



# Pūhau ana te rā: Tailwinds

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Title: Community development and public transport - A just transition for Students at Otago University

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## Abstract

When discussing sustainability, the first thing that might come to mind is environmental sustainability. However, a truly sustainable community is active in social and environmental sustainability. To enable social sustainability, having a reliable transport system is fundamental, especially accessible public transport. However, in Dunedin, there is a significant demographic gap in taking public transportation. According to the 2022 student travel survey, 50.1% of Otago University students own a Bus Card; however, 84.2% of students have never taken a bus. This report aims to delve into the transportation needs of Otago University students via the use of persona archetypes and evaluate the current transportation system with student needs and concerns. Through the use of personas and running them through the Dunedin Bus system, there is an argument that the current public transport system is not accessible to university students and thus needs a revamp to enable social sustainability within the university student population. University-run shuttles influenced by Penn State and the University of North Dakota and creating a student-friendly bus environment are some proposed changes needed to allow student engagement in the Dunedin community.

# 1. Introduction

When we think of sustainability, one might think of environmental sustainability. However, true sustainability means fulfilling the needs of the current generation without compromising the needs of future generations; this means ensuring a balance between economic growth, environmental care, and social well-being. Based on this definition, community development fits comfortably under the sustainability umbrella. Jim Cavaye gave the most comprehensive definition of community development that shows this 'community development means that a community itself engages in a process aimed at improving the social, economic and environmental situation of the community (Cavaye, 2015).' However, this is far from a new concept, with 'sustainable livelihood' being the critical topic of conversation at the 1992 agenda 21 Rio de Janeiro United Nations conference (Meakin & Canada. Library of Parliament. Research Branch, 1992, p. 23-28). Sustainable livelihood refers to meeting the needs of individuals, communities and the environment. Charles Perrings, who reviewed the conference agenda for his 1995 journal article, 'Sustainable livelihoods and environmentally sound technology', explains that this would look like everyone within society can earn a living. Meaning poverty, hunger, and the inequitable distribution of income and human resource development would be addressed by governments (Perrings, 1995, pp. 305-306). Environmental sustainability is the priority to limit further degradation, while social sustainability provides the capacity for people to feed, clothe and house themselves; combining both creates a sustainable livelihood. I argue that the best way to promote a sustainable livelihood is via encouraging and making community development accessible to the majority. John Bryden used a Canadian seminar on sustainable rural communities to conceptualise every individual community as a social system. Here he states that a sustainable community is one with the long-term capacity to regenerate itself. This means being able to be sustainable both economically and socially in a way that allows for evolution in the economic, social, cultural and ecological spheres (Bryden, Leblanc, Teal, University of Guelph. University School of Rural Planning and Development, & Trust, 1994, p. 40-50). Community development allows for this by nurturing development for innovative solutions to integral problems within the community that may go unseen by those not living and breathing them daily. In short, communities can use self-developments, whether via entrepreneurship,

community councils or groups, to leverage power to help address economic, environmental and social challenges present in their lives (Lyons, 2017, pp. 458-459).

## **2. Doughnut Economics**

Doughnut economics is a theory that acknowledges this concept of sustainable livelihood by putting our needs in a graph demonstrating our shortfalls and overshoots as a society. This method of economics addresses the needs of the 21st century by acknowledging our social and planetary boundaries.

The center hole is the extent to which people fall short of the United Nations' social priorities identified in the 2015 Sustainable Development Goals. The outer ring represents the environmental systems we need to sustain healthy human life. Between these boundaries lies the ideal area where humanity can meet our social and planetary needs (Raworth, 2017, p. 217). While this method can easily be applied to New Zealand, the best methods are the ones created for New Zealand with our mana, our tino rangatiratanga and our kaitiakitanga in mind. After all, there is no better expert than those who are living it.

## **3. The Oranga Iho Nui**

The Oranga Iho Nui model is an indigenous version of doughnut economics. It was co-created by Juhi Shareef and Teina Boasa-Dean by revisioning Raworth's original model. The original shape of the model was changed to a spiral. This is because, in Māori culture, circles represent wellness; and thus they are never closed. Instead, the circle is opened into a spiral that goes inwards. As energy spirals down and loops back in a repetitive motion; the energy repeats and gets more potent. The doughnut concepts are also flipped, with the environment being in the internal section and social being in the outer. In Maoridom, the environment is of high importance. In the MoonShot podcast, Teina Boasa-Dean explains that Papatūānuku and Ranginui are at the center of all living things as they are the 'powerhouse' of everything. This means they should be placed in the center of the spiral where the energy is most potent. Doing this allows them to regain lost energy and revive themselves after the dramatic loss of natural resources and environmental damage we are currently in (Episode 2 - Teina Boasa-Dean and a Māori interpretation of Kate Raworth's Doughnut Economics, 2020). The best way

to explain the reason for the flip of the social and environmental concepts is by using Boasa-Dean's own words-

*'At that particular point in time, when things were in more of a balance, of course, people could celebrate their behavior in relationship with the environment. Today, indigenous communities increasingly recognise that this is not the case, and having to position the earth mother and sky father at the center of a diagram like this, makes things overt and explicit (Shareef, 2020).'*

## 4. Just Transitions

We must acknowledge a key fact in social sustainability. Those communities that most need support often need more human or physical resources to facilitate community development. One of the best ways to make community development initiatives accessible is by ensuring transportation is obtainable for the majority while keeping New Zealand's net zero targets in mind. To achieve this, we must implement a just transition. What exactly is a just transition? According to Ann Eisenberg, a just transition involves achieving emission targets while ensuring that the impacts from the transitions are not disproportionately felt by vulnerable groups - to achieve this, she recognises two key points.

1. For a transition to be just to a low-emissions future, it needs to be fair to the most vulnerable populations, including low-socioeconomic, minority and rural communities.
2. The protection of workers and communities that depend on high-emission industries against the brunt of costs transitioning to a low-emissions future (Eisenberg, 2018, pp. 280-289).

The concept of a just transition follows the same thought process here in New Zealand's. James Shaw, the Minister of Climate Change since 2017, stated that a transition to a low-emission future needs to be fair and equitable that leaves 'No community, no family and no person behind (Shaw, 2021).'

This means working alongside Iwi, local governments, unions, community organisations and central government to find a solution that uniquely fits New Zealand's needs and concerns, one of them being the transportation sector. New Zealand's Ministry for the Environment released New Zealand's first emissions reduction plan' in May 2022, where they broke down all zero emissions plans for the transport sector. They state that transport is one of New Zealand's most significant greenhouse gas emissions, responsible

for 17% of New Zealand's gross and 39% of total CO<sub>2</sub> emissions. Not only this, but it is also recognised that the current transport system is inequitable - Māori, Pasifika, disabled people, and low-income households. Women, the elderly and those in rural communities are often underserved and overburdened by the present negative impacts such as death, illness and injury from transport crashes and pollution. The goal is that by 2035, New Zealand will have significantly reduced transport-related carbon emissions and have a more accessible and equitable transport system that supports well-being which includes objectives such as -

- Reduce reliance on cars and support people to walk, cycle and use public transport.
- Rapidly adopt low-emissions vehicles.
- Begin work to decarbonise heavy transport and freight (New Zealand. Ministry for the Environment, 2022, p. 167-198).

One of the most clear-cut ways to reach these goals is by encouraging public transportation over private household vehicles. However, this is easier said than done. According to the 2018 census, 57.8% of New Zealanders drove a private car to work, and 11.2% drove company vehicles - comparatively, only 4.2% took the Bus, 2% took a train, 2% cycled, and 5.2% walked to work (Stats NZ, 2018). The numbers reflect a similar narrative when we look at the mode of transportation for those travelling to school, with 11.4% driving and 39.1% being a passenger in a private vehicle (likely from elementary to lower high school aged children). In comparison, 3.6% cycled, 20.5% walked, 9.9% took the school bus, 7.1% took a public bus, and 1.9% took a train to school (Stats NZ, 2018). Why is this the case, however? First, we need to address that private vehicle ownership in New Zealand is very high for our population. In 2013, 92.1% of households owned at least one car, going more in-depth, 37.6% owned one car, 38.4% two cars, and 16.1% three or more cars, with the Nelson-Tasman-Marlborough region having the highest car ownership per capita rate (Ministry Of Transportation, 2020). For many Kiwi's it is more 'convenient' to drive rather than wait around and figure out bus routes. A Norwegian study asked, 'how do relative travel time and other public transport quality factors affect public transport competitiveness relative to the private car on commute journeys?'. This study determined that relative travel time, service frequency, comfort and price are often the top reasons individuals choose private vehicles over public transportation. Travel time tends to be higher, almost double the length, when individuals take public transportation (Lunke, Fearnley, & Aarhaug, 2021, p. 1-2).

Beyond these factors, there is also a clear negative connotation around public transportation in New Zealand. A 2010 report on the attitudes towards the public transportation system in the three major New Zealand cities, Auckland, Wellington and Christchurch, delved into this. This study discovered that the main reason for the preference for private vehicles over public transport is reliability. However, there was significant negative stigma and attitudes around taking public transport, including but not limited to -

- Public transport tends runs late
- Public transport generally being too crowded
- The public transport system reduces people's freedom to change their travel plans
- Hard to relax on public transport
- Owning a reliable car means not having to use public transport
- It is primarily young people who use public transport
- Public transport is only an option if the weather is good
- The only reason to use public transport is if you cannot afford to drive
- People tend to feel embarrassed to tell others that they rely on public transport to travel
- Public transport is only suitable for short trips (Murray, Walton, & Thomas, 2010, p. 925-926).

This article also explains how when a society's individuals' environmental attitudes are high, the lower prejudice is directed towards public transportation. Unfortunately, in 2010 when this was written, there was a general level of apathy regarding individual vehicle emissions. The phrase describes the generalised attitude, "There is no point in making changes to reduce my vehicle emissions because no one else will change their behaviour." (Murray, Walton, & Thomas, 2010, p.927). Knowing these statistics and background information, how can New Zealand ensure a just transport transition to net zero? For this project's scope, I will be focusing on a Dunedin context. More specifically, I am interested in answering how to make a just transition to net zero transportation that still allows Otago University students to be active within their community.

To do this, however, we must acknowledge that there is more than one universal type of student. In a town like Dunedin, where much of the campus is centralised and surrounded by

student accommodation, lovingly referred to as student-vill, a percentage of students can walk or bike within their community bubble. This is only for some students; however, I am creating fundamental archetypes of students at Otago University that require forms of transportation to be active community participants. After examining my experience and pulling data from the 2022 student travel survey, I identified six key groups and created travel personas for each archetype.



# Emma

## The Placement Traveller

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Emma is mid-twenties and has a dramatic change in timetabling between her 'class schedule' and her 'placement schedule.' she lives in Willowbank and commutes every day during the week. Emma walks to campus when she has classes. During the semesters that she has classes on campus, she usually walks; however, her last placement was in St Clair and thus would drive alone. During placement, she finds that her schedule fluctuates. She needs to be at the office by 8:30 on Mondays and Tuesdays and finishes at 5:30. However, for the rest of the week, she starts at 10 am and finishes at 7:30 pm. On Wednesday, she needs to return to campus for an hour at 1 pm for mandatory supervision that she cannot miss. Due to this, she finds driving more convenient and reliable while on placement as she is on a very tight schedule. Her biggest concern about changing transport mode is arriving on time as she has no flexibility in changing her timetable.

### **Key Transport points**

- Willowbank to St Clair
- St Clair to Campus
- Willowbank to Campus





# Zhang

## The International Traveller

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Zhang is in his late twenties and is an international PhD student. He lives at a university flat on Dundas street, very close to the university campus; he prefers walking for convenience and speed. He likes to arrive on campus early (7:45 am) and often leaves around 5 pm. He finds himself commuting every day of the week. His travel patterns usually revolve around travelling within central and North Dunedin, and have the shortest average travel distance of 6km. When he is not travelling to campus, he usually takes the bus to go to social activities. He has stated that he wants to see more of Dunedin outside of the centre to sightsee but is trying to figure out how to do this as he finds the thought of taking multiple buses nervewracking due to English being his second language and not knowing Dunedin well.

### **Key Travel points**

- Dundas to campus
- Campus to the City Centre
- Dundas to the City Centre
- Desire to sightsee Dunedin attractions



# Tāne

## The Social Traveller

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Tāne is in his early twenties and usually walks to and from classes. He lives in a flat on George street but often walks to his friend's house on Great Kings street so they can walk to class together. After classes, he waits around on campus until his girlfriend finishes, where he walks her back to her own flat on Cumberland street. He is unwilling to travel alone as with his busy class schedule, he enjoys the ability to catch up with others in between classes. He is reluctant to change his mode of transport as he is concerned that public transport will not be convenient for him to pick up and drop off others. He will travel approximately 10km in his journey. During weekends he is very social and often spends his Friday and Saturday evenings either in town or at other friends' flats. He does not believe public transport will cater to his very social lifestyle.

### Key travel points

- George Street to Great King Street
- Great King Street to Campus
- Campus to Cumberland street
- Cumberland street to George street



# Rose

## The Post-Grad Traveller

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Rose is in her late 20s, lives on Agnew street, and often walks to classes, stating convenience as the main reason. She travels frequently and often commutes outside her residence at least once daily. She says she is hesitant to take public transport because she has commitments outside her class schedules. She works Fridays and weekends on the main street in hospitality, she does not finish till 10 pm most days where she works. Rose tries to go to the gym (Unipol) every other day. She fears public transport is unreliable for her busy schedule, especially for work where she has a set time to be there and finishes late. However, she did show a willingness to bike to campus. One of her biggest concerns is the price and convenience of travel. She is pretty social, and every so often, she will go to a local cafe to study with friends

### Key travel points

- Agnew to Campus
- Agnew to Octagon
- UniPol



# Sam

## The outside of Student -Vill Traveller

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Sam is a mid-20s student that lives on Selwyn street in North East Vally. She typically drives, stating that speed and convenience are her main reasons for solo car travel. She needs to be on campus from 9 am to 1 pm. From there she works in retail on the main street till 6 pm. As the only flatmate with a car, she is responsible for picking up the groceries and being the first point of transportation for those around her. Due to this she is hesitant to take public transport due to the fear of being seen as unreliable by her flatmates. On average, she commutes six times weekly for academic and social reasons. Sam prefers to study on campus and often has weekly catchups with friends at a Cafe on George street. She states that she is willing to change her route and even mode of travel as long as it is convenient.

### **Key travel points**

- Selwyn to campus
- Selwyn to City Centre
- Campus to City Centre
- Campus to George Street



# Liam

## The Hall of Residence Traveller

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Liam is 18 and is new to Dunedin; initially, he is from the North Island, and this is his first time living apart from his family. He lives at Salmond College on Knox Street. Due to him being new to the city, he needs to learn his way around Dunedin, especially in areas outside of campus. He wants to be more involved in the Dunedin Community and has joined several clubs. He is also very social and wants to spend his weekends exploring the city with his new friends from the hall, meaning he often spends the weekend outside the hall. He is interested in public transport but is a little worried as he does not know Dunedin suburbs and is worried about getting lost when he ventures too far away from campus.

### **Key travel points**

- Knox Street to campus
- Knox Street to City Centre
- Campus to City Centre
- Desire to sightsee around Dunedin

Each person has different needs relating to sticking with a set schedule; however, some key themes run through all five.



- Students are social. They have plans outside of university and often use their transport time as a further way to socialise
- North and central Dunedin are the critical areas of need.
- Accessibility, convenience and frequency to campus is a crucial concern for all.
- Many students stay within the 'student-vill' boundaries due to accessibility. In order to promote student engagement in other areas, transport needs to be simple and convenient.
- Convenience, simplicity, frequency and key concerns
- Many students state walking as their primary mode of transportation, especially around the university campus.
- 50.1% of students own a Bus Card; however, 84.2% of students have never taken a bus

Student community participation is fundamental for social sustainability. While Vincint Tinto published his work in the mid to late 1990's his research is still relevant to today's conversations around community development. University students who have access to accessible on-campus participation, such as reliable transportation methods, have been shown to correlate with better grades and fewer drop-out rates. Tinto also mentions that having an accessible student community increases peer networking opportunities, interaction with professors and engagement in extracurricular activities. These campus social opportunities can enrich learning and build a better, more educated and prepared workforce (Allen & Farber, 2018, p. 175).

Using these personas as guidelines, I identified some key routes these individuals may take; from there, I took these bus routes and evaluated the effectiveness for each individual. My goal in doing this was to have a data set of bus frequency, bus experiences, wait times, bus stop experience and general enjoyment of the trip to see how the current D.C.C 'long term plans' interact with students (Dunedin City Council, 2022). I have focused on four key goals that match the average student's needs. These include goal two, 'a connected city', seven, 'a supportive community', nine, 'a city of learning' and ten, 'an active city'. However, it is important to note that the D.C.C is not the council in charge of the buses; that responsibility is on the O.R.C (Otago Regional Council). Due to this, I will be using both councils' annual reports when discussing the Dunedin bus system.

## 5. A Connected City

What does a connected city look like when looking at the student demographic? A connected City is where all aspects of its infrastructure and different social sectors are interconnected. This would look like people like Sam having just as much access to the University community as someone like Tāne. This would also look like Zhang, who is new to the city feeling comfortable in exploring the further regions of Dunedin like Port Chalmers or Harington Point, with the reassurance that he will easily be able to return home to central Dunedin with little confusion.

Something that I noticed during my evaluation of the bus system is that once you leave central Dunedin, bus stops become less notable and sheltered. There was one point on route 33 where the final stop was unmarked, with no signage saying where we were or when the next bus was. I also found the system inaccessible, especially to those for whom English may be their second language. In the 2018 census, the top six spoken languages in New Zealand (not including English and Te Reo) were - Samoan, Mandarin, Hindi, French, Cantonese and Tagalog (Figure New Zealand, 2018). The most common international students' home countries in the same year were China, Malaysia, the US, India, Vietnam and Indonesia (University of Otago, 2021). The bus timetable website, the schedules at the bus hub and even the bus app only come in English, which I am aware is due to financial reasons. Still, I argue that to have a truly connected city being able to understand what the timetable means is fundamental, especially when Dunedin has such a vibrant and culturally diverse population. There is also not a wide selection of routes advertised as 'university routes', something that I will delve into in more detail in 'A City of Learning'; however, it also relates to this section. How can students be connected to the larger community when the campus, where students spend most of their time, is often treated as an isolated and separate entity from the rest of the city?

## 6. A Supportive Community

A supportive community is usually described as local infrastructure and community attitude being supportive of the growth/development of community developments or groups. One example could be Emma's ability to make it to her placement in a way that makes her feel

safe and comfortable, as her time on placement is not only improving herself, but preparing her to serve the community better. Liam could also travel around the city to make it to his uni club meetings and feel welcomed in a new city. As I mentioned Emma in this section, I used her schedule and compared it to the current Dunedin bus system. Monday to Tuesday, she works from 8:30 to 5:30, while Wednesday to Friday, she works from 10 am to 7:30, with a necessary hour on Wednesdays when she is needed on campus for supervision. With this information, the following bus routes is what she would need to take.

#### Monday – Tuesday

Emma must be at the George Street Bus stop at 7:44, where she will take the Number 8 (St Clair via the City) and arrive at 8:16 am. This would mean Emma would arrive 20 minutes early for her placement as the next possible bus would make her 20 minutes late.

On the return, she would need to be at the bus stop in St Clair by 5:37, meaning she has seven minutes to get from her placement office to the stop. From there, she will take the Number 8 (Normanby via City), where she will arrive at the George Street stop at 6:10 pm.

#### Wednesday – Friday

She would take the same Number 8 bus, but she would catch it at 9:14 am on George Street this time. She would arrive at St Clair at 9:46 am on the return, where she would need to be at St Clair stop at 7:37 pm, where she would catch the Number 8 bus. She will arrive at the George Street stop at 8:10 pm. However, her route gets more complicated on Wednesdays, when she must return to campus for mandatory supervision. Her supervision is between 1 pm and 2 pm, meaning she must be at the bus stop in St Clair to catch the Number 8 at 12:22 pm, where she will arrive on George Street at 12:51 pm, giving her nine minutes to walk to wherever on campus her supervision is. On the return, she must be at the bus stop on George Street by 2:17 pm in order to catch the Number 8 to St Clair. She will be back by 2:47 pm.

As part of this report, I evaluated roughly 15 different bus trips; 50% were on time, there was also a 25% chance the bus would be late by 5-10 minutes and another 25% chance the bus would be early by 2-5 minutes. While 50% is a pretty good efficiency rate, many, including people like Emma, need the reassurance of arriving at a location at a set time.



## 7. A City of Learning

A city of learning is one of the most relevant goals for the student population. In order to do this, there must be a reliable and accessible method of transportation to and from vital academic areas. This would look like a city where all students, no matter their background, had the same resources and accessibility to learn. This means Rose can have the same opportunities as someone who does not have to balance work and study, and Emma can get the most out of her placement without worrying about the cost of travel.

Something to note that is significant, especially in the student demographic, is that there are only two bus routes designated as 'university routes', which are Number 37 and 38, that, on their peak hours, have a bus every 30 minutes. This route goes from Main South Road in Green Island to Forth Street.

The Otago campus is 111 acres, with academic buildings spread across North and Central Dunedin, as seen on the map below. This stop does not cover students who may live further north, such as Māori Hill, nor does it cover areas of campus like the Business School or some of the medical lecture halls. However, when discussing a city of learning, we must consider those in placement degrees. These include social work, teaching, medicine, physiotherapy, and many more. Often during placement periods, the student must travel outside of student-vill and sometimes outside of the central city. These students are often required to have reliable transportation and be able to travel between their place of residence, their placement location and campus with little difficulty. This means that students must always have reliable transportation while they are on placement. The university route only covers a few residential halls, such as Carrington, Salmond and Knox. For example, If Liam wanted to take the bus from his hall, Salmond, to campus, he would not take the university route. Instead, he would need to take Route 10, Opoho to Shiel Hill. This can be confusing for people who are A) not familiar with Dunedin suburbs or B) are students from outside of Dunedin, either international or domestic. A university route should be targeted to and designed around those who majority use the campus - Students.

## 8. An Active Community

There are multiple definitions of what an active community can look like, ranging from literal definitions of active to more abstract ones. Due to this and using the context of the other D.C.C goals, I will define an *active community* as the following. A community that is developed in a way that encourages resident interaction and activity within the city. This means having infrastructure that Liam, who is new to the city, could navigate to attend community events as well as being accessible to those outside of the city center like Sam. The O.R.C has done a few things to encourage bus transport, such as half-price fares till the 31st of March, 2023. This would appeal to people like Liam or Zhang, who desire to explore the city but may need more funds. Orbus also joined OUSA and the sustainability office during the second Lockdown in 2021 to create the 'Breather' initiative, which encouraged students to explore Dunedin beyond their flats and North Dunedin. On the 'Breather' page, they have five videos showing different locations in Dunedin and how to get there with the help of the Dunedin bus system. Unfortunately, the last time this initiative was updated was a year ago, with the videos only getting between 35-119 views (OUSA, 2021). I believe this initiative was a significant step in the right direction but has seemed to have lost traction quickly. Having something like this being more widely advertised and promoted towards individuals like Liam, Zhang and even Tāne. Programs like this would be ideal for those who express desires to explore Dunedin and/or express the importance of being social, which would help encourage student engagement within the Dunedin community and public transportation.

The current Otago bus system needs to meet the student population's needs. When we evaluate the four goals mentioned above, we can see disconnect with students, which is why student bus riding rates are as low as they are. To summarise my findings for each of the four goals, I would say that:

*A Connected City* – the bus system could be more accessible to the Dunedin population, including but not limited to a broader range of languages available for the bus timetable.

*A Supportive Community* – the uncertainty of arrival times, the unlikelihood of bus stops being exactly where one needs them, and bus frequency are huge barriers for students who often have rigorous timetables and schedules.

*A City of Learning* – there is only one bus route labelled as a 'university route', and this route does not cover a significant majority of the campus or residential halls.

*Active Communities* – there has been a significant push in the last five years to make the Dunedin bus system a more viable option for Dunedin residents and their needs. An excellent example of this was the OUSA 'Breather' initiative; however, campaigns that seem to be targeted towards students seem to lose momentum very quickly.

## 9. Proposed Solutions

This leads me to possible solutions. I acknowledge that I will be altruistic and idealistic within this section, especially regarding the cost of these solutions. However, in an ideal world, this is the best solution to make a just transition to net zero transportation that still allows Otago University students to be active within their community.

### **University Shuttles**

When thinking about possible solutions for making the campus more accessible to all students, I started reflecting on the singular 'university route' available. I have mentioned prior how that route does not cover the needs of all students, so I tried to find how other universities overseas may have combated the issue. This led me to learn about the university shuttle system that a few American colleges have implemented—specifically, Penn State and The University of North Dakota (UND).

I chose these two colleges because they have similarities with Otago geographically and in terms of student demographics. Some of the similarities identified are the following -

- Otago is approximately 111 acres with around 21,549 students.
- Penn State is approximately 7680 acres with around 40,000 students.
- UND is approximately 521 Acres with around 14,646 students.
- Otago students arrive on campus around 8 am or 9:30, which fits with UND's 10 am-12 pm average period.
- The average travel distance for Otago students is 7km, with the most common distance being between 0.1 - 2.14 km. UND 40.8% of students travel around 2.4 km.

- It is hard to define what counts as off-campus, so I will be going based on postcode - 9016, which is in North Dunedin. So for simplicity, anything outside of North Dunedin is off campus, so 46.3% of students live off campus, and UND 56.4% live off campus.
- Barriers and valuable characteristics are the same for all universities.
- The reason for travel mode was also similar.

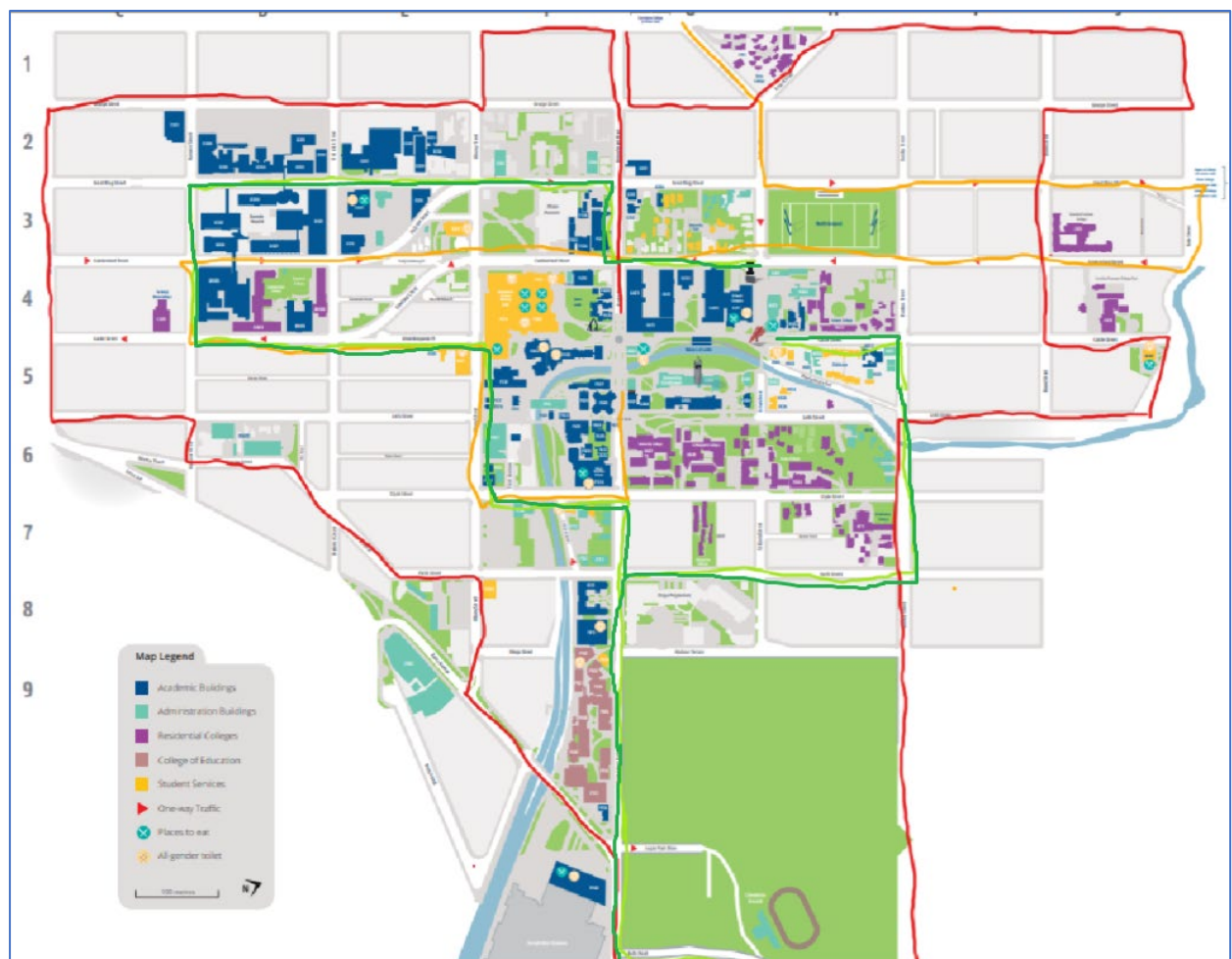
In Shailendra Sinhasane's blog post about the importance of university shuttles, Sinhasane outlined three main goals that a shuttle system should aim for, provide easy accessibility to university buildings, make the campus surroundings more active and livelier, and allow healthy, enjoyable moments on campus. He points out that successful shuttle systems can also help with parking demands/management, allow easier access to multiple university buildings, traffic control/flow around campus, and allow for friendly mobility management. He also points out that this system is beneficial to the university as it can allow universities to track, collect and analyse travel data live, all while developing a sustainable campus transport system (Sinhasane, 2020). When we look at the UND data about their shuttle system, we can see that 47% of students make two one-way trips daily, while 38% make four one-way trips daily, with travelling from campus to home being the most common reason for each trip (93%). On average most users live off campus (56.4%), but students that live in halls (25.1%) and those living in on-campus apartments (14.6%) are also frequent users (Small Urban & Rural Transit Center & Upper Great Plains Transportation Institute, 2011, p.25). From Penn State and UND examples, a few 'must haves' have been explained for university shuttles to be effective for students.

- There must be pre-planned routes with equally dispersed stops.
- They must frequently be running during both critical academic hours and after.
- Have real-time information on delays and locations.
- Displays around campus or an accessible app.

While this may seem a considerable initial expense, the benefits outweigh those. A successful shuttle system can prevent congestion and help the university reduce parking demands allowing them to utilise campus resources better. Shuttles also reduce emissions by discouraging single occupancy vehicles, enabling commuters to visit campus when needed while boosting accessibility to multiple sites. This, in turn, allows enhanced utilisation of

campus resources and visibility. However, something that is more important is that shuttles offer a safe and reliable mode of transportation for students, especially those who stay on campus late for either study or extracurricular activities. While it is just a rough outline, I can see three routes being of the most use -

- The orange line represents the 'hall of residence' route that stops at each hall and around the main campus.
- The green line represents the 'academic building' route covering all of the campus and academic buildings outside the central university.
- The red line will cover critical streets that students live on and bring them to the central campus, which I have named 'out of student-vill'.



This is just a rough concept of routes, and more planning would be needed if a shuttle system was to be implemented.

## **10. How does this work for my personas**

### **Emma**

Emma is one of the more complex students due to her strict time scheduling and potential travel distance when she is on placement. So while a shuttle may work well at times, like when she is on campus, more is needed to solve her travel needs when on placement, especially if it is located outside of central Dunedin. So, unless there was a separate shuttle route that catered to placement students, something that I am unsure of how to facilitate due to the time and location differences between each placement student, I cannot see her frequently using the service.

### **Rose**

I believe Rose is one of the students who could most benefit from a service like a university shuttle. She could use the shuttle from her flat to uni and potentially take it from uni into town for work.

### **Sam**

Sam is similar to Rose in its effectiveness. Depending on the route, this solution would be ideal for her as her primary travel needs are within the central city boundary.

### **Zhang**

Zhang could work well, especially showing him around different aspects of uni and slowly building confidence in navigating Central and North Dunedin with the confidence of being able to return to his needed destination.

### **Tāne**

Due to Tāne using his travel time to socialise, I cannot see him using the shuttle for campus journeys; however, I can see him frequenting it for clubs and sports meetings.

## Liam

Liam would be another person whom this shuttle could be ideal for. He would have the confidence to go to and from his residential hall to campus while having the freedom to explore the city. Much like Tāne, he can also use it for clubs and meetings.

## 11. Bus campaigns

Breather was a joint campaign with OUSA, the Office of Sustainability and Orbus. The project's goal was to get students outside of north/central Dunedin and make sustainable lifestyle choices and everyday activities (like taking a bus instead of single-person rides). The plan was to eventually have chartered buses that took students to locations shown in videos to make the bus less intimidating and more accessible for everyday use. Unfortunately, the Covid Lockdown and funding paused the project before the plan could fully take form. Campaigns like this would heavily promote student bus uses if done correctly. The key is to create engaging events involving the bus system that slowly makes the bus environment known and comfortable for the student population. An example of this that the University has done previously is doing 'bus tours' where a bus is parked on/near campus where students are walked through the whole process of getting on and off the bus by a driver. These bus tours are a good idea; however, to be fully effective, they should be more regular, for example, having them during O-week and ReO-Week. This would allow all new students to experience the tour and feel more comfortable with the Dunedin bus system.

Another concept that would be effective in creating 'event' routes and buses targeted towards students. This way, we turn taking a bus into a fun experience or activity, all while building student comfort around the concept of taking a bus. The theory is that we introduce the student population to the bus system without telling them they should use the bus. Students will be drawn to the bus events due to what they offer and naturally become familiar with the system. This should make them more confident in taking the bus for personal reasons outside the events. In order to do this, we must make the events appealing towards both new and returning students. Some of the event ideas I have come up with are -

## **Study bus**

Turn the bus into a quiet, cozy study atmosphere with 'lo-fi study beats' playing with Wi-Fi available. The route goes around to more aesthetically pleasing locations such as St Claire. Advertised and in service around exams.

## **Wellbeing bus**

A bus that goes around the natural views of Dunedin encourages students to leave the busy city and breathe. During this route, people could do breathing exercises or be encouraged to participate in mindfulness activities, much like what the breather campaign wanted to achieve.

## **Breakfast bus**

Students will never say no to free or cheap food. A breakfast bus could offer coffee and bagels and go around key student streets and uni.

## **Welcome to Dunedin bus**

Targeted to freshers and second years that go from university to key areas such as supermarkets, different beaches, walking trails and so on. During the trip, a map of key routes and which bus to take for these areas could be offered. This would probably be most effective during O and ReO-Week

## **Speed-dating Bus**

This is the 'gimmickiest' idea I have had, but having the occasional gimmick event would keep students interested. The event could be exactly what it sounds like – people could get tickets, and with each bus stop, your seat partner changes, much like traditional speed dating. The end location could be a beach where people can get off the bus and chat with people they enjoyed their bus trip with.



Familiarity with buses and how they work, especially for those who initially are from somewhere other than Dunedin or towns with an expansive bus system, is the crucial step to encourage student engagement. Events like these are an excellent introduction to the bus system without appearing preachy about bus usage.

## 12. How does this work for my personas

Unlike the shuttle solution, testing the effectiveness of bus events is more complex than evaluating their transport needs concerning efficiency and location. Instead, we will have to evaluate each persona according to what would draw them to engage in events, such as sociability. Due to this, I have identified five key areas that would need to be filled for events to appeal to university students.

	Social	Exploration	Acessability	New Experience	Benefit	
Emma	✓		✓	✓		
Rose	✓		✓		✓	
Sam	✓		✓		✓	
Zhang	✓	✓	✓	✓	✓	
Tāne	✓	✓	✓	✓		
Liam	✓	✓	✓	✓		

## 13. Conclusion

Social sustainability often gets overlooked in the broader scope of a sustainable lifestyle despite it being just as important. Within the scope of this report, the best way to encourage

social sustainability is to make community development and engagement accessible via reliable transportation. In order to do this in Dunedin, we must focus on the university student population due to the city's student town reputation. This led me to question how to make a transition to net zero transportation that still allows Otago University students to be active within their community. It is far from a straightforward question, however. Students are diverse and forever changing with each year, knowing this any possible solutions must have some flexibility. In order to demonstrate this, I created six student personas as an example of the diverse student population. With these personas, I evaluated the D.C.C transport goals and possible solutions by putting these 'students' into the picture. While further research and evaluation would need to be done, I am feeling confident that the proposed solutions above would be a positive step in the right direction towards helping students be more active in the Dunedin community, all while being committed to New Zealand net-zero carbon goals.

## **14. Continued Research**

Due to the short scope of this project there are some gaps that further research could address. It would have been beneficial towards this project if I had the time and resource to I would have liked to interview actual students on campus to get some testimonials about their bus experience. Unfortunately I was unable to do this and relied on the survey results from the student travel survey. It would have also been interesting to go into the hall of residence and ask first year students about what they would like to see for student transport, especially Aquinas residence which already has a shuttle system in place. While perhaps idealistic it would also been nice if I could run the bus event ideas by the D.C.C or even potential run one myself in order to measure interest. If this project was to be picked up and continued I would interest to see if the student travel data followed a similar trajectory to what I discovered with my personas or if 2022 was an outlier due to the Covid pandemic starting to fade from students zeitgeist.

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