

A report on the potential impacts of a proposed international airport on the settlement of Tarras

A research report submitted in fulfilment of the requirements for
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Prepared for:

Central Otago District Council

By Catherine Morris, Keegan Wells, Clark Williams, Mia Tangney, Rudi Murray-Pyle

The report is work undertaken by students from the Planning Programme at the University of Otago and should in no way be seen to represent the views of the University of Otago

Executive Summary

The research objective of this study was to determine the impacts of a proposed international airport on the small rural settlement of Tarras, considering its physical, social, cultural, economic, and environmental aspects.

Tarras is an agricultural-based community at the southern end of Southern Highway 6, near the Lindis Pass in the greater Cromwell Basin. The residents of Tarras cherish their lifestyle and the vast open landscape. However, the area's infrastructure is limited to only two one-way bridges, making transportation cumbersome. Moreover, the township lacks a connection to a sewage and wastewater system, hindering growth.

While the rest of Central Otago is growing in population, Tarras has experienced slight decline or stagnation over the past decades. Addressing these infrastructure and population challenges is crucial for the community's prospects.

Methodology: To substantiate the research objective, this research employed a mixed methods approach, based on a pragmatic research paradigm, which included a study context chapter, literature review, policy analysis, GIS analysis, key informant interviews, and both in-person and online surveys.

Results and Discussion: The research uncovered an extensive list of potential effects stemming from the proposed airport, categorized into environmental, social, economic, and cultural impacts. It was observed that these effects were interconnected, ranging from short-term to long-term, and direct to spillover cumulative impacts. For instance, pollution (including noise, air, water, and light pollution) emerged as a prominent concern. This is linked to social issues such as the reduction of amenity and overall quality of life, as well as economic consequences affecting agriculture and the ecosystem of the Clutha Mata-Au river.

Moreover, the study highlighted the significance of supporting infrastructure for the airport's development and operation. Community members emphasized the need for new and upgraded roads, public transport, and sewerage/wastewater systems, acknowledging the pressure it would exert on existing "self-reliant" infrastructure.

Lastly, regarding alignment with the values and aspirations of Tarras, the research revealed a consensus on valuing landscape, rural character, lifestyle, visual amenity, and a tight-knit

community feel. However, the proposed airport did not align with these values, leading to differing visions for the future, ranging from maintaining the rural lifestyle to urban transition. Participants suggested alternatives, such as rail, solar farms, and viticulture development, better aligned with their values.

As this report informs the Central Otago District Council (CODC) as the consenting authority on the airport, it offers a comprehensive picture of the potential airport and its subsequent effects. The findings stress the importance of conducting comprehensive impact assessments, community engagement, and adopting sustainable designs to ensure positive outcomes.

Recommendations: Based on the research, four key recommendations are proposed:

1. Develop a spatial plan for the Tarras-Bendigo area, reflecting local aspirations while preserving key values.
2. Organize community forums facilitated by unbiased third-party sources to foster informed opinions.
3. Conduct a holistic effects assessment, considering short-term, long-term, direct, spillover, and cumulative impacts.
4. Evaluate the airport proposal against national aviation and sustainable tourism strategies, carbon emission goals, and prioritize upgrading existing infrastructure to meet growth demands.

Limitations, Further Research and Conclusion: This study acknowledges the limitations due to continuously evolving information and suggests further research that widens the scope to include the entire country and region, considering the broader impact of the proposed airport.

In conclusion, the study establishes that a proposed international airport in Tarras would have significant and interconnected effects, extending beyond the immediate airport site. The majority of the community opposes the proposal and desires comprehensive information to make informed decisions about its potential implementation.

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Thank you to the CODC for hosting us in Alexandra and allowing us to glimpse into your world this year. Any of us planners would love to work in your beautiful district council.

To the MPlan cohort, thank you for the laughs, the good times, and the tough times. See you all at Alexandra Holiday Park again soon.

List of Abbreviations

CIAL: Christchurch International Airport Limited

CODC: Central Otago District Council

ORC: Otago Regional Council

RMA: Resource Management Act (1991)

GHG: Green House Gas Emissions

NSP-HPL: National Policy Statement for Highly Productive Land

QLDC: Queenstown Lakes District Council

RPS: Regional Policy Statement

FMU: Freshwater Management Units

KTKO NRMP: Kāi Tahu Ki Otago – Natural Resource Management Plan 2006

KI: Key Informant

EIA: Environmental Impact Assessment

Glossary

Kāi Tahu/Ngāi Tahu: Principal South Island Māori Iwi

Kaitiakitinaga: Guardianship or Protection

Māhika kai: Traditional value of food resources and their ecosystems

Taonga: Treasure

Te Tiriti o Waitangi: The Treaty of Waitangi

Waahi tapu: Places sacred to Māori

Wai Māori: Freshwater

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1 Introduction

The impacts of large-scale infrastructure projects in rural areas have the ability to completely alter both the landscape and culture of an area. While many infrastructure projects are judged almost exclusively through an economic lens, social and environmental factors are both key components in determining the success of a project (Zeng et al., 2015). Having such a vast range of potential effects makes it very difficult to accurately determine an infrastructure project's potential benefits or consequences before it has been completed.

An often-neglected impact of large-scale infrastructure is the many different stages that a project will go through before completion. When looking into rural areas specifically the construction stage of projects can have wide-reaching impacts. Focusing on small towns specifically, issues such as worker accommodation can create significant problems and can often be an expensive issue to fix. Factors such as this are often overlooked but prove crucial in creating a successful infrastructure project.

When looking into infrastructure projects in rural areas specifically, the potential impacts on the surrounding land in the area are a major concern. While already urbanised areas do not tend to have the same issues, undeveloped or agricultural land is much more susceptible to influences from nearby developments. The impacts of carbon emissions and runoff of pollutants have been shown to impact more than the immediate area in which construction is taking place (Nunes et al., 2011). When looking at agricultural communities specifically, the potential ramifications of this become immediately obvious. Contamination of high-class soils is often irreversible (Mackay et al., 2011) and can significantly harm the ability to raise livestock and grow crops. In agricultural communities, this is an issue that would have significant repercussions across the entire area. This is not to say that large-scale infrastructure has no place in agricultural areas, as often these areas provide the best option for such endeavours. However, with many areas relying so heavily on these soils, the potential impacts that can be caused should be seen as an incredibly important potential effect, despite the fact that it is often overlooked in literature regarding infrastructure projects.

The concept of 'social license' is an important aspect of creating successful infrastructure projects, particularly in rural communities (Kerselaers et al., 2013). A social license can be

described as having the support of the community in which the project is going to take place. Although having the support of the surrounding community is not compulsory for most projects, it has been shown that projects with the backing of those in the area tend to be more successful than those without (Kerselaers et al., 2013; Jijelava & Vanclay, 2017). While many projects are judged solely through an economic lens, social and cultural factors such as social license are extremely important to truly understand the long-term success of infrastructure projects.

1.1 Research Problem

This research will explore the potential localised effects of a new international airport proposed by Christchurch International Airport Limited (“CIAL”) in the small rural settlement of Tarras, Central Otago, New Zealand. This will be done by investigating the views and aspirations of the local community towards the development and identifying future infrastructure needs. Local communities are disproportionately subject to the negative impacts of large infrastructure projects (Li et al., 2013). Therefore, it is crucial these localised effects are given special consideration in the development of the proposed airport. Additionally, as a rural settlement, a large infrastructure project will create extensive *change* compared to an urban area, where there is already existing infrastructure. As a result, having irreversible social, environmental, economic, and cultural effects. Historically, rural communities’ voices, values, and aspirations were disregarded in regard to projects which benefited the greater population. Therefore, by focusing on the local scale and the views of the local community the local effects can be adequately taken into consideration and managed. ‘Tarras Airport’ will be the key name used throughout the report to refer to the proposed Airport to convey the localised focus of the research. This is opposed to ‘Central Otago Airport’ which is the term used by CIAL to illustrate the Airport is to provide for the greater region.

Although there is currently no plan to begin construction of the airport, approximately 750 ha of land has been purchased in the area by CIAL. The land that has been purchased was previously used for agriculture and is comprised of mostly class 3 soils. The use of this high-class land for major infrastructure has been a point of concern for many who are opposed to the airport. There is widespread debate around the need for another international airport in the Lower South Island. Furthermore, Although the airport is proposed to be built in Tarras, the vast majority of visitors are expected to be visiting the nearby tourism hot spots, such as Queenstown. Although Queenstown already boasts an international airport of its own, the

proposed airport in Tarras is still considered necessary by the CIAL due to the forecasted tourism and population growth.

1.2 Interpretation of Brief

The brief for this research project was provided by the Central Otago District Council (“CODC”). This brief provided background context on the situation, as well as three research objectives which are displayed below.

- a) To understand aspirations of the Tarras community and where the proposed airport fits in with that aspiration*
- b) To understand the existing infrastructure and what might be required to support the development of an international airport in terms of accommodating a workforce or at least part of a workforce in the township*
- c) To consider the potential benefits of an increase in residents in the town in terms of local businesses and the Tarras Primary School*

These objectives were used to develop research questions as well as guide the entire scope of research for this project. A very important aspect of this brief was the scope of the effects which were to be researched. While studies into many large-scale infrastructure projects focus on the economic output and the impacts on a large scale, our interpretation of this brief led to a much more refined scope. Rather than focusing on effects as a whole, this research was limited to effects on Tarras and the Tarras community specifically. Although the airport would have impacts on the entire Otago region, focusing specifically on Tarras not only made the project much more achievable but also would highlight the opinions of a small community that would often be overlooked.

1.3 Research Aim and Questions

The aim of this research is to consider the potential impacts of a proposed new international airport on a small provincial town including consideration of what infrastructure might be needed to support the project in the future and the effects on rural production in the Tarras area.

In order to achieve the aim, the research was divided into three main research questions.

- 1. What are the potential localised effects of the proposed Tarras Airport**
- 2. If the airport was to go ahead what supporting infrastructure would be required, and what impact would this have on Tarras and the surrounding region?**

3. How does the Tarras community see the Airport aligning with their values and aspirations, if at all?

These three research questions were developed to more accurately focus the results of both primary and secondary data collection. These questions provide a scope which is not only achievable, but also align with the objectives described in the brief provided by the CODC.

The first research question is entirely effects based, specifically focusing on the effects on Tarras itself. This question is very important to the research as it provides a broad understanding of the potential impacts that the proposed airport may have. Having a smaller area to focus on also allows for the research to look into a mix of social, economic, cultural, and environmental factors. The social impacts particularly are important to this research question due to the fact that they are often overlooked.

The second research question was adapted directly from the research objective provided in the brief from the CODC. This question focuses on the infrastructure that would be required not only once the airport is complete, but also during the phases of construction. Often overlooked necessities such as workers' accommodation are covered under this research question, as well as the impacts that changes such as this would have on the entire Tarras community.

The third research question was also developed directly from the objectives in the brief provided. This question is different than the others in the sense that the results can vary vastly depending on the opinion of an individual. Answering this research question relies on reaching a significant portion of the Tarras community, and understanding the many different opinions which are held. While this research question will not have a definitive answer, the ultimate goal is to reach as wide of an audience as possible and to show the range of opinions in the community.

1.4 Research Methods

This research employs a mixed methods approach, utilising a number of both primary and secondary research methods. A more detailed description of these methods can be found in the methodology section of this report. The secondary methods include the use of GIS software to conceptualise the area, as well as analysis of both relevant literature, planning documents, and environmental impact assessments of other large infrastructure projects. These methods provide a foundation that allows for the primary methods of data collection to be understood within the context of the project.

Three methods of primary data collection were used for this research. An online survey was released prior to visiting Tarras for research. This survey was targeted at the Tarras community but collected responses from those across the Central Otago region. While researching in Tarras a number of semi-structured interviews also took place with a variety of people with different skills and expertise relevant to the research. Further in-person data collection took place at the Tarras town hall where the entire Tarras community was invited to take part in an informal session discussing their own opinions on the proposed airport.

This wide variety of research methods allowed for a broad understanding of the development, based on both the knowledge of professionals as well as the opinions of those within the community itself. Further information on the methodology of this project is described in the methodology chapter below.

1.5 Report Structure

This report will be structured in the chapters as described below.

Chapter 1 – Introduction: A brief overview of the research to provide context and explain the significance of the project

Chapter 2 – Literature review: A review of literature and case studies relevant to the project

Chapter 3 – Study context: A section to provide context on Tarras and the Central Otago region, as well as the rationale for the proposed airport

Chapter 4 – Policy context: A review of the relevant planning policies and documents related to the proposed airport

Chapter 5 – Methodology: A description of the methodology used in this research and potential limitations that are associated with this

Chapter 6 – Results: The results uncovered from primary methods of research

Chapter 7 – Discussion: A discussion of the findings from the research and how they compare to past literature on the topic

Chapter 8 – Recommendations: Recommendations that will be provided to the CODC as a result of the research

Chapter 9 – Conclusion: A summary of the research problems and findings of the project

2 Literature Review

2.1 Introduction

This chapter will summarise the key themes which have emerged in literature relevant to the proposed Tarras Airport. In order to give full context to the research the first section will discuss rurality and change in rural settlements. Next, to fully understand the introduction and process of a potential airport, large-scale infrastructure projects will be explored. This will have a particular focus on the research methods and key effects found in literature and case studies. It is important to recognise there is a gap in global literature that focuses on large scale infrastructure projects in a rural setting in developed countries. Following the infrastructure, the environmental, social, economic and cultural impacts of large-scale infrastructure will be examined with a more specific focus on airports. Our research aims to aid in addressing this gap. Reviewing this literature will justify and inform the present research on the potential localised effects of the Tarras airport, as well as provide context on the aspirations of local communities and the infrastructure that may be required for such extensive infrastructure projects.

2.2 Rurality, Rural Planning, and Change

2.2.1 *Rurality*

Research in rural areas is becoming increasingly important, as they face immense external pressure and change. Due to the scope of the research being focused on the rural town of Tarras, this section will first examine rurality. The term ‘rural’ is often used simply to describe areas outside of urban hubs, typically used when referring to farming communities or other more remote towns (Cloke, 2006). While this provides a basic definition, the scope of what defines rurality extends far beyond physical location, with cultural and social differences playing a significant role in the concept of rurality as a whole (Castle, 1993; Gibson et al., 2008; Hodge & Monk, 2004). Defining rurality based entirely on population size or location does little in terms of understanding the true differences between a ‘rural’ and ‘urban’ community. By looking into the specific values most associated with rural areas, as well as economic differences, a more well-rounded description of rurality can be developed. Beyond economic and social links within a rural context, place-based and culture links also exist.

Although the cultural differences between different areas will vary vastly, scholars have observed that rural identity is strongly rooted in one's connection to nature, place and community (Beach et al., 2019 ; Woods, 2005 ; McManus et al., 2012). Specifically, it has been found that those in rural areas tend to feel a connection to the particular region in which they live, in a far more pronounced way than those who reside in more urban locations (Hribar & Lozej, 2012).

Alongside this connection to the surrounding environment, many in rural areas are seen to value independence much more than those in urban areas (England et al., 1979). Historically this has been true, as in many instances 'countrymindedness' principles have dissuaded those in rural areas from collaborating with national government or other large-scale developments. However, in recent years it has been seen that rural communities have become more accepting of government intervention, particularly as it relates to improved infrastructure (Barrios, 2008). This is not to say that independence has become less important in these areas, but rather that rural communities have begun to reap the potential benefits that government assistance and large-scale developments can provide (Cockfield & Bottrill, 2012). Although independence remains a key component that describes rurality, the perception that rural communities are completely against change and development may no longer be appropriate.

Economic opportunities and trends also play a large role in understanding rurality. Rural areas are no longer simply "agricultural" but "multifunctional", serving production, consumption, and preservation roles (Holmes 2006; Gomez-Limon et al.,2012). While the agriculture, forestry and mining sectors remain the pillars of most rural economies, service and retail industries have steadily grown in many rural regions (USDA, 2023). In New Zealand particularly, the impacts of tourism have heavily influenced many rural economies. While the social impacts of this have been a mixture of positive and negative, the economic impacts have been almost overwhelmingly beneficial in many instances (McGregor & Thompson-Fawcett, 2011).

Perkins et al. (2015), view the movement of predominant industry throughout Central Otago shifting over the past decades from agriculturally intensive processes to a shared economy with tourism, agriculture, and viticulture. This process, sometimes referred to as re-resourcing, displays Central Otago's ability to grow and change alongside the globalizing economy, diversifying itself through natural investments.

2.2.2 Rural Planning

Planning in these shared economies with low population density is not an easy task. Rural planning can be simply described as “*the process of planning for rural areas, with a focus on rural issues and from a rural perspective.*” (Frank & Reiss, 2014, p. 388). Rural planning literature covers developed and developing countries and topics concerning policies, community sustainability, resilience, and voice (Crowe, 2011; Beebe & Wheeler, 2012; Compas, 2012; McManus et al., 2012; Marquardt et al., 2012; Taylor 2012; Trabalzi & De Rosa, 2012).

The research has adopted a ‘rural planning’ approach, which is focused on a holistic, integrated, community-based approach, that empowers the local community, and coordinates their values and aspirations (Stauber, 2001; OECD 2006a; Woods 2006; Gallent et al. 2008; Bell, Lloyd, and Vatovec 2010; Crowe 2011). This is opposed to ‘planning in rural areas’ in which planning is conducted predominantly by interests operating at larger scales for narrower objectives (Cohen 1977). Rural planning emphasises understanding specific rural places, and therefore, will vary on a case-by-case basis and over time. The present research will be focusing on a specific rural place, in a specific time period. As such, the results will be different from other case studies on rural places and communities.

Most of rural planning over the last decades, especially in the context of large infrastructure projects, can be seen as ‘planning in rural areas’. Only in recent decades, as rural areas are becoming increasingly important and facing immense external pressure and change, is there a discussion surrounding the more holistic approach. For example, local jurisdictions have imposed large-lot zoning to protect the countryside, which ended up promoting costly, sprawling development patterns lacking the desired rural character and community spirit (Enger 1994; Cherry and Rogers 1996; Marcouiller, Clendenning, and Kedzior 2002; Daniels 2008, 2009; Newburn and Berck 2006). *The Small Town Planning Handbook* (Daniels et al. 2007) is the longest running planning in rural area guides. The Handbook advocates for towns of varying sizes to voluntarily make and manage a local comprehensive plan and implementing mechanisms, as well as conduct strategic planning and visioning.

Relevant to the research, since the early 2000s there has been a shift in rural planning policy discourse away from sectoral support policies (largely connected to agriculture) towards spatial approaches, focusing on the local (Shortall & Shucksmith, 2001). The policy shift represents a recognition of the benefits of spatial planning approaches, an acknowledgement of their ability

to integrate different dimensions of public policy (agriculture, housing, employment, transport) and offers a holistic approach to balancing the cultural, economic, social and environmental processes which shape rural areas (Scott, 2008). Yet as Atkinson (2019) notes, small rural towns often receive insufficient recognition in these spatial plans, with the main concentration of policy being focused on large cities and metropolitan areas. This is also largely backed by the Central Otago situation. While Cromwell is not a large metropolitan area, the Cromwell Basin Spatial Plan (2019) only briefly touches on the township of Tarras.

2.2.3 Change in Rural Areas

Rural areas are increasingly subject to change. Agriculture, which has historically been the main user of rural land, now has to compete for land with other functions, such as tourism and recreation, housing, and services (Oltmer, 2003, van den Brink et al., 2006, Jongeneel et al., 2008, Zasada, 2011). Land use change as a result of the continuous reorganisation of the land in order to adapt it to the changing social demands (Antrop, 2005). Moreover, as global economic interdependence increases, more disruptions of local economies occur (Beck, 2006). Especially for those that have locked-in economies, such as one dominant economic base centered around primary industries (Beck, 2006; Gill, 2018).

When considering the New Zealand context, populations in many small towns have been declining for five decades due to the rationalisation of the primary sector (Beck, 2006; Leach, 2013; Gill, 2018). But many of the small towns will be growing, especially in relation to amenity values in the Otago region. Rural areas are expected to accommodate the rapidly expanding urban hubs, while simultaneously providing resources for an increasing population (Curran-Cournane et al., 2016). Rural areas are increasingly recognised as valuable and increasingly contested in meeting diverse contemporary global needs and challenges due to rising global consumption, population, and urbanization (Bell et al., 2010; Halfacree, 2008; Stauber, 2001; Wall & Marzall 2006). Thus, between globalization, economic opportunity, and ever-changing socio-political factors, rural areas are bound to change. But as discussed earlier in the planning in rural areas subsection, it must be up to the rural communities themselves.

2.3 Effects of Large Infrastructure Projects

“People commonly envision infrastructure as a system of substrates-railroad lines, pipes and plumbing, electrical power plants, and wires. It is by definition invisible” (Star, 1999, p. 380).

A plethora of studies have been conducted on the effects of large infrastructure projects, including airports, at various scales. The effects can be positive or negative, intended or accidental, direct or spillover, potential or actual, short and long-term, during construction or operation, and have cumulative impacts (Streatfield & Markless, 2009; Zeng et al., 2015; Yao et al., 2011). Current research either focuses directly on one effect or categorised it into three to four categories – environmental, social, economic, and sometimes cultural effects. From a sustainable development perspective, economic, social, and environmental impacts are equally important and all need to be considered in decision-making (Li & Loo, 2016). Bacior & Prus (2018) discuss the importance of having an “integrative view” of the effects of infrastructure projects. The present research will explore holistically the potential localized effects of a proposed airport in a rural settlement in New Zealand.

The present study has taken a similar approach to that of Monterrubio et al., (2020), as in, it will explore the residents’ perceptions of the potential economic, social, environmental, and cultural effects of the proposed airport. Monterrubio et al. (2020) used negativity bias theory to examine the impact of an airport development in Mexico, and gain an understanding of local community perceptions. They found economic impacts were perceived as positive but environmental and social ones more negatively. Perceived negative impacts outweighed positive ones and therefore the airport project was not supported. The present research has taken a negativity bias perspective, as minimal positive social and environmental impacts were uncovered. Additionally, they explore the perceptions of the community before the construction of the airport. This approach is uncommon, with most studies focusing on the effects during operation (Bacior & Prus, 2018; Cidell, 2015; Dimitrioiu, 2018; Tsui et al., 2019). However, the results of this study vary dramatically from the Tarras Airport case study, due to it being situated in a developing country.

Articles on the effects of airport developments are wide-reaching, and vary on a case-by-case basis. Monterrubio et al. (2020) provide synthesis of the positive and negative economic, environmental, and social effects of airport construction, operation, relocation, and expansion, which has been adopted in *Table 2.1* below. However, the table does not include cultural effects, which is crucial to any holistic assessment, especially in a New Zealand context.

Table 2.1 Potential effects of large-scale infrastructure projects

	Economic	Environmental	Social
Positive	<ul style="list-style-type: none"> • Economic growth (Li & Loo, 2016; Tveter, 2017) • Income (Hakfoort et al., 2001; Percoco, 2010) • Job creation (Appold & Kasarda, 2013; Cidell, 2015; Hakfoort et al., 2001; Li & Loo, 2016; Percoco, 2010; Tveter, 2017) • Market access (Glaeser, Kolko, & Saiz, 2001) • Productivity (Glaeser et al., 2001) • Regional development (Halpern & Bråthen, 2011; Percoco, 2010; Tveter, 2017; Van Wijk, 2011) • Tourism activity (Eugenio-Martin, 2016; Tsui et al., 2019) 		<ul style="list-style-type: none"> • Access to air transport (Halpern & Bråthen, 2011) • Avoidance of passengers diverting to other airports (Li & Loo, 2016) • Opportunities for shopping, tourism and leisure (Zimmermann, Felscher-Suhr, & Vogt, 2018) • Regional accessibility and connectivity (Halpern & Bråthen, 2011; Salazar & Gallart, 2017) • Resident location and retention (Halpern & Bråthen, 2011) <ul style="list-style-type: none"> • Region's attractiveness (Dimitriou, 2018)
Negative	<ul style="list-style-type: none"> • Airport leakage (Suzuki, Crum, & Audino, 2003) • Plan, design, operation and maintenance costs (Li & Loo, 2016) 	<ul style="list-style-type: none"> • Air pollution (Li & Loo, 2016; Schlenker & Walker, 2016) • Aircraft noise (El-Fadel, Chahine, Baaj, & Mezher, 2002; Lawton & Fujiwara, 2016; Li & Loo, 2016; Rodríguez-Díaz et al., 2017; Sahrir et al., 2014; Wolfe et al., 2017) • Ground support vehicle emissions (Hu et al., 2009) • Habitat disturbance (Li & Loo, 2016) 	<ul style="list-style-type: none"> • Crowding (Hakfoort et al., 2001) • Land grabbing (Vázquez, 2018) • Changes in land usage (Rahayu, Ahyudanari, & Pratomoadmojo, 2016) • Population growth (Glaeser et al., 2001; Tveter, 2017) • Public resistance and debate (Zimmermann et al., 2018) • Quality of life (Halpern & Bråthen, 2011; Sahrir et al., 2014) • Residential property values (Batóg et al., 2019; Espey & Lopez,

		<ul style="list-style-type: none"> • Waste (Li & Loo, 2016) • Water pollution (Li & Loo, 2016) 	<ul style="list-style-type: none"> • 2000; Trojanek, Tanas, Raslanas, & Banaitis, 2017) • Road congestion (Li & Loo, 2016; Tsui et al., 2019) • Health (Franssen et al., 2004; Sahrir et al., 2014; Wolfe et al., 2017; Yim, Stettler, & Barrett, 2013)
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Research has primarily focused on the economic impacts of airports, particularly on regional economic development (Halpern & Bråthen, 2011; Tveter, 2017; Wijk, 2011). The effects of large infrastructure projects tend to be studied during the operation phase (Cidell, 2015; Dimitrioiu, 2018; Tsui et al., 2019), while analyses of their impact during the planning and construction stages are more limited (Monterrubio et al., 2020). Less studies on the effects of large infrastructure projects have been situated in rural contexts in comparison to urban contexts (Bacior & Prus, 2018). Lastly, an understanding of how these effects are perceived by host communities is underexplored (Monterrubio et al., 2020). The present study will aim to contribute to these gaps.

Exploring holistically the effects of large-scale infrastructure projects is difficult because they are inherently complex, and involve several stakeholders, with often competing and conflicting views (Bacior & Prus, 2018; Dimitrios & Sartektaki, 2022; Fiori & Kovaka, 2005; Rolfe et al., 2007; Tilt et al., 2009; Yao et al, 2011; Zeng et al., 2015).

The subsequent section will explore the economic, environmental, and social effects of large infrastructure projects, focusing particularly on airports. As well as those situated in rural areas and in developed countries. But first, a discussion on the uneven effects of large infrastructure-projects.

2.3.1 Uneven Effects

Large infrastructure projects can bring both positive and negative impacts at all scales. However, it is broadly argued local communities are disproportionality subject to the negative impacts of the large infrastructure projects they host, as observed in many instances throughout the literature (Barrios, 2008; Karselaers et al., 2013; Li, et al., 2013; Rolfe et al., 2007). Whereas the benefits flow more broadly at the regional or national scale (Rolfe et al., 2007). The idea of considering the benefit and wellbeing of wider society has been heavily discussed

surrounding infrastructure development (Zeng et al., 2015). This is not to say that local communities do not reap the benefits, especially those relating to economic growth, job creation, and tourism activity (Li & Loo, 2016; Tsui et al., 2019; Tveter, 2017). Nonetheless, it is crucial these localised effects are given special consideration in the development of large infrastructure projects.

Additionally, rural areas can be unevenly targeted as the location of large-infrastructure projects. Rural areas are often chosen due to them being the location of the least resistance despite what impact the developments may have on the communities they are constructed in (Friedberger, 2000; Lowe et al. 1993). The literature on uneven effects informed the decision to concentrate on the localised effects of a proposed airport on the small rural community.

2.3.2 Economic Effects of Large Infrastructure Projects

There is a large body of published studies describing the role of large infrastructure projects on economic growth and development (Boruch, 2011; Dimitriou & Sartzetaki, 2018; Dimitriou et al., 2015; Wu et al., 2014).

Transport infrastructure in particular is one of the most important factors in the development of rural areas, stimulating investment and new economic opportunities, increasing employment, promoting economic growth, and supporting connectivity between regions (Banister & Berechman, 2000; Boruch, 2011; Cantos et al., 2005; Maparu & Mazumber, 2017; Robertson, 1995; Wu et al., 2014). This is considered the same for airports (Dimitriou & Sartzetaki, 2018; Dimitriou et al., 2015).

Extensive literature has investigated the impact of transport infrastructure projects, particularly roading, on economic activity and regional development. The first major project by Aschauer (1989), concluded infrastructure developments were of great importance to the evolution of economic growth in the USA. Cantos et al. (2005), also contended that in addition to transport infrastructure having a positive influence on economic growth within the region it is located, it also has very substantial spillover effects into other regions. On the other hand, Chandra & Thompson (2000), showed that while transport infrastructures do contribute positively to economic growth, this mostly favors urbanized regions. Whilst investment in rural areas did not necessarily lead to positive outcomes, as it enhanced the rural-urban transition, to the detriment of rural characteristics and qualities. The present research will explore whether the airport will have a local economic impact, or will the benefits be favoured towards the regional and national scales. Additionally, both Banister & Berechman (2000) and Chandra &

Thompson (2000) demonstrated that new transport infrastructure can favour the development of certain industries at the expense of others, such as agriculture.

A well-researched positive economic impact of an airport is tourism. Doerr et al. (2020) found the introduction of a regional airport into the German countryside increased tourism and overnight stays, thus promoting regional economic development (Doerr et al., 2020).

On the other hand, airports are not always successful economically. In their study, Florida et al. (2015), found Airports tend to function as part of a well-developed region but struggle to find a place in underdeveloped regions. It was also found that airports primarily used for moving people had significantly higher benefits to the surrounding area than airports used for moving goods (Florida et al., 2015).

In a rural context, large infrastructure projects can have negative impacts on established sectors, such as agriculture. Opposition to new developments due to economic reasons typically arises from those working in the agriculture industry. While new developments or projects tend to have an overall positive impact on the economies of rural areas (Reeder & Brown, 2005), the agricultural industry is one of the few that reap almost no benefits from these developments. The main issues raised by farmers have been the often-poor compensation for their land, as well as the increased usage of surrounding land making farming activities more difficult (Kerselaers et al., 2013). While these issues do not impact people outside of the farming sector, the reliance on agriculture in these areas means that infrastructure projects impact the economy of entire rural regions. Yet, development has been seen in this capacity for decades.

Overall, the economic effects of airports are largely positive and are significant in the justification of new infrastructure, however, whether these economic effects will be felt by the local community is unknown.

2.3.3 Environmental Effects

While economic effects are largely positive in regard to infrastructure projects, environmental ones are largely negative. From an environmental perspective, GHG emissions, air pollution, noise, waste, water pollution, and reduced biodiversity and productive agricultural land are all prevalent environmental concerns in relation to airports (Li & Loo, 2016; Bacior & Prus, 2018; Curran-Courrane et al., 2021; El-Fadel et al., 2002; Marisol & Harrison, 2014; Nunes et al, 2011; Rodríguez-Díaz et al., 2017; Wolfe et al., 2017). Few studies have attempted to investigate the impact of airports on the ecological environment (Xiong et al., 2022).

Furthermore, they tend to focus on the direct effects, while less attention has been paid to changes in the ecological environment caused by spillover effects of airports (Xiong et al., 2022).

Greenhouse gas emissions from air travel and its association with climate change is an issue of global significance when considering an international airport. An exponential increase in aviation emissions has been attributed to the ease of access to flights as prices have decreased and incomes have increased. This has been observed in both a global and New Zealand context (Mclachlan & Callister, 2022; Gössling & Hingham). Aviation transport runs on fossil fuels and contributes significantly to the 12% of global emissions related to transport (Khalili et al., 2019). Demands for transport continue to rise, therefore, the implications of a new airport in relation to climate change are vital to understand (Khalili et al, 2019; Sahrir et al., 2014). As stated by Gössling & Hingham (2021) tourism needs to fully decarbonize in the next 30 years to meet emissions reduction goals. For this to happen, a large-scale transition is required.

Air pollution is another effect commonly associated with airport operations, affecting community health (Li & Loo, 2016; Luo et al., 2018; Mulliner et al, 2007; Schlenker & Walker, 2016). Sources of air pollution from an airport extend beyond emissions from incoming and outgoing flights. In New Zealand alone, Patterson and McDonald (2004) found airport supporting infrastructure (runways, air terminal buildings, booking services, etc.) alone are the largest indirect CO₂ contributor to transport emissions. The infrastructure needed in Tarras would fall under this category. Other sources of pollution also include airport related traffic, power use and maintenance (Marisol & Harrison, 2014; Monterrubio et al., 2020). Therefore, it is important to consider the level of pollutants in proximity to people from airports. There is also an association between an elevated level of air pollution and vegetation damage (Emberson et al, 2001; Harmens, 2011; Mills et al., 2011; Niyogi, 2004). Considering the value of the Tarras landscape for agriculture and amenity, this will be important to consider.

Alongside this, degradation of biodiversity and ecological value have been associated with large scale infrastructure projects (Bacior & Prus, 2018; Garcia Lopez, 2012). When considering biodiversity, the implications of collisions with planes and wildlife such as bird populations are important. As stated by Blackwell et al. (2009) the impacts on wildlife tend to be an overlooked aspect of airport planning. Yet biodiversity goes further than flora and fauna, it also includes soil contamination and loss of land resources (Wu et al., 2020; Xiong et al., 2021). Primary contamination sources include atmospheric deposition, runoff from the runway,

and fuel leaks (Nunes et al., 2011). Such impacts are important to consider in relation to the National Policy Statement for Highly Productive Land (Ministry for the environment, 2022). The trend of interconnectedness and positive- feedback loops is immense within the environmental effects and could greatly affect the mana-whenua of the Tarras area.

2.3.4 Social Effects

The research and practice of social impact assessments (“SIAs”) are widely explored in literature, including their strengths, weaknesses, and best-practice. Social impact assessments (“SIA”) are simply the process of analysing and managing the potential and actual social effects of development (Esteves et al., 2012; Tilt et al., 2009; Vanclay, 2003). Social impact assessments are rooted in participatory, community-based planning. By identifying potential social effects in advance, SIAs increase the understanding of change and capacities to respond to change; seek to avoid and mitigate negative impacts and enhance positive outcomes; emphasise enhancing quality of life; and ultimately allow stakeholders to make better decisions (Esteves et al., 2012; Gramling & Freudenberg, 1992; Imperiale & Vanclay, 2016; Howitt, 2011; João et al., 2011; Tilt et al., 2009). In a well-recognised study, Vanclay & Esteves (2011) provide a framework of current best practice in social impact assessments (“SIA”). This framework is shown in *Figure 2.1* and informs the present research methodology.

Current Good Practice SIA

The activities typically undertaken in an SIA process are well established and documented (see IAIA 2009). Whether proponent-led or community-led, SIA essentially involves:

- Creating participatory processes and deliberative spaces to facilitate community discussions about desired futures, the acceptability of likely impacts and proposed benefits, and community input into the SIA process, so that there can be a negotiated agreement with a developer based on free, prior and informed consent;
- Gaining a good understanding (i.e. profiling) of the communities likely to be affected by the policy, programme, plan or project including a thorough stakeholder analysis to understand the differing needs and interests of the various sections of those communities;
- Identifying community needs and aspirations;
- Scoping the key social issues (the significant negative impacts as well as the opportunities for creating benefits);
- Collecting baseline data;
- Forecasting the social changes that may result from the policy, programme, plan or project;
- Establishing the significance of the predicted changes, and determining how the various affected groups and communities will likely respond;
- Examining other options; .
- Identifying ways of mitigating potential impacts and maximizing positive opportunities;
- Developing a monitoring plan to inform the management of change;
- Facilitating an agreement-making process between the communities and the developer ensuring that principles of free, prior and informed consent are observed;
- Assisting the proponent in the drafting of a social impact management plan that puts into operation all benefits, mitigation measures, monitoring arrangements and governance arrangements, as well as plans for dealing with any ongoing unanticipated issues as they arise;
- Putting processes in place to enable proponents, government authorities and civil society stakeholders to implement arrangements, and to develop their own respective management action plans and embed them in their own organizations, establish respective roles and responsibilities throughout the implementation of those action plan's, and maintain an ongoing role in monitoring

Adapted from Vanclay & Esteves (2011, pp. 11–12) (Esteves et al., 2012, p.35)

Figure 2.1 Best Practice SIA (Esteves et al., 2012; Vanclay & Esteves)

On a case-by-case basis, scholars have assessed the social effects of various large infrastructure projects at multiple scales. The social effects of large infrastructure projects encompass effects on lifestyle, health and wellbeing, culture, community, displacement and resettlement, housing, local amenities and facilities, justice, human rights, and resilience, (Dimitriou & Sartzetaki, 2018; Esteves et al., 2012; Helseth & Ryser, 2007; Mckenzie, 2013; Rolfe et al., 2007; Tilt et al., 2009). The literature tends to focus on the social impacts of large infrastructure projects in

developing countries (Mtkei et al., 2017; Tilt et al., 2009, etc.). Social issues like physical displacement are not as large of a concern for developed countries, and for the Tarras airport. Furthermore, research on the social impacts of new airports, gives emphasis to the positive social impacts, such as those relating accessibility and connectivity, providing the opportunity to travel and visit friends and family (Bandstein et al., 2009; Halpern & Bråhen, 2011, etc.). This was the same in rural areas, as the airport helped connect remote areas to the rest of world (Barrett & Moores, 2022; Imperiale & Vanclay, 2016).

Social impacts are particularly important in rural contexts. Literature contends social capital plays an important role in issues that rural areas and small towns face (Woodhouse, 2006). Effects on rural qualities and characteristics like the slow lifestyle, community connection, and amenity value are often forgotten in social impact assessments and literature (Woodhouse, 2006; Mayer and Knox, 2010). In a central Otago context, Perkins et al. (2015) finds amenity and landscape value is of utmost importance to local residents. Sudden influxes in population, can cause disruptions to social networks and cohesion (McKenzie, 2013; Yao et al., 2011). Mckenzie (2013) also highlights how increases in population put pressure on local social infrastructure and facilities, such as schools and health services.

A term often used across international literature as essential to the successful implementation of large projects is the “social license to operate” (Moore, 1996; Cooney, 2017). Introduced in the late 1990s, the concept is described as a continuum of social support for a project - ranging from no support, acceptance, to approval (Jijelava & Vanclay, 2017; Parsons & Moffat). The concept does have criticisms, such as it does not necessarily mean a project is infeasible or undesired (Owen & Kemp, 2013). Despite these critiques, it is still a valuable concept in the research context.

Community engagement and social acceptance is a crucial part of any large-scale infrastructure project, especially due to the uneven negative impacts placed on local communities (Barrios, 2008; Karselaers et al., 2013). In regard to rural areas in particular, recent findings suggest that rural communities are becoming more receptive to engagement (Barrios, 2008). When it comes to undertaking new developments or creating tourism opportunities in rural areas, the support of the local community has been shown to be vital for long-term success (Alim et al., 2021). A lack of social license to operate can ultimately halt or cancel large projects. For instance, Jijelava & Vanclay (2018) explore how a hydroelectric plant in Georgia was halted after extensive social protest. The project ultimately lacked legitimacy, credibility and trust. As in,

the local communities saw no social justification for the project. This may be the case amongst the Tarras community, who may not agree with the rationale of the proposed airport. Jijelava & Vanclay (2018), among many, agree the concept of a social license to operate has the potential to encourage project proponents to consider and implement activities which will lead to better outcomes for all parties.

The social impacts of new developments are possibly the more important factor to consider when assessing the attitudes of rural communities towards new developments. The pushback on developments due to social reasons is not limited to any specific population group, as the concerns most frequently raised often revolve around protecting the natural environment and preserving the culture of the area (Kerselaers et al., 2013). However, possibly one of the largest reasons that communities oppose new developments is due to the way in which they are proposed to the public. While many developers aim to involve the local community throughout the entire process of a project, this is often seen as superficial, with the input often being completely disregarded. Kerselaers et al., (2013, p.201) shares this sentiment,

“If there is no room for adaptation of the plans, you shouldn’t have a public consultation, because there is nothing that can be done... If there are no more alternatives, then it [the public consultation] is purely a formality.”

Developments exacerbate this issue as many community members may not be against a project specifically, but turn against it due to the fact that no real measures are taken to account for their social wellbeing (Kerselaers et al., 2013). Forms of tokenistic consultation such as this have been shown to negatively impact the perception of a project and are often more detrimental than having no public participation at all (Dola & Mijan, 2006). The social impacts of new developments will vary vastly depending on the situation; however, the perception of these projects can be greatly improved with honest communication, and a genuine goal of catering to the needs of the specific community. Even with approval and genuine shared goals for the future, land use change is still a complicated planning concept.

2.3.5 Cultural Effects

Cultural implications can be extensive, this will vary based on the location, scale, and nature of specific infrastructure projects. On a large scale, indigenous communities may be displaced, and sites of cultural significance may be lost resulting in the loss of cultural and ecological knowledge (Tilt et al, 2009). From a New Zealand perspective, cases such as the conflicting indigenous and corporate values surrounding Ihumātao, an area of cultural significance

highlight the importance of considering the cultural implications of developments (Hannock et al., 2020). Hanna et al. (2016) emphasises the importance of not overlooking cultural implications and instead carefully mitigating them. This example highlights the importance of understanding the cultural significance of a place where development is proposed. In the context of the proposed Tarras airport, it will be important to consider any cultural implications that may arise before undertaking any development.

2.3.6 Spillover Infrastructure Effects and Land Use Change

The effects on airports and other large infrastructure projects can be categorized into direct and spillover effects. Airports do not merely provide a transport function, but also typically grow to be a key economic node for social and economic development (Addie, 2014). Addie (2014) describes airports as the “*key catalysts for urban growth and economic development in an era of global urbanization*” (p. 1). These projects create immense changes in the land use of the surrounding area by attracting people, commercial, and industrial development (Kasarda, 2013). In assessing land use surrounding airports, Graham (2005) finds logistics and storage, hotels, high-tech and other industries are located in the valuable areas. Furthermore, infrastructure projects can alter the overall functioning of an area. For example, an increase in the population of a rural area, making it more urban (Balta & Atik, 2022). The impact of the airport on land use change and development is a key consideration in the construction of an airport in Tarras, especially due to the majority of land being used for agriculture.

In a New Zealand context, the change of land use on agricultural land is of high importance. Current trends show that land used for agriculture and horticulture is the most susceptible to land use change in New Zealand. Since 2002 there has been a 14% decrease in land used for these purposes across the country (Stats NZ, 2021). With New Zealand continuing to urbanise it can be expected that agricultural land will continue to decrease in the near future (Rutledge et al., 2010). The impacts of land use change lie mostly in the irreversible damage done to high-class soils across the country (Mackay et al., 2011). Examining these changes, in the context of the potential Central Otago airport remain highly important for the greater agriculture production of the area, as well as in connection to the social effects. A study by Xiong & Tan (2018) focused on airport related land use change. A significant reduction in agricultural land was found to occur as a result of the airport and supporting infrastructure. A “spillover effect” was described as infrastructure such as new roads were built to accompany the airport.

Additionally, as a rural area Tarras has limited existing infrastructure. In a New Zealand context, Nel et al., (2019) suggest that small towns are ill-prepared to deal with the rapid new-found growth they gain during the construction phase or outcomes after completing a major development project. There is a gap in the literature in examining the effects of a large infrastructure project on existing rural infrastructure. This present research will aim to address this gap, by exploring what spillover infrastructure effects will materialize in Tarras.

2.3.7 Case Studies

This section will explore two case studies from the literature that assess the effects of large infrastructure. In doing so, providing a comparison to the present case study on a large-scale infrastructure in a rural area. Case studies on large infrastructure projects in rural areas and in developed economies are notably undeveloped. Most research on the impacts of large-infrastructure projects has been carried out in large urban centres or in the global South. The results of the chosen case studies cannot directly be applied to the present case study; however, they can indicate the general themes expected.

Firstly, Bacior and Prus (2018) assess the impact of a motorway development on agricultural land and regional sustainable development, through a case study in regional Poland. The results from their study suggest the motorway had a negative impact on agricultural lands for four reasons; the direct taking over of the lands for the purpose of the motorway, land fragmentation, decrease in quality of the lands in the vicinity of the motorway, and disturbances from the motorway activity. The negative impact of the development was also seen in the environment, biodiversity, changes in land use, and the cultural landscape (Bacior & Prus, 2018). The case study can be compared to the present research, as the transport infrastructure of an airport may have similar effects on agricultural lands. The impacts on agricultural land were determined using a cadastral map which highlighted factors such as soil class, land use type, buildings, and the range of the motorway (Bacior & Prus, 2018). This allowed for a more comprehensive assessment of impacts. A similar method will also be employed when determining the potential impacts of the Tarras Airport on highly productive soil.

The second case study, undertaken by Tilt et al. (2009), focused on the social impacts of large dam projects in Lesotho and China. Once again, while the context differs, insights can be gained in relation to the Tarras based research. Data was used from social impact assessments to determine the primary impacts of a large-scale infrastructure project on the local communities (Tilt et al., 2009). The main impacts identified in this study included

resettlements, changes to employment structure and the rural economy, effects on housing and infrastructure, and “non-material cultural aspects of life” (Tilt et al., 2009). All of which could be expected in the rural context of the Tarras community. The social impacts associated with the migration of new populations including workers for the construction and operation phases of the development was a particular concern. More specifically, overall community function was affected. For the dam projects, the displacement of individuals from their homes was a significant issue. In the Tarras context, this is not likely to be a concern. While the development may lead to a feeling of displacement, forced physical displacement is unlikely in this context. The methodology taken by Tilt et al. (2009) informed the present research, this included focusing on the local people and using qualitative interviews.

Neither of these case studies are truly comparable to an Aotearoa New Zealand context, or a Central Otago Airport specific one. As such, the present research will provide a unique case study. The development of an international airport in the highly rural setting of Tarras in the New Zealand context is quite different from the dominant themes in current research. Furthermore, the focus will be beyond one type of impact. The aim is to determine the primary economic, environmental, social, and cultural effects.

2.3.8 Demand for Air Travel

The proposed airport in Tarras is strongly linked to discussions on demand for air travel. Previous studies have demonstrated that there are two major components in considering the potential need to develop a new airport; the expected future demand and regional development prospects and the current capacity of surrounding airports (Dimitriou & Sartzetaki, 2022; Ryerson & Woodburn 2014). However, as highlighted in Suh & Ryerson (2019), creating an accurate estimate of air travel demand is difficult. This is because of unpredictable changes in the global economic climate (Suh & Ryerson 2019). No event has demonstrated this quite like the COVID-19 pandemic, which had unprecedented impacts on the amount of air travel globally and left many airports almost entirely empty (Dimitriou & Sartzetaki, 2022; Gao, 2022). While this is an extreme example, even smaller economic recessions or upturns greatly impact the number of people who can travel via air. On the other hand, air travel is still a continuously growing field, with some estimates expecting the number of air travellers in 2040 to reach 10 billion passengers (Dixit & Jakhar 2021). For context, the number of air travellers in 2018 was just over 4.3 billion passengers. A growth in future demand for air travel in and out of Central Otago, and the existing airports inability to provide a solution

has been adopted by CIAL as the rationale for a new airport in Tarras. The literature highlights how this rationale is not fully legitimate.

2.4 Informed Leaders Research

This current research does not aim to contribute to the larger group work and research that is being done under the Informed Leader Research Group. The Informed Leader Research Group is composed of leading scientists, academics, and researchers around Aotearoa New Zealand focusing on issues and debates on an international and national scale, specifically in the aviation industry (Informed Leaders, 2023). Yet their literature is relevant to the study through specific elements surrounding the effects and rural protection, as discussed previously in the literature review.

Their argument hinges on the future of Aotearoa New Zealand in regard to the economy and climate change. Firstly, low-carbon aviation. Aviation carbon emissions are growing rapidly prompting a conversation around low-carbon aviation, but for the upcoming decades it seems to largely be a fallacy (Becken et al., 2023; Peeters & Papp, 2023; Stephenson et al., 2018; Bows-Larkin et al., 2016). Delivering low-carbon aviation on a large scale is fraught with numerous issues and there is currently no reliable solution (Informed Leaders, 2023).

Secondly, the group examines tourism sustainability throughout Aotearoa. The Informed Leaders (2023) argue that tourism is struggling with the crucial issues of sustainability within the tourism industry and the new airport undeniably invites more growth (Higham et al., 2022; Higham et al., 2022b; Hopkins et al., 2016; Hopkins et al., 2012).

Lastly, the group argues that the socio-technical approach to building the potential airport and its infrastructure would lock the country into ‘long-term path dependencies’ that would have consequences for many decades into the future (Informed leaders, 2023; Geels et al., 2017; Geels, 2012; Elzen, 2004; Geels et al., 2016).

All of the literature compiled by the Informed Leaders form their basis to directly oppose the airport through published works, citations, direct communication with CIAL, and indirect open letters to the New Zealand Government.

2.5 Summary and Implications

The literature examined highlighted the complexities we can anticipate in the rural context of Tarras. For example, the enhanced connection rural communities tend to have with their environment which influences a general adversity to change. Considering the gap in research

surrounding large scale infrastructure, particularly developed rural areas. Our research aims to understand the aspirations of the rural Tarras community in relation to the proposed airport. The global context of the demand for air travel in the context of climate change was another key consideration which emerged. This will be important to consider in the context of the proposed airport.

Literature on large scale infrastructure projects and airports highlighted the conflicting interests often present surrounding such projects. Alongside this, the irreversible nature of short- and long-term effects was prevalent. The more specific literature on environmental, economic, social and cultural effects of airports and other large scale infrastructure projects provides insight relevant to our research. The potential effects of the Tarras airport and infrastructure needs will be a key focus of this research as a result. This aspect of our research also aims to fill the gap in research relating to large scale infrastructure projects in rural areas. Literature related to social impacts, the social license to operate and the connection rural communities have to their environment highlights the importance of proceeding with a community-based methodology. This should allow for the Tarras community, who would be most strongly impacted by this project, to be heard. The case studies explored also highlight key methods. This includes mapping land use and community, stakeholder interviews and focus groups.

3 Study Context

Central Otago, well known for its unique landscapes, distinctive seasons, strong communities, and iconic history

The research is situated in Tarras, Central Otago, New Zealand. Christchurch International Airport Limited (“CIAL”) have purchased a 750-hectare site of agricultural land in Tarras for the Proposed Central Otago Airport (referred to as the Tarras Airport for the purpose of this research). The area is renowned for its idyllic landscapes, distinctive seasons, and world-class products, i.e., merino wool and pinot noir wine (Central Otago District Council, 2019a). Tarras is a valuable study area in planning for the extensive impacts of contemporary large-scale infrastructure projects on small rural communities. Especially impacts on rural characteristics, associated infrastructure, and local community values and aspirations. The following chapter establishes the locational specifics of the study area and proposed airport – including the geographical, historical, environmental, and socioeconomic context, and the implications for the research. Additionally, the chapter will describe the aviation context and rationale for the Central Otago Airport itself.

3.1 Location of Tarras and Proposed Tarras Airport

Tarras; “The Northern Gateway to Central Otago”

The proposed Tarras Airport is located on a 750-hectare site in Tarras. Tarras is a small rural farming settlement located in the inland Central Otago region of New Zealand’s South Island (*Figure 3.1*). The land use of the Tarras area is predominantly rural (agricultural, viticulture, rural-residential), with a small settlement – the Tarras village. Tarras encompasses much of the head of the Cromwell Basin – extends north to the Lindis Valley, west to the Clutha River/Mata-au, South to Bendigo and the head of the Lake Dunstan, and is bounded by the Dunstan Range to the east. The rural area is in the far northwestern boundary of the Central Otago District, bordering the Queenstown Lakes territorial boundary. Crucial to the rationale of the proposed airport, Tarras is strategically located on State Highway 8, 32km north of Cromwell, 91km north of Queenstown, and 390km south of Christchurch via Lake Tekapo and the Mackenzie District. Additionally, only 32km from Wānaka via the State Highway 8A junction in Tarras.



Figure 3.1 Map of Tarras Locality

Figure 3.2 illustrated the purchased site for the proposed Central Otago Airport. At present, the site is used for agricultural purposes. It is bordered by State Highway 8 to the east, State highway 8A to the north, and Maori Point Road on the western boundary. Surrounding land uses include scattered rural residential properties, vineyards, and various commercial/industrial businesses including logging, joinery, and an electricity substation. The site is 400m south of the Tarras village.

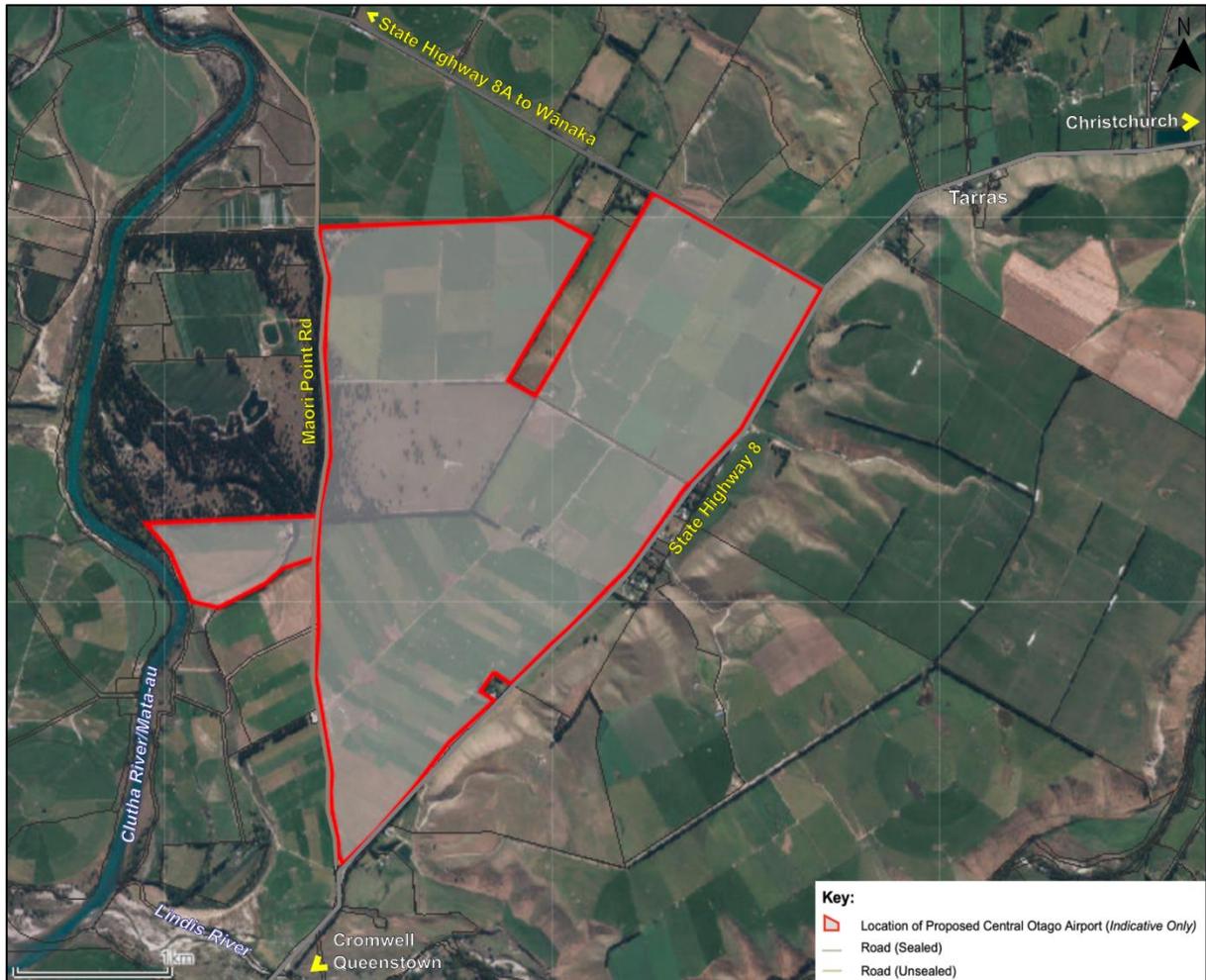


Figure 3.2 750-hectare site CIAL has bought for the Proposed ‘Central Otago Airport’

3.1.1 Governance and Plan Zonings

Tarras is located within the jurisdiction of the CODC and Otago Regional Council (“ORC”). Under the Resource Management Act 1991 (“RMA”) and Local Government Act, the CODC, as a territorial authority, have responsibilities for land use, infrastructure, subdivision, and noise. Whilst the regional council’s responsibilities include managing the effects on soil, water, air, waste, pollution, and the coast. Much of CODC’s functions under the RMA are administrated through the Central Otago Operative District Plan (“District Plan”). Under the District Plan, much of Tarras is “zoned” (i.e., used, developed, regulated) for rural land uses. The exception being the Tarras Village, zoned for Rural Settlement purposes. Importantly, the site for the proposed airport is also zoned Rural. The zoning of Tarras is very restricting for development unless it aligns with a rural land use. Within the Otago Regional Plans, the Tarras basin is the location of extensive groundwater protection zones, notably the airport site is situated on the Lower Tarras Aquifer. Archsite data, illustrates many known archaeological sites in the vicinity of the airport site and the Tarras region from Māori and European

occupation. Overall, the location of the proposed airport is strategically located, yet will radically change the area and rural characteristics.

3.2 Historical Context

Tarras and Central Otago has been shaped and transformed by distinct periods in its history. The Iwi of Kāi Tahu/Ngāi Tahu first made their home in Te Waipounamu (South Island) over 800 years ago. Central Otago was part of seasonal māhika kai trails for many of the hapū and whānau in the Ōtakou and Murihiku districts (Kāi Tahu Ki Otago, 2005). Māori travelled along the Mata-Au, Lindis Pass, and Thomsons Saddle (inland trail) for valuables such as pounamu, moa, pora, eels and weka (Anderson, 1986; Beattie, 1930). The Mata-au and Lindis River were important Mahika kai resources.

In regard to the European history of the area, Otago was founded by Scottish settlers in 1848. As with Māori occupation, initial settlement was clustered in Coastal Otago, especially Dunedin (Hocken, 2011). The first Europeans settled in Central Otago in the late 1850s for sheep farming (Mather, 1982). Since initial European occupation, Central Otago has been shaped by globalised economic industries that have evolved in its distinctive landscape (Perkins et al., 2015). Firstly, The Central Otago Gold Rush of the early 1960s stimulated a rapid influx of people to the region and subsequent rapid expansion of settlements. However, the gold rush was short-lived, and only a few years later desertification entailed. The landscape still bears witness to old trails, cottages, mines, and machinery. Soon after, with the help of the accumulated gold wealth, the area supported extensive pastoral farming endeavours, particularly merino sheep (Bristow, 1966; Hercus, 1966). Later, irrigation was used to transform low-lying pastoral land into stone fruit orchards and more recently vineyards and cattle (Hercus, 1966; Perkins et al., 2015). In 1992, the controversial construction of the Clyde Hydroelectricity Dam on the Mata-au/Clutha River, drastically transformed the Cromwell basin (Perkins et al., 2015; Price, 2020). Today, the agricultural, viticulture, and horticulture sectors remain significant, alongside tourism (New Zealand Herald, 2016). All of these events have brought about lasting changes to the population, infrastructure, environment, and economy (Hercus, 1966).

Overall, Tarras and Central Otago has had a relatively short human history. Distinct periods have shaped its identity, and have been associated with social, economic, environmental and landscape change in the region (Perkins et al., 2015). A recognition of the Māori and Pakeha

history in the Tarras area is valuable to understanding the community's perspectives and values, important sites and landscapes, and land use and socioeconomic changes.

3.3 Environmental Context

The natural environment of the Tarras area is characterised by a distinct landscape and climate, vast water and soil resources, rural land uses, and important ecosystems and biodiversity. These elements mean a large-scale infrastructure project in Tarras will irreversibly change the environment. Airports and aviation also notably contribute to global and national carbon emissions. Therefore, it is important to take into account their impact on climate change as an environmental effect.

3.3.1 Climate

Central Otago has a continental-style climate, characterised by four extremely distinct seasons. Located in the rain shadow of the southern alps, it has some of the hottest summers and coldest winters in New Zealand (Macara, 2015). Central Otago is the driest region of New Zealand, receiving less than 400 mm of rainfall annually (Macara, 2015). The region has low wind, freezing and frosty nights, and is subject to snowfall especially on the mountains. In Tarras, the annual rainfall is between 300-500 mm (ORC, 2015). The Bendigo-Tarras basin is the sunniest in Otago, with over 2,100 sunshine hours annually, however, the average daily low in the winter is -2°C (Macara, 2015). Its unique climate contributes to its distinctive natural environment, key economic sectors, and recreational lifestyle.

3.3.2 Landscape, Visual Amenity, and Rural Character

Tarras and the wider Central Otago region has a nationally and internationally recognised distinctive landscape and denotes many characteristics of an amenity rich rural area (Perkins et al., 2015). The regions outstanding natural environment is dominated by rugged folded schist mountain ranges, the fast-flowing Mata-au/Clutha River, and intervening dry flat valley basins. Tarras is characterized by a flat basin bordered by Dunstan Range and Pisa Range. The Matu-au/Clutha River flows south to the head of Lake Dunstan, and the Lindis River in a south-westerly direction into the Clutha. Central Otago is well recognised for its natural beauty, yet the long stretches of irrigated pasture, vineyards, and fruit trees also contribute to the amenity and rural character of the area. In Tarras, Merino-sheep high-country stations and large agricultural plains dominate the landscape. The distinctiveness and uniqueness of its landscape features has been shaped by its continental climate, contributing to its rich amenity. Especially, in autumn and spring where trees change colour or blossom. The unforgettable landscape of

Central Otago is key part of its regional identity as place to live, work, and enjoy (CODC, 2023). In relation to the research, amenity is today a dominant force for social, economic, environmental and landscape change in particular rural regions like Central Otago (Perkins et al., 2015).

3.3.3 Water Resources

Despite a relatively dry climate, the Central Otago District contains significant water resources. New Zealand's lakes, rivers, and groundwater are central to people's social, cultural and economic wellbeing; however, they are under considerable pressure from development and climate change. The water quality and quantity of Central Otago's lakes and rivers is generally good. However, there is pressure in the drier areas of the catchment, where there is significant water use, or intensified farming and population growth (ORC, 2023). Furthermore, degrading trends in E.coli, nutrients, and aquatic insect life (ORC, 2023). Central Otago has a large source of groundwater with several large basins that hold relatively deep gravel aquifers and shallow alluvial ribbon aquifers near rivers, including the Lower Tarras Aquifer. Groundwater quality is generally good, however, some bores in lower Tarras have elevated E. coli and nutrient levels (ORC, 2023). The use of the District's water resources is high. Uses include recreation; hydroelectric power generation; irrigation; domestic and industrial consumption; as a receiving body for wastes; and as an aquatic ecosystem. The rivers, lakes and wetlands are also significant components of the regions landscape.

3.3.4 Ecosystems and biodiversity

Central Otago has a rich ecosystem, which provides habitat for a range of native, rare, and threatened species, contributing a lot to national biodiversity. This includes a range of fish – trout, eels, galaxis; invertebrates – stone fly; reptiles – skinks and geckos; birds – black fronted tern, New Zealand falcon; and flora (ORC, 2015; CODC, 2008). The vegetation of the Tarras area comprises high-country tussocklands, low altitude scabweed and exotic grasslands of the agricultural flats (ORC, 2015). The hill faces are regenerating native shrublands. The Bendigo wetland, where the Clutha-Mata-au runs into Lake Dunstan, provides a habitat for diverse wildlife (ORC, 2015). However, like the rest of New Zealand, the ecology of the region is threatened by processes of land-use change and invasive species (aquatic weeds, mammal pest species) (ORC, 2015). The impact of the airport on ecosystems and biodiversity is an important consideration in the construction and operation of the proposed Airport.

3.3.5 Land-use

Land-use in Central Otago was traditionally dominated by pastoral farming. While still significant, change in physical, economic and social conditions has led to an increasing diversification and intensification of land use activities, largely associated with rural lifestyle trends, viticulture, and horticulture, recreation, and dairy farming. In Tarras, pastoral farming is still the dominant land-use, particularly sheep (merino) (ORC, 2015). However, similar to the rest of Central Otago has witnessed an increase in life-style blocks, dairy farming, and viticulture (ORC, 2015). There is a number of past and present crown pastoral leases in the high country (ORC, 2015). Approximately 40,000 hectares of conservation land within the Central Otago District, much of which are on these pastoral leases (CODC, 2008). The land use pattern has greatly been influenced by the soil characteristics and climate of the region.

3.3.6 Highly Productive Land

Highly productive land (also referred to as highly productive land or high-class soils) is the most favourable and versatile soil in New Zealand for primary production. Highly productive land makes up approximately 15% of New Zealand Land (Defined as class 1,2, and 3 soils under the land use capability classification). In the last two decades, 35,000 hectares has been lost to alternative use, development, or subdivision, especially lifestyle blocks. In Tarras, there are areas of class 3 soils which are protected under the National Policy Statement for Highly Productive Land. Importantly, high-class soils are not the only special land resource in Central Otago and Tarras. Because of particular soil characteristics as well as the continental climate and irrigation, the poor soils are ideal for viticulture and horticulture uses, and are considered a special resource (CODC, 2008).

3.3.7 Low Carbon Future of Aviation

A key environmental consideration in assessing the impacts of a new airport is its contribution to global and national greenhouse gas emissions (“GHG”) emissions. In New Zealand, the aviation industry accounts for 2% of total GHG emissions (Christchurch Airport, 2022). Additionally, there are concerns over the development and expansion of jet-airports in the context of government declared climate emergency (Otago Daily Times, 2021). New Zealand, and the aviation industry must take urgent action to reduce GHG emissions. Conversely, innovation in the industry means new airport infrastructure can fit into a low carbon future (Christchurch Airport, 2022). For example, through the development of new generation low carbon aircrafts, sustainable aviation fuels, and zero carbon hydrogen and electric planes

(Christchurch Airport, 2022). Subject to green washing standards, CIAL have a reputable image for reducing emissions that occur from sources within their organisation. In relation to the proposed Central Otago Airport, they are investing in native forest regeneration and have plans to develop land onsite into a resilient supply of renewable energy for future aircrafts (Christchurch Airport, 2022).

3.4 Socioeconomic Context

Tarras is a rural settlement, with a rural population and economy. The Tarras region has a small population of approximately 231 permanent residents (CODC, 2007). The wider Central Otago region has a population of approximately 25,200 (2022). The largest urban centre is Cromwell (over 5,500) located less than 30 minutes from Tarras by vehicle (Stats NZ, 2018). Tarras is also located in close proximity to the Queenstown Lakes region, with the urban settlements of Queenstown and Wānaka. Central Otago is a thriving region with one of the fastest growing populations in New Zealand, particularly in neighbouring Cromwell. This rapid growth is attributed to spillover effects from the Queenstown Lakes District and its central location, scenery, primary industries, lifestyle and amenity (CODC, 2023; Perkins et al., 2013). While there are challenges of a growing population elsewhere in Central Otago, Tarras's population has remained stagnant. However, recent viticulture opportunities and more intensive farming have brought new people into the area.

People living in Central Otago are primarily European (91.9 percent), higher than the national average (70.2 percent). The Māori population (8.4 percent) and other ethnic minority groups are lower than the overall population portion of New Zealand (Stats NZ, 2018). While the ethnicities of Tarras are not publicly available, it is expected to be similar to Central Otago as whole. The district has a higher median income than nationally, as well as a significantly higher proportion of over 65s (21%) which is expected to grow to over 30% by 2028. Tarras has traditionally been populated by families, who have a long history and strong sense of connection to the area, initially attracted by the gold rush or farming (CODC, 2007). Young people tend to leave the area to find a wider range of employment or educational opportunities (CODC, 2007).

3.4.1 Livelihoods and Economy

Central Otago has a distinct and diverse economy and is an attractive place to live and visit (CODC, 2023). Agriculture (sheep, cattle, deer), horticulture (stone fruit), and viticulture (pinot noir) industries form the foundations of the economy (20.1 percent of employment and 13.9

percent of GDP), while tourism and services play an increasing role in local economic development due its central location and proximity to tourism destinations of Queenstown and Wānaka (Duval, 2004; Infometrics, 2023; Perkins et al., 2015). The Central Otago economy is growing, contributing to rising land and housing prices, especially in Cromwell. This may prove weighty to the construction and operation of the proposed airport, with limited short-term and long-term accommodation options.

In Tarras specifically, Agriculture remains the primary contributor to the local economy, particularly sheep farming (CODC, 2007). Viticulture has a growing role in the region, with the likes of Māori Point Vineyard and Swallows Crossing. Tarras is also characterised by being on the main tourist route into Central Otago from the north (CODC, 2007). The economy is less diverse than the rest of Central Otago and may benefit from economic diversification. Its economy and industries are inextricably linked to international export markets, and reliant on irrigation, due to extremely low rainfall (CODC, 2007). It becomes evident in the results that some locals believe the airport may bring more opportunities to Tarras. Aviation underpins the world economy and is fundamental to the exporting of products in Central Otago.

3.4.2 Infrastructure

Tarras has a small rural primary school, with a role of 20 students as of July 2022 (Education Review Office, 2022). The village includes a Merino wool shop, café, petrol station, church, and community hall. Tarras residents have access to a variety of recreational resources in nearby lakes and rivers, and rural mountain ranges, and golf course. A broader range of social services are available in Cromwell and Wānaka, less than a half an hour drive from Tarras. Housing is classified as rural-residential, and there is an increasing abundance of lifestyle blocks. Tarras has a lack of three-waters infrastructure, an at capacity supply of electricity, and a fibre telecommunications network. Its roading network is varied, from state-highways to country paper roads. The limited and rurally characterised infrastructure means a new airport would require major upgrades to relatively all forms of infrastructure.

3.4.3 Community Values and Aspirations

The Tarras population is actively involved in community activities and is vocal on what they value about the settlement, and what they aspire for it to be. Tarras has a vast range of community groups from the Rural Women, play group, Golf Club, to Sustainable Tarras. Findings from a community workshop in 2007 indicate the issues of importance to the Tarras community relate largely to infrastructure and water – irrigation, drinking water supply, roads,

public toilets, telecommunications, electricity (CODC, 2007). But also, residential and business development, and advocacy for education, recreation, heritage, and tourism (CODC, 2007). Furthermore, the community identified that development should be sympathetic to landscape characteristics and heritage. The present research aims to explore whether the airport aligns with community values and aspirations.

3.5 Aviation Context

Christchurch International Airport Limited (“CIAL”) are proposing a new regional airport on 750- hectares of rural land in Tarras. The apparent rationale for the airport will be described at national, regional, and local scales, however, has a common theme of *connectivity*.

3.5.1 Existing Aviation infrastructure

New Zealand has four international airports, alongside 35 domestic airports, and many non-commercial aerodromes. In just the lower South Island, there are three commercial jet airports – Queenstown International Airport, Dunedin Airport, and Invercargill Airport. There is also a non-jet airport in Wānaka. The below diagram depicts the airports in the lower South Island and the proposed Central Otago Airport (*Figure 3.3*). CIAL contend the existing airports in the lower South Island are unable to provide a solution to future aviation needs (Christchurch Airport, 2022).



Figure 3.3 Airports in the Lower South Island, New Zealand (Adapted from: Christchurch Airport, 2022)

3.5.2 Rationale for Central Otago Airport

As a geographically isolated island nation, New Zealand has a unique dependence on aviation to connect to the world (Christchurch Airport, 2022). Aviation currently is the most practical and time-efficient method for importing and exporting freight. Furthermore, connects New Zealanders to the rest of the world and vis versa. Aviation is also important in moving people and products within New Zealand, connecting islands and regions. Connectivity is critical to the social and economic wellbeing of New Zealanders in multiple ways as shown in Figure 3.4.



Figure 3.4 Economic and social outcomes of Aviation (modified from Christchurch Airport, 2022).

The same connectivity rationale at the national level can be said for the regional scale. CIAL speak of Central Otago’s economy and social wellbeing depending on the efficient movement of people and products (Christchurch Airport, 2022). Many of Central Otago’s key sectors rely on high-quality transport connections. For instance, to export products, to fill seasonal employment shortages, and for tourism. The rationale for a new airport in Central Otago is pivoted towards the need for new airport infrastructure to keep up with forecasted growth in tourism, population, and exported high-quality products like cherries. CIAL states “A new regional airport would deliver much-needed safe and efficient connectivity for the region for the next 50+ years” (Christchurch Airport, 2022, para. 3).

The site in Tarras was chosen by CIAL as the most suitable place in the region for a new airport. This was because it is removed from areas with projected high population and incompatible activities, accessibility to multiple regions and state highways, flat terrain and room for safe efficient aviation and supporting infrastructure (Christchurch Airport, 2022). The below *figure 3.5* illustrates the project phases. At time of writing, CIAL at the ‘validation and planning’ phase of the project.

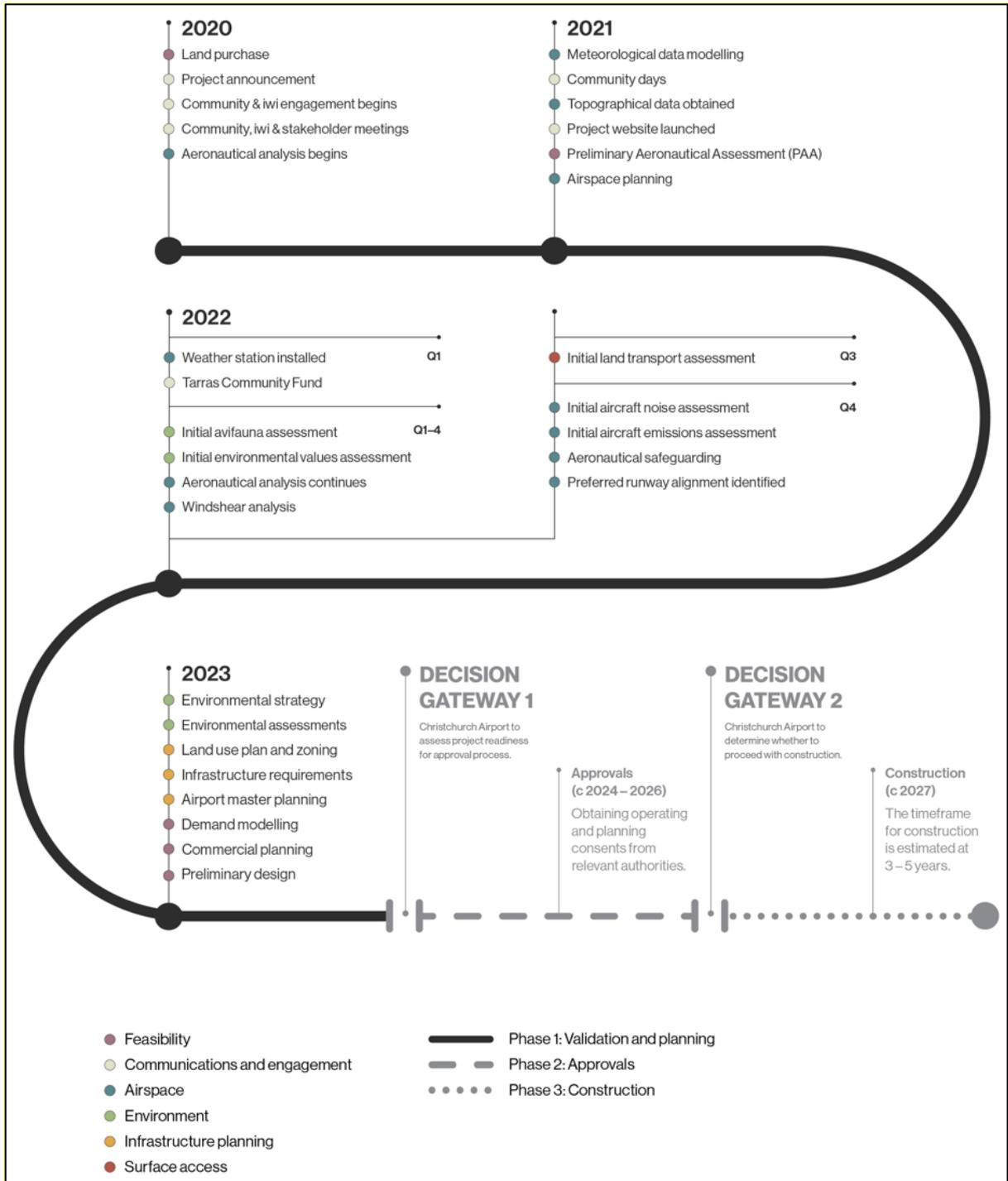


Figure 3.5 Central Otago Airport Project Overview

3.5.3 Debates on Airport Capacity and Alternatives to the Tarras Airport

There are debates on firstly, whether airport capacity in the lower South Island and Central Otago is needed, and secondly, whether upgrading existing infrastructure is more appropriate.

CIAL have argued that the current airports in the lower South Island are unable to keep pace with growth and meet the future social and economic needs of Central Otago. Before the

COVID pandemic, it was well known Queenstown Airport was facing capacity constraints. Furthermore, its expansion is constrained by its encroaching urban and physical environment (*Figure 3.6*) and noise restrictions. Furthermore, CIAL dismissed the ability of Dunedin and Invercargill airports to provide for the region, as they are too distant from Central Otago (a 2–3-hour drive), and their utilisation would have ramifications such as pressure on roading infrastructure and additional climate emissions (Christchurch Airport, 2022).



Figure 3.6 Physical limitations of Queenstown Airport

On the other hand, Queenstown, Invercargill, and Dunedin Airport executives believe there is no reason why these airports cannot provide for present and forecasted growth (Herron, 2022). Queenstown Airport believes they serve the community well and have plans for meeting the growing needs of the region in their 10-year strategy (Queenstown Airport Cooperation, 2022; RNZ, 2022). Furthermore, Dunedin and Invercargill airports have surplus capacity (Herron, 2022). Lastly, The COVID pandemic and global climate is continuing to have a major impact

on global aviation and tourism industries, including significantly reducing the foreseen pressure on airport infrastructure nationally and regionally (Herron, 2022). In summarising this perspective, Invercargill Airport CEO states “*existing infrastructure is better placed to deliver a long-term, sustainable and ultimately more environmentally friendly service*” (Herron, 2022, para. 28).

The upgrading and consideration for a new airport in the Central Otago and Queenstown Lakes area has been investigated multiple times over the last 30 years. Notably, the expansion of Wānaka Airport into a jet airport was heavily considered as an option to increase aviation capacity in Central Otago. However, talks of its expansion recently met strong community opposition. In 2020, Wānaka Stakeholders Group Inc., made up of thousands of Wānaka residents and other stakeholders, won a court case ruling QLDC and Queenstown Airport Corporation failed to adequately consult the community over an illegal 100 year-lease and long-term plans to develop Wānaka Airport into a jet airport (Jamieson, 2019; Jamieson, 2021). This case illustrates the importance of consulting and being open and transparent with local communities and is of relevance to the proposed Tarras Airport. Overall, there are extensive debates on the rationale for a fifth airport in the lower South Island, and alternatives to manage perceived growth constraints using existing infrastructure in the region. These debates continue to be discussed throughout the results.

4 Policy Context and Analysis

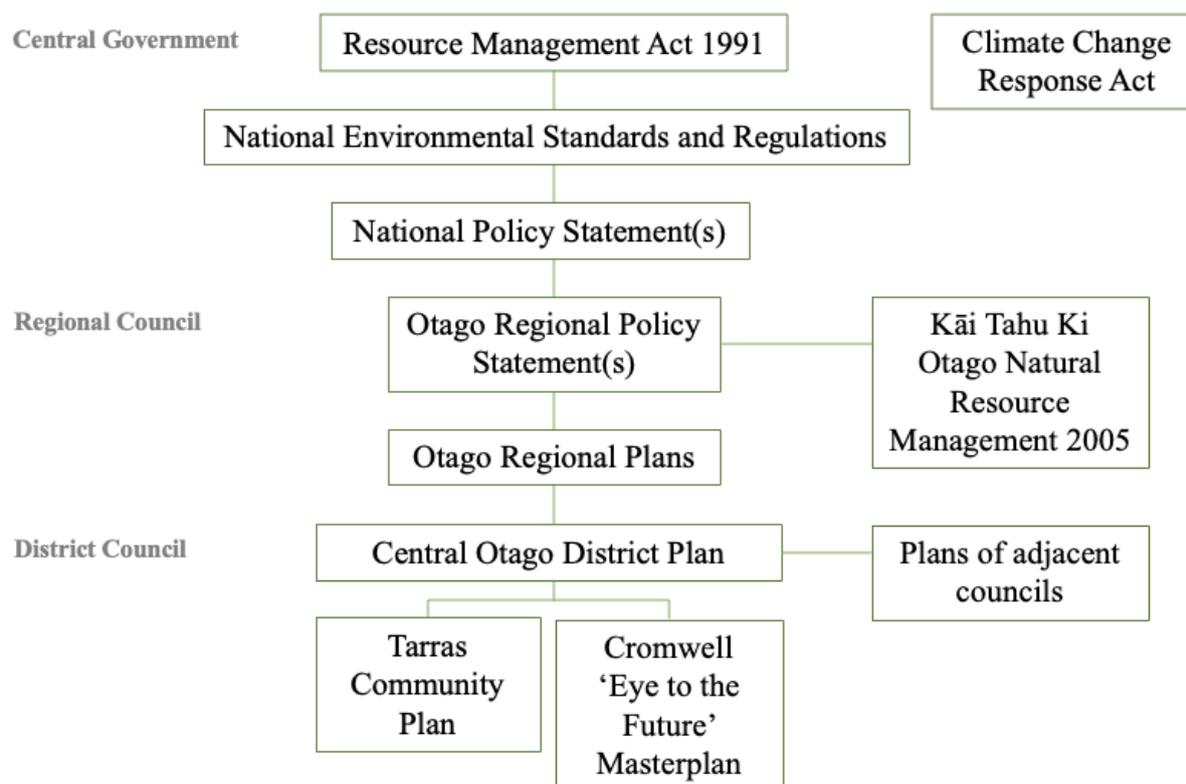


Figure 4.1 Hierarchy of planning instruments (regulatory and non-regulatory) with identified relevance to the proposed Tarras Airport

This chapter will examine national, regional, and local environmental legislation and planning documents that pertain to the development of an international airport in Tarras, Central Otago, New Zealand (see *Figure 4.1*). This chapter will begin by examining the national context and national driven-direction, most notably, the National Policy Statement for Highly Productive Land (NPS-HPL). Subsequently, an assessment of the proposal against regional and district planning documents, including what consents might be required to enable the project to proceed.

4.1 National Planning Context

4.1.1 Resource Management Act 1991

The Resource Management Act 1991 (“RMA” or “the Act”) is the primary piece of environmental legislation in New Zealand that governs how people interact with natural and physical resources. This includes the management of air, land use, and water. Part 2 of the RMA sets out the purpose and principles of the Act. The purpose of the Act is to promote the

sustainable management of natural and physical resources. Principles most relevant to the Airport proposal and rural study area are provided in *Figure 4.2*. Part 2 of the RMA is relevant to the current study as it highlights the complexity of the sustainable management of the rural environment. Particularly how to balance enabling people and communities to provide for their social, economic, and cultural wellbeing with protecting the environment. As well as providing for competing interests. Additionally, resource consent decisions (s104) are “subject to Part 2”, especially in the event of conflict.

6 Matters of National Importance (recognise and provide for)

(b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development

(e) the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:

7 Other Matters (particular regard to)

(a) Kaitiakitanga

(c) The maintenance and enhancement of amenity values

(d) Intrinsic values of ecosystems

(f) Maintenance and enhancement of the quality of the environment

(g) any finite characteristics of natural and physical resources

(i) the effects of climate change:

8 Treaty of Waitangi

Take into account principle of Te Tiriti o Waitangi

Figure 4.2 Principles of the RMA (s.6-8) relevant to the proposed Tarras Airport

The RMA is an umbrella statute that streamlines a hierarchy of planning documents. At the apex of the hierarchy sits the central government created policy statements and national environmental standards, then regional council policy statements and regional plans, followed by territorial authority district plans (Warnock & Baker-Galloway, 2015). In relation to the study area, the RMA sets out the framework in which the Central Otago District Plan manages land use.

It is important to recognise there are ingrained issues with respect to the RMA. Notable to the research, the RMA is “effects-based” as in it manages the effects of activities rather than activities themselves (Ministry for the Environment, 2022b). Hence, lacks “environmental bottom-lines” (Ministry for the Environment, 2022b). Therefore, in theory, any activity can be approved, proven it can mitigate “adverse” effects. Secondly, the RMA does not adequately

address climate change adaption and mitigation commitments (Ministry for the Environment, 2022a). And thirdly, the resource management system in New Zealand lacks a long-term spatial planning, to anticipate and plan for future land use change and infrastructure. Fourthly, the RMA struggles to assess the cumulative impacts of a proposal (Milne & Grierson, 2008). The resource management system is presently undergoing a reform process that involves the development of three new Acts. These Acts will be implemented gradually over the next decade, with the goal of addressing the aforementioned issues and additional challenges (Ministry for the Environment, 2022b). Namely, the Natural and Built Environments Act - the central replacement for the RMA, The Spatial Planning Act – develop long-term regional spatial strategies, and the Climate Adaption Act – addresses managed retreat.

Under the RMA are an array of national policy statements which guide matters of national significance.

4.1.2 National Policy Statement for Highly Productive Land 2022

The most relevant National Policy Statement to the airport proposal is the National Policy Statement for Highly Productive Land 2022 (NPS-HPL). Only around 15% of New Zealand’s land is categorised as highly productive and is diminishing rapidly due to urban sprawl and land fragmentation (Ministry of Primary Industries, 2023), The NPS-HPL provides national direction to protecting the availability of these most favourable and versatile soils for primary production now and for future generations (Ministry for the Environment, 2022c). The purpose of the policy is to direct inappropriate subdivision, use, and development away from highly productive land where practicable (Ministry for the Environment, 2022c). The NPS provides clear direction to local councils on mapping and zoning highly productive land, and balancing the demand for housing, urban growth, and other infrastructure (Ministry for the Environment, 2022c).

Objective: Highly productive land is protected for use in land-based primary production, both now and for future generations.

Policy 4: The use of highly productive land for land-based primary production is prioritised and supported.

Policy 5: The urban rezoning of highly productive land is avoided, except as provided in this National Policy Statement.

Policy 8: Highly productive land is protected from inappropriate use and development.

Figure 4.3 Relevant policies of the NPS-HPL to the proposal and likely cumulative effects

The land of the proposed airport site and surrounding land is identified as highly productive land. The land has been utilised for rural production since the 1850s. When considering the Airport proposal, the consent authorities (CODC, ORC) must give effect to the objectives and policies of the NPS-HPL (see *Figure 4.3*). This involves determining whether the Airport and associated aviation activity is an “inappropriate” development of highly productive land (s3.9). Subsequently, they may only allow highly productive land to be used in an inappropriate manner when:

Section 3.10(1):

- (a) there are permanent or long-term constraints on the land that mean the use of the highly productive land for land-based primary production is not able to be economically viable for at least 30 years; and*
- (b) the subdivision, use, or development:*
 - i. avoids any significant loss (either individually or cumulatively) of productive capacity of highly productive land in the district; and*
 - ii. avoids the fragmentation of large and geographically cohesive areas of highly productive land; and*
 - iii. avoids if possible, or otherwise mitigates, any potential reverse sensitivity effects on surrounding land-based primary production from the subdivision, use, or development; and*
- (c) the environmental, social, cultural, and economic benefits of the subdivision, use, or development outweigh the long-term environmental, social, cultural, and economic costs associated with the loss of highly productive land for land-based primary production, taking into account both tangible and intangible values.*

CIAL must adequately demonstrate that the Airport proposal satisfies the above criteria. As well as demonstrating consistency with regional planning documents, which are made in accordance with national policy statements.

4.1.3 Climate Change Legislation in New Zealand

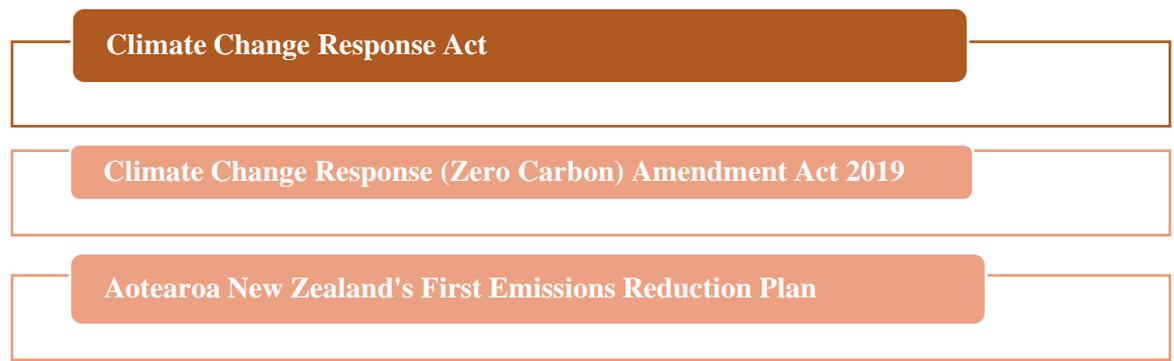


Figure 4.4 Climate Change Legislation In Aotearoa New Zealand

Removed, but not separate, from the resource management system, is New Zealand’s climate change legislation (*Figure 4.4*). New Zealand’s climate change policy has repercussions for the present research in terms of the carbon emissions associated with the aviation industry and tourism. Firstly, the development of a new international airport is contradictory to the Climate Change Response Act 2002. In 2019 this Act provided the legal framework to enable New Zealand to meet its international obligations under the United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement (Ministry for the Environment, 2021a). In 2019, The Climate Change Response (Zero Carbon) Act put into writing New Zealand’s commitment to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5 degrees above pre-industrial levels (Ministry for the Environment, 2021b). As well as setting the national GHG emission reduction target of net zero by 2050 (excluding biogenic methane). The Emissions Reduction Plan, contains the statutory strategies, policies, and actions in contributing to global efforts, as required by the Climate Change Response Act 2002. The airport development and its aviation activity will no doubt contribute to national and international GHG emissions. Therefore, its alignment with these documents is an important consideration in the airport development.

4.2 Regional Planning Context

4.2.1 Otago Regional Policy Statement(s)

Two regional policy statements (RPSs) currently provide an overarching policy framework for the sustainable management of natural and physical resources in the Otago region – The Partially Operative Otago Regional Policy Statement 2019 and Proposed Otago Regional Policy Statement 2021. *Figure 4.5* illustrates the relevant components of the RPSs the airport may have effects on. For the purpose of this exercise, only the policies and objectives of the

Proposed Regional Policy Statement 2021 are evaluated. Notably, the objectives and policies highlight the importance of protecting the regions land resources for primary production. However, it does acknowledge and provide for “multifunctionalism” within rural areas.

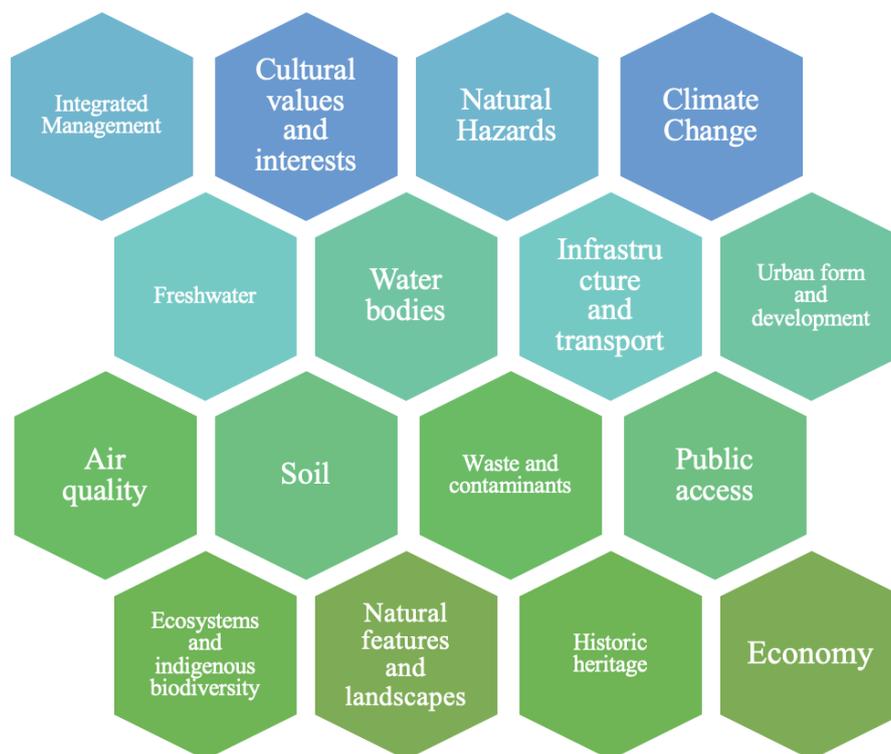


Figure 4.5 Key considerations in the Airport proposal in accordance with Otago’s RPSs

4.2.2 Otago Regional Plans

The Otago Regional Council have four regulatory regional plans that set out how resources should be managed including rules for their use – Air, Coast, Waste, and Water (Table 4.1).

Table 4.1 Assessment of Otago Regional Plans against Airport Proposal

Plan	Purpose	Proposed Airport Assessment
The Regional Plan: Air for Otago (Air Plan)	Assists in managing the air resource and air quality issues. It has rules for activities that discharge contaminants into the air.	The airport development may require a discharge permit to discharge contaminants into the air.
The Regional Plan: Coast for Otago (Coast Plan)	Assists in managing the resources of the coastal marine area (mean high water springs to 12 nm). It has rules for undertaking activities within the coastal marine area.	Not applicable to the Airport development, as the activity will not take place or affect (directly) the coastal marine area.
The Regional Plan: Waste for Otago (Waste Plan)	Assists in managing waste issues. It has rules for the disposal of waste, discharge of hazardous waste and oil, disturbing contaminated land, and operating waste treatment and disposals.	The aviation activity will likely require the disposal and discharging of hazardous waste.

The Regional Plan: Water for Otago (Water Plan)	Assists in managing water resources. It has rules for the use of water, activities in/on waterbodies and their margins, discharges of contaminants that may affect water quality.	The airport development and operation will likely require the need to take water (water permit) as well as discharge contaminants to land and/or water (discharge permit). A land use consent may also be required for structure and/or disturbance of waterbodies.
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Alongside preparing a new regional policy statement, the ORC is also preparing a new Land and Water Regional Plan (expected 2023). The new Land and Water Plan aims to set clearer environmental outcomes in line with the National Policy Statement for Freshwater Management. This involves splitting the region more manageable Freshwater Management Units (FMU). The proposed airport will be within the Clutha Mata-Au FMU, which due to its size, is further divided in five Rohe (area). The proposed airport is located in the Dunstan Rohe, in close proximity to the Clutha/Mata-Au.

It is important the activities subject to these plans are considered alongside activities subject to district planning documents. As well as the cumulative effects of the whole activity, the effects of construction and operation, and subsequent land and infrastructure development.

4.2.3 Iwi Management Plan

Kāi Tahu Ki Otago – Natural Resource Management Plan 2006 (KTKO NRMP) is a non-regulatory iwi management plan. It identifies Kai Tahu values, issues, and objectives for the entire Otago region, and specific to the locale of the research, the Clutha/Mata-au catchment. The plan evolved from the Māori worldview that humans are a part of the natural world. The principle of the plan is “Ki Uta Ki Tai” (from mountains to the sea), emphasising the interconnectedness of natural resources, thus their holistic management (Kāi Tahu Ki Otago, 2005).

The direct effects of the airport operations are addressed under Air and Atmosphere, but the proposal is likely to also have effects on Wai Māori, Wāhi Tapu, Mahika kai, and cultural landscapes, as analysed in *Table 4.2*. The next section will examine the local planning context in Central Otago.

Table 4.2 Assessment of Issues, Objectives, and Policies of the Otago Region and Clutha/Mata Au Catchment Chapters in the KTKO NRMP

Issues	Objectives	Policies
Wai Māori (Water)		
<ul style="list-style-type: none"> Discharges Water Extractions Water quality Land use 	<ul style="list-style-type: none"> The waters are healthy and support Kāi Tahu ki Otago customs 	<ul style="list-style-type: none"> Require an assessment of instream values for all activities affecting water. Require land disposal for human effluent and contaminants Encourage all stormwater to be treated before being discharged. To require monitoring of all discharges be undertaken on a regular basis Promote sustainable land use, and sound environmental practices where land intensification occurs.
Wahi Tapu (sacred)		
<ul style="list-style-type: none"> Destruction and modification through the direct and indirect effects of development and resource use. 	<ul style="list-style-type: none"> Protected from inappropriate activities 	<ul style="list-style-type: none"> To require that a Kāi Tahu ki Otago mandated archaeologist survey an area before any earth disturbance work commences To promote the use of Accidental Discovery Protocols for any earth disturbance work
Mahika Kai and Biodiversity		
<ul style="list-style-type: none"> Discharges impacting on mahika kai. Loss of indigenous biodiversity 	<ul style="list-style-type: none"> Habitats protected. Mahika kai resource are healthy and abundant Indigenous plants and animals are protected 	<ul style="list-style-type: none"> Assessment of the impacts of the proposed activity on Mahika kai To protect and enhance existing wetlands Hazardous operations and substances are not to impact Mahika kai
Cultural Landscapes		
<ul style="list-style-type: none"> Intensified land use Infrastructure Building of structures and activities Inability to address indirect and/or cumulative effects 	<ul style="list-style-type: none"> Relationship that Kāi Tahu ki Otago have with land is recognised in resource management activities and decisions Protection from inappropriate use and development 	<ul style="list-style-type: none"> Protect the full range of landscape features Promote the control of visitor and recreational activities Earthworks avoid adverse impacts
Air and Atmosphere		
<ul style="list-style-type: none"> Discharges Increased aircraft traffic and resultant noise pollution. Impact of national priorities for carbon credits Visibility of cultural landscape features 	<ul style="list-style-type: none"> Sites of significance are free from odour, visual and other pollutants The life supporting capacity and mauri of air is maintained 	<ul style="list-style-type: none"> To require Cultural Assessments for any discharges to air Encourage reduced vehicle emissions. Promote the planting of indigenous plants to offset carbon emissions Encourage aircraft operators to utilise technology to reduce aircraft noise pollution require light suppression techniques

4.3 Local Planning Context

4.3.1 Central Otago District Plan

The proposed Airport is located in the jurisdiction of the CODC and is subject to the Central Otago District Plan (“District Plan”). The District Plan was prepared under the provisions of the RMA. It has objectives, policies, rules, and other methods to manage the use and development of natural and physical resources within the District (CODC, 2023).

Table 4.3 provides the key provisions of the District Plan subject to the construction and operation of a proposed international airport in Tarras. Based on available information, it can be observed that the airport development is contradictory to many of the objectives and policies of the District Plan, especially activities anticipated for the rural resource area. While the issues, objectives, policies, and rules are generally applicable to the proposed airport development, the rural resource area chapter has not anticipated a large-scale infrastructure development in this zoning. Therefore, is not adequately equipped to control and manage the effects of the activity.

Similarly, the infrastructure, energy, and utilities section of the plan (section 13) does not anticipate an airport of such large scale. It can be considered as part of the development of the ‘transport network’. The main rule applicable to the proposed airport is Rule 13.7.3(ii) – Commercial Airports:

“Airports providing for the transport of passengers, freight transport services or that act as a base for commercial operations are discretionary activities. The development of new airports can have a significant environmental effect particularly in terms of noise and the impact on the roading network and consequently the preferred location requires careful consideration. Council therefore considers it necessary that any new development be assessed through the resource consent process.” (CODC, 2008, p.13:17)

This rule was likely curated to be for small airdromes, common to Central Otago, not an international airport. The policy guiding this Rule (Policy 13.4.2) states an airport development must address the matters identified in this policy to ensure amenity values and environmental quality of the district are maintained or enhanced. These matters related to effects on:

- Noise, vibration, glare, light spill and dust
- Heritage and cultural values
- Traffic
- Landscape
- Kai Tahu values
- Sustainable Energy use
- Existing infrastructure and utilities
- Indigenous vegetation; fauna; fish and game; waterbodies and their margins
- Erosion, subsidence, slippage, inundation or other natural hazard events

The analysis only covers the airport operation itself, and its construction. Therefore, does not address any ancillary activities likely to be associated with the airport, such as retail and accommodation, and spillover infrastructure requirements, such as new roads and electricity lines. Accommodation in the rural resource area is a *Controlled Activity* subject to conditions. Retail activity not associated with a “rural selling place” – a place selling rural produce, is a *Non-Complying Activity*. Therefore, the applicant must meet the RMA “threshold test” when applying for resource consent. To meet the threshold test, the applicant must establish that the adverse effects of the activity on the environment will be minor or that the activity will not be contrary to the objectives and policies of the relevant plan or proposed plan. Given the master plan for the airport has not been released to the public, it is difficult to grasp the full extent of the development and its overall effect.

Table 4.3 Analysis of Proposed Airport against Central Otago District Plan Provisions

Section 4: Rural Resource Area			
Issues	Objectives	Policies	Rules
<ul style="list-style-type: none"> • 4.2.1 Outstanding natural landscapes and features • 4.2.2 Unique and distinct landscapes • 4.2.3 Natural features • 4.2.5 special land resources • 4.2.7 Effects on Water Bodies • 4.2.11 Transportation network • 4.2.13 Increasing visitor numbers • 4.2.15 Development in rural areas • 4.2.16 Industrial and commercial activities 	<ul style="list-style-type: none"> • 4.3.1 Needs of the district's people and communities • 4.3.3 Landscape and amenity values • 4.3.5 Water Resources • 4.3.7 Soil Resource 	<ul style="list-style-type: none"> • 4.4.2 Landscape and Amenity value • 4.4.3 Sustainable management of infrastructure • 4.4.5 Effects on water quality • 4.4.6 Adverse effects on the soil resource • 4.4.8 Adverse effects on the amenity values of neighbouring properties • 4.4.9 Effects of rural activities • 4.4.10 rural subdivision and development 	<ul style="list-style-type: none"> • 4.7.4 (ii) Noxious effects
Section 13: Infrastructure, Energy, and Utilities			
Issues	Objectives	Policies	Rules
<ul style="list-style-type: none"> • 13.2.1 The development and use of the transport network 	<ul style="list-style-type: none"> • 13.3.1 Transport network • 13.3.5 Landscape and amenity values 	<ul style="list-style-type: none"> • 13.4.1 Positive contribution of infrastructure • 13.4.2 Managing the development of the transport network • 13.4.11 Reverse sensitivity 	<ul style="list-style-type: none"> • 13.7.3(ii) Commercial Airport Discretionary Activity
Section 12: District Wide Rules and Performance Standards			
Issues	Objectives	Policies	Rules

<ul style="list-style-type: none"> • 12.2.1 Land use activities adjacent to the roading network • 12.2.2 Noise • 12.2.3 Signs • 12.2.4 Adverse effects of lightspill, glare, odour, dust, electrical interference • 12.2.6 Temporary activities 	<ul style="list-style-type: none"> • 12.3.2 Protection from noise • 12.3.3 Reducing adverse effects of signs • 12.3.4 Avoidance, remedying, mitigation of nuisances 	<ul style="list-style-type: none"> • 12.4.1 parking, loading, maneuvering • 12.4.2 Noise • 12.4.3 Noise from temporary activities • 12.4.4 Signs • 12.4.5 Temporary signs • 12.4.6 Public safety and information signs • 12.4.7 Management of nuisance effects • 12.4.9 Temporary activities 	<ul style="list-style-type: none"> • 12.7.1 Access standards from roads • 12.7.2 Parking • 12.7.3 Loading and maneuvering • 12.7.4 Noise • 12.7.5 Signs • 12.7.6 Light Spill
Section 3: Mana Whenua			
Issues	Objectives	Policies	Rules
<ul style="list-style-type: none"> • 3.2.2 Waahi Tapu (Sacred Places) • 3.2.3 Waahi Taoka (Treasured Resources) • 3.2.4 Wai (Water) • 3.2.5 Mahika Kai (where food is produced or procured) 	<ul style="list-style-type: none"> • 3.3.1 Waahi Tapu (Sacred Places) • 3.3.3 Waahi Taoka (Treasured Resources) • 3.3.4 Wai (Water) • 3.3.5 Mahika Kai (where food is produced or procured) 	<ul style="list-style-type: none"> • 3.4.3 Waahi Tapu and Waahi Taoka • 3.4.4 Wai (Water) • 3.4.5 Mahika Kai 	

It is important to note the District Plan is severely out of date, made operative in 2008. The District Plan is not a static document, with several plan changes made in accordance with RMA allowances. Nonetheless, its 10-year review has passed (2018). The District Plan has not anticipated the proposed airport. As such, the District Plan is not likely prepared to adequately deal with such a large-scale activity that has numerous impacts and considerations. As district plan reviews are time-consuming and costly, district councils are hesitant to undertake the complex task in the wake of the three Acts replacing the RMA.

4.3.2 Spatial Plan

Secondly, The Cromwell ‘Eye to the Future’ Masterplan Spatial Framework – Stage 1 Spatial Plan (“Spatial Plan”) applies to the Airport proposal. The Spatial Plan is a non-regulatory indicative plan and strategic vision used to guide growth in the Cromwell basin for the next 30 years, including the outlying settlement of Tarras (CODC, 2019). Part 2 of the Spatial Plan outlines the key community principles and coinciding objectives (*Figure 4.6*).



Figure 4.6 Key Principles of the Spatial Plan (Source: CODC, 2019)

Part 3 denotes the spatial aspect of the Plan guiding future development, zoning, and District Plan changes. However, Tarras was largely removed from this section. Tarras's exclusion suggests there is a need to fill this gap, especially with the possibility of an international airport. Nonetheless, the objectives for 'all' outlying settlements reflect the community's preferred option for "growth focused within the larger urban area of Cromwell." In doing so, aims to retain existing the pattern of development and 'countryside' living amenity and landscape values of the settlements. The plan also supports the establishment of small local convenience nodes with community services, the protection of landscape values, and the containment of urban development for the protection of the rural productive environment. These objectives become prominent in the results section of this report.

4.3.3 Tarras Community Plan

The Tarras Community Plan is a non-regulatory plan published in 2007. The community plan emerged through a community consultation process, providing important community direction for groups involved in Tarras. The plan provides a collective community vision (*Figure 4.7*) and proposed a number of recommendations to ensure Tarras remains an attractive and desirable place in which to live, work and play (CODC, 2007) Key discussion points and objectives were on meeting the community's needs for water supply, physical infrastructure (provision for wastewater, roading, public toilets), encouraging growth and development of the area while preserving its special character, community development (local services, recreation, heritage character), and the encouraging tourism and business opportunities (CODC, 2007).



Should all or any of these values be lost or degraded, the area will no longer be a ‘special place’

Figure 4.7 Tarras Community Plan Vision

The Tarras Community Plan is in the process of being updated. Due to its age, it may have less weight. The plan provides a valuable basis for addressing how the proposed airport aligns with community values and aspirations. The research will aim to add to this.

Overall, the policy context and analysis chapter has examined the national, regional, and local environmental legislation and planning documents that pertain to the airport proposal. The policy context demonstrates the airport has many “moving parts”, which will require an array of consents to control the effects of the activity on the environment. The proposal is contended to be inconsistent and unanticipated within national, regional, and local planning documents. The policy context and analysis section forms part of our results section, which is provided in the subsequent chapter.

5 Methodology

Undertaking research comes in various forms, all shaped by a researchers' epistemological position that is shaped by their individual experiences and opinions (Onweugbuzie & Leech, 2005). While all the approaches taken by a researcher are grounded within the context of their research, research paradigms assist the researcher in determining how other researchers view particular studies and research methods. This research was conducted through a mixed-methods approach directed by a research paradigm, in turn establishing a basis for this research.

This chapter will outline the methods used in this particular research. It will accomplish this by first discussing the research paradigm in this study. Secondly, it will explain the research design. Thirdly, it will review the secondary research methods: the policy analysis and the literature review. Fourthly, it will be followed by the primary research methods used, including the key informant interviews and the wider town survey, Fifthly, it will reflect on the ethics and positionality of the researchers. Lastly, it will discuss the limitations of this research.

5.1 Research Paradigm

The researcher's outlook and approach to the research aim strongly correlate to the research paradigm, which attempts to identify a set of common beliefs, while viewing the world to address a set of research questions. Khaldi (2017) describes this way of viewing the world as ontology, which is concerned with the reality of beliefs. Khaldi (2017) additionally describes how to know the world or epistemology which focuses on how researchers can verify these beliefs. This paradigm steers and gives direction to the methods of the specific research. Therefore, it is crucial to carefully select a philosophy that can extract the most from a research topic, as well as ensure the findings are not distorted and misconstrued (Kitchin and Tate, 2000).

This research has cautiously selected the pragmatism paradigm to underpin the mixed methods approach. Johnson et al. (2007) argue that a pragmatic approach understands that an individual's knowledge and personal experience is valuable when processing and considering a plethora of viewpoints, positionalities, and perspectives. One of the aims of this research is to better understand a contested topic that has divided opinions from differing backgrounds and fields of expertise. The pragmatic approach allows this wide perspective on a topic to reduce

bias through the mixed methods approach, unlike some of the other approaches, thus allowing the least amount of bias possible. While the positivism paradigm may appeal to this research for analyzing the town survey, it implies there is one correct answer, rather than a wide range of opinions, thus not being used within this research (Yardley & Bishop, 2008). Thus, pairing the pragmatic approach with this design-based research and subsequent research aims is the best approach.

5.2 Research Design

The research design was created and shaped by the brief provided by CODC, the client of this project. The research aim given in the brief is as follows:

Consider the potential impacts of a proposed new international airport on a small provincial town including consideration of what infrastructure might be needed to support the project in the future and the effects on rural production in the Tarras area.

The research questions developed to achieve this aim were:

1. What are the potential localised effects of the proposed Tarras Airport
2. If the airport was to go ahead what supporting infrastructure would be required, and what impact would this have on Tarras and the surrounding region?
3. How does the Tarras community see the Airport aligning with their values and aspirations, if at all?

In order to achieve the aim and answer the research questions, a mixed methods approach is the basis of this research methodology. Hay (2021) argues that utilizing both qualitative and quantitative methods is beneficial to compare and contrast as well as fill any gaps the other method may have not covered or unintentionally looked over. This goes against a previous status quo that these two should not be used together (Kitchin & Tate, 2000). However, that status quo has declined in the past years as more research has proven the benefits of using both. Qualitative methods are unsurpassed in in-depth analysis and gaining deeper understanding of topics. This method acknowledges that social processes and opinions are consistently evolving alongside the social environment they stem from and allows researchers to be flexible and adapt their methods as the world evolves (Limb & Dwyer, 2001). In contrast, quantitative methods are less intensive, largely statistical, and have larger sample sizes (Hoggart et al., 2022). These quantitative methods are easily turned into highly communicable tables and figures, an applicable way to present data. In the context of this study, this would be the Tarras community

survey which aims to understand why a larger sample of people are connected to their environment and opinions on the topic.

After combining both qualitative and quantitative methods to build the research upon, triangulation will complete the research design by pinpointing potential findings, and conclusions of the research, and creating recommendations. By using multiple methods and receiving results from each, triangulating them allows for more accurate results to be achieved and improves academic rigour (Hay, 2021). This process will reveal the best results possible based upon the given research aim and subsequent questions.

5.3 Secondary Research Methods

In order to produce the best results, the researchers undertook secondary data collection foremost. These secondary research methods include a literature review, policy review, environmental impact assessment and GIS mapping. These all formed the basis of the content, allowing the researchers to have informed knowledge surrounding the context of the project, current literature, and case studies of other similar infrastructure projects. Moreover, this secondary method assisted in triangulating the research results.

5.3.1 Literature Review

The leading form of secondary research within this study was composed through a broad literature review. It was structured from far-reaching international literature funneling down to specific details with a narrow scope on the Central Otago region, detailing other infrastructure projects that are comparable to the Tarras Airport. A literature review allows researchers to gain in-depth knowledge on previous outcomes, provides scope, and uncovers relevant ideologies and themes (Clifford et al., 2016). Moreover, Merriam (2009) additionally states it provides an opportunity for the researchers to discover gaps in the literature which could influence their personal research. Hence, the reason for undertaking the secondary research before the primary research.

In addition to the current themes in the literature, it also gave the researchers an opportunity to better understand the larger relationship between place and effects. With this research being focused on small rural towns, the interplay between the environment, social, and economic effects and its residents is impactful. Special attention within the literature was dedicated to this topic through analyzing each of the individual effects in an Aotearoa New Zealand context. This connectedness, while not easy to measure, will be better understood due to the literature review which will in turn help create better recommendations for the CODC.

5.3.2 Policy and Document Analysis

The other key focus of the secondary research method is the key policy and document analysis. These planning documents are the underlying regulatory and non-regulatory policies and objectives which guide the future of the region and Tarras specifically. The research team first examined the overarching national regulatory documents, specifically the Resource Management Act (1991) and The National Policy Statement on Highly Productive Land (NPS-HPL). These overarching documents give direction and set guidelines for their regional counterparts. These include the Regional Policy Statement and Regional Plans, purposely the plans relating to water and land plans.

The more localized policies and plans included the Central Otago District Plan and the Central Otago Spatial Plan. These both indicate how the land use is specifically managed and guides investment across the district. The Tarras Community Plan was also reviewed for its specific long-term goals within the area. Additionally, non-governmental documents such as Iwi Management Plans were analyzed for greater discovery of people's relationship to the land and to include in the recommendations. Throughout all of this policy analysis, similar to the literature review, researchers explored gaps in the policy and noted prospects that could assist the CODC's analysis on the potential Tarras Airport within the recommendations section.

5.3.3 Environmental Impact Assessment Analysis

To allow for the full consideration of effects associated with large infrastructure projects, an Environmental Impact Assessment (EIA) analysis of other International and National-based large-infrastructure projects was undertaken. EIA analysis is useful for the research as means of triangulation with primary methods (Bowen, 2009). Furthermore, it is particularly applicable to qualitative case studies, like the present research (Bowen, 2009; Yin, 1994). However, the method has various weaknesses, including insufficient detail and selectivity bias. Using the method in combination with other methods, will reduce the impact of these weaknesses. The impacts assessments were reviewed by effects, and placed in a table categorised into environmental, social, cultural, and economic effects. The EIA analysis was used to inform research questions 1 and 2, on the array of effects to be recognised in the construction and operation of large-infrastructure developments.

5.3.4 GIS Mapping

To better understand the current infrastructure and capabilities of the Tarras area, the research team created six maps through GIS mapping systems. They are as follows, a map detailing

current land use of the area, another examining the land use capability of high-quality soil, and one specifying every existing building. In addition to these, speculative maps based on existing airports were later added to the discussion to further illustrate potential land use change in the area. All of this information was crucial in forming questions about the capacity of Tarras to maintain a potential large-scale infrastructure project, and what would need to change if it were to go ahead. Moreover, it assisted the researchers in being more familiar with the area and generating relevant questions to ask in primary data collection.

5.4 Primary Research Methods

The primary research methods included key informant interviews and a wider town hall survey for residents of Tarras in order to gather comprehensive data pertaining to the subject matter. This was mostly undertaken from May 1st to May 5th, 2023 in the Central Otago region. A total of 13 key informant and participant interviews were undertaken as well as 104 town hall attendees / survey respondents were received in person and via a local Facebook group. The data was then refined, analyzed, and interpreted in the following weeks.

5.4.1 Semi-Structured Key Informant Interviews

Semi-structured, or open style question interviews were one of the key qualitative components of the primary research. This style of interviewing is a productive method of gaining perspective, knowledge, and experiences from experts in their respective fields, especially in a small-town setting (Longhurst, 2003; Nightingale & Bossman, 2015). These interviews allowed the researchers to gain insight and perspective on topics that are frequently too complex or varying in nature for a large survey. A preconceived list of questions guides the initial part of the interview but as the conversation develops, the open style of questioning allows the researcher to tailor the line of questioning to the experts' field and explore in greater depth areas of interest. Fylan (2005) notes that this allows each conversation between interviews to change substantially, allowing for more comprehensive results. Moreover, this style of interviewing, in comparison to structured interviews, allows a more informal style of discussion allowing the participants to give more rounded responses of their experiences (Adams, 2015).

The key informants for the interview were found based upon differing fields to get all-encompassing attitudes and involvements on the research topic as well as answer the varying research questions. This included members of CIAL, planners, local elected officials, key community members and other stakeholders from environmental and recreational groups. All

of which were recruited through convenience sampling, a method in which the researcher approaches certain members of the community based upon their professional role (Etikan et al., 2016). The researchers gained their contact information through publicly available email addresses or phone numbers. The informants participated in voluntary interviews that lasted approximately 30 minutes to an hour and occurred either in an agreed upon location or over Zoom. All of these were recorded, transcribed, and promptly discarded at the end of the research to preserve anonymity and align with the ethical standards of the University of Otago.

5.4.2 In-Person and Online Survey

To better gauge the wider community views on the potential Tarras airport, the secondary form of primary data collection was an in-person survey/focus group as well as an online survey for those who could not attend the in-person one. Both of these methods collected both quantitative and qualitative data by utilizing open-ended questions in addition to one's directly producing data (Harland & Holey, 2011). The questions set forth in both methods were carefully crafted to directly relate to the research aim and subsequent questions, while understanding the perspective of the Tarras residents through a 5-point Likert scale.

The in-person data collection and survey took place at the Tarras Town Hall on May 2, 2023. Researchers stayed at the town hall for the entire day to allow the highest number of attendees possible. Whilst at the town hall, the researchers gave the option to partake in small interviews one on-one and /or add the prompts on the sheets, both of which were anonymous. The prompts on the sheets were asking about opinions on the airport on a Likert scale, another prompting positives and negatives they see with the proposed airport, and the impact it would have on their daily lives.

In order to get the most participants to increase data validation, in case residents could not attend the town hall, a survey was posted online in local community Facebook groups. The survey began with questions surrounding demographic to better understand local positionality followed by open-ended questions pertaining to the current values they hold and the future of Tarras. The final section, in order to achieve quantitative results, had the participants place their support or lack of on a Likert scale. In total, the survey was able to achieve a sample size of 94 respondents. Both of these surveys additionally used the convenience method sampling due to the nature of the research alongside the time constraints of the study period.

5.4.3 Data Analysis and Interpretation

The semi-structured key informant interviews were audio recorded and subsequently transcribed in order to dissect the information contained within them. The data was then organized using coding, a primary means of processing the transcriptions into manageable text sections by sorting them into similar themes and categories (Namey et al., 2008; Kitchin & Tate, 2000; Newman, 1996). Similar themes were brought out of the surveys and coded alongside to the key informant interviews when relevant and created new sections surrounding community opinion when needed.

The quantitative research was collated in spreadsheets and statistically analyzed. The aim of this data analysis is to establish the key themes and patterns to construct tangible correlations and construct validity within the study (Newcomer et al., 2015). The findings were translated into graphs and tables in order to communicate the research findings in a more efficient manner.

All of the data analysis between the quantitative and qualitative methods, alongside the secondary data methods was interpreted and triangulated to produce the most accurate findings, conclusions, and recommendations that follow in this report (Namey et al., 2008). Throughout the process of data collection and interpretation, researchers took the utmost care to align their work and secure data storage with the ethical standards of the University.

5.5 Ethics and Positionality

This research required careful ethical consideration due to the use of human participants. The use of ethics in research addresses the conflicts of interest, and the power imbalance between research and participant, and ensures the research itself is sound (Guillemin & Gillam, 2004; Valentine, 2001). Moreover, it assists the researchers in recognizing their own ontological and epistemological interpretations and outlooks (Smith, 1999). Prior to any key informant interviews or surveys undertaken, an Ethics B application was submitted and approved by the School of Geography.

The ethics application contained the questions that were to be asked to the key informants while noting the open style of questioning, as well as the survey questions to ensure a lack of leading questions and biases. Additionally, it established an information sheet and consent form to give to key informants for their approval before completing the interview and informed them of their ability to be kept anonymous and/or leave the interview if they did not feel comfortable with the line of questioning. Thus creating a safety net for both the researchers and participants

from any unwanted adverse effects that may arise within this process. The raw data and contact information from the key informants was stored on a secure cloud drive that only the researchers had access to and was promptly deleted at the termination of the research.

Due to the research topic being an ongoing contested issue, positionality was at the forefront of the researchers mind throughout the research period. It was ensured via the ethics form as well as verbal confirmation to all informants and participants the researchers remained as unbiased as possible. Panelli (2004) states that personality acknowledges that backgrounds and personal history affect one's interpretation of the world. To mitigate this as much as possible, researchers acknowledged their biases to their best extent, and relied upon each other and the supervisor as sounding boards throughout the entirety of the project to ensure their biases did not affect the research.

The researchers conducting this study stem from various backgrounds thus allowing for a range of balanced perspectives and understanding on the research subject. The one large potential bias was one of the researchers being raised in Central Otago. Yet, this was mitigated by assigning relevant sections and interviews to other research members who did not have that affiliation.

5.6 Reflections and Limitations

Every research method inherently has weaknesses and disadvantages. By understanding these limitations of the method, researchers can easily identify shortcomings in their own work. The research undertaken within this project was extensive and the methods were planned with the utmost care. Nevertheless, there were still significant issues that limited the research. While these do not drastically affect the final results and recommendations, it is important to reflect upon the data collection process and emphasize their impact on the research process as a whole.

The primary limitation of this research project is the restricted amount of time and human resources available, which led to a limited number of interviews and survey responses. The time constraints during the short field week made it challenging to collect in-depth data and conduct additional interviews or surveys. Comparatively, it allows the researchers to interview stakeholders and informants that were easily accessible, whether that be through time constraints or publicly known. Moreover, if informants had supplementary content to contribute after the data analysis was completed, it could not be added to the final report. While the key informant interviews provided in-depth content about the subject matter, many of the

informants most likely had predetermined emotions surrounding the topic, which may have led to a lack of bias within their answers.

The responses of the Tarras community followed a similar vein. This research topic evoked many emotive responses from the community which may have influenced the responses within the surveys. Moreover, the in-person survey in Tarras was only able to be conducted for one day, therefore having the potential to hinder some residents' attendance. While the online survey was created to help combat this issue, it was distributed throughout the area using local Facebook groups. While it did gain traction, it does underrepresent those who do not use social media.

Another large limitation of the research was the constantly evolving nature of the subject matter. Whilst researching the potential airport, new relevant information was released once sections were finalised. The researchers retrospectively included this information to the best of their abilities, however, not all of it could be included due to the time limitations of the project.

Lastly, due to the scope of the research, only residents of Tarras were included in the survey. In actuality, the potential airport will affect a much larger radius of communities and stakeholders throughout the Otago region and Te Waipounamu, the South Island as well as larger international companies that rely on air transport for passengers, cargo, and business.

5.7 Conclusion

This chapter has justified the basis behind the research methods including the mixed methods approach based upon a pragmatic research paradigm. The key methods in this approach included a literature review, policy analysis, GIS analysis, key informant interviews, and in-person and online surveys. Ethics were of great focus because of the human-based element of the research ensuring it was conducted with utmost respect to the volunteers and to align with University standards. Additionally, a few limitations, mostly time constraint based were discussed, but these are to be considered minor. The methodology overall was chosen and carried out to best inform the researchers for making considerations and recommendations to the CODC.

6 Results

This chapter will detail the key findings from the primary research which were designed to address the research aim and research questions. The primary research methods included key informant (KI) interviews; online survey questionnaire; and interactive in-person survey. The results will also incorporate the findings from the GIS mapping exercise and EIA analysis. The results are presented in three subsections. The first relates to the effects that may arise as a result of the construction and operation of the proposed Tarras Airport. The second section will describe the cumulative infrastructure effects. Lastly, the third section will illustrate the results in terms of community's opinion, aspirations, and values. The third section will emphasise qualitative data rather than quantitative data to avoid fueling doubt and contestation between stakeholder groups.

6.1 Effects of the Proposed Airport

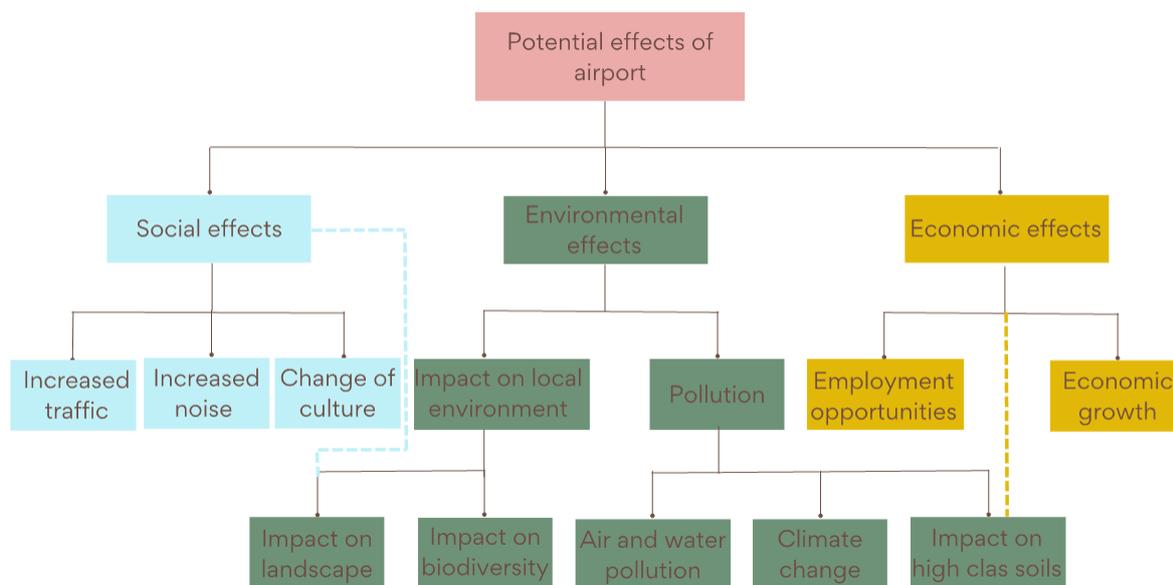


Figure 6.1 Effects of the proposed airport raised by primary methods of data collection participants

Through our three methods of data collection, these being the online survey, town hall survey, and key informant interviews, a number of potential effects as a result of the proposed airport were identified. Figure 6.1 above illustrates the range of social, environmental, and economic effects raised during primary data collection. As confirmed by the environment impact analysis, the range of issues mentioned is not inclusive of all effects to be considered by the

proposal. Notably, cultural effects such as the impact on Kāi Tahu values were not mentioned specifically. Cultural effects will be touched on in *Section 6.1.9*.

The scope of this research predominantly focuses on the effects on the Tarras community and area itself. While the majority of data collected during the research was Tarras specific, effects on New Zealand or internationally such as the impact on climate change were often discussed. Therefore, these effects will be touched on to connect back to broader context.

In order to continue the focus on the Tarras community itself, the results from the survey were divided into three groups based on the location of each survey respondent. Furthermore, to illustrate any discrepancies based on location.

- Tarras – respondents currently living in Tarras
- Near Tarras – respondents from Bendigo, Queensberry or the Lindis Valley
- Central Otago – respondents from anywhere else within the Central Otago area

The following sections will discuss the most prevalent effects mentioned in all methods of data collection.

6.1.1 Noise

The potential impacts of noise from the airport were a common theme across all three methods of data collection. The results gathered from both the town hall meeting, as well as the online survey, showed that noise is a major concern among those in the Tarras community.

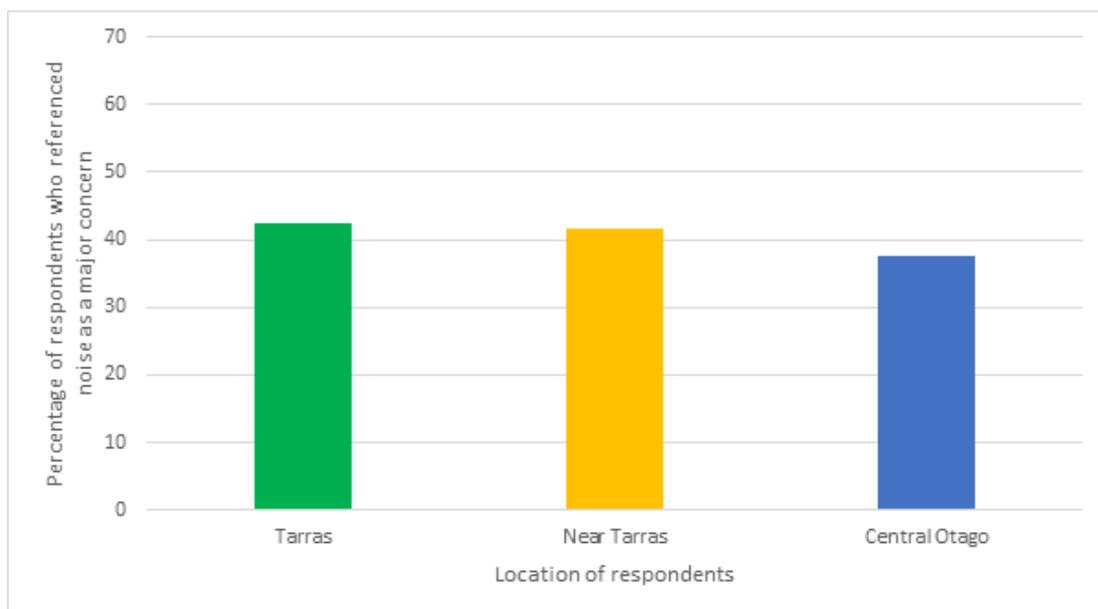


Figure 6.2 Percentage of survey respondents who referred to noise as a major concern by location of residence

Figure 6.2 shows the percentage of respondents who referenced noise as a major concern, separated by location of residence. Although respondents from Tarras and the surrounding area were slightly more likely to reference noise, there is only a slight decrease when looking at those from the wider Central Otago area. Over 40% of total survey respondents had significant concerns about noise, making it one of the largest concern areas across the entire survey.

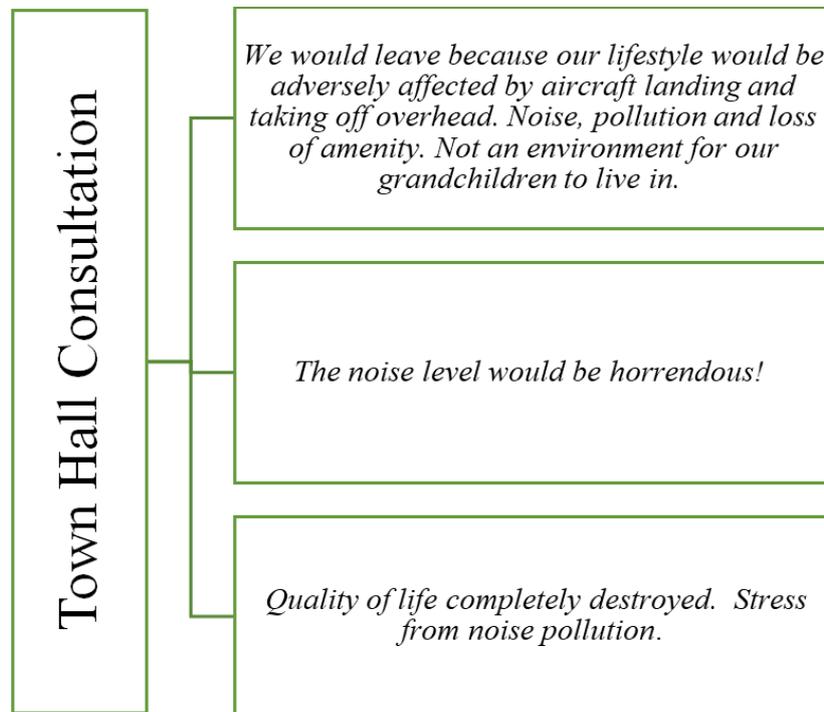


Figure 6.3 Quotes relating to noise from town hall survey

The quotes above in Figure 6.3 were collected from anonymous responses at the Tarras town hall survey. The potential impact of noise was an issue that was brought up by a significant number of participants here. As described in the quotes above, the major concern is that the noise of aircraft would impact the quality of life and serenity of Tarras and the surrounding area.

The potential impact of noise was an issue that came up far less frequently during Key Informant interviews. It was also an issue that had different perspectives than the survey and town hall data. As quoted below, KI 7 believes that the noise from the airport will impact only a small portion of the population and that the site specifically has been designed in a way to minimize this impact:

“When you apply a traditional noise contour to our site, dwellings inside the noise contour. I'm not even going to say dozens. It's a very small number (...) I believe that

the site has deliberately chosen to minimize. In terms of numbers, the households exposed to airport noise now and in the future.” (KI 7)

6.1.2 Air and Water Pollution

The potential effects of pollution due to the proposed airport were a very common area of concern across all forms of data collection. This effect is limited exclusively to pollution in the air around Tarras, and potential pollution of the Clutha river. Other aspects such as climate change and effects on high-class soils will be covered separately.

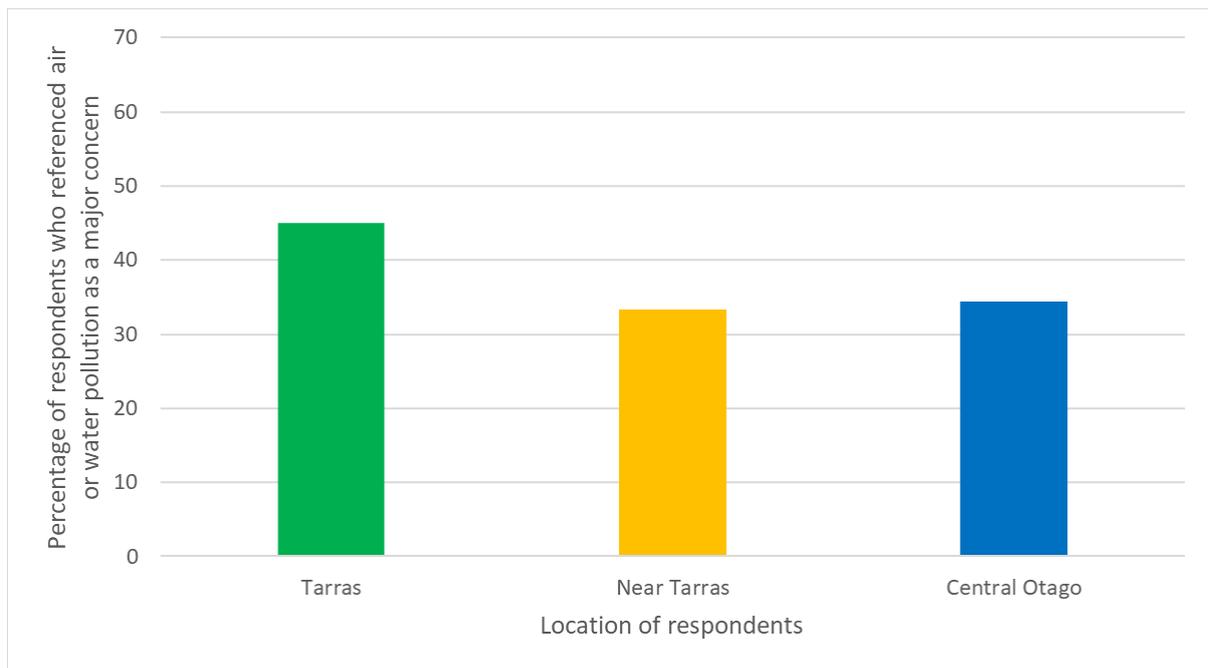


Figure 6.4 Percentage of survey respondents who referred to pollution as a major concern by location of residence

Concerns on the environmental impacts of the airport were shared by respondents from across all of Central Otago, as shown above in *Figure 6.4*. In general, Tarras residents were more likely to voice their concerns on the environmental impacts, with 45% of respondents doing so. However, the impacts on the environment remained one of the most discussed issues by respondents despite the location of their residence.

The response from the town hall meeting showed that residents of Tarras had significant concerns about the environmental impacts of the airport. The quote below from P 5 mentions how pollutants from the aircrafts could have potential impacts on the orchardists and horticulturalists in the area. The main concerns specifically were the runoff from the tarmac, as well as the fumes from overhead aircraft. The use of water from the Clutha Mata-Au River, and the subsequent release of pollutants, was also mentioned as a potential factor in degrading the waterways and surrounding environment. From key informant interviews the specific areas

of concern in regard to the environmental impacts stemmed mostly from tarmac runoff as well as the emissions from aircrafts. These concerns are shown in *Table 6.1* below. The construction of the airport and the airport itself were not seen by informants as having the same detrimental effects as the continuous use of aircraft in the area.

Table 6.1 Quotes relating to air and water pollution from town hall survey and Key Informant Interviews

Participant	Quote
P5	<i>“This is a point that the orchardists and horticulturalists and vineyard owners haven't thought about. Most of them are getting or have organic certification. Now when you get the 200 odd pollutants coming out of the back of the jet aircraft dropping all over the vineyards, they can no longer be organically certified.”</i>
P5	<i>“The airport has bought a strip of land that backs onto the Clutha River. So that means, they're going to draw water from there, but they're also going to release all the pollutants.”</i>
KI 3	<i>“The thing I can see is very worrying is the runoff from the tarmac, which always contain contains a lot of oil and fuel. I presume that will go through some sort of grey water system and then I don't know if it will go into the river or if it will go in would be spread on the land. But I see that as worrying because this is very highly permeable soil, very fragile soil. I worry about that polluting the Clutha.”</i>
KI 1	<i>“It's pollution. It's all those sorts of things. They've going to dump fuel sometimes and things like that. Where's that going? Could be going down on the farms. So I think there's lots of stuff they don't think about.”</i>

6.1.3 Impact on Visual Amenity and Landscape

Through data collection, the potential visual impact on the landscape due to the airport was a common theme. This includes the visual impact of the airport itself, but much of the focus was on the light pollution associated with it. The dark and clear skies were seen as being put at risk due to this, and the concerns around losing this was voiced by several informants.

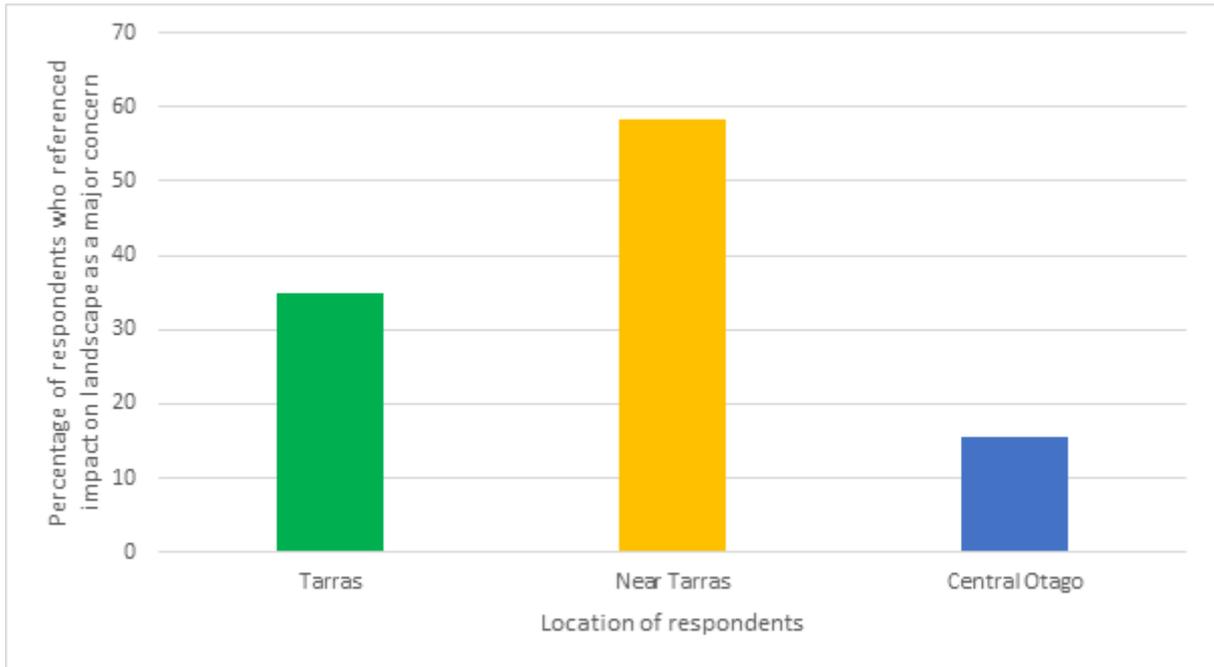


Figure 6.5 Percentage of survey respondents who referred to landscape and visual amenity as a major concern by location of residence

As shown in *Figure 6.5* above, the concern about damage to the landscape was a very common theme among survey respondents. The group that was most likely to raise concerns on this were those in the land surrounding Tarras, with nearly 60% raising concerns. Of those who live in Tarras 35% saw the impact on landscape and amenity as a major concern. Specifically, those from Tarras referenced the impact on the night sky, and the role that light pollution would play in harming it. Respondents from the wider Central Otago area were generally much less concerned with the impact on the landscape.



Figure 6.6 Quotes relating to the effect of the airport on visual amenity and landscape from town hall survey

Anonymous participants at the town hall raised similar points as those from the survey. Once again, the impact on the night sky was referenced as shown above in *Figure 6.6*. Another common sentiment was that the airport would turn the area from a rural landscape to an industrial one. This is to do not only with the airport but the many associated activities such as car rental and increased infrastructure.

When interviewing key informants, the themes were similar to those from the town hall meeting. The quote from KI 3 echoed the concerns of Tarras transitioning from a rural to an industrial environment. However, in the quote from KI 7 below the concerns about light pollution and its impact on the night skies are addressed. This quote seems to show how the potential concerns of light pollution are mitigated by the method of lighting used by airports. This is based on the method of lighting used by Christchurch Airport, showing how it can be used in a practical setting. On the other hand, KI 4 weighs up the disadvantages of visual impacts with the advantages of an international airport to the area.

Table 6.2 Quotes relating to visual amenity and landscape effects from Key Informant Interviews

Informant	Quote
KI 4	<i>“Your kind of left with well, unfortunately, if it does go ahead, there is going to be a visual impact on what we currently have. But then what you'll have is an International Airport, so this comes with advantages, but there are disadvantages.”</i>
KI 7	<i>“The thing about airports is that typically they're designed and operated to minimize the amount of light that's produced (...) So my reference point for that is at Christchurch here we have specially designed roading, car parking and building lighting systems and apron lighting systems that direct light down that they do not encourage light spill upward which might compromise night sky experiences.”</i>
KI 3	<i>“I don't want to live in that kind of environment. I don't want to live in an industrial environment.”</i>

6.1.4 Change in Lifestyle

The potential impact on the lifestyle of Tarras and the surrounding communities was brought up often across the survey and town hall meeting. Generally, the fear from Tarras residents is that the airport will change the town from a small, laid-back area, to a fast-paced transportation hub. Despite being a topic that many survey and town hall participants discussed, it was not an issue that came up during key informant interviews.

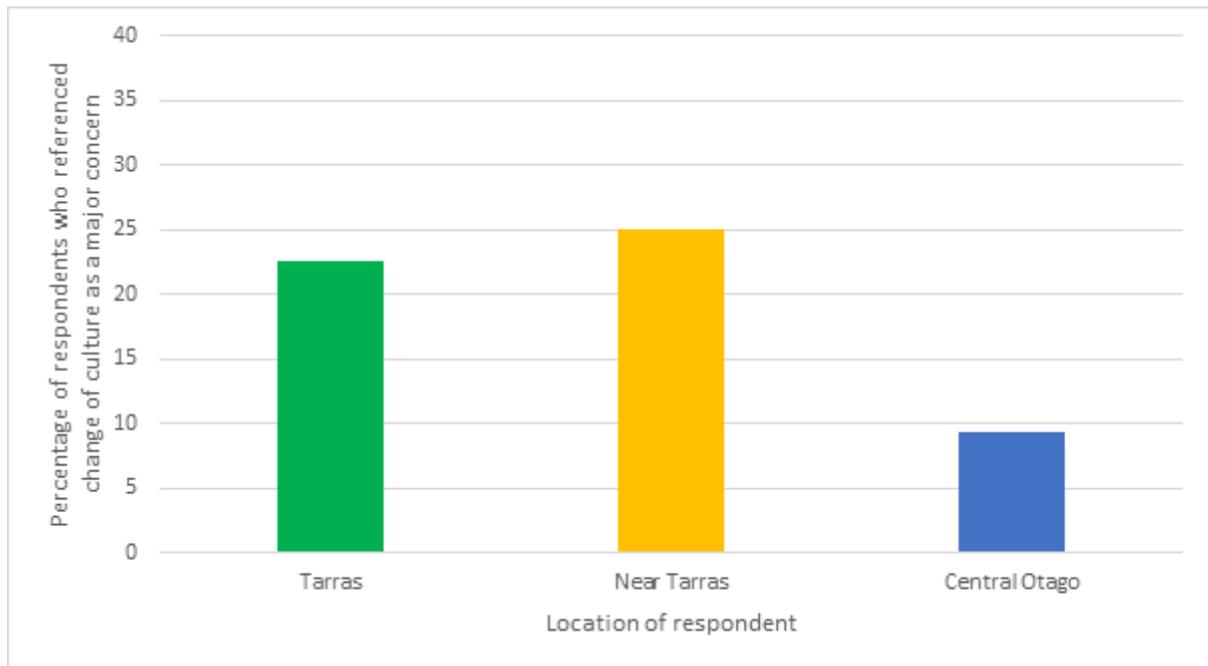


Figure 6.7 Percentage of survey respondents who referred to change in lifestyle as a major concern by location of residence

The results from *Figure 6.7* clearly show how the concerns around lifestyle change are dependent on region. Based on the survey data those either in or near Tarras are more than twice as likely to reference lifestyle change as a major concern compared to the wider Central Otago area. While lifestyle change was not among the top concerns, it was still relevant with nearly a quarter of respondents from Tarras and nearby referencing it.

Participants at the town hall survey had significant concerns about the direction that Tarras would be heading as a result of the airport (*Figure 6.8*). The quote above from P5 discusses how the peaceful nature of the town is at risk, and how several people have already made the decision to move as a result of this. The common theme across these quotes is the loss of rural lifestyle, which they expect to be replaced by a fast-paced, industrial culture.



"[people who moved to Tarras] want a quiet, peaceful retirement, and some have built their forever homes and are looking forward to a nice gentle time and this [Airport proposal] has dropped. I know of several people now who are already in the process of moving, but there are many here who can't move." (P5)



"Tarras would be an industrial zone. The rural aspect of Tarras would be lost." (Anonymous)



"[The airport would] ruin the country lifestyle. The Tarras village would no longer function as a focus of our community." (Anonymous)

Figure 6.8 Quotes relating to concerns of change in lifestyle effects from town hall survey informal chat and survey

6.1.5 Impact on Biodiversity

The potential impact on local biodiversity is an effect that was not discussed as frequently as many other potential environmental impacts. The environmental impact assessment analysis shows it is an effect that is given great weight in decision making. Proposals for large projects are often unaccompanied by ecological impact assessments. From the survey data, it did not appear to be of particular importance to respondents regardless of location. However, those who did raise their concerns around the impacts on biodiversity were very passionate on the subject. As shown below (Table 6.3), the participants at the town hall survey were much more engaged with the potential biodiversity impacts than any other group.

Table 6.3 Quotes relating to biodiversity effects from the town hall survey

Participant	Quote
P4	<i>"Yeah, so I live just where the river goes into the Dunston Lake and north of where I live not far is a whole wetland. And I counted 40 different species of birds. And there's a lot of quite rare and interesting birds. I just feel that airplanes coming in, they'll be coming into very close proximity."</i>
N/A	<i>"Bird life would be pushed out to areas further away. The Bendigo Wetlands, Bendigo Loop and Lindis River bird nesting areas are under low level landing path."</i>

P4

“There's a lot of Skinks and other Animals. There's a lot of insects and creatures that are native. And I mean, all of this has Just been ignored”

The town hall meeting is where the potential impacts on biodiversity were addressed most frequently, particularly by P4 who had first-hand knowledge on the subject. The Bendigo wetlands, Lake Dunstan, and Lindis River nesting areas were the main areas of concern. There has been little discussion on the potential impacts on biodiversity in the area, but the many different habitats make it an area with a variety of wildlife. While biodiversity in general was brought up as an issue, the potential flight path of aircrafts was the specific problem discussed by P4. With the location of the runway not yet confirmed, the potential impact on the bird life in the area could be substantial.

Key informant interviews did not have as much of a focus on the biodiversity impacts. However, the quote below from KI 3 highlights many of the same issues raised earlier by P4. The wetlands and Lake Dunstan are mentioned once again, as well as the possibility of bird strike with aircrafts coming in to land.

“By jet fumes, the wetland, the bottom at the top of Lake Dunstan, which is, you know, an enormous breeding ground for birds. Planes are going to be coming in low over that at the risk of bird strike. They're going to have to suppress that bird population, or it would be too risky, that would be unsafe and all of their flight paths come low over that wetland” (KI 3)

6.1.6 Impact on Highly Productive Soils

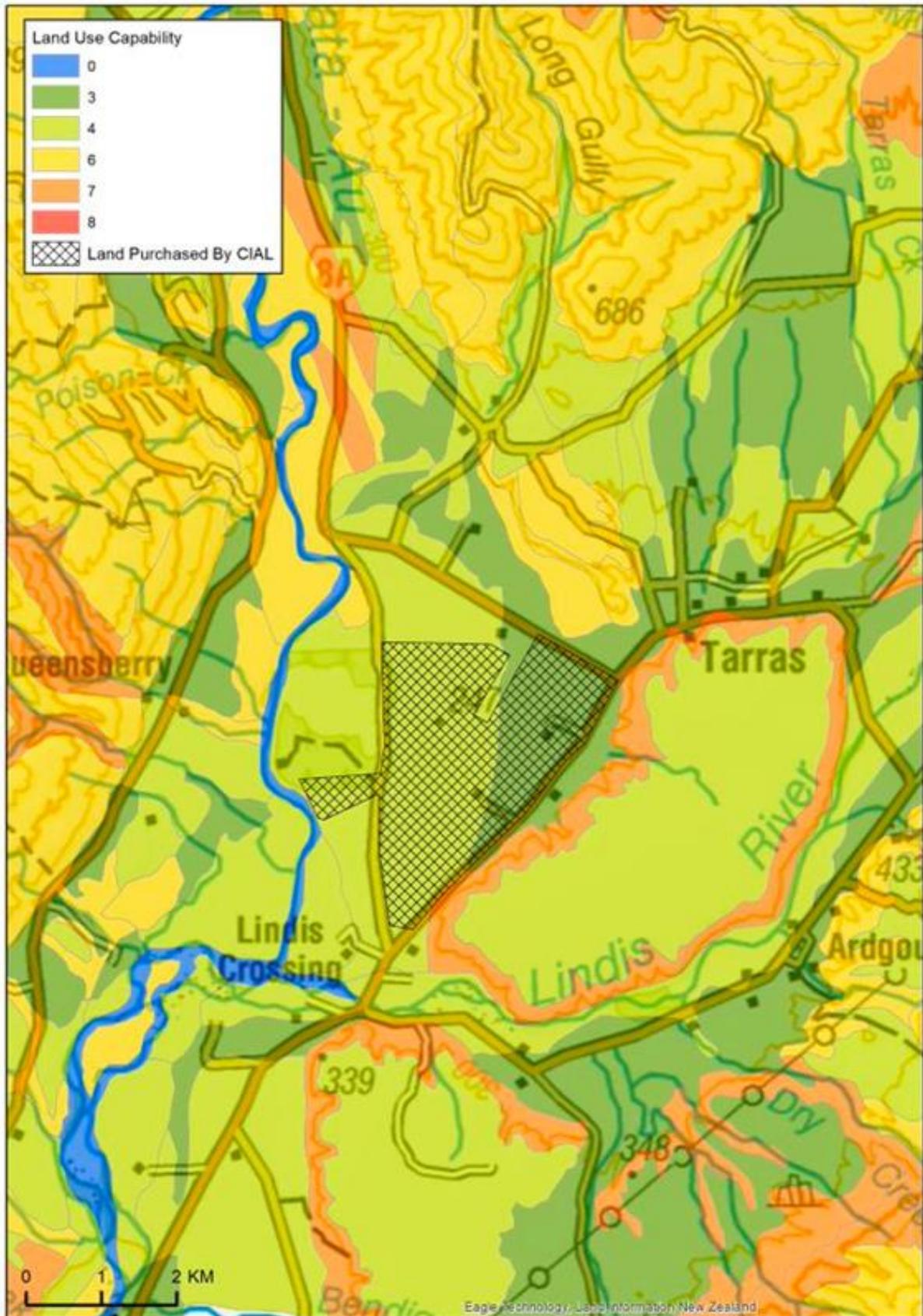


Figure 6.9 Map of land use capability (highly productive land) in Tarras and site purchased by CIAL

The potential impacts on highly productive soils in the area was a topic that was seen as extremely important in the research for this project. The above GIS map demonstrates the land use capability of Tarras and site purchased by CIAL. Class 1, 2, and 3 are considered highly productive soils in New Zealand. The proposed airport site is class 3 and 4 soils. The majority of the Tarras area is class 4 soil.

However, the potential effect on highly productive soils was not an effect that survey respondents or town hall participants were particularly worried about. Although participants at the town hall tended not to have significant concerns about the potential degradation of high-class soils at the site of the airport, there was still some discussion on the value of the productive soils in the area:

“I think it's Class 3 agricultural land. You know valuable land it's perfectly good land for agricultural use. That chap across the road from us who bought his farm, quite a while back, [they] said they've been astonished at how productive the land has been.”
(P1)

This quote doesn't call into question the potential effects of the airport, but does show how the land is of very high value for agricultural use.

The bulk of primary data on high class soils came from key informant interviews (*Table 6.4*). The sentiment from the town hall participant was echoed in the quote from KI 3, stating that the land is very well suited for the crops. Additionally, KI 2 brings forth an important point that in this instance, the lower-class soils have been shown to still be of productive value for the type of crops that are grown in the area, like grapes and stone fruits. The GIS map in Figure 6.9 shows stretches of lower-class soils. KI 4 seems to weigh up the potential impacts on highly productive land versus the potential benefits of an international airport. Overall, the effect of highly productive soils in the wider Tarras area was not heavily considered by research participants.

Table 6.4 Quotes relating to highly productive soil effects from the town hall survey

Informant	Quote
KI 3	<i>“I think some of the airport site is [class] 3, and I think some of it is [class] 4 or probably 5. One of the main horticultural things in Central Otago, of course, is grapes. We don't need 1-2 or 3. In fact, 1 or two 2 probably too rich, so we're better on 3 and 4.”</i>

KI 4	<i>“It is the only site that it can go in for all Central Otago and Queenstown Lakes. Unfortunately, there will be a loss of those soils. But those soils will be in the construction works saved and those soils themselves would be used.”</i>
KI 2	<i>“It’s got some very high-class soils listed in the latest national policy statement. But then the irony is, because of, the temperature range and sunshine hours, the poor soils are actually quite good for growing wine. Yeah, so. You’re in this kind little unique spot which is utilising those attributes of the area to produce high quality, high value products.”</i>

6.1.7 Economic Benefits

The opinions on potential economic benefits as a result of the airport had significant variation from each different form of data collection. In general, the opinions were that an airport could lead to an increase in property value across Tarras and that the wider Central Otago area would see significant growth as a result of the development. However, these opinions were not consistent across the board, with many arguing that Tarras would see none of the economic growth that is associated with the airport. Instead, the surrounding tourism districts would continue to benefit. The potential effect of increased employment was another factor discussed heavily, but this is considered a separate effect from economic growth as part of this research.

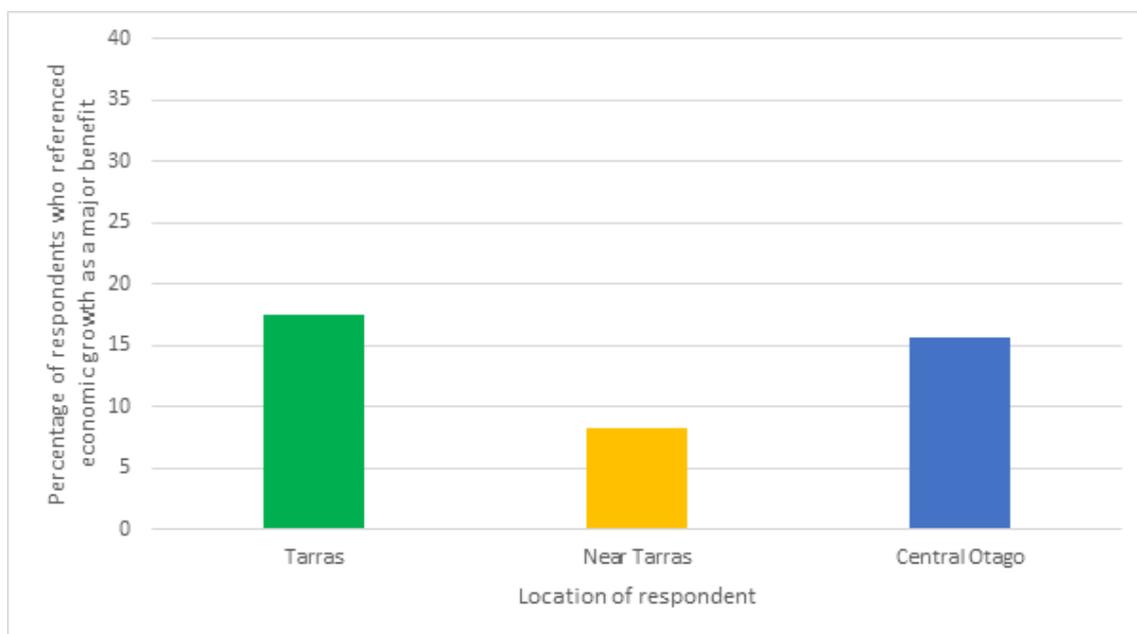


Figure 6.10 Percentage of survey respondents who referred to economic growth as a major benefit of the airport by location of residence

Based on the survey data above in *Figure 6.10*, the potential economic benefits of the airport are a major point of focus across all of Central Otago. There is little variation based on location for this effect. However, the reasons that respondents saw this as a benefit vary quite vastly.

Generally, those in and around Tarras were much more focused on the potential increase in property value as a result of the airport. The wider Central Otago respondents were more interested in how the airport could be beneficial to the economy of the region as a whole, not as much in the benefits that Tarras specifically could experience. While respondents from all regions acknowledge the potential economic benefits, the reasoning behind this can vary vastly.

The response from the participants at the town hall survey showed different results than the survey. Of all participants at the town hall, almost none saw the airport as having the potential to grow the area economically. Only one participant saw the airport as being a driver of growth in the town; *“it would turn Tarras from a small community into a thriving town”*. The vast majority of participants saw it as a venture that would change Tarras for the worse, not for the better.

The opinions on economic growth as a result of the airport were more divisive when it came to key informant interviews. The general consensus was that it would be beneficial to the economy, and stimulate growth in the area, as shown in the quotes from KI 4 and KI 1 below in *Table 6.5*. Especially for the viticulture and horticulture sectors who have an international airport in close proximity. However, the perception that land value would increase as a result of the airport was called into question. An increase in land value was one of the major factors brought up both in the survey as well as interviews, but as shown in the quote from KI 3 there are still questions on whether this would necessarily happen. Broadly, informants believed that the economic benefits would be positive for the community, but there is still scepticism on the scope of these benefits, and whether or not they would benefit the Tarras community directly.

Table 6.5 Quotes relating to the economic benefits of the airport

Informant	Quote
KI 4	<i>“For the producers around here, the horticulture and viticulture sectors, this could be really beneficial to them. You know, you can have trucks just going directly from these regions, around Bendigo straight to there to get cherries etc. on the plane. For that type of thing. Direct access to an airport they’re excited about.”</i>
KI 1	<i>“Ah, but I imagine it would probably be for the better for the economy I mean it would.”</i>
KI 3	<i>“A lot of us think, and I know one of the reasons people who I said had sold their property and moved away was just because they thought the value of their land would plummet. You know, I'm not saying that that will happen. I think it's very unpredictable.”</i>

6.1.8 Employment Opportunities

The potential job opportunities as a result of the airport was an effect that was discussed across all three methods of data collection. For the most part, these employment opportunities were seen as a positive for both Tarras as well as the surrounding communities. However, there was some disagreement on whether these opportunities would actually be beneficial to those who live in Tarras. Furthermore, whether jobs opportunities were needed given the low unemployment rates in the District.

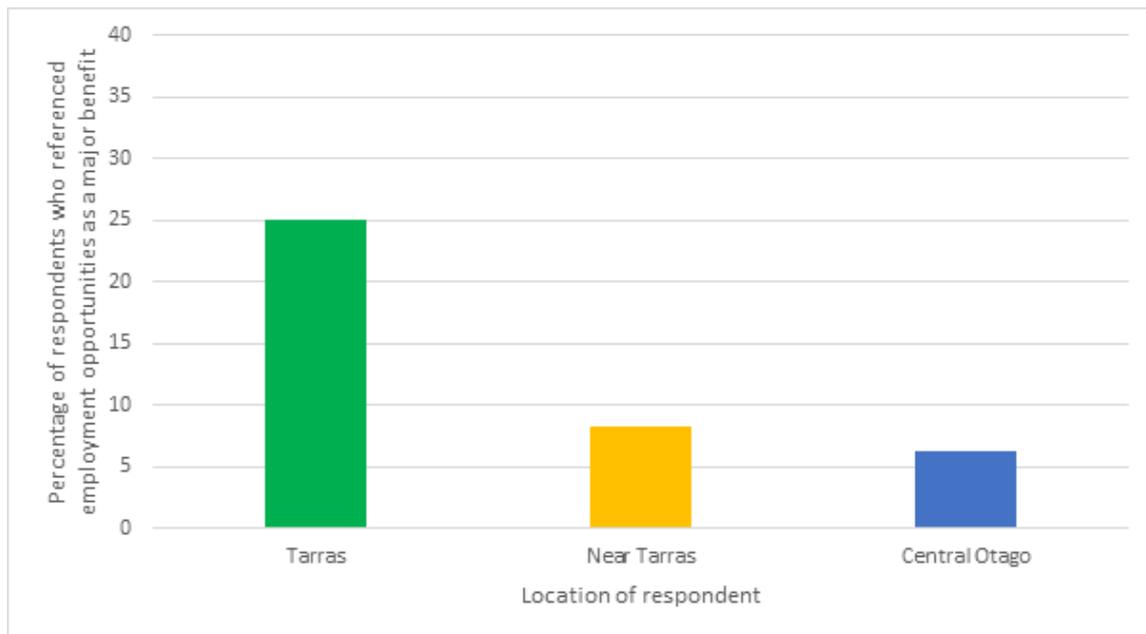


Figure 6.11 Percentage of survey respondents who referred to employment opportunities as a major benefit of the airport by location of residence

The survey results show a very strong trend in how people view the potential economic benefits of the airport. While respondents from all different areas seemed to agree that economic growth would come as a result of the airport (Figure 6.10), Figure 6.11 above shows how Tarras residents are much more interested in the potential employment opportunities that the airport may bring. Respondents from Tarras were three times as likely to reference job opportunities as a major benefit when compared to those outside of Tarras. However, due to low unemployment rates, these opportunities were more related to jobs for their children and grandchildren, and the variation in job opportunities from what there is currently in the district (Figure 6.12).

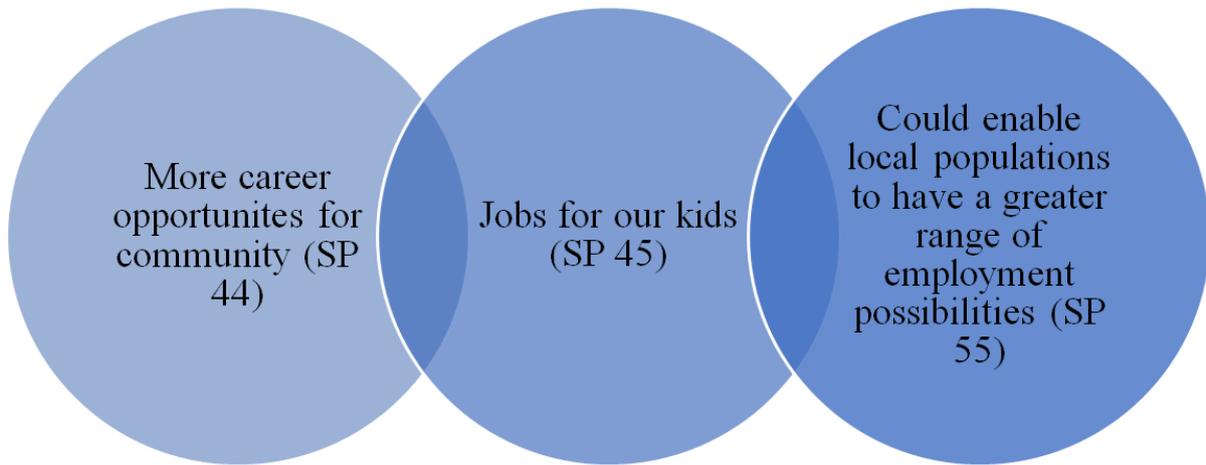


Figure 6.12 Survey participants responses to the employment opportunities

The town hall survey showed that many people currently living in Tarras were interested in the potential employment opportunities as a result of the airport (*Figure 6.13*). However, due to low unemployment rates, these opportunities were more related to a *variation* in job opportunities from what there is currently in the district. Unlike the survey results, these potential jobs were not seen as inherently beneficial. The quote from P1 below discusses how a large portion of the jobs created would be low-wage jobs, which won't pay highly enough to support the cost of living in Central Otago. Despite the fact that most participants saw the potential jobs created as a benefit, there was still a sense that the jobs would not help the community itself grow.

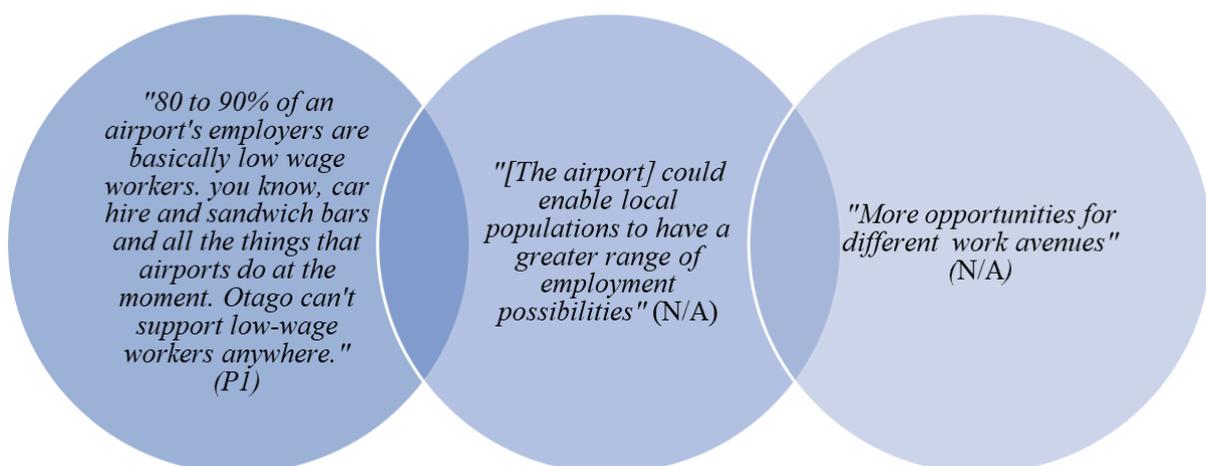


Figure 6.13 Quotes from the town hall survey around employment opportunities

Key informant interviews provided a significant amount of information on the potential employment opportunities the airport could generate. As discussed by KI 7 and KI 4, one of the major benefits would be the different ways in which jobs are created. In both the development stage, as well as the actual running of the airport, a huge number of labour will be required. This could lead to economic benefits for Tarras as well as the district as a whole. However, KI 1 discussed how it is likely that the work will almost entirely be outsourced due to the lack of available labour in Tarras. Again, everyone is already employed. This is an interesting observation, as it acknowledges that the employment opportunities will exist, but it is unlikely that the Tarras community will be the ones who reap the rewards of them.

Table 6.6 Quotes related to employment opportunities from the airport

Informant	Quote
KI 7	<i>"So during the construction phase, there will be job opportunities for people, during the operations phase there will be job and employment opportunities for people in the Tarras region."</i>
KI 4	<i>Initially there would be [jobs] with any billion dollar plus project and the people in these small towns will seek the opportunity to whatever work happens with it. So, there will be the initial building and then there will be the ongoing. And I suppose for that one, it'll be down to what else is stacked around the actual airport operation itself.</i>
KI 1	<i>"I do think no, it would probably not create more jobs for the community, right? Because everyone does have their jobs, I guess as it is. (...) There are a lot of lifestyle block holders, but a lot of them tend to be more retired.</i>

6.1.9 Cultural Effects

Table 6.7 below illustrates the cultural effects of significance to the proposed airport. This data collected was from the effects considered in national and international EIA for large infrastructure projects. "Cultural" effects in a New Zealand context are inclusive of effect on Māori values, knowledge, and sites of significance. Furthermore, is inclusive of historical value (heritage sites) and spiritual value (connection). Large infrastructure projects were accompanied by cultural impact assessments, archaeological impact assessment, and heritage impact assessments.

Table 6.7 Cultural effects of large infrastructure projects

Mana Whenua Values	Wāhi Tūpuna and other cultural sites of significance	Archaeology – Māori and European	Historic buildings, places, and sites	Connections to Nature or Place
				
<ul style="list-style-type: none"> • Recognise and provide for Kai Tahu/Ngāi tahu, local Runaka values. • Seeking views of local iwi and Rūnaka • Co-design approach • Wai Māori • Cultural Landscapes • Air, land, indigenous biodiversity, coast • kaitiakitanga and mauri. • Haere Whakamua, Ki uta ki tai, Utu, Tikaka 	<ul style="list-style-type: none"> • Embody the relationship of mana whenua and their culture and traditions with their ancestral lands, water, sites, wāhi tapu (sacred places), and other taoka (treasure). • Potential threats or activities which are incompatible with the values of the Wāhi Tūpuna area 	<ul style="list-style-type: none"> • Known archaeological sites • Unknown archaeological sites • Accidental discovery protocol • Human remains (koiwi tangata) • Notification to Heritage New Zealand Pouhere Taonga and/or iwi group or Kaitiaki representative • Damage, modification or destruction 	<ul style="list-style-type: none"> • Demolish, alterations, and additions. • Identify, protect, and acknowledge • Heritage New Zealand and Territorial Authority 	<ul style="list-style-type: none"> • A new consideration • Important in fostering pro-environmental behaviours • Impact on the ability to connect to nature and place

6.1.10 Nationally and Internationally Felt Effects

Although this research is aimed to focus exclusively on the effects felt by the Tarras community, there were two other major potential effects that were discussed significantly in both the interviews as well as the online survey. These two effects were surrounding the potential impacts of climate change, as well as differing opinions on the need for the South Island to increase air travel capacity. Although the impacts of these are outside of the scope of the research question, enough data was collected that it is worth discussing.

The issue of climate change was discussed across all three forms of primary data collection. Across all survey responses, roughly 10% of respondents listed the impacts of climate change as a major concern if the airport were to go ahead. However, the bulk of concerns on climate change were raised in both the town hall meeting and the key informant interviews conducted. This effect differed from those discussed earlier for two major reasons. Clearly, the scale of the impact is much larger, but it also differs in the sense that the issue will likely still be a concern regardless of whether or not the airport goes ahead. Quotes shown below from both informants and participants illustrate the thoughts on how climate change is an effect that should be addressed.

“It runs completely contrary to all of those strategy documents. And of course at the global level we have Paris, we have our global climate commitments. We have this urgent need to have gross emissions by 20-30 and this proposal again It's just completely contradictory to those really important strategies.” (KI 5)

“We need to think of first climate change and the fact that, we have an awful lot of repairs to do even now, and it's probably going to be getting worse. So in terms of our national capital investments, they're probably not particularly relevant to direct more airports.” (P1)

The main theme that was found throughout interviews in regard to climate change was how the airport would go against the emission goals laid out by the New Zealand government, as well as other international agencies. The consensus among informants was that the airport was contrary to goals described in New Zealand climate change legislation. However, an interesting feature that came out of these interviews was the disagreement on whether electric or hydrogen planes would play a part in the proposed airport. Examples of these quotes are shown below.

“Electric and hydrogen planes of scale are not going to happen before you're in a retirement home” (KI 2)

There are planes flying now on hydrogen that are flying distances that are showing promising signs of being available within a 10-15 year time frame commercially. So it's just not accurate for people to say the technology doesn't exist or aviation is not suitably motivated to transition fast enough. (KI 7)

This is an interesting finding from the research, as climate change legislation surrounding airports does not take the potential use of hydrogen planes into account. While these quotes do not definitively show whether or not this technology is feasible, the difference in thought points to potential reasons why opinions on the airport may differ. If this airport would be used for low-carbon emission transport, there is a real possibility that attitudes towards the project would change. However, with no definitive way of knowing whether or not this is realistic, climate change, and the impacts that airports have on this, will continue to be a significant concern.

The second impact mentioned came primarily from those who responded to the online survey. This was the potential for increased tourism, primarily in the Queenstown-lakes district. Unlike other effect mentioned, this is seemingly both a positive and negative impact depending entirely on the opinion of an individual.

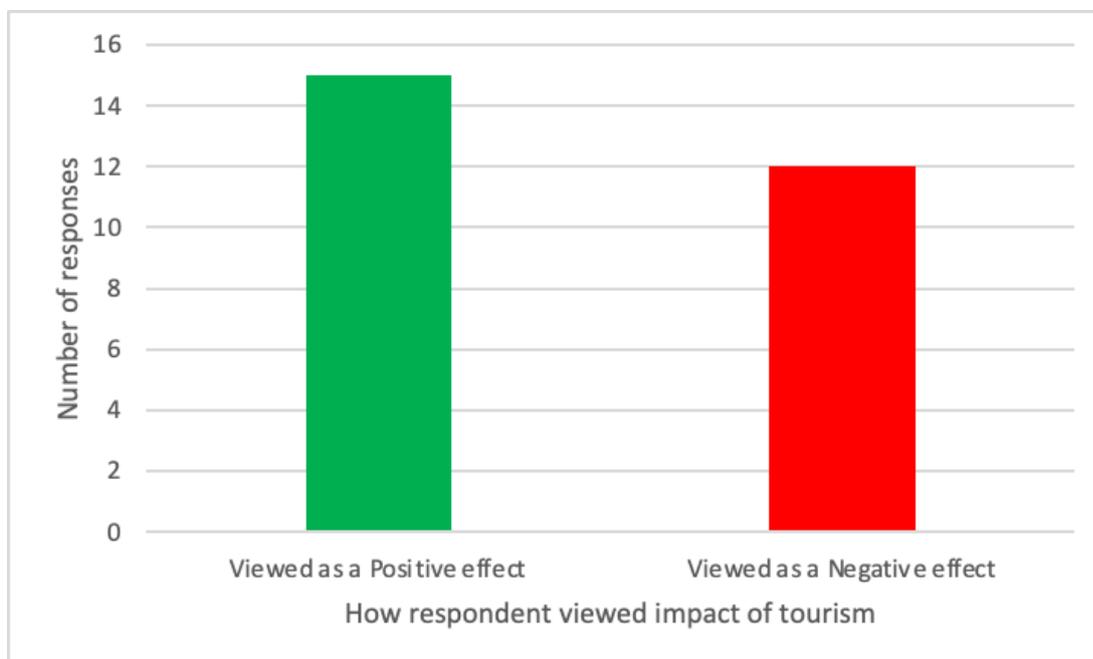


Figure 6.14 Survey responses on impact of tourism

As shown above in *Figure 6.14* a significant number of survey respondents referenced increased tourism in their responses. However, there was a near-even split on whether or not they viewed this increase as having a positive or negative impact on the area. This split was largely driven by the location of respondents. Across all forms of data collection, it was clear

that tourism as a result of the airport would not be centred around Tarras itself. For this reason, those who responded from Tarras viewed tourism much more negatively, as it would directly benefit towns such as Queenstown or Wānaka rather than their own community. This sentiment is shown below in a quote from KI 3.

“You don't make tourist destinations right beside an airport. You make them within a sort of polite access distance of an airport, so you know it might be good for Cromwell and Wanaka it won't be good, it won't be good for Tarras.” (KI 3)

6.2 Infrastructure Effects

*“One of the things that the planning structure doesn't do is allow for full consideration of all of the effects of an activity. And in some ways, you can see why, because sometimes it was just too hard. But in this case, you know, **it's everything.**”* (KI 2)

This section illustrates the findings relating to spillover infrastructure effects that may arise as a result of the construction and operation of the proposed Tarras Airport. The above quote from KI 2 synthesises this key theme. They describe while the proposed airport's EIA will not necessarily consider the spillover effects on infrastructure from such a large-scale development in a rural area. In all methods of data collection 'spillover infrastructure effects' was a key concern. For instance, it was the third most prevalent concern from survey participants, after noise and pollution. The effect on infrastructure is so expansive it warranted its own section. However, these cumulative infrastructure effects should be viewed alongside all the effects in the above section.

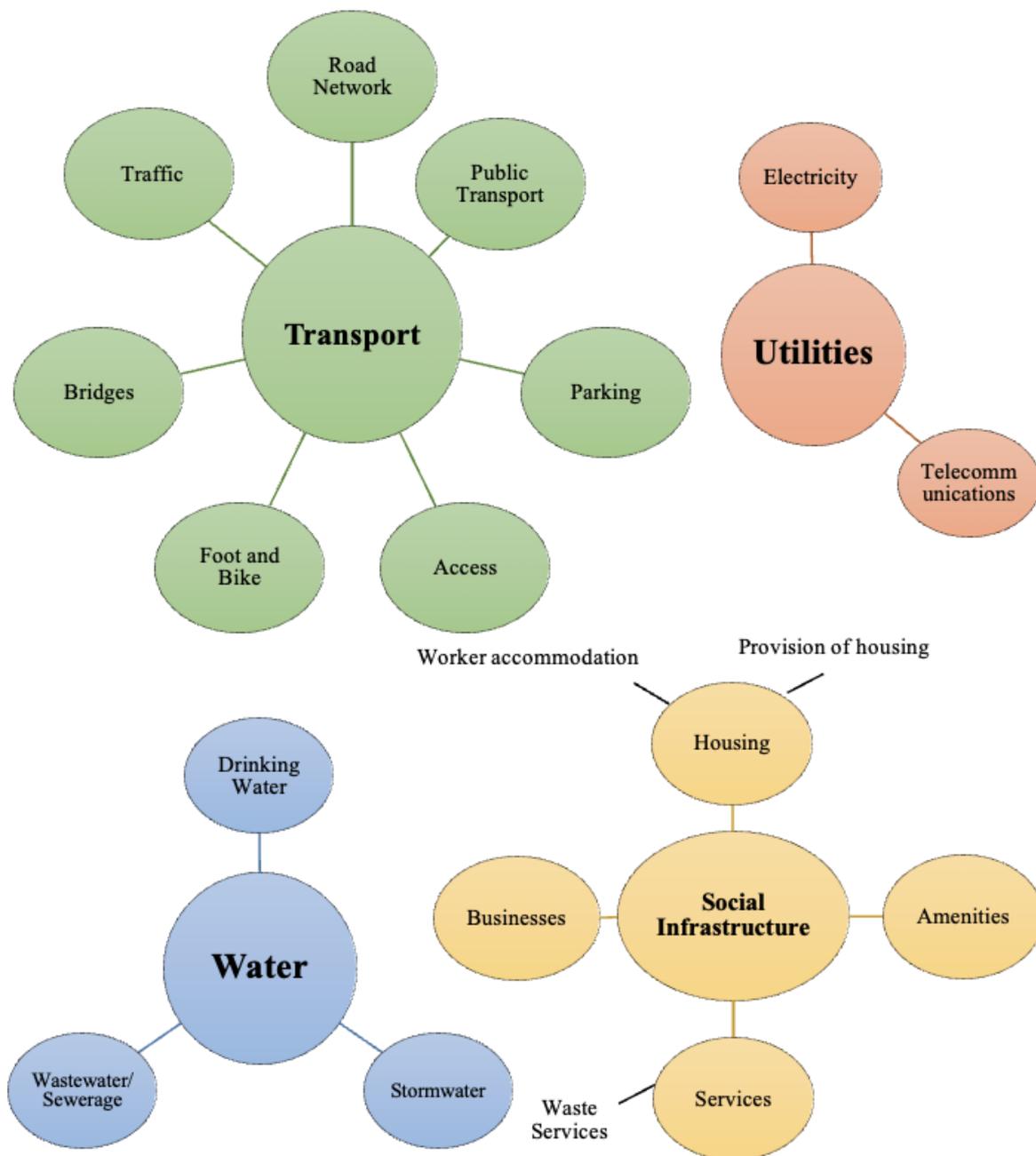


Figure 6.15 Cumulative Infrastructure effects considered in large-infrastructure project EIAs worldwide

The above diagram illustrates the spillover infrastructure effects considered in large-scale infrastructure projects worldwide (Figure 6.15). The below diagram is what infrastructure the community deemed necessary to support the airport and consequent development. The most prevalent answers were new and upgrade roads, sewerage/wastewater systems, and public transport. Sub-themes of the primary research are described in subsequent sections.

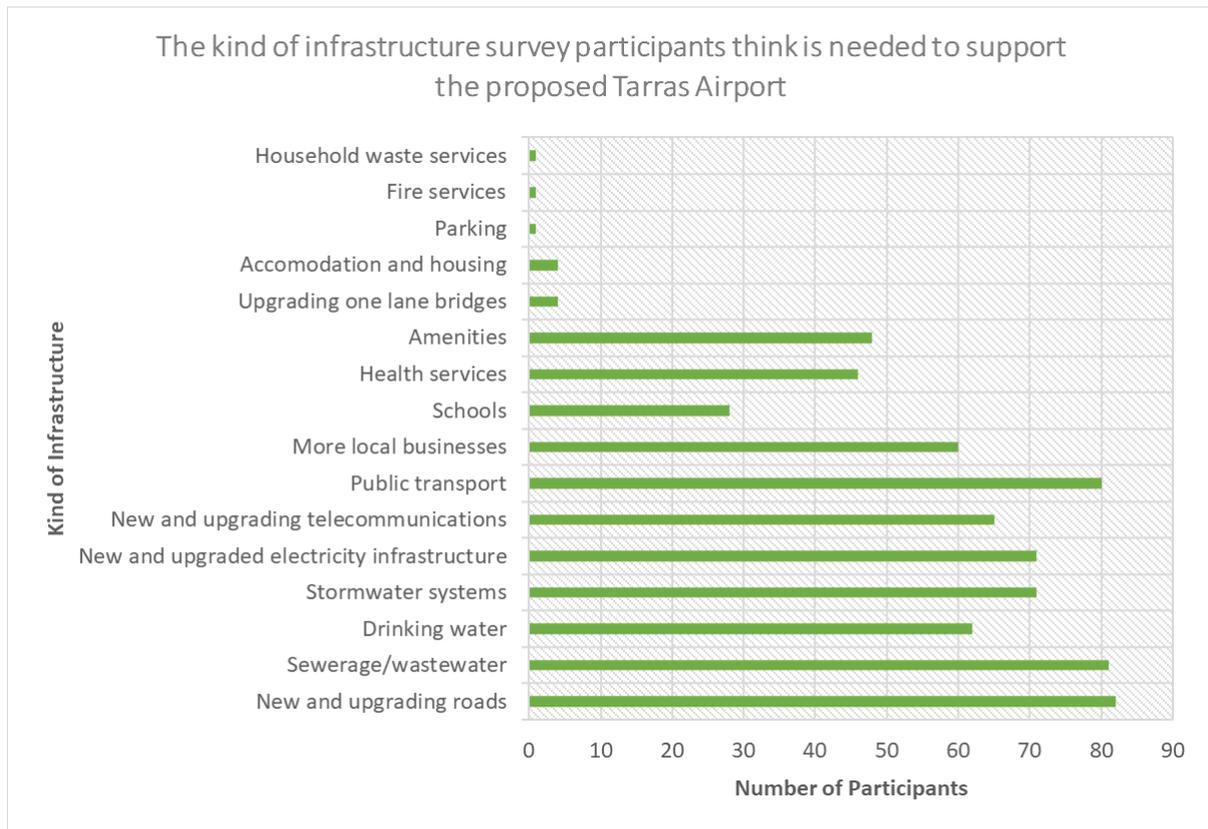


Figure 6.16 Survey participants’ responses to what infrastructure they thought was needed to support the proposed Tarras Airport

6.2.1 Rural Characteristics of Existing Infrastructure

As a rural area with a small, dispersed population, Tarras has almost no publicly reticulated infrastructure. Particularly, three-waters infrastructure (drinking water, stormwater, wastewater). The self-reliant nature of Tarras’s infrastructure was highlighted by P5; “*we don’t need anything. Everyone is self-reliant. We’ve got our own water, our own sewage*”. Participants understood the airport would place immense pressure on their “self-reliant” infrastructure: “[The airport] would place increased pressure on local infrastructure (bridges, roads, water, power)”. The additional urbanised infrastructure was described as “*unwanted*” by a town hall survey participant.

Electricity was used by key informants as an example of how fragile the infrastructure is with development pressure in the region (Figure 6.17). KI 1 and KI 4 note the electricity distribution network is already being significantly upgraded due to other developments in the Tarras-Bendigo area. As commented on by KI 7, CIAL are aware they will require large quantities of electricity as they transition to “low carbon aviation” and are in discussions with relevant groups.

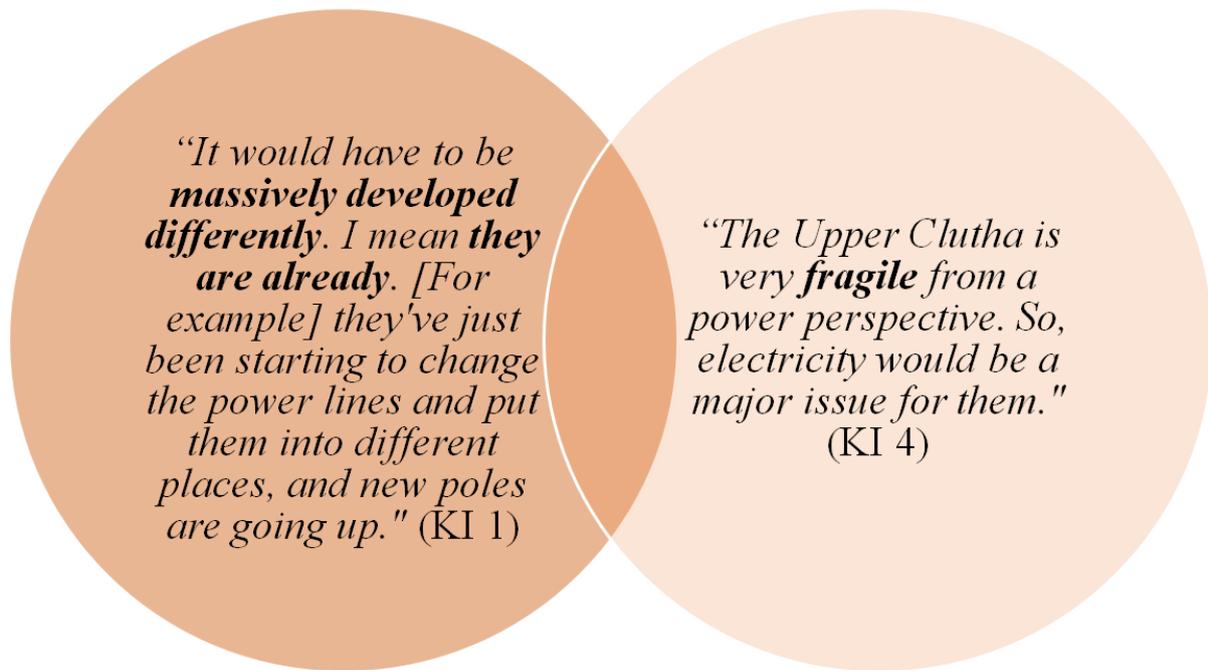


Figure 6.17 Electricity Capacity Quotes from Key Informant Interviews

The EIA analysis highlighted effects on electricity generation, transmission, and distribution are addressed by large infrastructure project in terms of availability of supply or whether upgrading or new infrastructure is required. This is the same with other public infrastructure, such as stormwater, wastewater and sewerage, drinking water, and telecommunications. Most large infrastructure projects analysed required immense upgrades to existing infrastructure or newly established infrastructure, especially to unserved rural areas. This is consistent with the beliefs of the community members in the town hall survey meeting and key informant interviews.

6.2.2 Roads and Road Usage

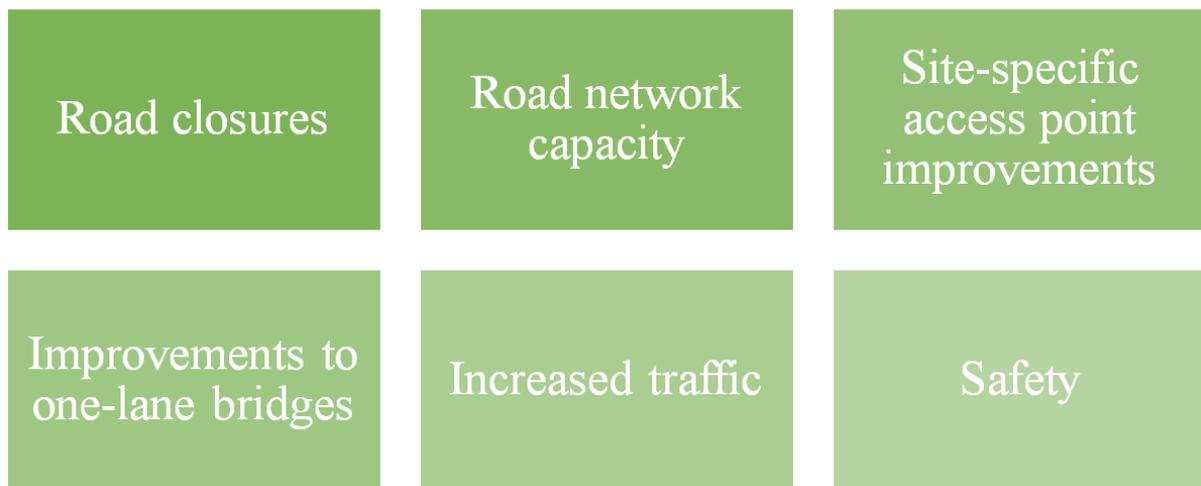


Figure 6.18 Road related infrastructure considerations

The cumulative impacts of the proposed airport on the roading network were emphasised by research participants (Figure 6.18 above). The impacts of traffic were a major point of concern, particularly among those currently living in Tarras (Figure 6.19 below). These concerns revolved not only around the potential congestion immediately surrounding the airport, but also the safety of those driving the roads, and the ability of infrastructure to support the increased volume. Those near Tarras and across wider Central Otago still saw it as a concern but were much less likely to have it among their leading issues.

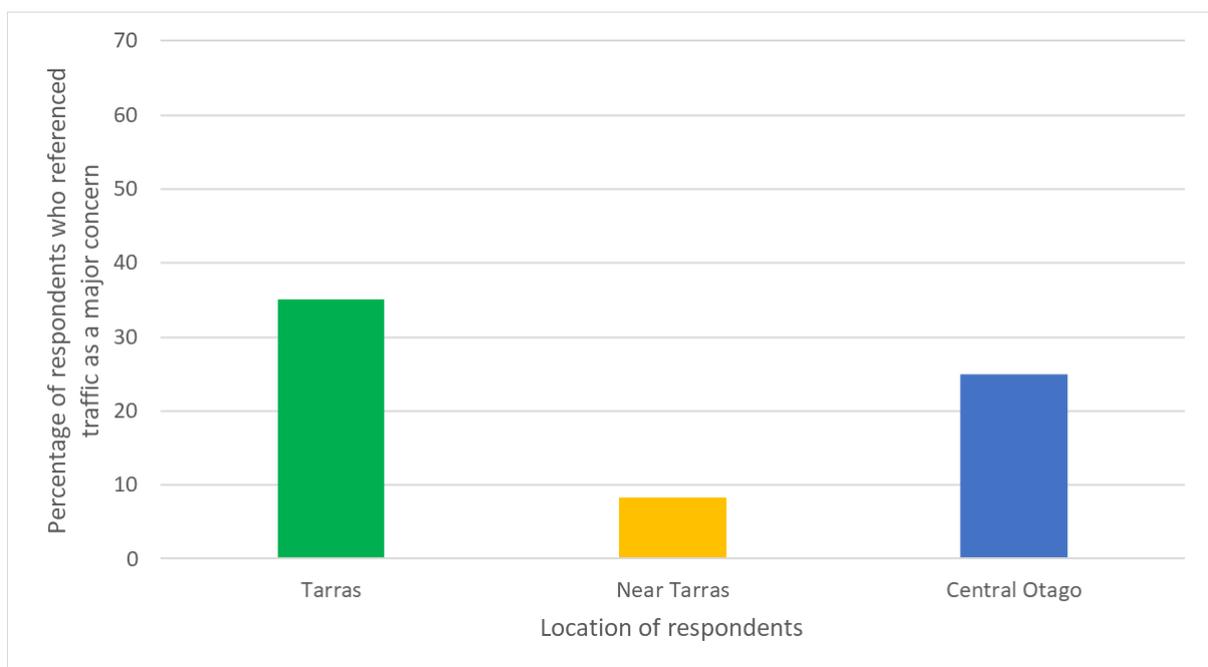


Figure 6.19 Percentage of survey respondents who referred to traffic as a major concern by location of residence

There was inconsistent beliefs on whether the road network was capable of handling a highly likely increase in traffic as visualised by red and green in *Table 6.8* below. Similar to survey data, the issues of congestion, lack of suitable roading infrastructure, as well as potential safety factors were major points of concern. On the other hand, P 5 and KI 7 did not believe that increased congestion will necessarily be expected as a result of the airport development. They believed the airport was well connected and positioned to an extensive roading network. Additionally, KI 7 contends upgrades to transport infrastructure should be considered in terms of the growth that is expected in the region, “*irrespective of whether an airport goes ahead or not*”.

Table 6.8 Diverging beliefs on road network capacity and safety from key informant interviews and town hall survey

Participant	Quote	Theme
N/A	<i>“Increase in traffic on the roads. The one-way bridge at Lindis crossing would cause a backup of traffic”</i>	Traffic, one-way bridges
KI 5	<i>“The wider infrastructure of bringing people to the airport and having them dispersed from the airport would require major roading and perhaps other infrastructural developments in this rural part of Central Otago (...) so you can imagine you know greatly enhanced needs for roading infrastructure. Bridges would have to be expanded all those sorts of costs that are not borne by Christchurch International Airport would need to be borne by regional, central government.”</i>	Road upgrades, cost to community
KI 2	<i>“Overtime the traffic, the roading network is not designed for a high-volume airport”</i>	Traffic, road network capacity
KI 2	<i>“It's the fact that people will die on Kawarau Gorge driving through there at midnight. When they've climbed off a plane from Hong Kong or New York or wherever. The airport will say, well, that's NZTA's problem. Yeah, but we as motor users will then have to pay for the upgrade of the Kawarau gorge which is measured in billions. Just the two bridges on either side of here – one at Lindis and one at Luggage are both single lane bridges. So where does this all get considered.”</i>	Safety, bridges, safety improvements, cost to community
P5	<i>“The Crown range, which is lethal for people who've never driven in New Zealand or through the Kawarau Gorge that is already congested, there's no room to increase the width of the roads.”</i>	Safety, traffic
P6	<i>“There will be increased traffic on this side of the lake. There will be increased road volumes on this highway. I don't see that it's any different than any of the highways and because of its location, like I say, you've got people from Tekapo, Wanaka, Queenstown and Cromwell and all that's coming in here. You've got multiple roads. All good state highways accessing it. (...) it's got a whole lot better potential for access in and out than Queenstown Airport has.”</i>	Good road network capacity, good location relative to roading
KI 7	<i>“It's positioned well relative to key roading infrastructure which already exists in the region. There is a lot of capacity in that system. They are high</i>	Good location relative to roading,

	<i>quality roads that have relatively modest daily traffic movements on them and so in the immediate roads adjacent to the proposed site, we don't anticipate any significant improvements would be needed"</i>	good road network capacity
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The results from primary data collection are largely consistent with EIA analysis. It is justified for community members to possess these apprehensions. The EIA analysis observed various transport-related impacts in relation to the operation of large infrastructure projects. Including parking, traffic volumes, site-specific access points, footpaths, bike lanes, public transport, and local road maintenance. Additionally, the analysis placed a significant emphasis on construction-related transport and traffic management, such as vehicle movements to and from the construction site, detours, road closures, and access points. Of which weren't as much of a concern to participants across all methods of data collection. Nevertheless, participants in the primary research expressed greater concern for the effects on the wider road network in Central Otago and safety compared to what was presented in EIAs.

6.2.3 Who Pays?

As touched on by KI 5 above, Participants P5 and KI 2 highlighted how the cost of supporting infrastructure is not placed on developers, but local councils, other infrastructure providers, and ratepayers. In contrast, the CIAL spokesperson notes councils and infrastructure providers should forecast and anticipate regional growth and cater accordingly.

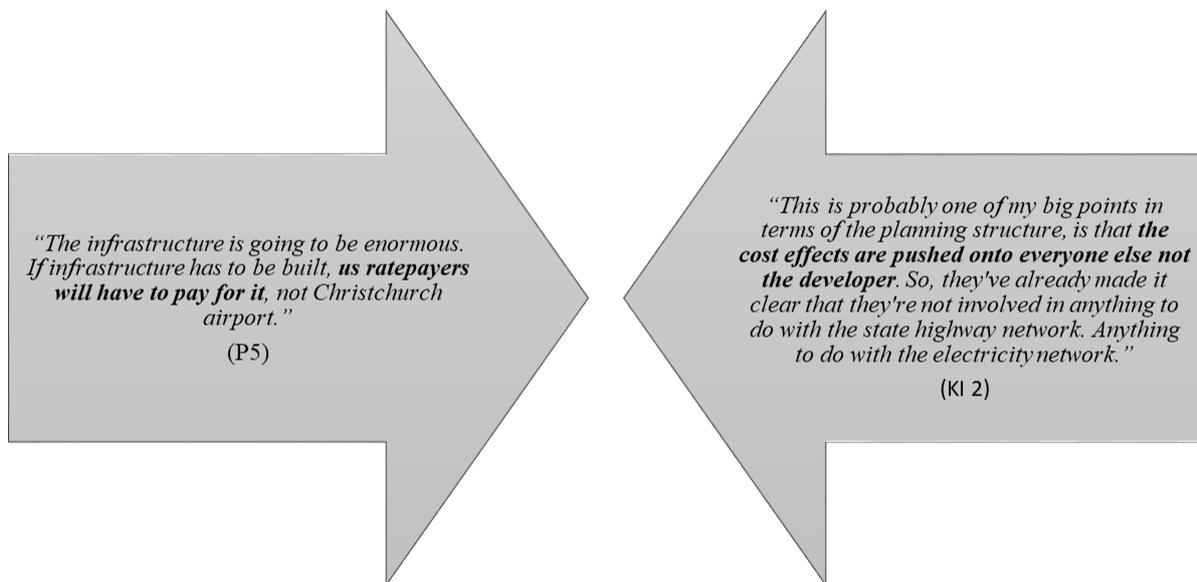


Figure 6.20 Research participants voicing their frustrations over developers not having responsibility for cumulative infrastructure effects

6.2.4 Land Use Changes and Development

Land use change and development was a key theme addressed through GIS analysis, key informant interviews, town hall survey, and the online survey. The below GIS maps illustrate the current land use (*Figure 6.21*) and buildings (*Figure 6.22*) on the site purchased by CIAL and the greater Tarras area. *Figure 6.21* shows the majority of the land is utilised for rural land uses, with is made up predominantly of grasslands. The airport land itself is mainly high producing grasslands. There is small pockets of settlement or built-up areas on the state highway and Tarras settlement. This aligns with the town hall survey interactive survey, where participants valued Tarras for its strong rural character and farming history. The second GIS map (*Figure 6.22*), illustrates the dispersal of small number of buildings, the majority housing. There is a cluster of buildings to the west, which is the recent Queensberry housing development. It was observed through primary data collection that Tarras residence are concerned about subsequent land use change and development.

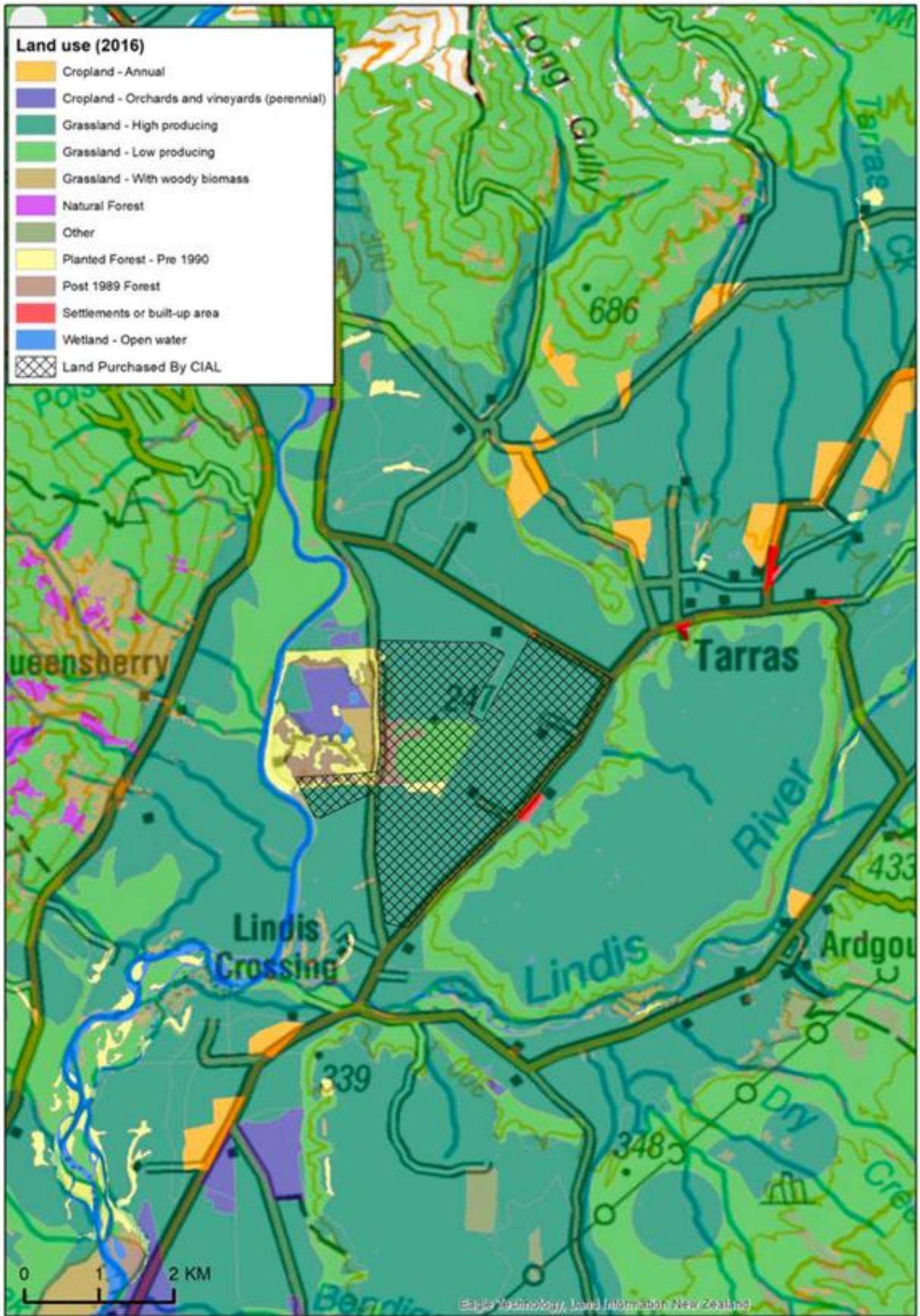


Figure 6.21 Map of Land Use in Tarras and site purchased by CIAL (Source: Authors, 2023)

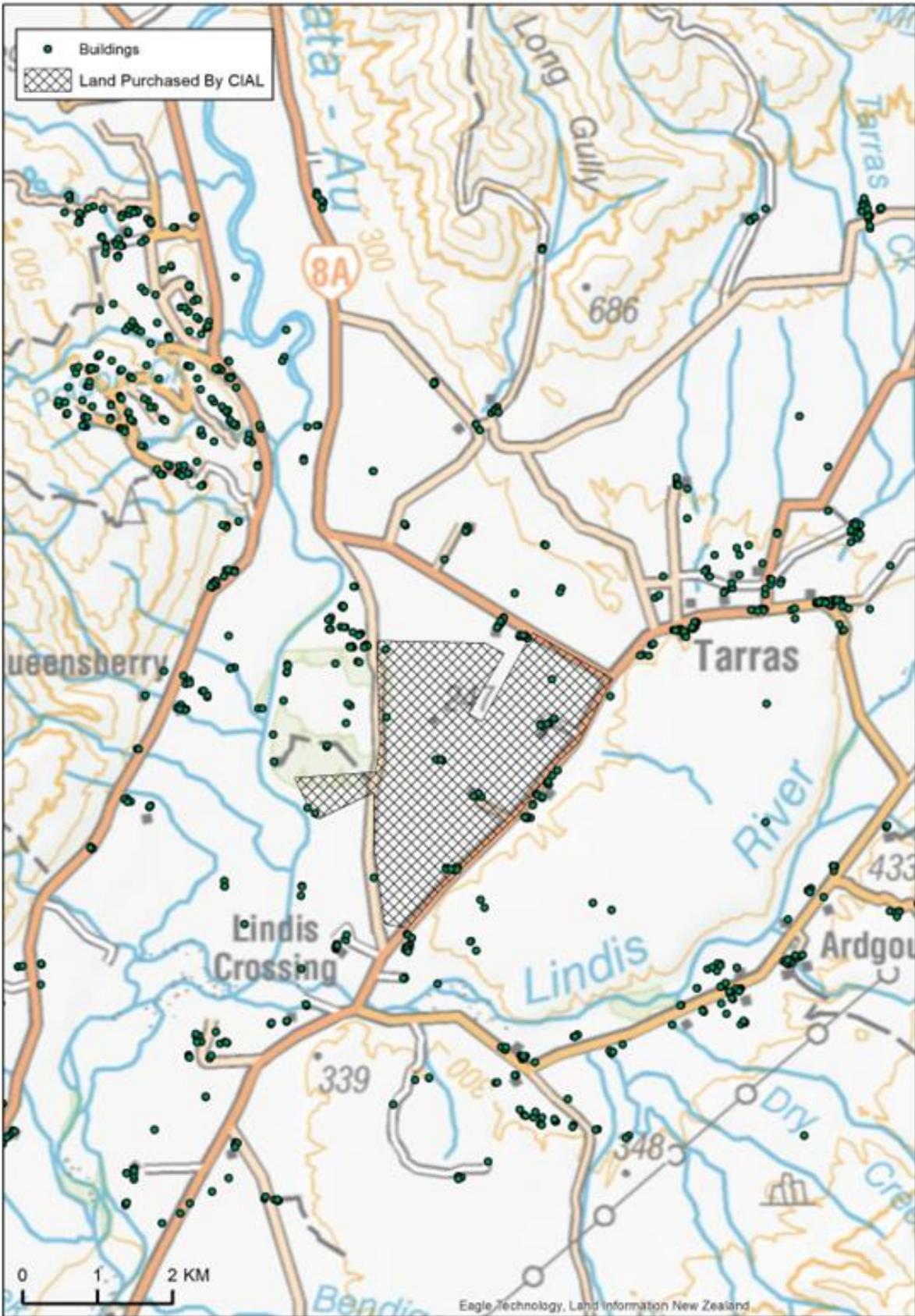


Figure 6.22 Map of buildings in Tarras and land purchased by CIAL (Source: Authors, 2023)

The community is worried about subsequent land use change and development as a consequence of the airport. *Table 6.9* analyses these responses from key informant interviews, the online survey and town hall survey interactive survey. The change in land use and development was often associated with a negative impact on agriculture, rural character, lifestyle, and the tight-knit community feel.

Table 6.9 Responses from participants on land use change

Participant	Quote	Assessment
KI 6	<i>“It is difficult to have the lifestyle that we have here with an industrial precinct (...) Perhaps that's the more troubling of the two, because that's ill defined. I can have an image of what a large aircraft coming at midnight from Taipei or Shanghai looks like, that's easy, but what does a glass factory look like? (...) It's what comes with an airport. Look at the Christchurch airport precinct and the industrialization around it.”</i>	Subsequent land use and development will impact the lifestyle in Tarras.
KI 5	<i>“Contrary to the strategy documents and declarations that we've mentioned, an airport of course, also drives urbanisation processes. So, where you have an airport, you usually need all sorts of other ancillary facilities in terms of fuel storage, fire and emergency appliances, hotel facilities, check-in and passenger processing facilities, car park.”</i>	“Ad-hoc” or spontaneous development against strategic and regulatory planning documents
Town Hall Participant	<i>“The Tarras village would no longer function as a focus of our community. Shops at airport, the industrial nature of the airport would be an eyesore in the landscape of green farmland. Tarras would no longer be a charming, supportive country community.”</i>	Land use change and development impacting community feel
Town Hall Participant	<i>“[Change it from] productive land use from primary sector to an industrial park covered in concrete.”</i>	Change from agricultural to industrial land use
Town Hall Participant	<i>“Tarras would be an industrial zone. The rural aspect of Tarras would be lost.”</i>	Land use change and development impacting the rural character
Town Hall Participant	<i>“Would also mean hotels, accommodation, retail and companies associated with infrastructure.”</i>	Commercial development
SP 58	<i>“Once an airport is established there will be few constraints on expansion, activity types that take place and neither the community nor Central Otago District Council will have any control over what path the airport establishment and expansion activities take (...). The Airport will seek to re-zone the Airport land and take agricultural land around the perimeter.”</i>	The change in land use will continue to expand around the airport

Throughout all research methods, spatial planning was mentioned as a method to manage land use change and development, irrespective of whether the airport was to go ahead. Many of the participants echoed the fact they have felt left out of the conversation of what their town's future

looks like. One survey participant made it clear through saying they would like to see a “*vibrant small community with authority and mandate to decide its own future.*” (SP 59). Community members at the interactive survey spoke of a recent community consultation towards developing a new Tarras Community Plan. KI 4 describes this finding:

“It’s a total change of land use (...) I would imagine it would either be factored into what might be considered for a spatial plan there. (...) It would probably have its own either spatial plan or its own very comprehensive plan change.” (KI 4)

6.3 Community Opinion

This upcoming section will discuss the larger community opinion surrounding the airport, and the future aspirations of the town. Due to the sample size of the survey and town hall attendance rates, the data will not be presented quantitatively. Instead, the data will be presented qualitatively to represent a portion of the community’s opinion. Given the highly emotive and contentious nature of the airport proposal, the qualitative presentation will avoid aggravating the situation. In order to effectively display the data collected on the topic this section will be organised into three sections. Firstly, the overall values and aspirations people hold in Tarras currently and in the future. Secondly, the Tarras community and surrounding residents’ opinions on the airport. Lastly, a wider CIAL opinion on the potential airport and alternatives will be discussed.

6.3.1 Community Values

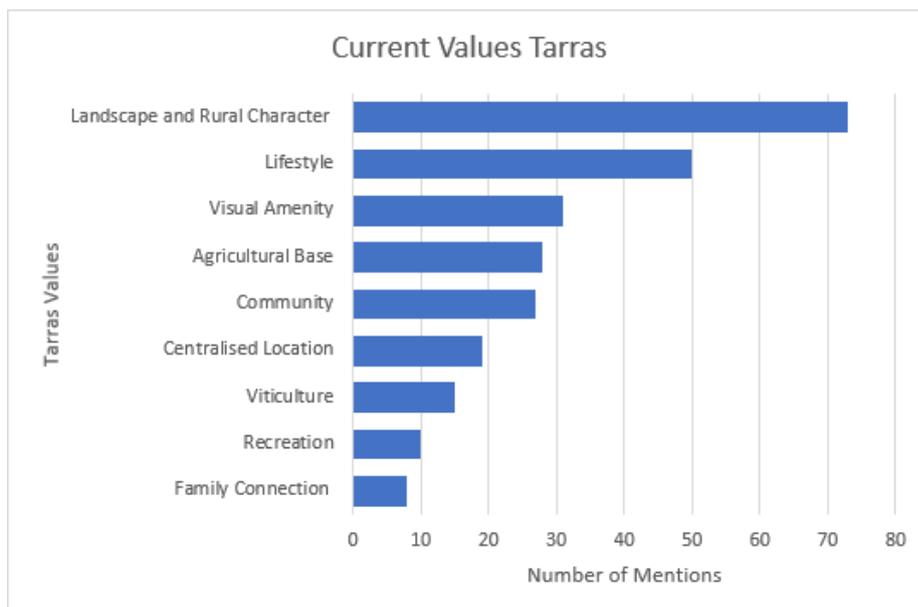


Figure 6.23 Survey responses on what Tarras residents value

Tarras draws in people for its rural amenities and values. When asked why the residents live in the area, most people pointed to the landscape and rural character of the area. Between the vast Southern Alps and green farmland, Tarras attracts and retains people primarily due to the landscape and rural character, lifestyle, and visual amenity of the area. As seen above in *Figure 6.23*, those are the top three favourite things about Tarras according to all methods of primary data collection (survey, town hall survey, and key informant interviews). Key informants and town hall survey participants spoke of Tarras’s rural amenity value. Some of these responses are shown below in *Figure 6.24*.

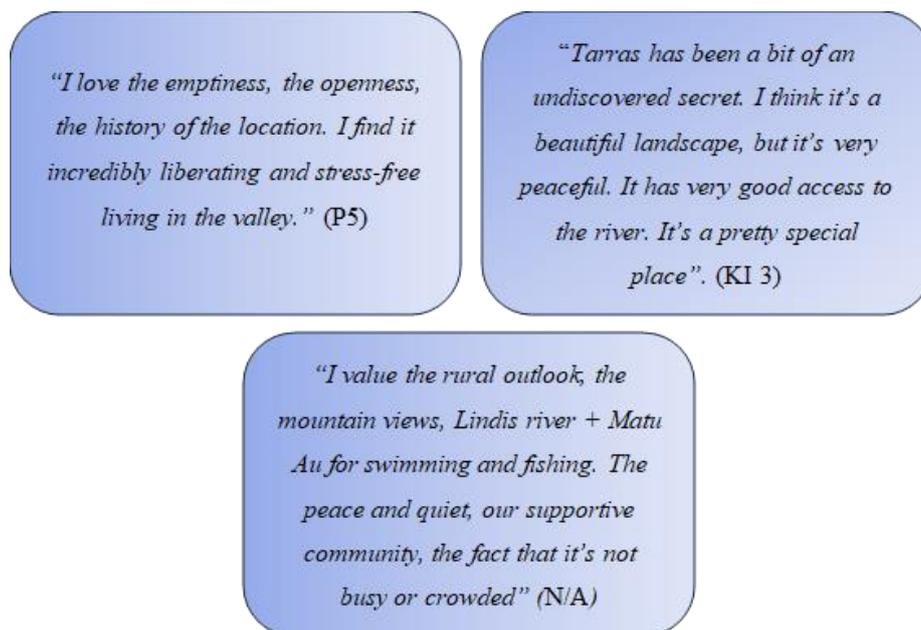


Figure 6.24 Quotes from key informants and town hall survey participants on rural amenity

Fourthly, people remain in Tarras for the agricultural base, whether it be viticulture, stone fruit, or pastoral farming. The importance of the community within the settlement also plays a big role, as found in the survey responses and confirmed by P5:

*“The value of living here is being able to walk down the river uninterrupted, no crowds. There is a pretty good **sense of community** here”.* (P5)

P5 references both the natural amenities of the area, but also the sense of community. The isolation, population size, and smaller tourist numbers allow the Tarras residents to connect with each other on a deeper level and form a strong sense of community. Overall, The Tarras community had very similar values, which as later discussed, are *inconsistent* with a proposed airport development.

6.3.2 Community Aspirations

Interestingly, in looking towards the future the majority of the research participants would like to see growth in the town, whether it be through an airport or other projects which align better with the rural amenity values.

There was a variety of beliefs on whether Tarras was growing or in decline as exemplified by *Figure 6.25* (below). P2 aligned their thoughts with why growth and economic opportunities were needed in Tarras. However, the majority believed the town was in decline.

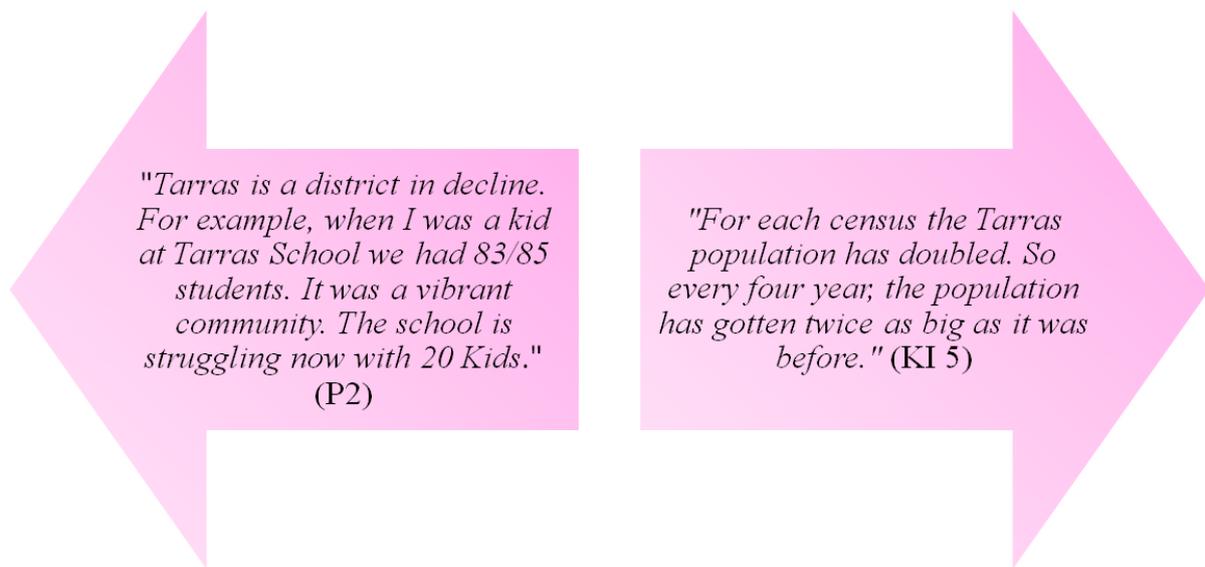


Figure 6.25 Opposing Opinions on Tarras Decline

In the survey data, the greater opinion showed a desire for growth. This growth was expressed to come in the form of support for new agriculture and viticulture industry developments, commercial through businesses, or additional housing. This desire stemmed from many people's connection to the place and the desire to preserve the land.

Figure 6.26 demonstrates the range of viewpoints on what growth should look like from survey respondents. Whilst most of the considerations were somewhat homogeneous in what they hoped Tarras would develop to in the future, there were a few outliers in the survey. The furthest to the left shows a conservative approach, where the respondents wanted much of the same to what Tarras currently is (zero – little growth). The middle response demonstrates slow-moderate growth, with more of the same rural developments such as lifestyle blocks, agriculture, horticulture, and viticulture developments. The far-right response illustrates high growth. Again, the majority of respondents opinions laid in the middle – slow-moderate growth which aligns with the rural amenity values and economy.

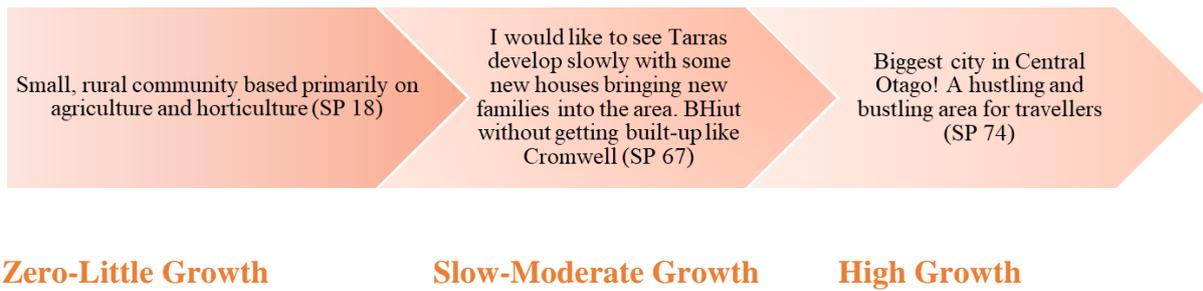


Figure 6.26 Community opinions on how growth should look

Figure 6.28 on the following page collates the opinions on growth across all methods of data collection. The different colours group the different viewpoints on growth per *Figure 6.28* below. In summary, regardless of what type of growth, many people would evidently prefer it to stay true to the values they treasure about Tarras already. The participants express a desire for controlled and sustainable growth that is rooted in community-based approaches. Developments that complement the natural amenities, such as the dark sky or native forest, is highlighted through many of the answers. They broadly reflect a desire for slow, steady, and thoughtful growth that enhance and protect the qualities that make Tarras unique.



Key



Figure 6.27 Future of Tarras Aspirations from participants in all forms of data collection

6.3.3 Community Opinion on the Airport

The overall opinions surrounding the proposed airport are mostly split and divisive. While the sense of community was what most residents valued in Tarras, many say the airport has divided the town, and they have struggled to be a collective community. *Figure 6.29* below illustrates the contested nature of the proposal, and the divisiveness in the community. KI 1 refers to the lack of public consultation and information surrounding the whole project development, allowing people to have many assumptions and emotive opinions based on the unknown.

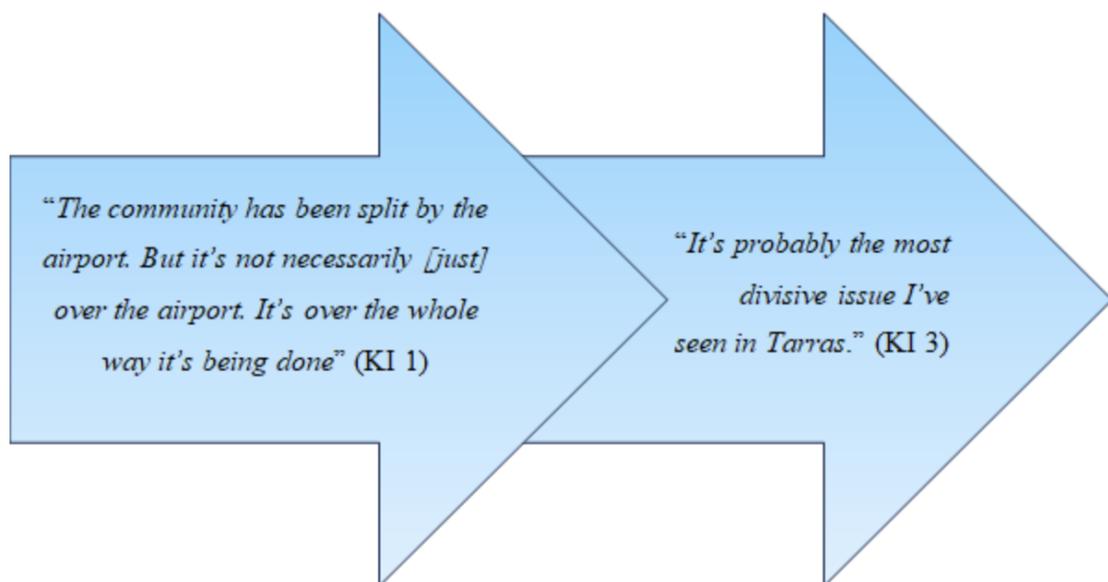


Figure 6.28 Quotes on the community being spilt on Proposed Airport in Tarras

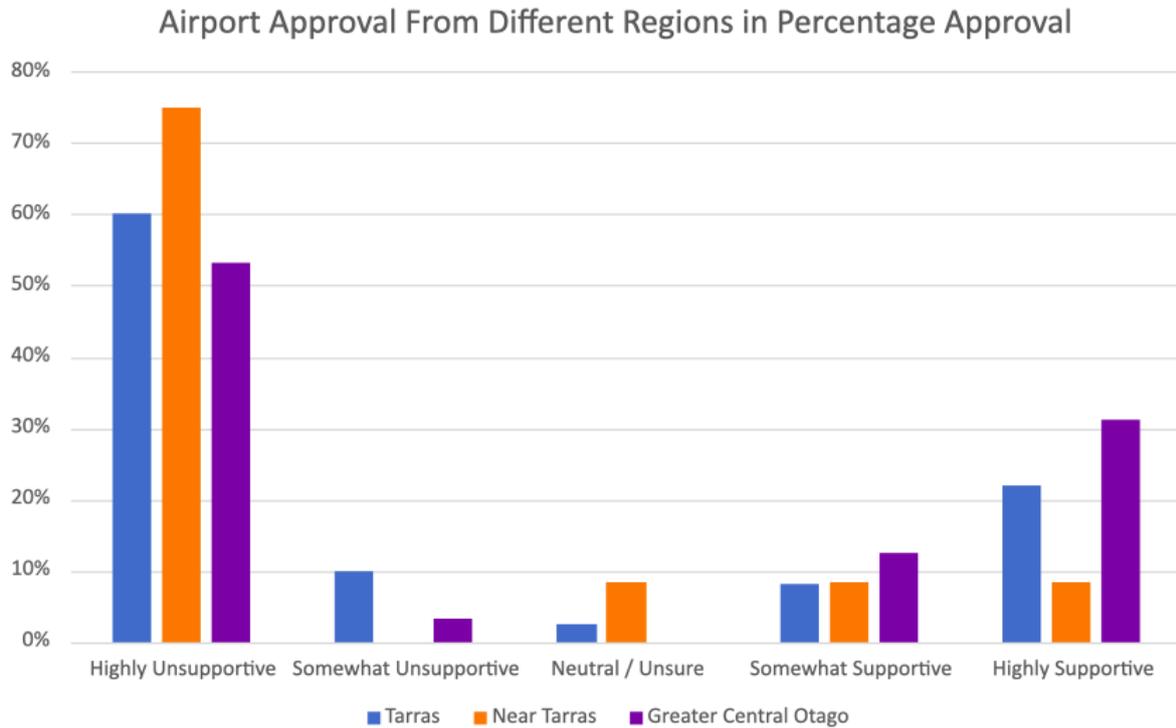


Figure 6.29 Airport Support by location of residence

The online survey as well as the town hall survey provided insight into the dividedness of the community. While the results displayed in Figure 6.30. are shown by percentage of people who supported or opposed the airport, the quantitative data cannot be given much weight as described in Section 5.4.3 – Methodology. For this survey, Tarras refers to anyone who labelled themselves as living in Tarras. ‘Near Tarras’ is Bendigo, Queensberry, and anywhere else in the Lindis Valley, and ‘Greater Central Otago’ is anywhere else within the region, but not elsewhere in Aotearoa. The split between the two sides is very evident with more survey respondents being highly unsupportive of it, but also some being highly supportive of it. The somewhat unsupportive and somewhat supportive and neutral / unsure categories have less respondents overall, showing the divisiveness of the issue. Nonetheless, the findings from the survey and town hall survey show the majority of people from Tarras and the wider central otago region are **Highly Unsupportive** of the airport. Those residing near Tarras were the most likely to be highly unsupportive (74%).

Figure 6.31 (below) shows the opinions from the town hall survey over how people ranked their support versus how they perceived the community’s support, or lack of, for the proposed airport as a whole. The perceived attitudes of the community show that residents support the airport more so than anticipated. Moreover, many people were unsure how the community felt about the airport.

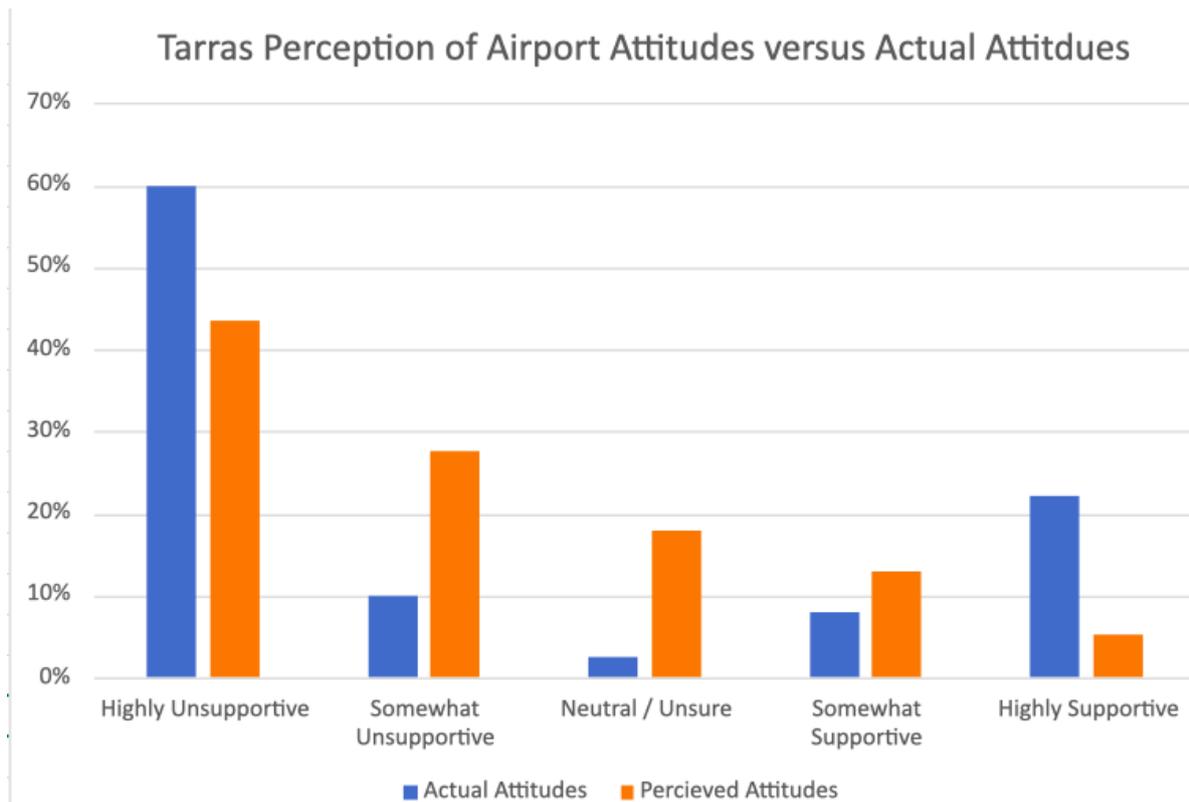


Figure 6.30 Tarras Perception of Airport Attitudes versus Actual Attitudes

An unbiased community session or plan where the community could collate their perspectives was raised as an important action by KI 7;

“My fear about the project and about other projects is that they get hijacked by uninformed discourse that headlines and sound bites hold sway over good information-based decision making, and that concerns me”. (KI 7)

A larger community session led by an impartial party, was highly favoured by informants and participants in other conversations.

While the participants and key informants felt a range of emotions and feelings about the airport, some were able to provide some benefits that would come alongside the development of the airport. They are listed below in *Table 6.10*. It is important to note the benefits of the airport were a lot slimmer than the negatives. For instance, 45% of survey participants noted zero benefits.

Table 6.10 Benefits of the Airport for the Tarras community from key informants and survey participants

Participant	Quote
KI 1	<i>“They (farmers) wouldn't mind if it came along because they could sell off their land. We do all know that some of them have already started to look at subdividing, doing subdivisions, and getting Council approval”</i>
SP 55	<i>“Could enable local populations to have a greater range of employment possibilities. Currently we can be a bit starved in terms of services, so that might improve”</i>
SP 29	<i>“Diversification for a struggling rural sector - gives rural farmers an ability to diversify their high-country operations in the Tarras area to pay for increasing regulation costs”</i>
SP 10	<i>“Convenience, no more distressing trips to Queenstown.”</i>
SP 16	<i>“Produce can leave directly. Not having to drive to Queenstown to Fly out. Economic growth for the region”.</i>

Collectively, these perspectives reveal the interplay between economic, social, and environmental factors in a large-scale development project. These quotes reflect the direct benefits of the airport itself such as new employment, convenience of air travel for residence, and the exporting of local produce. Moreover, the opportunity for individuals such as farmer to subdivide and sell their land. As well as the indirect opportunity for growth and diversification when planning decades into the future.

In contrast, the opposition to the airport held many beliefs that it would not bring much growth to the town and even if it did, much of this growth wouldn't benefit the community. *Table 6.11* provide statements to why participants opposed the airport from a range of primary data collection methods.

Table 6.11 Community Oppositions to the Airport

Participant	Quote
KI 3	<i>“I think it will kill the community. I always use Mamona as my example. That little town beside Dunedin Airport. Did it thrive and grow? No, people said we don't want to live here, and everybody left and it's bottom tier housing. The shops in the area even closed”</i>
P4	<i>“I couldn't actually live where I live If the airport goes ahead but I asked if CIAL would buy me out. They won't even buy people out, so that they're just kind of walking all over people who live here”</i>
SP 55	<i>“There would be a large environmental impact on an area that is already overstretched in terms of the impact of tourism on the region.”</i>

SP 58

“The Lindis Pass Valley, Tarras, Lake Dunstan to Cromwell, will suffer an irreversible visual assault from flights within the valley system and with accompanying jet noise that will echo within the contained valley systems. Compared to the current visual & acoustic footprint of the rural activities are "good for the soul" and once let go can never be reinstated, nor the damage repaired. Additionally, the long-standing farming-based people will be gradually displaced from the area and those connected with commercial activities arrive to perhaps work, but live somewhere else such as Cromwell & Wanaka”

The fear voiced in these concerns highlights the negative impact on the community, as well as the lack of confidence that the proposed airport would support the local economy. KI 3 highlights another small rural town, Mamona, which declined with the introduction of an airport. The displacement highlighted by P 4 and SP 58 show the adverse effects, both environmental and pollution, that could lead to flow on effects such as displacement. All of them emphasise the shift towards a more commercialised environment and that it would deter from the rural and natural amenity values as well as the local way of life in Tarras.

6.3.4 CIAL Opinion and Social License to Operate

The interview with a CIAL spokesperson (KI 7) provided a fundamental understanding of the rationale behind the proposed airport and site choice. CIAL places much emphasis on this being a future project, based upon forecasted future demand. The informant highlights the importance of planning for future needs and making informed decisions about regional infrastructure. Ultimately, the CIAL informant places their intention to make well-informed decisions based upon reliable data and future growth trajectory.

“We're working off demand forecasts that anticipate what the needs are going to be in 10 years' time. We think it's responsible. It's challenging for some people, we understand that, but to have honest conversations about what the demand is showing us is going to be needed in 10 years' time”

“We're not asking anybody for approval to build an airport tomorrow. If our hypothesis is correct, we are gathering a body of information that decision makers will be able to use and making good data based decisions about the future infrastructure for the region if that's all that this project does in the end and we don't build an airport, but we've given people to make good decisions, really good information to base those on, then we've still done a good job”

“The reason we are looking at the possibility of establishing a new airport in Central Otago is because we consider that there is soon to be a deficit of infrastructure in the region to support air connectivity. It's a region that has experienced significant growth in the last 10 years in particular and is forecast to continue to experience significant growth in the foreseeable future, 10,20, 30 ahead”

Figure 6.31 Statements illustrating Rationale for the Proposed Airport from CIAL Spokesperson

6.3.5 Alternative Approaches to the Proposed Airport

A key theme across primary data collection was alternative approaches to meet forecasted growth, as opposed to the proposed airport. The notable theme was the upgrading of *existing aviation infrastructure*, for instance, Queenstown Airport, Wānaka Airport, Dunedin Airport, Invercargill Airport. These airports were assumed by participants to have capacity, or opportunity to extend capacity. KI 5 also frequently mentioned the possibility of light rail to connect the airport of the lower South Island more effectively and efficiently. Statements supporting capacity alternatives are shown in *Table 6.12*.

Table 6.12 Aviation Capacity alternatives

Travel Alternative	Supporting Quote and Participant
Light Rail	<i>“We need to invest in low carbon infrastructure. And rather than spending whatever the price tag might be on building a new airport, maybe we should be investing in light rail systems that might connect Queenstown with the Invercargill Airport” (KI 5)</i>
Wanaka Airport	<i>“We wanted them to expand the regional airport in Wanaka they are owned by Queenstown Airport and they own a lot more land there. It could be transformed into a wide body jets without them having to buy anymore property. The residents at the moment aren’t particularly keen.” (P1)</i> <i>Yes but use existing airport infrastructure, particularly the under utilised Wanaka airport (SP 4)</i>
Queenstown Airport	<i>Although the airport proposal is based on the proposition of future capacity needs that can't be accommodated within the existing infrastructure, namely that Queenstown airport can't accommodate future growth, that of course depends on the assumption that's been made that future growth is required. Because Queenstown Airport does actually have a significant existing capacity and some further capacity. So it really depends on the future that someone might foresee for tourism in this region and particularly tourism in Queenstown, the idea of building a new airport is very complex in terms of existing infrastructure. (KI 5)</i>
Dunedin and Invercargill Airports	<i>No. As previously mentioned, Dunedin and Invercargill have unused capacity, and we should be aiming to decrease international flights for the good of the planet. (SP 79)</i> <i>There are currently three airports that have surplus capacity to service Central Otago - Queenstown, Invercargill and Dunedin. There are established transport links/national highways connecting each region. Invercargill airport is within a similar distance to Milford Sound as Queenstown. These airports have sufficient capacity to service the region for decades to come, and the infrastructure to cater for increased arrivals - hotels/motels, restaurants, attractions etc. (SP 81)</i>

Participants also suggested other infrastructure alternatives, including solar farms and housing (Table 6.13). The community is not against infrastructure development. Rather they mostly emphasise the importance of low-carbon infrastructure investment or investment in more pressing issues.

Table 6.13 Infrastructure alternatives to the Proposed Airport

Infrastructure Alternative	Supporting Quote and Participant
Solar Farm	<i>“They could put solar farms at the property, because actually electricity is a massive problem that New Zealand's got” (KI 1)</i>
Housing	<i>“There's an opportunity to have low density housing to deal with the chronic housing issues that you see around Cromwell around Alexandra” (KI 6)</i>
Other Investment	<p><i>“I guess the conclusion would be I don't see that it's useful to the country when we have enormous needs for infrastructural investment like replacing the flooded-out roads and bridges in the North Island for a start and then trying to move to a decarbonized economy. Which is another whole part of the airport business.”</i></p> <p><i>“Of all the pressing needs for New Zealand at the moment I just don't feel that new airports are on the table. Because it's not to say that we don't have a need for multiple urgent changes, electrification of the transport industry, decarbonization and so on. Then we're going to have a lot of climate refugees soon.” (P1)</i></p>

On the other hand, there was debate over the safety and future of Queenstown airport among other participants. This was largely due to its location, size, and expansion constraints. P6 comments on the safety concerns with Queenstown Airport: The environmental impact in transporting people from Dunedin and Invercargill Airports to the Queenstown Lakes area was also discussed. Additionally, the whole Tarras Airport debate was often linked back to a national conservation or strategy on aviation capacity, as expressed by P1 and KI 6 below in Figure 6.32.

"The bigger question is does New Zealand need a new International Airport, right? And how many international airports does it need? But I do think we have to think of this nationally, not parochially. How many International Airports does the South Island need?" (P1)

"The better outcome is that either the Christchurch airport as one shareholder or the New Zealand people as the other shareholder, have a national conversation. We decide what it is that we want as a nation, and we go do that." (K6)

Figure 6.32 Quotes relating to a need for a national conversation on aviation

6.3.6 Summary

The community opinions surrounding the potential airport development in Tarras are diverse and divided. The values and aspirations of the community are focused on the rural amenities, landscape, and sense of community that Tarras provides. The residents appreciate the open space, landscape amenities, and the opportunity to operate as a community. Whilst there is a desire for growth in the town and region, it is important to many residents that this growth stems from their values.

The lack of public consultation and information has contributed to assumptions and emotive opinions. While a significant portion of the community is highly unsupportive of the airport, another portion is highly supportive which demonstrates the high engagement with the issue. While the CIAL emphasises the future demand and the need for better air connectivity in the region, many other infrastructure projects have been proposed by those opposing the airport. Most of which focus on low-carbon solutions which align with the community's desire for sustainable growth and investment in renewable energy. Overall, the community's values, aspirations, and opinions reflect the complex interplay between economic, social, and environmental factors.

7 Discussion

This research aims to explore the potential effects of a proposed new international airport on the small rural settlement of Tarras, Central Otago, New Zealand, by investigating the views and aspirations of the local community towards the development and identifying future infrastructure needs. This chapter provides a discussion that addresses the aim and research questions by interpreting and synthesising the key findings across our primary data results, policy analysis, and literature review. The chapter will be structured by research questions. The first research question pertains to exploring the potential localised effects of the proposed Tarras Airport from a holistic perspective. Whilst interrelated, the second research question explored what supporting infrastructure would be required and form spontaneously. Moreover, how this development would impact the Tarras region spatially. The final question investigated the values and aspirations of the Tarras community and whether these align with a proposed airport. Analysing the research findings will illustrate the complexities and array of effects to consider with large infrastructure projects, the cumulative nature of these effects, and challenges and contradictions arising from developments in rural communities.

7.1 Localised Effects of Proposed Airport

Large infrastructure projects involve a myriad of effects that need to be considered and managed through construction and operation stages (Streatfield & Markless, 2009; Zeng et al., 2015; Yao et al., 2011). These can be categorised into various dimensions, including environmental, social, economic, and cultural effects. It is also crucial to recognise the multifaceted and interlinked nature of these effects, their short-term and long-term nature, and their cumulative impact (Streatfield & Markless, 2009; Zeng et al., 2015; Yao et al., 2011). Bacior & Prus (2018) discuss the importance of having an “integrative view” of the effects of infrastructure projects.

The introduction of an international airport in the small rural settlement of Tarras would have various effects. This section will focus on the potential localised effects of the proposed Tarras airport most prevalent through the findings of the research – particularly environmental, social, and economic effects. Due to a lack of specific information regarding how the proposed airport would manage relevant issues, speculative claims informed by relevant literature and context-specific knowledge can be made at this stage. Therefore, this is an exploration of the potential effects.

These effects highlight the complexity of large infrastructure projects and emphasise the importance of conducting comprehensive impact assessments, community and stakeholder engagement, and adopting sustainable designs and, in doing so, mitigating adverse effects and creating positive outcomes (Kerselaers et al., 2013; Zeng et al., 2015).

7.1.1 Interrelations of Effects

As highlighted by Zeng et al. (2015), it is essential to consider both the short- and long-term effects of large-scale infrastructure projects and the cumulative effects over time. The cumulative effects of an international airport on the environment pose a risk to local ecosystems. Kāi Tahu Ki Otago (2005) kaupapa “Ki Uta Ki Tai” emphasises the connectedness of the different elements of a catchment; the air, atmosphere, land and coastal environment. This highlights the importance of a holistic approach to recognising and mitigating potential effects. Cumulative environmental effects are also relevant on a global scale when considering the link between the aviation sector and climate change (Khalili et al., 2019).

Concerns raised in our results illustrate the interrelated nature of the potential effects and highlight the importance of not viewing these in isolation. For example, environmental concerns such as pollution also pose a risk to the visual amenity of the night skies. Furthermore, pollution of waterways diminishes both amenity and recreational value. A loss of productive land is detrimental to both the environment and the economy (Xiong & Tan, 2018). Development on productive land also poses a risk to the amenity values of the Tarras landscape, which contributes to the peaceful rural feel. This research mirrors Monterribio et al. (2020) findings as they concluded the perceived negative impacts outweighed the positive ones. Moreover, these examples also highlight how these effects do not fall entirely within a single category. However, for the purpose of this discussion, the effects will be categorised into environmental, social, economic, and cultural effects.

7.1.2 Environmental Effects

Relevant literature highlighted the common environmental effects of airports. These impacts are largely negative. On a local scale, the effects highlighted in the research findings were air pollution, soil and water quality, and biodiversity loss. Demonstrating the environmental issues of importance to the Tarras community. These impacts should be carefully considered in relation to the airport. It is also important to acknowledge the global implications of an international airport. As seen in *Section 6.1.10* implications relating to greenhouse gas emissions and climate change were a notable concern among participants. As highlighted by

participants, the addition of an international airport goes against international and national commitments to reduce greenhouse gas emissions. While this research focuses primarily on local scale effects, implications of this scale are vital to consider regarding the proposed Tarras Airport.

7.1.3 Air and Water Pollution

Air pollution is a prevalent environmental effect of airports, both locally and in terms of global climate change emissions. This is linked to the various airport-related sources of pollutants and the impacts this has on both human health and vegetation (Emberson et al., 2001; Mulliner et al., 2007). As such, air pollution was among the most prevalent environmental concerns of the proposed airport. This reinforces widely recognised matters related to living near an airport (Marisol and Harrison, 2014).

While the literature greatly emphasised the negative air pollution that is associated with airports (Li & Loo, 2016; Luo et al., 2018; Mulliner et al., 2007; Schlenker & Walker, 2016), our results do not place as much emphasis on it specifically. This may be due to the greater scale impacts of emissions and air travel as a whole. However, when considering air pollution in relation to policies and plans, it is very relevant. The Otago Regional Council Air Plan sets out values and rules surrounding air quality. The airport development must gain appropriate discharge permits and comply with other relevant frameworks discussed later in this section.

Water quality was another key concern highlighted in our research. This, too, was an anticipated finding given the prevalence of the issue in other large-scale projects and for other airports (Nunes et al., 2011). Runoff from airport-related activities was key in literature and also a prevalent concern in our results. The impact on the Clutha River Mata-Au was specifically noted (*Table 6.1*). This was regarding discharging contaminants into the Clutha River and its use as a water source. This finding was somewhat unexpected due to the lack of literature discussing the direct relationship between water and airports. This could point to a stronger connection to place that is seen in rurality, as Tarras sits geographically on the Mata-Au and near Lake Dunstan (Woods, 2005 ; McManus et al., 2012) Such actions would require relevant permits, including demonstrating that adverse effects are appropriately mitigated to have no more than minor effects on the environment.

7.1.4 Biodiversity

Airports and similar infrastructure have been associated with reduced local biodiversity (Prus & Baciorek, 2018; Garcia Lopez, 2012). Given the high level of biodiversity in Tarras which

locals value, this association is a concern also relevant to the proposed Tarras airport. While biodiversity loss was not the most prevalent environmental concern, its importance has been raised. The association of biodiversity with Tarras's highly valued landscapes and amenity reinforces the importance of maintaining biodiversity. As seen in the Otago Regional Policy Statement, ecosystems and indigenous biodiversity are vital considerations (*Figure 4.5*). As such, minimising the loss of biodiversity is another essential consideration.

7.1.5 Highly Productive Soils

The effect on highly productive soils is a concern that was less prevalent in our results than anticipated. Given the significance of highly productive land to rural New Zealand, issues such as land fragmentation were expected to be more of a concern (Curran-Cournane et al., 2021). However, the impact on soil quality was still a concern. Specific worries were raised surrounding the risk of soil being contaminated by fuel and other contaminants (*Table 6.1*). The National Policy Statement for Highly Productive Soils is a key policy consideration for the airport development given only 15% of New Zealand's land is highly productive and diminishing quickly (Ministry for Primary Industries, 2023). A portion of the site purchased by CIAL is classified as highly productive land. Subsequent spontaneous development could also impact the abundance of high-quality soil in the region. Whether or not the airport is considered as or allowed as an inappropriate development will be a key decision under the NPS-HPL.

Additionally, the research findings highlighted the value of low-quality soils to the horticulture and viticulture industry in Central Otago. The value and retention of this “special land resource” is recognized in the CODC District Plan (CODC, 2008). The value of these low-quality soils may not be recognised at the national or international scale. However, demonstrates the importance of considering locale-specific effects. Furthermore, the purpose and vision of the rural land use zoning of most of Tarras under the district plan must be considered. An airport can be viewed as an incompatible activity in the rural zoning.

7.1.6 Implications of Environmental Effects

As previously highlighted, effects of large infrastructure projects are multifaceted. Therefore, the flow on social and economic effects of these effects are important. Similar infrastructure projects have raised social concerns such as a reduction in amenity and recreation values, linking to an overall reduction in quality of life (Bacior & Prus, 2018). These concerns have been both directly and indirectly related to environmental effects, such as the ones presented

in our results. These effects can also be economically significant. For example, literature shows a link between the aesthetic appeal of rural landscapes and tourism (Perkins, Mackay & Espiner, 2015). Related concerns were also highlighted by participants in our results, with landscape and amenity being a major concern. This was mostly linked to pollution (*Figure 6.6*). Alongside this, loss of productive land, biodiversity and air pollution would reduce agricultural production. For example, (*Table 6.1*) raised the risk of producers losing organic certification. These areas are integral to the identity of Tarras, therefore reinforces the importance of minimising adverse environmental effects. Therefore, any environmental harm the airport may cause is also a relevant economic consideration.

7.1.7 Economic Effects

Potential economic impacts were not uniform across the research. Potential benefits included economic diversification and growth, increased property value, and job opportunities. Potential negative impacts included uneven benefits across the region, decreased property value, and a decrease in agricultural productivity.

It was somewhat surprising that no mentions of improving the connectivity between Tarras through transport infrastructure and the rest of the country or nation was noted, as a large theme in the literature covered rural transport infrastructure (Cantos et al., 2005; Maparu & Mazumber, 2017; Dimitriou & Sartzetaki, 2018; Dimitriou et al., 2015).

Infrastructure developments tend to be associated with economic benefits such as economic diversification and employment opportunities (Rolfe et al., 2007). According to Cantos et al. (2005) such benefits tend to be higher in urban areas. This research suggested that transport infrastructure in rural areas has less benefits and reduces the rural area. This links to concerns raised in our research. The idea that any economic benefits may not actually benefit the Tarras community at a local level was prevalent. Given the dominance of agriculture in the community. Reducing the rural area may instead have negative local impacts. Literature suggests that the primary economic impact of airports is increased tourism (Doerr et al., 2020). The chances of Tarras directly benefiting in this area are small compared to surrounding areas such as Queenstown and Wānaka. This can be linked to a lack of supporting tourism infrastructure. As highlighted by Cantos et al (2005) travel infrastructure does not tend to benefit rural areas that lack developed infrastructure.

Opinions varied on the nature of economic impacts the airport would bring. Some Tarras residents saw increased property value as a potential benefit. Others anticipated a decrease in

property value. Interestingly, the wider Central Otago area was more interested in general economic development. This is consistent with the expectation that Tarras itself may not receive significant economic benefits. This finding is broadly consistent with the other literature that discusses uneven effects, where the wider country or region benefits at the cost of the local area (Barrios, 2008; Karselaers et al., 2013; Li, et al., 2013; Rolfe et al., 2007).

Job opportunities were another key consideration. This was perceived as a benefit by some whereas others disagreed (*Table 6.6*). When considering the current demographics of Tarras we can assume the majority of the population are either employed already or have retired. Therefore, the prospect of potentially lower wage jobs servicing the airport may not provide any benefit to the community. Temporary employment would also be required during the construction phase. As it is unlikely Tarras alone would have the people to fill these roles, outsourcing is likely. It is still important to consider that in particular the younger population can benefit from these opportunities. A smaller but significant proportion of respondents recognised the potential for these opportunities. A further example is diversifying the economy beyond agriculture. This was in recognition that agriculture is undergoing a transition and as a result having new opportunities is an important consideration.

Our research suggests Tarras has potential to benefit from the airport economically overall (*Table 6.5*). It is difficult to imagine a situation in which Tarras remains rural while receiving significant economic growth as a result of the airport. In the case where the airport stays contained to its site and infrastructure is minimal. It can be assumed economic benefits would be felt elsewhere in New Zealand. On a local scale, the impacts may be minimal. This is confirmed by Karselaers et al (2013) who describe the lack of benefits the agricultural industry reaps with the addition of infrastructure.

In a scenario where significant development happens as a result of the airport. Tarras would benefit economically. However, the agriculture sector would likely suffer. Therefore, determining a scenario which best aligns with the values and aspirations of Tarras is the optimum result. It is important to consider who benefits from this and what are the dominant economic goals for the population. Research question three seeks to gain an up-to-date reflection of these values and aspirations.

7.1.8 Social Effects

The social implications may be the biggest localised effects of the proposed airport. Nuisance impacts, specifically noise and traffic, were two of the most prevalent concerns raised during

the data collection process (*Figure 6.3*). Alongside this, social changes leading to a sense of displacement are particularly concerning for the Tarras community. Conversely some welcome this change for Tarras. A key message throughout was that the prospect of the airport has been divisive within the community. Conflicting opinions surrounding developments of this size are expected (Rolfe et al 2007).

7.1.9 Nuisance Effects

Increased traffic is of significant concern, particularly to those most local to Tarras. Safety on the roads was a notable concern found in the research. The risk of passengers arriving from long haul flights then travelling on complex roads such as the Crown Range and Kawarau Gorge is worrying for some. Alongside this, the likely impact of congestion has also been raised. The opinion on this matter was not uniform across the data, with some participants suggesting the road infrastructure is adequate. This is something that should be investigated carefully by appropriately qualified personnel when making informed decisions related to the airport. A clear projection of expected passengers should aid in determining the capacity of the infrastructure. Such effects should be considered on both a short- and long-term basis and for construction and operation phases.

The impact of noise as a social effect was barely regarded within the literature review. This could be due to the near quiet atmosphere Tarras currently maintains and the stark contrast the airport would bring. Noise during construction and operation phases of large-scale infrastructure is an issue. Links to distress and lower quality of life can be made (Prus & Bacior, 2018). The ongoing noise of incoming and outgoing flights makes an airport even more concerning. This was the most common concern raised among survey participants and was also prevalent in the town hall session. Our research also suggested that the airport site was selected to minimise noise impact on residents, suggesting the impact may not be as severe as anticipated. However, the results highlight the importance of providing supporting technical data and mitigation measures. A common approach to noise from transport hubs, including ports and airports, is affected parties are compensated for retrofitting acoustic insulation into homes, to mitigate these effects (Camara et al., 2018). Such mitigation measures will be an important consideration should the airport go ahead.

7.1.10 Change of Lifestyle

As seen in literature, a strong sense of place is particularly prevalent among rural communities. This is largely linked to a connection with nature (Beach et al., 2019). With rural character,

landscape and visual amenity being core values for many participants, the connection with nature is important to the Tarras community's sense of place. The peaceful lifestyle and close-knit community in Tarras enhances this connection further. As Woodhouse (2006) notes, this connection to natural amenity, lifestyle, and other favourable characteristics are not mentioned in many social impact reports, while it was one of the more noted effects within this research.

As seen in research by Tilt et al (2009) large infrastructure projects often cause massive social change. For example, disruptions to social cohesion and cultural practices. Both of which could be quite prevalent from the airport. Their research was set in the global south and also found physical displacement as an issue. Whereas in Tarras, which is more economically developed, a sense of displacement is more likely as such large-scale changes would alter the values mentioned. The prospect of the airport alone has evidently impacted the level of social cohesion in the community.

7.1.11 Cultural Effects

The potential cultural effects of the proposed airport are also important to consider. As highlighted in the environmental impact assessments, large infrastructure projects have been linked to various cultural effects. These include Mana Whenua values, sites of cultural, archaeological and historical significance and connection to nature (*Table 6.7*). The most prevalent cultural impact raised in our primary data collection was connection to nature and place. Residents fearing a change in the slow-paced culture of Tarras and loss of amenity reducing their connection to the natural landscapes were prominent concerns (*Table 6.2 & Figure 6.24*). This can be compared to the study by Tilt et al. (2009), which highlights how large infrastructure projects can impact “non-material cultural aspects of life”. This cultural impact is particularly relevant when considering the enhanced connection with nature that rural communities tend to have (Beach et al., 2019).

Conversely, concerns related to mana whenua values and sites of cultural, archaeological and historical significance were not prevalent in the data collected. Considering the importance of these values, particularly in a New Zealand context this was not anticipated. Despite this, the effects the proposed airport may have on these values are hugely important. These values are set out in the Kāi Tahu Ki Otago Natural Resource Management Plan. Alongside this, a comprehensive assessment of cultural effects should be undertaken. Relevant research highlights the importance of ensuring adverse cultural effects are not disregarded but are carefully anticipated and mitigated (Tilt et al., 2009; Hanna et al., 2016; Hannock et al., 2020).

7.2 Infrastructure

Supporting infrastructure is a key component in the development and operation of an international airport. This section analyses the current infrastructure landscape of Tarras and outlines what new and upgraded infrastructure may be required for the airport. Within the literature review it was discovered that large-scale infrastructure projects have significant spillover effects on local communities (Cantos et al., 2005). In mind of this, the impact that the proposed airport will have on the rural character of Tarras is investigated as well as the Tarras community's reaction to this *rural change*. Finally, speculative plans for the Central Otago airport based on other New Zealand airports will be presented to show how land use change and development may change the Tarras region.

7.2.1 Existing Infrastructure

Tarras, as a small rural settlement with an agricultural-based economy, has limited infrastructure. This includes very little publicly reticulated infrastructure such as stormwater, wastewater and drinking water. There is also pressure on electricity infrastructure within the Central Otago region. As mentioned in the results section, the residents of Tarras consider themselves self-sufficient, which is attainable due to the community's small rural nature.

The potential Tarras airport, as with any significant development project, will require significant supporting infrastructure. The case studies in Perkins et al. (2015) found that airports put significant pressure on local infrastructure. Especially airports built in underdeveloped or rural areas. This was expected to be the case in Tarras, based on its lack of existing public infrastructure. Immense new and upgraded infrastructure would be required, some of which are discussed below.

7.2.2 Housing

The provision of housing is an important supporting infrastructure consideration at both the construction and operation stages of the airport. As highlighted throughout the findings of this research, low unemployment rates, and a small population base means both construction and operation stages of the airport will likely require a large amount of outsourced labour. These employees will have to live within close proximity to the airport in Tarras or surrounding urban areas (Cromwell or Wānaka).

However, the research emphasised that housing in Central Otago is in short supply and expensive. Furthermore, the housing stock in Tarras consists largely of lifestyle blocks and

large rural farms. Therefore, the housing supply is inappropriate for a large labour force. Case studies in rural Canada found large infrastructure projects increased the demand for housing, and rental prices resulting in displacement. Top-down coordination and investment within the local communities have been shown through case studies as an effective strategy to offset displacement and maintain social networks that are key to the rural character of a region (Tilt et al., 2009).

Housing was not expressed in much detail from our findings. Nonetheless, the provision of housing during both construction and operation stages, and this subsequent impact on existing communities is a vital consideration in planning for the Tarras Airport.

7.2.3 Transport Infrastructure

With an international airport there are also significant transport infrastructure requirements. The evaluation of transportation infrastructure extends well beyond the confines of the airport, encompassing the destinations people travel to and from. Keast et al. (2008) recognises transport infrastructure as the facilitator of access. Transport infrastructure encompasses roads, bridges, public transport, parking, access, and foot and cycling, connectivity was found to be to key successful operation of an airport while traffic incidents and limited access reduce success (Keast et al., 2008).

The proposed Tarras Airport is well positioned relative to key roading infrastructure, including two state highways. This was highlighted by the CIAL spokesperson as a key strength of the proposed site. The current road network capacity immediately adjacent to the proposed site was also viewed as acceptable by the CIAL spokesperson, with steady flows of traffic.

On the other hand, research participants across all methods of data collection noted significant upgrades to transport infrastructure is needed to support the airport operation and efficient connectivity to other areas of Central Otago and the South Island. For instance, many of the roads in the wider Central Otago region have improvement constraints, such as those which connect the site to the tourist hub of Queenstown. Furthermore, rural areas like Tarras exhibit lower-density transport services compared to established urban areas.

New and upgraded public infrastructure comes with a notable expense. Evident in the results, the question of who should bear the cost of upgrading infrastructure for the airport was a point of contention between stakeholders and CIAL. The research demonstrated the view that while developers enjoy the advantages of improved infrastructure, they are not typically responsible

for its costs. Instead, it is often the councils, infrastructure providers, and ratepayers who bear the financial burden:

“The cost effects are being pushed onto everyone but the developer” (KI 2)

However, CIAL believe they should not be responsible for these costs. KI 7 contended upgrades to transport infrastructure should be assessed in terms of the growth that is expected in the region, *“irrespective of whether an airport goes ahead or not”*. Overall, the transport infrastructure of Central Otago will likely require significant upgrades to accommodate the scale of change that an international airport will bring.

7.2.4 Electricity Infrastructure Requirements

The airport will significantly increase the region's demand for electricity infrastructure. Residents of Tarras describe the current electricity infrastructure of Central Otago as “stretched” and in need of significant upgrades even without the airport.

“The Upper Clutha is very fragile from a power perspective. So, electricity would be a major issue for them” (KI 4)

Transpower and Aurora Energy electricity transmission and distribution infrastructure is currently undergoing critical upgrades to support the vulnerable Wakatipu Basin (Roxburgh, 2023). Aurora’s distribution lines were upgraded in May-July 2023 to support current large projects in the Tarras-Bendigo area. CIAL understand the Tarras area does not currently have the electricity capacity to support an airport. In response to this constraint, CIAL have stated a similar solar could be constructed in Tarras to the 150 megawatt solar farm to power Christchurch Airport (Cook, 2022).

The CIAL is expecting that within the next 10 years airports will start using electric or hydrogen powered planes to making flying more sustainable and is aware of the future demands for electricity that an airport in Tarras might have. In the context of a declared climate emergency there are concerns over whether a new jet airport is the right direction for New Zealand. The Aviation industry contributes to 12% of global transport emissions (Khalili et al., 2019). Khalili et al states that the implications of a new airport in relation to climate change is vital to understand particular in relation to tourism which would need to decarbonise in the next 30 years to meet the current emission reduction goals (Gössling and Hingham, 2021). The CIAL maintains that new airport infrastructure can fit into a low carbon future. The CIAL have a reputation for reducing climate emissions within their organization, for the Central Otago

airport they are planning on investing in native forest regeneration as well as a solar farm as a source of renewable energy for future planes (Christchurch Airport 2022). While the CIAL appears confident in a low carbon aviation future Tarras residents are skeptical which is represented by KI 2 and KI 5:

“Electric and hydrogen planes of scale are not going to happen before you're in a retirement home” (KI 2)

“Despite what airlines and airports might claim, there's absolutely no prospect of hydrogen or electric flight within his lifetime. So he said, it's business as usual if we want growth of aviation, it's going to be high carbon.” (KI 5)

7.2.5 Land Use Change and Development

The proposed Tarras airport will bring significant change to the rural character of Tarras, not solely due to the airport but also as a consequence of the spillover infrastructure and development effects. The supporting of infrastructure may cause what is known in international literature as the “spillover effect” where land fragmentation from roading and electricity infrastructure causes significant change to a region and have a negative effect on the surrounding agricultural production (Xiong & Tan, 2018).

The current study found the majority of the community is opposed to the airport proposal and the changes it will bring. This finding was consistent with that of Hribar & Lozej (2012) who contended rural areas are often independent communities and oppose developments that make significant changes to their community and lifestyle. However, our findings varied from Barrios (2008), who states rurality does not make a region inherently resistant to development, but rather communities were supportive when developments also improved local infrastructure. In contrast, the research results suggest the community is more worried about the spillover infrastructure effects, such as an industrial precinct, hotels, and carparks, than the airport development itself. This is because the infrastructure would bring about change to the rural nature of Tarras:

“Tarras would be an industrial zone. The rural aspect of Tarras would be lost” (Town Hall Participant)

This is echo'd by Addie (2014) who states the airport becomes larger than a transportation hub but also sets an economic node for social and economic development. Which was furthered voiced as a concern by the Informed Leaders Group (2023) claiming the airport would lock the

region in a long-term path dependency towards more carbon emissions as the airport would set the greater tone (Geels et al., 2017). Furthermore, supporting infrastructure comes at the cost of local councils and ratepayers rather than developers, and thus must be consistent with their views.

The airport proposal conflicts with the current Cromwell ‘eye to the future’ master plan framework objective of urban growth within Cromwell to retain existing patterns of countryside living and visual amenity in outlying settlements such as Tarras. The Central Otago District Plan has not anticipated such a complex development, which can therefore make it difficult to adequately assess the activity holistically.

“One of the things that the planning structure doesn't do is allow for full consideration of all of the effects of an activity. And in some ways, you can see why, because sometimes it was just too hard. But in this case, you know, it's everything.” (KI 2)

This section illustrates the findings relating to spillover infrastructure effects that may arise as a result of the construction and operation of the proposed Tarras Airport. The above quote from KI 2 synthesises this key theme. They describe while the proposed airport’s EIA will not necessarily consider the spillover effects on infrastructure from such a large-scale development in a rural area.

7.2.6 Speculative Land Use Development Examples

In response to the community's concerns about land use change and development stemming from the airport, the findings prompted a spatial exercise to envision what development around the Tarras airport may look like. It was found in the literature that significant infrastructure projects can create growth in certain industries stemming from reduced transportation costs which can cause a change in landscape and economy of the region (Charadra et al., 2000). Alongside the other findings that this airport may bring competition in regards to tourism, recreation, housing, and other services (Oltmer, 2003, Van Den Brink et al., 2006, Jongeneel et al., 2008, Zasada, 2011). It could be reasonably assumed the land use around Tarras would shift.

Observing other international airports across New Zealand may offer insight to the physical changes which may occur in Tarras. The international airports chosen to compare were Dunedin, Christchurch, and Queenstown Airports. These airports have had varying levels of

impact on surrounding land, suburbs, and regions. Thus, they serve as examples to illustrate the potential range of scenarios that could manifest in Tarras.

Firstly, Dunedin airport, which is situated in Momona, a 45-minute drive from the Dunedin city centre. The airport contains a small terminal and has had a relatively small impact on the surrounding rural countryside and settlement of Momona in comparison to the other two airports. If such a model was applied to the proposed Tarras international airport there would be a minimum impact on the surrounding rural landscape and Tarras village as shown in *Figure 7.1*.

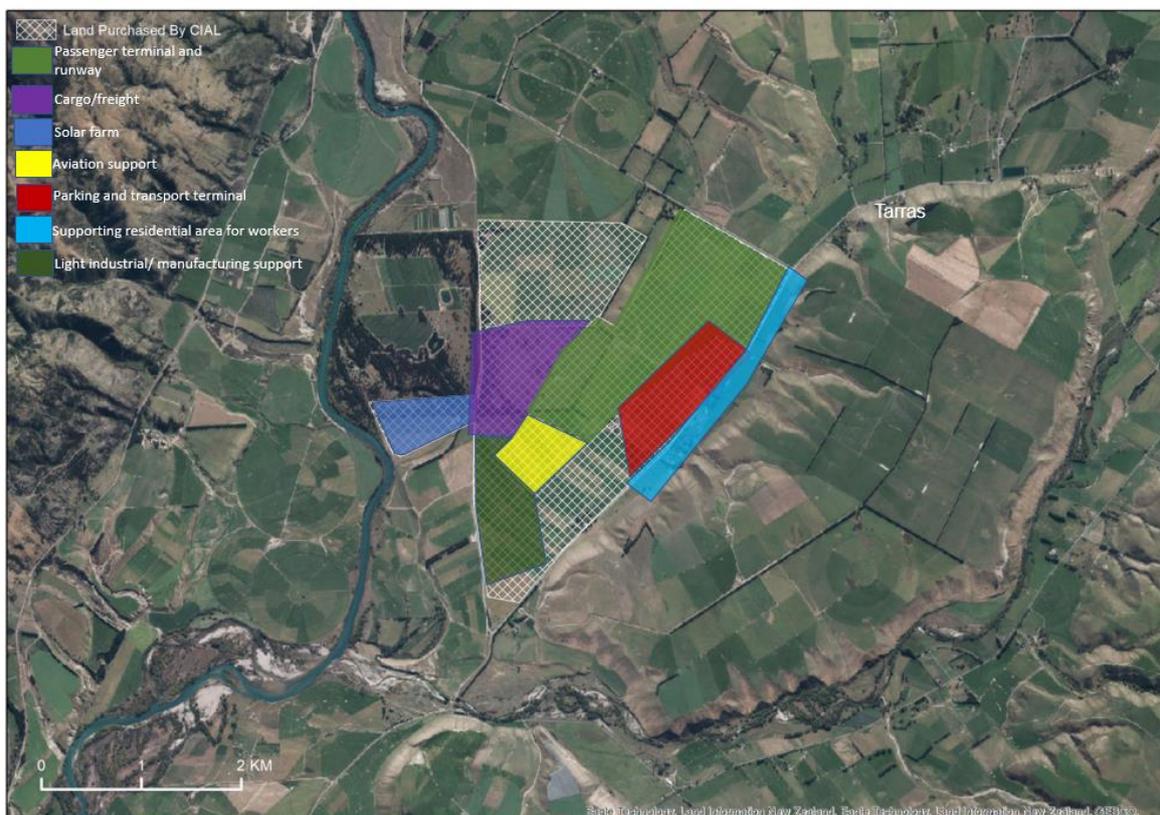


Figure 7.1 Potential Development around Tarras Airport Based Upon Dunedin Airport

Christchurch international airport has provided significant change within its region. Large areas adjacent to the airport were zoned for industry and freight. In addition, there is considerable commercial support that is built up around the passenger terminals, such as hotels (Christchurch City Council, 2013). CIAL has also brought significant portions of underdeveloped surrounding land for future expansions. If such an international airport model was placed in Tarras there would be significant changes to the surrounding areas where farming land would most likely be converted to industrial and manufacturing uses. In the survey, residents expressed their concern with how the proposed airport might affect the region similarly to the Christchurch airport: “Look at the Christchurch airport precinct and the

industrialization around it. It is difficult to have the lifestyle that we have here with an industrial precinct” (KI 6). There may also be additions in the form of commercial and residential areas. A potential example of this is shown in *Figure 7.2*.

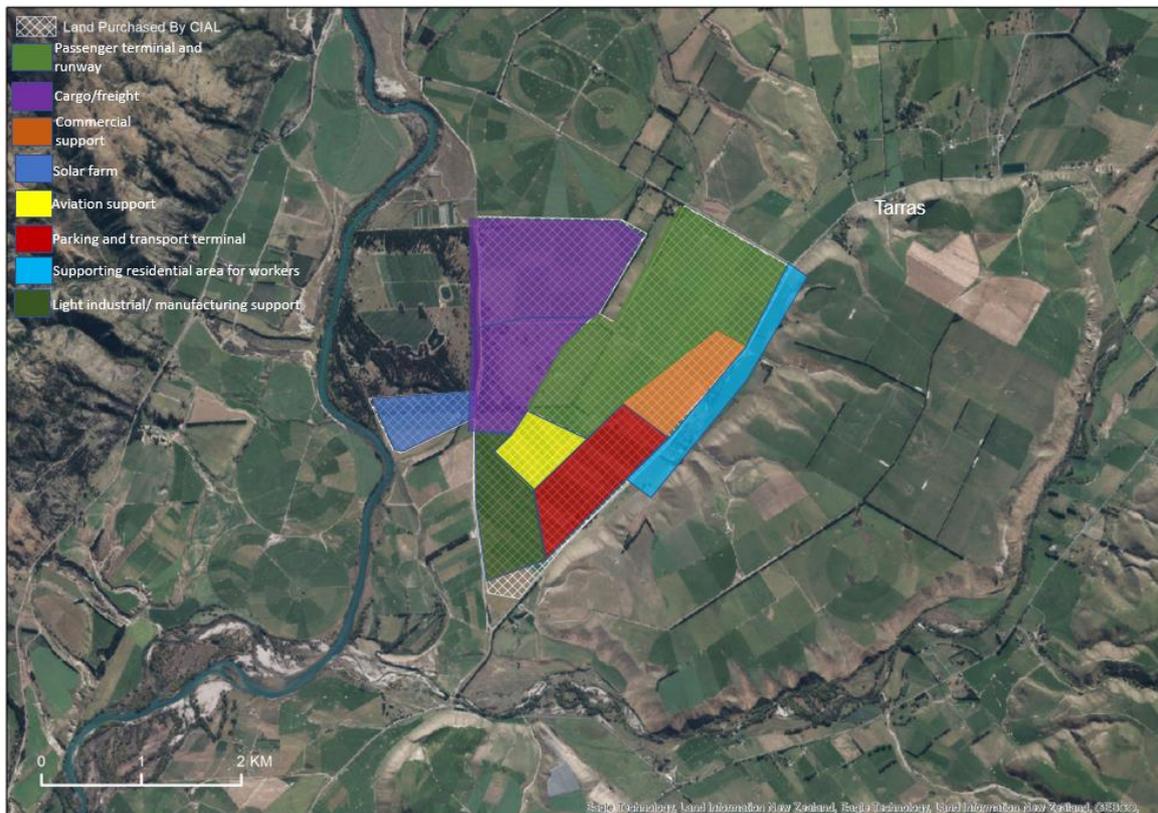


Figure 7.2 Potential Development Based Upon Christchurch Airport

The town of Frankton serves as the focal point for Queenstown International Airport, with a lot of its land use directly influenced by the airport's requirements. This has led to a significant transformation of the town. Surrounding the airport, one can find retail zones of varying sizes, residential areas ranging from low to high density, as well as light industrial zones (Church, 2020). Queenstown International Airport primarily caters to a large influx of tourists and has consequently developed extensive commercial and retail areas to meet their needs. If a similar scenario was to occur in Tarras it would bring about substantial changes to the town. This could include the addition of retail and commercial zones, along with higher density residential areas, as depicted in *Figure 7.3*. These zones would be designed to support tourists who require additional services well beyond what the current facilities in the area can accommodate the survey residents expressed their concern with how this change might look;

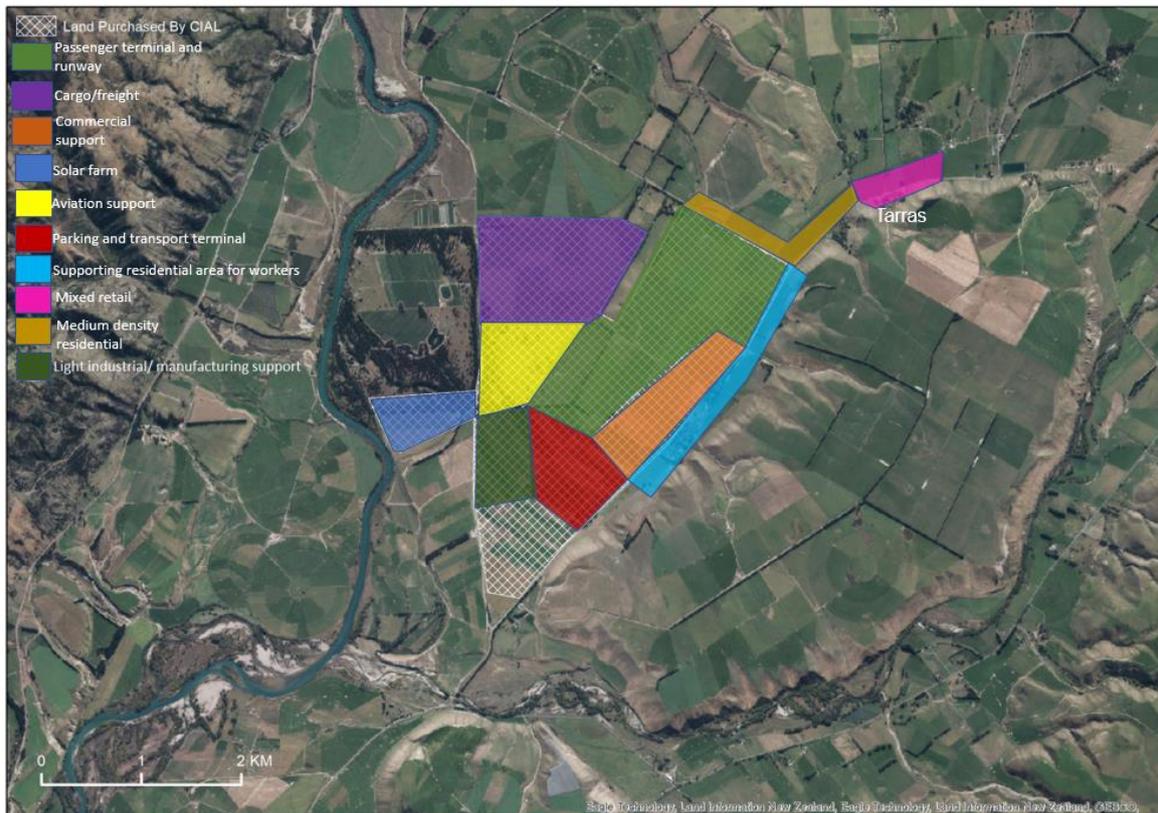


Figure 7.3 Potential development Based Upon Queenstown Airport

As the rural land would respond to diverse needs, population increase, and urbanization all of these are possible (Bell et al., 2010; Halfacree, 2008; Stauber, 2001; Wall & Marzall 2006). If the proposed Tarras airport goes ahead there will be a significant impact on the surrounding area however as shown with the international airports of Queenstown, Christchurch, and Dunedin, the extent of change could vary significantly.

7.2.7 Alternative Land Uses

Despite CIAL already acquiring the land for the airport construction, numerous Tarras residents who oppose the project would prefer to witness the land being utilized for alternative purposes. The study found residents would like to see the land remain as agricultural farmland. The land is high quality soil, and it is important that these soils are protected (NPS-HPL). This would maintain the rural character of the area and encourage “rural tourism” due to the visual amenity of the area (Perkins et al., 2015). Another interesting alternative suggested was solar farming. New Zealand and Central Otago are investing in solar power infrastructure, and aspiring to have 100% renewable energy by 2030 (Ministry for the Environment, 2022). Many Tarras residents have also suggested that the area could be subdivided for housing, as Central Otago faces a housing shortage. Other areas such as Queensberry have undergone subdivisions to create lifestyle blocks that maintain the rural character of the region (Jones, 2017). Alternative

strategies which maintain the rural character of the Tarras are preferred by most Tarras residents as opposed to the airport which would decrease the rurality of the region. The next research question will go on to explore whether the airport proposal aligns with the values and aspirations of the Tarras community.

7.3 How the Airport Aligns with Community Aspirations

The Tarras community is divided regarding their aspirations for the community. However, more of a consensus has been reached on what they value about Tarras. Values include the rural landscape, lifestyle and agricultural base. The more varied aspirations range from little to no development to a complete rural to urban transition. Considering the proposed airport, the dominant view is against the development. However, this opinion also varied. The divided opinion on the future of Tarras with or without the airport signals the need for an up-to-date spatial plan that reflects the dominant aspirations for Tarras while ensuring the key values are maintained.

7.3.1 Values and Aspirations

Much like the wider Central Otago region, Tarras is recognised for its distinctive landscapes and vast natural resources. What sets Tarras apart from the region as a whole is that the area is largely undeveloped. As a result, residents are quite self-sufficient and in tune with the natural environment. Our research suggests landscape and rural character are key values common to Tarras residents. This links closely to the peaceful slow-paced lifestyle which is also important to the residents. Therefore, the fact that Tarras is rural is prominent as to why residents value their lives in Tarras. Alongside this, the agricultural base Tarras provides aligns closely with these values. This has been reflected in our data and can be assumed by the dominance of agriculture, horticulture and viticulture in the community.

When considering whether or not an international airport aligns with these values, our research indisputably suggests it does not. However, it is also important to consider what the community's aspirations are. While the values remain consistent within residents. Various views exist surrounding how residents envision the future of Tarras. As seen in *Figure 6.28* opinions on growth differ. While some residents want little to no change, others want gradual development, and a smaller group wants a rural to urban transition. However, the overall opinions link closely to what people value about Tarras. For example, favourable forms of growth include “more of the same” low-carbon developments and controlled growth on a

relatively small scale. The growth most sought after is growth that still allows for the maintenance of the rural lifestyle and amenities the residents value.

The research findings were consistent with the Cromwell Basin Spatial Plan which promotes development concentrated in Cromwell and outlying settlements including Tarras should remain rural while maintaining the valued lifestyle and landscape. However, this plan does not provide a spatial framework for Tarras specifically. This is consistent with Atkinsons (2019) statement that rural towns receive insufficient recognition in spatial plans. The 2007 Tarras Community Plan also highlights some growth while preserving the area's character. However, this document is 16 years old.

The proposed airport has prompted a great deal of discussion surrounding what the people of Tarras value and aspire for the future. The research suggests that whether or not the airport goes ahead, a Tarras-specific spatial plan is a crucial gap to be filled. As well as an up-to-date community plan that reflect these values and aspirations. This will be further discussed in the recommendations of this report. Yet this quasi-finding aligns with the rural planning issues that are seen globally. There is a general lack of rural planning that integrates community needs but is also established by the rural community themselves (Frank & Reiss, 2014; Cohen, 1977; Daniels, 2008). But as noted, this need and potential creation of a spatial plan would follow the recent trends of rural areas moving towards spatial planning strategies (Shortall & Shucksmith, 2001).

When considering the airport more specifically, the community is divided. The majority opposed, but this opinion was not uniform. Our results found more people support the airport than participants anticipated. The study found a lack of information and public consultation can be linked closely with the strong opinions held on the matter. Without clear information and consultation, a great deal of assumptions are being made. The community members who participated in the research had a broad understanding of the impacts of the proposed airport.

However, without a clear understanding of specific plans it is difficult to know the true extent of the effects. Some may be underestimated while others may be overestimated. Both CIAL and the community are concerned about uninformed discourse. A larger community session led by an impartial party was highly favoured by informants. A key part of the community engagement process is ensuring those affected have a clear understanding of how the airport will affect them. Essentially, the Tarras residents require the facts in order to have a more informed opinion on the airport.

7.3.2 Community Engagement

When navigating these impacts keeping local communities informed and engaged is fundamental. An independent “country mindedness” in rural communities is described by Lynn et al (1979). This has been linked to a lack of participation by rural communities in government related processes over time. Recent findings suggest that rural communities are becoming more receptive to engagement (Barrios, 2008). In line with more recent studies, the proposed Tarras airport has provoked the rural community to be more vocal. The prospect of such significant change has the community striving to preserve the place they value, for the reasons they value it. Utilising the interest and knowledge of the community to create a successful consultation process is important. Although a greater understanding will be gained once more detail on the proposal is provided, an international airport in a small rural area will be an irreversible, transformative development. Hence, it is imperative to ensure the Tarras community are informed and actively engaged.

Large infrastructure projects can bring both positive and negative impacts at all scales. However, it is well known that local communities disproportionately experience the negative impacts of from large-scale infrastructure projects, as observed in many instances throughout the literature (Li et al., 2013). Additionally, rural areas are often chosen due to them being the location of the least resistance despite what impact the developments may have on the communities they are constructed in (Friedberger, 2000). The CIAL have stated that one of the reasons why Tarras was the best location for an international airport was due to the airport affecting the least amount of people in comparison to other areas in Central Otago. The idea of considering the benefit and wellbeing of wider society has been heavily discussed surrounding infrastructure development (Zeng et al., 2015). In this context, the Tarras community are at risk of the uneven negative impacts of the airport, while the social and economic benefits of air connectivity would disproportionately be received by the wider Central Otago region and New Zealand. Ensuring Tarras is not unfairly subject to numerous negative impacts is an important consideration.

Planning tools discussed in the literature review, such as the social license to operate and clear receptive consultation are critical to ensuring the negative impacts of airport are avoided or mitigated. While our research did not investigate the direct social license to operate, it must be noted that a lack of a social license and halted projects before (Jijelava & Vanclay, 2018). With the lack of information received by the public in addition to the loud opposition from powerful voices such as the Informed Leaders Group, CIAL should be weary of this.

Literature shows that the public is less receptive to development when affected communities do not feel informed and as though they have a voice (Kerselaers et al., 2013). This is observed to be the case in Tarras. Community members are feeling a range of emotions, and don't feel they are being adequately informed or engaged.

7.4 Summary

Overall, an international airport in Tarras has a wide range of potential effects. Environmentally, international airports have a largely negative impact, such as impacts on air quality, water quality, and biodiversity. Economically, the potential impacts were not uniform across the research. Potential positive impacts were identified as economic diversification and growth, increased job opportunities and property values. While negative impacts were identified as uneven benefits, decreased property values and a decrease in agricultural production. The airport has many social implications. The two most prevalent negative impacts were nuisance from noise and traffic as well as displacement and loss of rural identity that are of particular concern to the Tarras community. Culturally, the effects are not fully known, but assessments against Tangata Whenua values particularly relating to water, air, and cultural landscapes are critical.

Spillover infrastructure effects are a key consideration to be made in conjunction with environmental, social, cultural, and economic effects. Tarras has limited existing infrastructure. If an airport was to go ahead in Tarras significant infrastructure improvements will need to be made. This will likely lead to extensive changes to Tarras, reducing the rurality of the region to accommodate the scale and development associated with an international airport.

The Tarras community have clear values, which are reflected in local planning documents, these relate to landscape, rural character, and lifestyle. The majority of residents want minimal-moderate growth which is consistent with their values and rural economy. The values and aspirations are not consistent with a large-scale airport development.

8 Recommendations

The findings from this study have explored what are the potential localised effects of the proposed Tarras Airport, supporting infrastructure requirements, and whether the Airport aligned with the Tarras Community's values and aspirations. These set of key recommendations are directed to the CODC, CIAL, and other stakeholder groups to the sorts of considerations that need to be made at the local scale. While these recommendations are tailored to the local scale, the final recommendation seeks to link this to the national scale in regard to aviation. These recommendations confront the difficulty in considering the short-term and long-term effects of such a large-scale infrastructure project in rural area. Furthermore, have been devised in response to our findings achieved from answering our research questions. Overall, they seek to influence positive outcomes to rural change in Tarras, whether or not the airport is to go ahead. The recommendations are:

8.1 Recommendation 1: Information Sessions

The results of the research show the airport proposal as a divisive and emotive issue in the Tarras region. Most are strongly against the proposed airport, and a smaller group is for it. Nonetheless, the airport proposal largely contradicts the Tarras community's values and aspirations – why they choose to live, work, and recreate in the area. The prospect of such significant change has the community striving to preserve the place they value, for the reasons they value it.

The Tarras community feel they are inadequately-informed about the airport development. The public is less receptive to development when affected communities do not feel informed and as though they have a voice (Kerselaers et al., 2013). The lack of information and public consultation can be linked closely to the community's strong opinion. This has resulted in plenty of assumptions being made, as well as false and misleading information circulating. The community members who participated in the research had a broad understanding of the impacts of the proposed airport. However, without a clear understanding of specific plans, it is difficult to know the true extent of the effects. Some may be underestimated, while others may be overestimated. Both CIAL and the community are concerned about uninformed discourse.

For these reasons, the first recommendation is to have regular community forums from an unbiased third-party source. For instance, the CODC. The Tarras residents require clear factual

information to ensure they understand how the airport will affect them and, therefore, have a more informed opinion. Additionally, these information sessions would allow the Tarras community to have a collective voice. When groups lack common goals, internal disputes can arise, ultimately leading to negative outcomes.

At the time of writing, CIAL are at the “validation and planning” stage of the proposal. Hence, there are no thorough and robust investigations, environmental assessments, infrastructure requirements, and master planning at this stage. Therefore, there is still the opportunity to hold these information sessions when new information is available.

Community engagement and consultation is a crucial part of any large-scale infrastructure project, especially due to the uneven negative impacts placed on local communities (Barrios, 2008; Karselaers et al., 2013). When navigating these impacts, keeping the community informed and actively engaged is essential to building legitimacy, credibility, trust – all key components of a social licence to operate (Jijelava & Vanclay, 2018).

8.2 Recommendation 2: Holistic Effects Assessment

The findings suggest the proposed Tarras Airport has an extensive array of potential effects on the local community. It is crucial to not only recognise the direct environmental, social, economic, and cultural effects. But the spillover effects; the short-term and long-term nature of effects; effects at the construction and operation stages; and their cumulative impact. Bacior & Prus (2018) discuss the importance of having an “integrative view” of the effects of infrastructure projects.

New Zealand’s resource management system has been heavily critiqued in literature and in the research as unable to fully consider the effects of an activity (Milne & Grierson, 2008). This was raised by many key informants. Such as large-scale infrastructure project demands a holistic effects assessment, as it is *everything* in this scenario. The airport itself may not have adverse effects, but the subsequent supporting infrastructure, land use change and development may cumulate to have *astronomical* effects.

As a result, this recommendation stresses the importance of a holistic effects assessment. The applicant, stakeholders, community, and decision-makers must consider each of the potential effects of the proposal, this includes, but is not limited to the potential effects highlighted in the finding of the study. *Figure 8.1* below illustrates the components of the suggested holistic effects assessment, developed from the research findings.

Holistic Effects Assessment

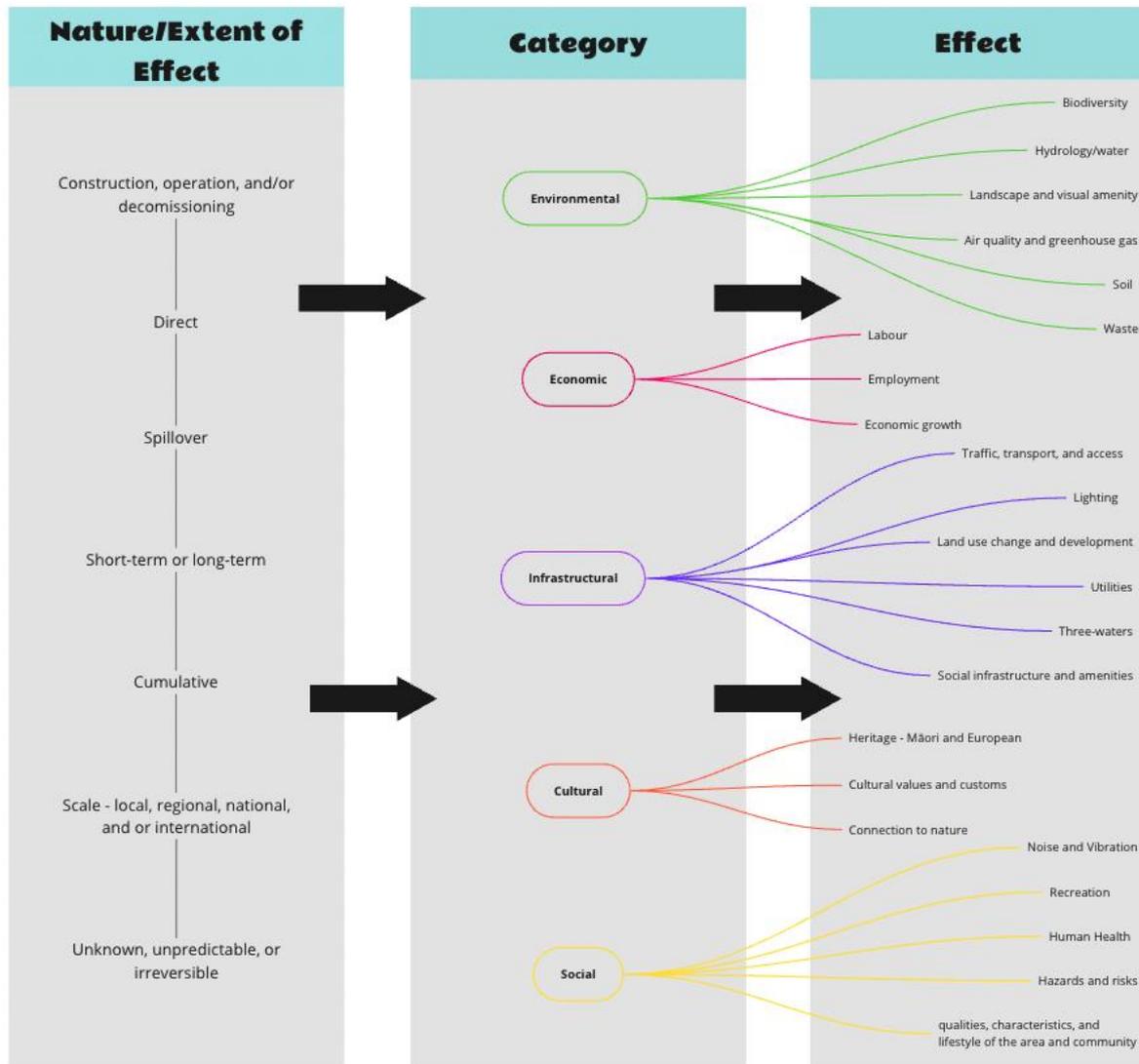


Figure 8.1 Holistic Effect Assessment Outline

While the research was focused on the local scale, the environmental effects assessment should address the potential effects at the local, regional, national, and international scales. As a recent large-scale infrastructure project in the west, and included as part of the EIA analysis, Western Sydney Airport Environmental Impact Statement provides an excellent basis of what a holistic effects assessment may include and look like. However, Western Sydney Airport is situated in an urban context, with existing infrastructure. Similar to the community engagement, a holistic effects assessment is crucial to making informed decisions.

8.3 Recommendation 3: Proactive Spatial Planning

The third recommendation from the research is the requirement for a Tarras-Bendigo Spatial Plan. The Tarras-Bendigo area of the Cromwell Basin is not included in the spatial aspect of

the Cromwell ‘Eye to the Future’ Masterplan Spatial Framework. However, it does indicate objectives which reflect the preferred approach of growth focused within the urban centre of Cromwell. While the existing pattern of development and ‘countryside’ living amenity and landscape value in Tarras is to be maintained. Nonetheless, its exclusion suggests there is an urgent need to fill this gap, especially with the possibility of an international airport. The speculative land use development plans detailed in *Section 7.2.6*, illustrate the type of change that could be expected in Tarras based on different New Zealand airports. Hence, the announcement of a proposed airport has urged the need to be proactive and create a spatial plan to ensure the values Tarras are maintained as much as possible.

The proposed airport has prompted a great deal of discussion surrounding what the people of Tarras value and want for their future. Community members wanted to be involved in the conversation on their town’s future. The spatial plan should reflect the dominant aspirations of the Tarras community, while ensuring their values are maintained. A spatial plan could work in conjunction with an updated Tarras Community Plan which is currently being developed to replace the existing 2007 plan. The plan would provide an updated collective community vision which would guide the spatial plan.

It is important to note Tarras is going through change, irrespective of whether the airport is to go ahead. Various commercial ventures are appearing in Tarras, such as a gin distillery, rural-residential subdivision, viticulture, and mining exploration. Therefore, a spatial plan is still a necessity for the region. The spatial plan could take two forms – one with an airport, and one without.

The spatial plan may seek to address some of the supporting infrastructure developments, identifying corridors for electricity, telecommunication, roading, and three-waters related infrastructure. Furthermore, it may seek to identify school requirements, temporary and permanent housing, public facilities, and land use zoning.

CIAL have outlined they are at the validation and planning stage of the proposal; this includes a land use plan and zoning; infrastructure requirements; and airport master planning. The CODC spatial plan should guide these CIAL processes. Alternatively, the CIAL and CODC plans could be created together.

8.4 Recommendation 4: Consistency with National and International Strategies

Whilst this research has focused on the potential *localised* effects of a proposed international Airport in rural Tarras, the development has national, and international significance. The research has highlighted how crucial the assessment of the development against global and national climate change efforts, sustainable tourism strategies, and aviation strategies is.

The resource management system, and associated legislation, highlights the preference for the upgrading of existing infrastructure to meet forecasted growth, rather than new infrastructure. In the context of the research, participants continuously highlighted the “extensive” aviation infrastructure already located in the lower South Island. Notably one international airport, and two domestic airports with international capacity.

The informed leaders have collated plentiful peer reviewed research, which addresses topics such as climate change, aviation emissions, sustainable tourism, “low carbon aviation” and green-technology, and infrastructure growth forecasting. They contend based on extensive research, the new airport should not proceed. This research did not seek to replicate this work. However, a future research opportunity presents itself to assess the proposal against these documents outside of the RMA.

9 Conclusion

The proposed international airport in Tarras is set to bring significant change to the region. The aim of this research is to “determine the impacts of a proposed international airport on the small rural settlement of Tarras in regard to physical, social, cultural, economic, and environmental factors”. To investigate this aim, the methodology for research included a mixed methods approach based upon a pragmatic research paradigm. The key methods of this approach included a study context chapter, literature review, policy analysis, GIS analysis, key informant interviews as well as an in-person and online survey. From the relevant themes of the literature review, we developed three research questions addressing different aspects of the airports impact to guide our study. These research questions are as follows:

1: What are the localised impacts of the airport?

The first question addresses the localised impacts of the airport which were determined by literature research as well as data from the survey and interviews. Reviewing international literature revealed the environmental impacts were largely negative on air and water pollution as well as the biodiversity of areas they are built in. These environmental impacts have further social and economic implications by reducing amenities, recreational value, and quality of life. Additionally, a loss of productive land and amenity tourism value can be seen throughout case studies. Policy context aided in answering this question in regards to the national policy statement on highly productive soil which highlights the significance that contaminants may have on the agricultural productivity of the region. The survey and key informant interview results showed what the residents of Tarras thought the biggest impacts economic and social impacts would be. Economic impacts were not uniform across the result. However potential benefits included economic diversification, growth, and increased property values. While negative impacts included uneven benefits and decreased agricultural productivity, this research suggests that overall Tarras has the potential to benefit economically at the cost of losing rurality and some agriculture production. Socially the most important impacts were nuisance impacts as well as a change in culture. Nuisance specifically noise and traffic were two of the most prevalent concerns raised. The potential development of the Tarras Airport will heavily impact the Tarras residents’ lifestyle, which is largely based upon landscape and amenity value.

The first question addresses the localized impacts of the airport which were determined by literature research as well as data from the survey and interviews. Reviewing international literature revealed the environmental impacts were largely negative on air and water pollution as well as the biodiversity of areas they are built in. These environmental impacts have further social and economic implications by reducing amenities, recreational value, and quality of life. Additionally, a loss of productive land and amenity value can be seen throughout case studies. Policy context was also useful in answering this question in regard to the national policy statement on highly productive soil which highlights the significance that a change in land use may have on the agricultural productivity of the region. The survey and key informant interview results showed what the residents of Tarras thought the biggest impacts economic and social impacts would be. Economic impacts were not uniform across the results. However potential benefits included economic diversification, growth, and increased property values. While negative impacts included uneven benefits and decreased agricultural productivity. This research suggests that overall Tarras has the potential to benefit economically at the cost of losing rurality and some agriculture production. Socially the most important impacts were nuisance impacts as well as a change in lifestyle. Nuisance effects, specifically noise and traffic were two of the most prevalent concerns raised. The airports will have an immense impact on the residents' lifestyle, which is based on the amenity and landscape value of the region.

2: If the airport was to go ahead what infrastructure would be required and what impact would this have on Tarras and the surrounding region?

The second research question was answered by examining the participants describing the current limited nature of existing infrastructure in Tarras, and what they thought was required to support the proposal. It was found that there was significant spillover infrastructure effect relating to three-waters, electricity, roading, and housing infrastructure. key informants. The infrastructure requirements of an airport were understood through examining international literature to identify significant water, electricity, roading, and housing infrastructure. All of which would be needed to support an international airport. It was also understood that these requirements would cause significant land use changes, developing industrial zones and reducing the visual amenity and rurality of the region. To illustrate the potential spatial impact of the airport, speculative GIS maps, based on other airports across New Zealand, were created to show the range of development which could occur around the airport. Tarras Airport could take the form of Dunedin Airport, which has had a small impact on surrounding farming land.

On the other hand, could become a large industrial or commercial zone like Christchurch and Queenstown Airports.

3: How does the Tarras community see the airport aligning with their values and aspirations if at all?

The final research focused on the Tarras community's viewpoint of the proposed airport. The research explored and established the key values of the Tarras community. These values were determined as natural landscape, rural character, and agricultural production. While it was determined that these values do not align with that of the proposed airport, there was also a revealed divineness among Tarras residents for the communities' aspirations with more coming out in support of the airport than anticipated. Opinions on growth varied from no change to gradual change and a small group wanting a full rural to urban transition. The literature review supported this finding through showing how other international communities had adjusted to infrastructure projects that did not align with the communities' values. Moreover, all of these findings highlighted the importance of community consultation in large infrastructure project which would have disproportionate negative impacts on rural communities.

9.1 Research Limitations and Future Research

The final research focused on the Tarras community's viewpoint of the proposed airport. The survey and the study context chapter showed some of the key values of the Tarras community. The study context chapter gives an overview of what some of the values of Tarras may be based on the surrounding natural landscape features as well as the livelihoods of the region. These values were determined as natural landscape, rural character, and agricultural production. While it was determined that these values do not align with that of the proposed airport, there was also a revealed divineness among Tarras residents for the communities' aspirations. Opinions on growth varied from no change to gradual change and a small group wanting a full rural to urban transition. The literature review supported this finding through showing how other international communities had adjusted to infrastructure projects that did not align with the communities' values. Moreover, all of these findings highlighted the importance of community consultation in regional development.

Within this research the scope was limited to Tarras, as the town itself would be most impacted by the potential airport. However, an international airport would also boast far-reaching effects, both nationally and regionally. Despite this research not focusing on this, it could include

increased tourist numbers to the Central Otago region and / or lower transportation costs for horticulture and agriculture. We limited our research to the community most significantly impacted by the airport due to the limited timeframe and set out our research in accordance with the scope of Tarras. However, if further research were to be undertaken on this topic, the researchers recommended widening the scope.

A limitation within this research is the lack of information and plans from the CIAL regarding the proposed airport which makes it difficult to assess the various impacts. The CIAL's Central Otago Airport is an ongoing project that even within our time frame of research has undergone some changes with new information being revealed through the media. The changing nature of this project could make our research limited and in need of updating in the long term as there is still a significant planning process before the airport will be built.

Despite these limitations, our research offers an understanding of the potential effects that the proposed Tarras Airport will bring. Each research question answers different aspects of change that the airport will bring to the region. The first question describes what the localized effects are. The second question considers how the spillover effects of the airport infrastructure may alter the existing infrastructure and landscape of Tarras. The third question focuses on the values and aspiration of Tarras residents and whether the airport align with these beliefs.

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