. For permanent loss of land, 60- and 110-year timeframes were used.

The sources of hazard data are shown below in table 1.

Hazard type	Hazard name	Data layer name	Hazard definition
Periodic inundation events	Coastal flooding present day	CFHZ0	Coastal flooding 1% AEP event, no SLR
	Coastal flooding 2080	CFHZ1	Coastal flooding 2% AEP event, +0.6m SLR
	Coastal flooding 2130	CFHZ2	Coastal flooding 1% AEP event, +1.2m SLR
Permanent loss of land	Coastal erosion 2080	CEHZ1	Coastal erosion 66% probability in 2080, includes 0.6m SLR
	Coastal erosion 2130	CEHZ2	Coastal erosion 5% probability in 2130, includes 1.2m SLR
	Permanent tidal inundation 2080	MHWS2080	Mean high water springs 10, +0.6m SLR
	Permanent tidal inundation 2130	MHWS2130	Mean high water springs 10, +1.2m SLR

Table 1. Hazard data

## Exposure indicators

Seven GIS spatial data layers representing community values potentially affected by hazards were selected from a range of 52 available layers recently gathered from councils. These were selected to give a high-level indication of the extent of exposure to different hazard scenarios, to be used for comparative purposes only. The exposure analysis is not designed to be used as an indication of risk for individual sites - more detailed analysis will be required at the local level to inform local risks and vulnerabilities. The sources of GIS data used are listed below, with more detail on specific layers used in Appendix A.

Value domain name	Exposure indicator name
Property	Building footprint
	Land area
Council assets	Road
	3 waters network
Community	Community facilities
	Māori freehold land
Māori	Marae and surrounds

Table 2. Value domains and exposure indicators

## What did we find?

The assessment provided a large amount of data that will help councils understand the spread of risks due to coastal hazards under climate change scenarios and assist in developing a programme of targeted adaptation planning.

Examples of the data outputs are shown below for one site and district (for brevity we do not include the complete dataset in this report). The data includes tables of exposure counts for each individual site (see Table 3), as well as graphs showing the relative distribution of risks for each district across different hazard scenarios (see Figure 4).

Note that this assessment is an exposure count only and does not provide an indication of potential consequences, loss or damage. It is intended to be used as a first-pass screening to assist with the selection of sites for more detailed risk assessment.

A preliminary ranking of sites was undertaken by identifying the three sites with highest exposure counts for each value domain per hazard scenario. A summary per district of how many times each site was represented in the top three is presented in table 4. Note that this is presented as an indicative summary only, and further analysis is required.

The complete results of the spatial analysis are presented in three excel file attachments (also presented in Appendix C as NRC SharePoint file links):

- Coastal exposure assessment \_FNDC\_20210624
- Coastal exposure assessment \_WDC\_20210624
- Coastal exposure assessment \_KDC\_20210624



<b>Dargaville, Kaipara district</b>							
<i>Periodic inundation</i>							
<b>Coastal flooding</b>	depth	Community facilities (no.)	Maori land (m2)	Marae 100m buffer (m2)	Buildings (no.)	3 waters pipes (m)	Roads (m)
<b>Present day</b>	0.15 - 0.3m	0	1032	920	48	8925	1789
	0.3 - 1.0m	0	644	4331	22	7749	790
	1.0 +	0	0	717	2	1924	161
	<b>Total</b>	<b>0</b>	<b>1675</b>	<b>5969</b>	<b>72</b>	<b>18597</b>	<b>2740</b>
<b>2080</b>	0.15 - 0.3m	0	8043	1111	92	8828	2602
	0.3 - 1.0m	0	2361	3243	86	12802	2480
	1.0 +	0	681	2515	5	9027	569
	<b>Total</b>	<b>0</b>	<b>11085</b>	<b>6869</b>	<b>183</b>	<b>30658</b>	<b>5651</b>
<b>2130</b>	0.15 - 0.3m	0	4176	6731	105	6025	3321
	0.3 - 1.0m	0	19595	4401	643	45561	11038
	1.0 +	0	2121	5249	91	19510	2525
	<b>Total</b>	<b>0</b>	<b>25891</b>	<b>16380</b>	<b>839</b>	<b>71096</b>	<b>16884</b>
<i>Permanent loss of land</i>							
<b>Costal erosion</b>	probability	Community facilities (no.)	Maori land (m2)	Marae (no.)	Buildings (no.)	3 waters pipes (m)	Roads (m)
<b>2080</b>	66%	N/A	N/A	N/A	N/A	N/A	N/A
<b>2130</b>	5%	N/A	N/A	N/A	N/A	N/A	N/A
<b>Permanent tidal inundation</b>	sea level rise (above mean high water)	Community facilities (no.)	Maori land (m2)	Marae (no.)	Buildings (no.)	3 waters pipes (m)	Roads (m)
<b>2080</b>	0.6m	<b>0</b>	<b>1418</b>	<b>5241</b>	<b>39</b>	<b>11302</b>	<b>1168</b>
<b>2130</b>	1.2m	<b>0</b>	<b>13197</b>	<b>6183</b>	<b>198</b>	<b>31748</b>	<b>5142</b>

Table 3. Example exposure data table for Dargaville, Kaipara.

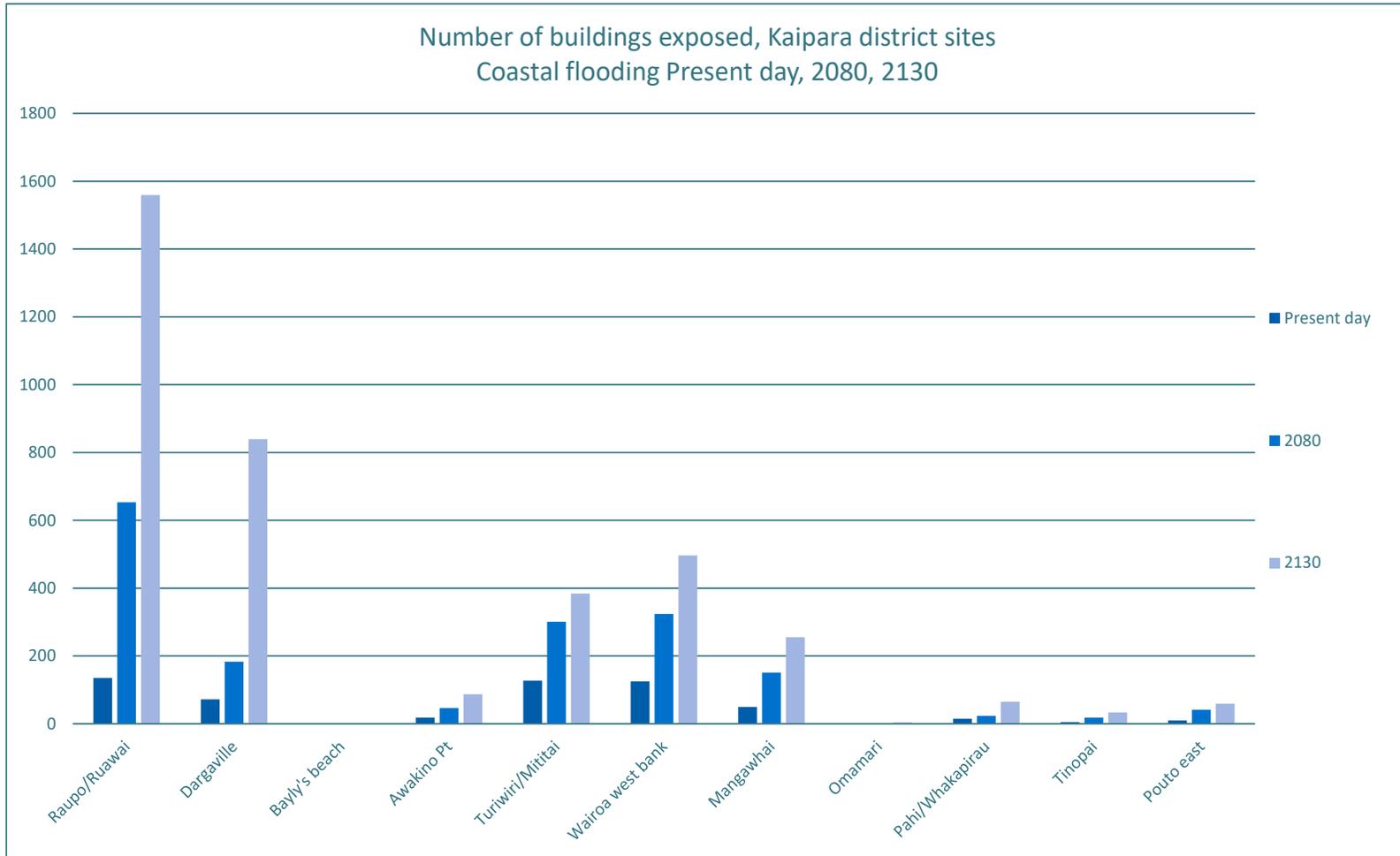


Figure 4. Example exposure comparison graph: Number of buildings exposed in Kaipara district sites to coastal flooding (Present day, 2080, 2130)

Kaipara district		Far North District		Whangarei District	
Site name	count	Site name	count	Site name	count
Raupo	12	Awanui	10	Whangarei	8
Wairoa west	5	Paihia	7	Pataua	8
Turiwiri	5	Tokerau	5	Ngunguru	7
Dargaville	5	Panguru	4	Marsden	6
Mangawhai	5	Whangape	4	Whangaruru	6
Pahi	5	Ahipara	4	Takahiwai	4
Baylys	3	Horeke	2	Outer Whangarei harbour	3
Pouto east	2	Whangaruru	2	Whananaki	2
Wairoa west	1	Russell	1	Waipu	2
Tinopai	1	Motukaraka	1	Wooleys	1
		Omanaia	1	Langs	1
		Whangape	1	Langs	1
		Opononi	1	Taiharuru	1
		Kaimaumau	1	Tutukaka	1
		Matauri	1		
		Paihia	1		
		Taipa	1		
		Kohokohu	1		

Table 4. Count of sites registered in the highest three exposure counts for all value domains and all hazard scenarios.



## Part two. Choosing an adaptation engagement process

Different communities will have different needs for adaptation planning. When developing adaptation planning programs, councils will need to identify appropriate engagement approaches that work best for their communities. The *Adaptation engagement framework* report helps outline the governance structures and project management requirements of different scales of adaptation engagement.

Data representing different community attributes can help indicate which appropriate approaches to adaptation planning for communities. Alongside the exposure indicator data explored in the previous section, community attribute data can also help identify appropriate timeframes for engagement.

Community attribute data is largely qualitative and can be drawn from a wide range of sources including council staff workshops, hapū representatives, census statistics and civil defence. Details of possible data sources are presented in Appendix B. This report does not collate or report on community attribute data. Following feedback from workshops with district councils in early 2021, the report suggests a process that could be used. The following presents a possible process for council staff to follow when considering locations and timeframes for adaptation planning.

### Adaptation engagement approaches

The *Adaptation engagement framework* report describes four different engagement approaches, summarised below:

Engagement approach	Description	Cost	Management	Timeframe
Community-led	Community-directed adaptation planning. Support from councils (e.g. hazards data, facilitation, funding opportunities etc), but process is led by community and documented via IHEMPs, CDEM plans etc.	\$	minimal	flexible
Small-scale/low complexity	Council-led process using facilitated community panels (1 or 2) and adaptive pathways decision-making framework. Limited requirement for complex engineering investigations or feasibility studies etc. Plan adopted by council.	\$\$	low	2-3 years
Combined locations	As for small-scale/low complexity but combining multiple adjacent sites into one larger project with multiple community panels.	\$\$\$\$*	Moderate*	2-3 years*
Large-scale/high complexity	Council-led process using multiple facilitated community panels and adaptive pathways decision-making framework. Requirement for complex engineering investigations and feasibility studies etc. Plan adopted by council.	\$\$\$\$\$	high	3-6 years

\*depends on scale of project

Characteristics of different communities can help determine which of these approaches is appropriate for different locations. These may include:

**Community-led adaptation planning project**

- Small population
- Relatively low number of interested parties
- Strong desire for self-determination
- Tangata whenua or community groups may have strong ownership over planning process
- Evidence of existing adaptation planning and/or community resilience plans
- Relatively few council assets exposed to hazards

**Small-scale adaptation planning project**

- Small population
- Relatively low complexity of interested parties
- Small number of council assets exposed
- Some exposure of private and public assets
- Little interaction with other sites

**Combined adaptation planning project**

- As per small-scale needs, but with enough connectivity to join into a larger combined project

**Large-scale adaptation planning project**

- Large population
- Many different groups within (and outside) the location affected
- High potential for conflicting views within the community
- High complexity with many different values affected (e.g. natural values, amenity, property, infrastructure)
- Significant exposure of private and public assets including lifelines infrastructure
- Large potential impact on local economy

## Assessing adaptation engagement approaches using community attributes

We have identified community attributes that may be useful when defining an appropriate adaptation response for different communities. Attributes may include:

**Scale**

- Size, type of settlement (urban vs rural)
- Natural heritage values at risk
- Population
- Number of dwellings
- Public assets and infrastructure
- Importance to local economy (e.g. food production)

**Connectivity**

- Proximity to other communities, especially where part of contiguous coastal geomorphology

**Cultural**

- Presence of strong cultural sense of autonomy, or cultural heritage values
  - Strong desire for rangitiratanga, or community self-determination
- Complexity**
- Number of interested or affected parties
  - Diversity of risks/impacts
  - Diversity of values affected
  - Regionally significant infrastructure or economic values affected
  - Exposure of planning zones allowing development
  - Treaty claims
  - Obvious conflicting values

Appendix B contains a list of potential data sources to use for defining community attributes.

## Appropriate timeframes for adaptation engagement

Regardless of the engagement approach used, some communities are likely to require, or be ready for, adaptation planning sooner than others. While ultimately all at-risk coastal communities will need to plan for climate change adaptation at some point, councils need to schedule adaptation planning programmes in line with available budgets and community expectations.

Consideration of projected hazard exposure and community readiness will help councils understand the urgency for adaptation planning for different communities. We also acknowledge that there are existing interactions with communities, such as ongoing conflict or legal issues that need to be taken into account that may also influence timing.

Considerations for setting engagement timeframes may include:

### Exposure

- Overall risk severity (at multiple timescales)
- High immediate and/or short-term risk
- Impacts on long-lived infrastructure
- High potential for ad-hoc responses resulting in lock-in
- High potential impact on development/redevelopment

### Community readiness

- Evidence of community readiness and engagement with issues
- Evidence of dissatisfaction - opportunity to defuse issue.
- Existing or future spatial plans
- Existing plans for infrastructure investment that may require adaptation planning input

### Relationship building required

- Existing tension between community and council
- Existing issues with community engagement processes that may complicate adaptation planning

## Adaptation needs assessment

The data from the hazard exposure assessment and community attributes can be combined using expert judgement using the following processes to give direction to site selection and timing for adaptation engagement.

Adaptation needs	Community attributes
Engagement approach	Scale
	Connectivity
	Cultural
	Complexity
Engagement timeframe	Exposure (now, 50, 100yrs)
	Community readiness
	Community conflict

Rankings for exposure and community attributes help point to appropriate engagement approaches and timeframes for adaptation planning. The below tables summarise the recommended approach to choosing engagement approaches and timeframes.

#### Engagement approach

Engagement approach	Scale	Complexity	Connectivity	Cultural
Community-led	Small	Low		High
Small community	Small	High	Low	
Combined locations	Small	High	High	
Large community	Large	High		

#### Timeframe

Timeframe	Exposure current day	Exposure 50yr	Exposure 100yr	Community readiness	Prioritise relationship building
Immediate	Extreme/high	Extreme/high	Extreme	High	
Short term	high	Extreme/high	Extreme	High	
Medium term		high	Extreme/high		
Long-term			high		
On hold				Very low	High

# Appendix A

## First pass exposure assessment data

### Exposure indicators

Value domain name	Exposure indicator name	Unit	Contributing data layer names	Changes to layers
Property	Building footprint	count	NRC LINZ BUILDING FOOTPRINT CENTROIDS (Freq)	N/A
	Land area	m2	N/A	N/A
Council assets	Road	m	NTA KDC ROADS (m)	grouped into one layer
			NTA WDC ROADS (m)	grouped into one layer
			STATE HIGHWAYS (m)	grouped into one layer
			NTA FNDC ROADS (m)	grouped into one layer
	3 waters network	m	KDC WASTEWATER LINES (m)	grouped into one layer
			FNDC WATER SERVICES (m)	grouped into one layer
			WDC STORMWATER LINES (m)	grouped into one layer
			WDC WATER LINES (m)	grouped into one layer
			WDC WATER SERVICES (m)	grouped into one layer
			KDC STORMWATER LINES (m)	grouped into one layer
Community	Community facilities	count	NORTHLAND SCHOOLS (Freq)	grouped into one layer
			WDC LIBRARIES (Freq)	grouped into one layer
			WDC MUSEUMS (Freq)	grouped into one layer
			FNDC CEMETERIES (Freq)	grouped into one layer
			NORTHLAND HOSPITALS (Freq)	grouped into one layer
			CIVIL DEFENCE COMMUNITY CENTRES (Freq)	grouped into one layer
			WDC CEMETERIES (Freq)	grouped into one layer
			NORTHLAND MEDICAL CENTRES (Freq)	grouped into one layer
WDC COUNCIL OFFICES (Freq)	grouped into one layer			
Māori	Māori freehold land	m2	MAORI FREEHOLD LAND (m2)	N/A
	Marae and surrounds	count	MARAE LOCATIONS (Freq)	buffer of 100m applied

# Appendix B

## Community attribute data

During workshops with district council staff, we discussed sources of information to help describe community characteristics that would assist staff to develop adaptation engagement programmes. We grouped information into two main groups: place and people. These sources of data are not prescriptive but can be used by council staff to start conversations about ‘how and when’, develop adaptation needs descriptions in community profiles or simply inform site ranking.

### Community attributes - place

Attribute type	Attribute name	Details	Data source	Data type	Measures affected
Hazards	Access	Road access outside community area	GIS data	Visual assessment, description	Exposure
	Historic event evidence	Any evidence of coastal or river hazards; other stressors (e.g. water supply)	NIWA, council reports, local knowledge	Reports, media, description	Exposure
Location/ Township	Size	Area, Population, total building count	Stats NZ, LINZ	Counts	Scale
	Urban/rural/other	Type of settlement	GIS data, Council staff knowledge	Description	Scale
	Connectivity	Proximity to other settlements/ potential to combine with other sites	GIS data, Council staff knowledge	Description	Connectivity
Cultural	Maori cultural heritage	Marae, urupa, waitapu, Māori freehold or other land ownership	GIS data, hapū knowledge	Count, description	Cultural
Environmental	Significant natural character	Natural values, aesthetics and amenity, and its meaning to locals and visitors	local knowledge	Description	Scale Complexity
	Natural heritage	Significant ecological, habitat or biodiversity values	GIS data, Council staff knowledge	Count, description	Scale Complexity
Council assets and planning	District infrastructure	Existing council assets - e.g. Roads, 3 waters, reserves, boat ramps etc	GIS data, Council staff knowledge	Count Description	Complexity
	Infrastructure plans and budgets	Long term plan, Infrastructure strategy details	Council staff knowledge	Description	Complexity
	Community plans	Structure plans, spatial plans, community engagement (existing or planned)	Council staff knowledge	Description	Community readiness
	Development	Future development, undeveloped land potential	District plans, growth strategies; council staff knowledge	Description	Complexity

Table 3. ‘Place’ Community attributes data types and sources

**Community attributes -people**

Attribute type	Attribute name	Details	Data source	Data type	Measures affected
Sensitivity	Social statistics	Age, health, population trends	StatsNZ	Description, statistics	Complexity
	Permanent vs transient residents	Evidence of holiday home population dynamics	StatsNZ	Description, statistics	Complexity
	Interested parties	Number of key interested parties, hapu/iwi, stakeholder groups, businesses etc	Local knowledge	Description	Complexity
Adaptive capacity	Community readiness	Existing adaptation momentum, willingness to engage; Engagement fatigue	local knowledge	Description	Community readiness
	Conflict	Community dissatisfaction or activism, history of conflict with councils	local knowledge	Description	Conflict
Resilience	CDEM planning and engagement	Existence of formal CDEM plans, previous engagement with CDEM	CDEM team	Description, reports	Community readiness
	Maori community	Strong community networks, sense of autonomy and resilience. May be informal, expressed through coordinated civil defence response actions or IHEMPs	local knowledge	Description	Cultural
	Local economy	Potential impact on local economy of food production; QV land use database, local knowledge	local knowledge	Description, statistics	Complexity

Table 4. 'People' Community attributes data types and sources

# Appendix C

## Attachments (NRC file links)

### Consultant GIS methodology reports:

#### Climate change risk assessment Python Toolbox overview

[https://northlandregionalcouncil.sharepoint.com/:b/s/dmHazardManagement/ETI3XsTwKT5Bpa4-F0MHLSEB4\\_ITOV3z\\_SBKBD2q-yaqaw?e=ImuKlr](https://northlandregionalcouncil.sharepoint.com/:b/s/dmHazardManagement/ETI3XsTwKT5Bpa4-F0MHLSEB4_ITOV3z_SBKBD2q-yaqaw?e=ImuKlr)

#### Community Area Climate Change Risk Assessment

<https://northlandregionalcouncil.sharepoint.com/:b/s/dmHazardManagement/EfeZQZS1QllKufg5BqzAfvEBnRj6WrKa6aYrNU7Gdgsnvw?e=BtXPTH>

### Site exposure assessment data:

#### KDC

<https://northlandregionalcouncil.sharepoint.com/:x/s/dmHazardManagement/EcmOlqBABlxGgCiyw-nheZsBrCko2V2EPt8NdweM6ZjRkg?e=ab56dz>

#### FNDC

[https://northlandregionalcouncil.sharepoint.com/:x/s/dmHazardManagement/EYKTzQejR0VGnXBlMo\\_7mNMB0I32HfRcEhJJLeBTnDUHXg?e=aan93d](https://northlandregionalcouncil.sharepoint.com/:x/s/dmHazardManagement/EYKTzQejR0VGnXBlMo_7mNMB0I32HfRcEhJJLeBTnDUHXg?e=aan93d)

#### WDC

<https://northlandregionalcouncil.sharepoint.com/:x/s/dmHazardManagement/EXMRbazR2m1Gi5s-z5CRDYkB0G421rcjvwo7OsvLVMmsGA?e=dTSeP6>

### GIS model files

W:\ArcGIS Pro\Environmental Services\Rivers and Natural Hazards\Natural Hazards\Data\Climate risk analysis

**Northland Regional Council**

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**TITLE:** **New vessel update**

**From:** Victoria Harwood, Pou Tiaki Hapori - GM Community Resilience

**Authorised by** Victoria Harwood, Pou Tiaki Hapori - GM Community Resilience, on 11  
**Group Manager/s:** February 2022

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### **Whakarāpopototanga / Executive summary**

This report outlines the recent developments in the replacement of the NRC Maritime Vessel Waikare including investigations into design which contribute to the reduction of NRC emissions.

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### **Ngā mahi tūtohutia / Recommended actions**

1. Investigations into costs and inclusion of design elements which reduce emissions are undertaken
  2. Emission reducing design features are included in the boat where possible
- 

### **Background/Tuhinga**

One of the 'Reduction of Emissions' projects from councils Ngā Taumata o Te Moana Implementation Strategy is to investigate options for improving the efficiency of NRC vessels and the transition of vessels to high-performance hulls and electric / hybrid engines to reduce overall council emissions.

The NRC Harbourmaster has investigated options and compared them against the requirements of council workboats. The requirements of the workboat duties cannot be met sufficiently for safe working practices and to carry out maritime tasks on the water with current available technology, which is not yet developed sufficiently or reliable enough.

The council maritime workboat the Waikare is due for replacement. The tender was recently awarded to CIRCA based in Whangarei. Discussions on the boat design are underway, with options including:

- To purchase main engines with a higher International Maritime Organisation (IMO) Tier rating than the new Maritime NZ rule requirement and would result in lower emissions, (IMO set the standards for vessels).
- Invest in hull form optimisation, this could lead to overall fuel savings.

These options are being investigated further and the associated costs as part of the design phase. The new vessel may have a working life with council for 10 years instead of 15 years so newer greener technology can be invested in sooner as it further develops.

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### **Ngā tapirihanga / Attachments**

Nil

**TITLE:** EV - Bus update

**From:** Victoria Harwood, Pou Tiaki Hapori - GM Community Resilience

**Authorised by** Victoria Harwood, Pou Tiaki Hapori - GM Community Resilience, on 11  
**Group Manager/s:** February 2022

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### Whakarāpopototanga / Executive summary

This update outlines the developments of other regions moving to electric buses and a basic overview of potential future options for council.

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### Ngā mahi tūtohutia / Recommended actions

1. The Transport Manager took a similar update to council workshop on 16 February for support.
  2. The Zero Carbon Transition Advisor will bring future updates as developments progress.
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### Background/Tuhinga

One of the `Emissions reduction` projects in the Ngā Taumata o Te Moana Implementation Plan is, Investigating options for improvements in bus fleet efficiency and delivery modes; developing an options analysis, business cases and timelines for transitioning buses to e-buses in alignment with emissions targets.

This project will progress over time as technology, availability of resources and funding sources become clearer. In the meantime, the council Transport Manager, based at the Northland Transportation Alliance (NTA) responsible for public transport in Northland, is part of the national Transport Special Interest Group (SIG) and keeps up to date with developments in other cities in New Zealand of e-buses and other technologies.

Auckland have ordered 150 EV buses to date and require 700 to cover peak services, they currently have 33 EV buses in use. Wellington have started to order EV buses and require approximately 380 buses to cover peak services. In Christchurch, Environment Canterbury have awarded new bus contracts in 2020 with the goal of 40% of their bus fleet EV or low emissions by 2023.

The availability and supply of EV buses to NZ will be under pressure from larger cities already placing orders. There are also national funding assistance issues, funding support has been requested through central government funding, but any support is yet to be confirmed. Waka Kotahi have advised that due to COVID-19, future funding assistance will be difficult to obtain. This statement is making it uncertain how this aligns with the governments emissions targets.

There are no current plans to replace public transport buses in Northland to environmentally friendly buses at this stage as contracts with current bus service contractors do not expire until 2027, but there is provision in the current bus contracts for the council to trial EV buses on the CityLink services.

In Whangarei, Ritchies buses (who currently have the contract for CityLink) have sold to KKR and Co. Inc. (from the USA) who are interested in environmentally friendly buses. Europe and the USA are looking at electric and / or hydrogen for larger vehicles such as buses and trucks and the investigations and developments are being shared internationally.

Current annual cost to council for one bus is just under \$50k. An EV bus would add a further \$99k on top per bus per year. The total cost of running one EV bus per year is currently \$147,500.00.

Further developments in technology including hydrogen options, which dont require the same level of infrastructure to support the buses, will be an option considered during this process. As information, availability and known costs progress, planning will continue on business cases for long-term plan processes closer to the expiry of the current Northland bus contracts.

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**Ngā tapirihanga / Attachments**

Nil