Future Proof: The Meanings and Makings of 'The Fibre Project' on Haida Gwaii

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Abstract

Fibre has come of age. Providing the 'gold standard' of connectivity (Crawford, 2020), worldwide deployment of fibre-based broadband technologies has accelerated steadily over the past decade. Based on 20-months of ethnographic fieldwork on the islands of Haida Gwaii, this study provides the first comprehensive, theoretically informed, empirically grounded case study of the becoming (Ingold, 2011) of a full-fibre network. Taking as its main object of study 'the fibre project' – a series of initiatives culminating in the initiation of a Gigabit capable Fibre-to-the-Home (FTTH) network – and adopting an infrastructural approach (Bowker and Star, 1999), it provides a critical ethnographic account of the planning, construction, maintenance, and situated usages of a 'full-fibre' network providing ubiquitous access to all endpoints on the islands of Haida Gwaii. Informed by notions of infrastructural *promise* (Larkin, 2018) and *infrastructural imaginaries* (Parks, 2009), it provides a processual account of the development, deployment, and situated usages of fibre as affective infrastructure (Knox, 2017). Contributing to the literatures of cultural anthropology and critical infrastructure studies (Starosielski, 2015; Weiss, 2018), it advances four novel analytics, including the promises of *transformation* and *reliability*, as well as the infrastructural imaginaries of fibre *as convergence* and *as political artefact*.

Key words: Fibre, Haida Gwaii, Ethnography, Broadband, Infrastructural Imaginary

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Acronyms

5G: Fifth generation mobile technology standards
BCBA: British Columbia Broadband Association
CHN: Council of the Haida Nation
CMT: Culturally modified tree
CRTC: Canadian Radio and Television Commission
DSL: Digital Subscriber Line
EEW: Earthquake Early Warning sensors
FTTB: Fibre-to-the-Basement
FTTC: Fibre-to-the-Cabinet
FTTH: Fibre-to-the-Home
FTTN: Fibre-to-the-Neighbourhood
FTTP: Fibre-to-the-Premise
FTTx: Fibre-to-the-x (comprising all variations of fibre)
Gbps: Gigabits (1 billion bits) per second
GKNS: GidG̲alang K̲uuyas Naay Secondary School
GPS: Global Positioning System
HGM: Haida Gwaii Museum
HGMAP: Haida Gwaii Mentor Apprentice Program
ISP: Internet Service Provider
Kbps: Kilobits (1 thousand bits) per second
LEO: Low Earth Orbit satellite
Mbps: Megabits (1 million bits) per second
MIEDS: Misty Isles Economic Development Society
NCRD: North Coast Regional District
NGA: Next Generation Access network
NICT: National Institute of Information and Communications Technology
NID: Network Interface Device
ODN: Optical Distribution Network
OECD: Organisation for Economic Co-operation and Development
OMVC: Old Massett Village Council
ONU: Optical Network Unit
OxIS: Oxford Internet Survey
Pbps: Petabits (1,000,000 Gigabits) per second
PON: Passive Optical Network
PoP: Point of Presence
PTP: Point-To-Point Network
SBC: Skidegate Band Council
SHIP: Skidegate Haida Immersion Program
SRD: Strathcona Regional District
VIRL: Vancouver Island Regional Library network

Preface

In Haida story-telling custom, it is considered appropriate to start with a bit about oneself. In an effort to both honour that custom and to lend some context as to how this research project took shape, allow me to begin with a story.

Long before I could locate the islands on a map, I had formed an image of Haida Gwaii in my head. Based on the visual record left by Emily Carr or, more recently, any number of *The Nature of Things* documentaries, it seemed the very archetype of an 'out-of-the-way place', a place I had variously heard described by friends-of-friends-of-friends as 'other-worldly' and 'lush'. In the summer of 2013, an opportunity to visit presented itself. At the time, I was working on a documentary related to the now-defunct Northern Gateway pipeline project, which had proposed the construction of a twinned-bitumen pipeline from Northern Alberta to coastal British Columbia, along with the construction of a marine terminal near Kitimat, from where bitumen-laden tankers would set off on what it was hoped would be an incident-free journey across the Pacific, passing just north of Haida Gwaii in the process.

At every public hearing along its proposed route, the Northern Gateway was met with vociferous opposition. Nowhere was the response more unified than on Haida Gwaii, and capturing some aspect of that was a critical component to the overall narrative of the documentary. Actually getting to the islands proved easier said than done. On arrival, however, I was immediately overcome by the scale, verdure, and *greenth* of it all. It struck me as both a visceral place – the sort of place where gardens were measured in acres – and as a place of political possibility, where decolonisation was less a metaphor than a verb of the everyday.

Staying in touch with those I had met on previous visits as best I could, I returned to the islands on a number of occasions over the next few years, and it was through these visits that I came to learn, in a very direct way, about the limitations of the islands' underlying internet

infrastructure. At the time of my first visit, broadband service to Haida Gwaii was provided by a fixed wireless system with a total capacity of roughly 70Mbps, provided through the longest over-water radio link on earth. Bandwidth-limited, unreliable, and in many areas simply unavailable, as one local newspaper article would helpfully explain, the end-user experience was one defined by the fact that '…every cat video, email, money transfer or Facebook 'like' that isn't sent here by satellite has to zip 124.83 km over the Hecate Strait' (Hudson, 2016a, p. 8), beamed dish-to-dish from the top of a mountain to a single point of connection just outside Ḡaaw *Old Massett*.

And yet, in the face of these challenges, I saw ingenious workarounds, improvisation, and modification. With streaming out of the question, a thriving grey market of pre-loaded USBs had emerged, as entrepreneurial islanders shuttling between Haida Gwaii and the mainland realised the mutually-beneficial solution that could be had simply by setting aside an hour or two of their next trip over to download a list of requests – movies, music, videogames – before re-selling them on-island. And while mobile coverage was largely absent, it seemed everyone held a sort of mental map in their head as to which specific geographies were known to provide a reliable signal: the bend before Richardson's Ranch along Highway 16, the look-out point by Relax Road. Raising this with someone on-island, I was met with laughter: 'Yeah, the internet is a perennial issue…Sorry, *the* perennial issue here'.

Years later, remembering our previous conversation, that same person would send me a link to an article from the islands' local newspaper, the *Haida Gwaii Observer*, detailing plans for what had come to be known as 'the fibre project'. More articles followed.

As I read, it occurred to me that both the volume of coverage afforded to 'the fibre project', and the overwhelmingly optimistic tone in which it was written, suggested this was something people cared deeply about. In fact, there was an undeniably emotive tone to much of the conversation, as far as I could tell. As the then-Mayor of Daajing Giids put it in the

course of one funding announcement, ‘This is fantastic. We’ve had our fingers and toes crossed — we’ve really needed this… Everything depends on it’ (Hudson, 2018a, p. 3). On top of this, from what I could see from the photos, the visual disturbances were anything but subtle. From truck-mounted cranes along Highway 16 to torn up pavement along Front Street in Skidegate, one local reporter would write that ‘[a]nyone driving the Graham Island highway these days can see what a challenge it is to install the backbone of the on-island network’ (Hudson, 2016a, p. 1), in a veiled reference to the piles of dirt and rock which had by then began to impose on certain stretches of road as the first strands of middle mile were laid.

The potential magnitudes of difference entailed by the provisioning of a ‘gold standard’, full-fibre network on Haida Gwaii were not lost on me, and as I thought about it more, it seemed that ‘the fibre project’ might offer an intriguing case study of infrastructuring (Bowker and Star, 1999; Smedberg, 2019) – the visibilities of which also seemed to afford a certain ethnographic ‘in’. In a place which had for so long been so dramatically *under*served, ‘the fibre project’ offered the prospect of a post-bandwidth era guided by the principle of abundance, rather than constraint. Over time, I came to convince myself that ‘the fibre project’ was both an interesting topic in its own right and something ‘good to think with’ in several broader senses. And so began my attempts to understand the emergence of a long-sought, incrementally materialised, and now operational infrastructure.

Thesis Summary

This study uses an infrastructural approach to provide a critical ethnographic account of the planning, construction, maintenance, and situated usages of a 'full-fibre' broadband network providing ubiquitous access to all endpoints on the islands of Haida Gwaii. Taking 'the fibre project' – a colloquialism for a series of infrastructural initiatives culminating in the initiation of a Gigabit capable Fibre-to-the-Home (FTTH) network – as its primary object of study, and describing fibre as *affective infrastructure* (Knox, 2017; Facer and Buchczyk, 2019), it traces the *promises* which have driven its materialisation (Larkin, 2013, 2018) and the *infrastructural imaginaries* (Parks, 2015) by way of which it has come to be situated within broader relational and political assemblages.

Based on 20-months of ethnographic fieldwork on the islands of Haida Gwaii, it provides the first comprehensive, theoretically informed, empirically grounded case study of the becoming (Ingold, 2011) of a full-fibre network. Drawing on concepts of *affective infrastructure* (Ortner, 2005; Parks and Starosielski, 2015), it responds to two over-riding research questions: '*What promises are made by 'the fibre project', and how do these correspond with the lived realities of its emergence?*' and '*What are the infrastructural imaginaries of fibre on Haida Gwaii, and how have these changed over time?'.*

In responding to these, it employs a conceptual framework grounded in the literatures of critical infrastructure studies and cultural anthropology (Star and Ruhleder, 1994; Bowker and Star, 1999; Star, 1999; Clifford, 2001, 2013; Graham and Marvin, 2001; Barker, 2005; Ortner, 2005; Harvey and Knox, 2012; Larkin, 2013; Amin, 2014; Parks and Starosielski, 2015; Knox, 2017; Anand et al., 2018; Weiss, 2018; Cantillon and Stevenson, 2023) and a theoretical approach grounded in the literature of the social shaping of technology (Marvin, 1988; Mackenzie and Wajcman, 1999; Russell and Williams, 2002), thereby accounting for processes of sociotechnical change as both a *discursive* and *material* outcome.

The core empirical work of this dissertation is split across three chapters. Approaching fibre as more-than-material (Barry, 2015), each chapter contributes a distinct understanding of 'the fibre project' through a series of vignettes intended to provide differing but complementary vantage points (Star, 1999) at differing nodes within the network. Together, these contribute to an ethnographically-informed account of the social infrastructures that 'the fibre project' both enables and is enabled by (Chapter 5 – *Software*); the spatial landscapes through which it moves, and its capacities, both real and imagined, to reconfigure spatial imaginaries of place (Chapter 6 – *Mobilities*); and to the layered temporalities of 'the fibre project' itself, including its interconnectedness to apparently 'separate' infrastructural assemblages (Chapter 4 – *Timescapes*).

The academic contributions of this study speak primarily to the literatures of critical infrastructure studies and cultural anthropology, as well as to the literatures of community and alternative network development (Mignone and Henley, 2009; McMahon, 2014; Ramillo, 2018; Gerli, 2019; Ali, 2021). Offering an unusual depth of encounter within, and theoretically informed rendering of, alternative network provision, it contributes a number of new affective vocabularies (Berger, 1972) and aesthetic terminologies (Ngai, 2015) of fibre, including the *promise of transformation*; the infrastructural imaginaries of 'the fibre project' *as convergence*; the *promise of reliability*; and the infrastructural imaginaries of 'the fibre project' *as political artefact.*

Future Proof: The Meanings and Makings of 'The Fibre Project' on Haida Gwaii

Chapter 1 – Introduction

Overview

This dissertation uses an infrastructural approach to provide a critical ethnographic account of the planning, construction, maintenance, and situated usages of a 'full-fibre' broadband network providing ubiquitous access to all endpoints on the islands of Haida Gwaii. Taking 'the fibre project' – a colloquialism for a series of infrastructural initiatives culminating in the initiation of a Gigabit capable Fibre-to-the-Home (FTTH) network – as my primary object of study, I describe its affective dimensions (Knox, 2017; Facer and Buchczyk, 2019), trace the promises which have driven its materialisation (Larkin, 2013, 2018) and describe the infrastructural imaginaries (Parks, 2015) by way of which it has come to be situated within broader relational and political assemblages.

This chapter provides an introduction to the over-riding themes and contexts informing the remainder of the study, and is divided into two parts. In *Part one – Broadband*, I provide an overview of broadband technologies and the noted distributional bias which has historically seen *wired* broadband technologies concentrated in urban milieux and *wireless* technologies in more rural regions. I then narrow my focus to provide an overview of fibre-optic broadband technologies – the 'gold standard' of connectivity (Crawford, 2020) – and note the recent 'FTTx trend', which has seen explosive growth in the development and deployment of fibre networks across the world, including in a growing number of previously unserved or under-served rural regions. Noting how this growth in the physical infrastructures of fibre has come with a correspondent growth in the cultural visibilities of fibre, I outline some of the key ways by which fibre has come to be known, talked about, and represented in recent years, as a means to illustrate that what was once considered something of a luxury has in a

relatively short span of time come to be perceived as 'strategic infrastructure' (Analysys Mason, 2020, p. 23), vital to the sustained growth and vitality of modern society.

In *Part two – Haida Gwaii*, I move away from a focus on broadband *per se*, in order to better acquaint the reader with the specific context of Haida Gwaii, which serves as the geographic locus to the study. Outlining the unique geomorphological, sociocultural, and political landscapes that have seen Haida Gwaii labelled as everything from 'the islands at the edge of the world' to 'the Galapagos of the North' (Gill, 2010, p. 6), I provide a brief history of the development of broadband infrastructures on-island, noting how the challenges imposed by the islands' small population, sparse settlement patterns, and relative geographic isolation have historically imposed significant constraints on the availability of high-quality, high-speed infrastructures. However, as I outline in the penultimate section to this chapter, after a decades-long struggle to secure full-fibre connectivity, the construction of a full-fibre terrestrial network between 2010 to 2020, shortly followed by the landing of a subsea backhaul cable in late 2022, has in a relatively short span of time produced an altogether different connective ecology. 'It's like going from a wheelbarrow to a Lamborghini'[1], as one informant would later put it. After providing a descriptive topology of 'the fibre project', the chapter concludes with a summary and synthesis of the ideas introduced, before briefly outlining a roadmap to the remainder of the dissertation.

Part one – Broadband (as) infrastructure

Broadband technologies

In the accelerated timelines that define modern technological discourse, broadband is so 'old' a technology that it can seem hardly worth talking about. Largely out of sight and out of mind (until it stops working), when viewed against the shiny newness of more contemporary

[1] JB. Interview, Skidegate, 2021.

buzzwords like artificial intelligence, it can be hard to overlook the fact that the history of broadband has, in a very literal sense, already been written (Mack, 2020).

While ‘broadband’ is often used as a catch-all term for ‘high-speed internet’, the term actually refers to several technologies fundamentally defined by their ability to enable the high-speed transfer of multimedia and high bandwidth information, with a data transmission rate of at least 256 Kbps. This transmission occurs across a network consisting of three stages: the *backhaul* (the high capacity trunk system that brings Internet to a community), *middle mile* (the high-capacity transport between communities to global transmission networks), and *last mile* (the access networks which aggregate local traffic to and from households).

Broadband technologies can be broadly divided along the lines of *wireless* technologies and *wired* technologies. Wireless broadband technologies include geostationary satellite technologies and fixed wireless systems such as microwave radio link systems. Less costly and much more straightforward to install than most wired alternatives, wireless technologies have tended to be the favoured medium for broadband provisioning in rural contexts. By contrast, wired broadband technologies have historically been dominated by a handful of technologies such as Digital Subscriber Line (DSL) over legacy copper telephone lines, cable modems over cable networks, and to a much lesser extent, fibre optic networks. While every broadband technology comes with its own ideal use cases, affordances, and constraints, and the decision to deploy any one type is one informed by considerations of cost, geography, population size, and distribution of endpoints, among other factors, it bears stressing that wireless technologies are fundamentally more bandwidth-limited, less stable, and more prone to interference from outside sources (e.g. shifting atmospheric conditions) than wired technologies.

The successor to dial-up – which used Point-to-Point (PTP) wireline connections between telephone subscribers at typical speeds of around 1Mbps – broadband's introduction into the residential Internet market in the early 2000s was seen as (and has since been retrospectively described as) nothing short of revolutionary, inasmuch as it allowed multiple users to access the internet, at far higher rates of data transmission, in more places, at all hours of the day. Put differently, it established the technological substratum enabling the beginnings to the sense of connective *taken-for-grantedness* around which an increasingly large share of devices, platforms, wearables, and other digital media are now built (Warren, 2007; Mack, 2020). Describing it as 'the natural next step in Internet evolution and diffusion', offering a 'seemingly limitless gamut of possibilities' scholars such as Papacharissi and Zaks (2006) argued at its dawn that '[t]he future of the Internet is intertwined with broadband capabilities' (p. 64). These possibilities have, of course, also produced commensurate destabilisations, as Pepperrell and Law (2015) note, insofar as the (ongoing) societal impacts of broadband extend deep into matters of personal privacy, governmental transparency, and freedom of association, none of which can be quite so straightforwardly described as 'good'.

But if the mark of a successful technology is to 'become infrastructure' (Dourish and Bell, 2011, p. 95) – or at least, as Weiser (1991) put it, a sort of 'calm technology', of the sort which 'disappear… weave themselves into the fabric of everyday life until they are indistinguishable from it' (p. 3; see also Weiser and Brown, 1996) – then the pervasive characterization of the Internet as somehow ephemeral and omni-present (everywhere and nowhere all at once) is illustrative of the mundane infrastructural character of broadband, having become embedded so deeply into routine that it flirts with invisibility.

Distributional bias

These invisibilities, however, are sometimes momentarily extinguished. For many, and as numerous others have commented upon elsewhere (Jackson, 2020; Kuhn et al., 2020), a

byproduct of the COVID pandemic was its spotlighting of the material inequalities of broadband access, broadly conceived. While these inequalities were seen to exist across a wide spectrum of demographic and identity-based axes, the stark differences in availability between urban and rural broadband markets was one of the most widely-discussed.

As has been extensively written about elsewhere, it has long been the case that 'broadband diffusion is characterized by a marked distinction in the services enjoyed between those residing in urban as opposed to rural areas' (Papacharissi and Zaks, 2006, p. 67). Critical geographers have described this as a sort of 'geographic inertia' (Grubesic, 2006, p. 445) resulting in 'a disproportionate share of both redundant backbone links and, even more so, total bandwidth' (Malecki and Gorman, 2001, p. 25) located in urban centres of the world. As a result, the relative quality and durability of available broadband infrastructures has historically been strongly correlated with population density (Ramirez and Richardson, 2005; Preston et al., 2007; Benkler, 2010; Schneir and Xiong, 2016; Ali, 2021) resulting in a 'quality and capacity divide' (Pick and Sarkar, 2020, p. 118) across urban-rural lines. Accordingly, it has often been the case that rural connectivity is experienced not as 'a state of being either on *or* off the Internet, but of being intermittently and unpredictably connected' (Burrell, 2018, p. 3; emphasis in original) – and to be forced to pay more, along the way. In an early commentary on the matter, Platt (2001) wrote, '[in] cyberspace as in real space, location, location, and location are the most crucial factors determining quality of service' (p. 3), while Grubesic (2003) noted certain 'inequities in the broadband revolution' and highlighted that 'evidence suggests that urban areas are receiving the majority of infrastructure investment' (p. 263). While the terminology of 'cyberspace', and its dichotomising against 'real space' holds less currency today, the basic premise remains: as remoteness and population sparsity increase so too does the likelihood of an area having no or very poor broadband connectivity (Williams et al., 2016, p. 757).

In a Canadian context, these discrepancies in access and affordability have historically been at their most salient and egregious in First Nations, Metis, Inuit and Indigenous communities, two-thirds of which are located in areas designated as ‘remote and rural’ (McMahon, 2014; Coelho, 2018).

From luxury to necessity

First widely-deployed in a commercial and residential capacity in Asia, where significant government intervention saw newly-constructed buildings ‘wired’ from the outset, fibre-optic broadband technologies (hereafter simply ‘fibre’) were originally developed in the 1950s for endoscopes, with the intention of allowing doctors to view the inside of a human patient without major surgery. In time, telephone engineers found a way to use the same technology to transmit and receive telephone calls. Today, fibre is used to transmit the vast majority of the world’s data, doing so by transmitting data as light pulsed in a pattern along thin glass or plastic filaments: at the transmitting source, the light signals are encoded with data, while at the receiving end, the light signal is decoded as data.

Just as ‘broadband’ is more of a catch-all term for a bundle of separate technologies than any one medium, ‘fibre’ is more of a scalar descriptor which can be used to refer to a number of different network configurations and types, from ‘hybrid’ networks (e.g. fibre-coax), in which only a portion of the network is fibre-based, up to ‘full-fibre’ networks, in which every component from backhaul to customer consists of fibre. The purest form of a fibre network – that is, ‘full fibre’ – refers to an Optical Distribution Network (ODN) in which fibre runs all the way to an Optical Network Unit (ONU) at the subscriber’s premises (a house, an apartment, a business, etc.), in a configuration referred to as Fibre-to-the-Home (FTTH), or alternatively, Fibre-to-the-Premise (FTTP). The broader umbrella of *FTTx* additionally covers the architectures of Fibre-to-the-Neighbourhood (FTTN), Fibre-to-the-Curb/Cabinet

(FTTC), and Fibre-to-the-Basement (FTTB), among others, all of which refer to network types in which the final point of distribution occurs over a non-optical infrastructure.

Fibre networks can be built as either Passive Optical Network (PON) or Point-to-Point (PTP) architectures, the former being the more common. However they are built, fibre networks carry numerous, distinct advantages over alternative broadband technologies. For one, fibre is a phenomenally fast and capacious medium: in December 2023, for example, a team of engineers at Japan's National Institute of Information and Communications Technology (NICT) were able to transmit more than 20 times the entire global internet per second, at a rate of 22.9 PBps, using a *single* fibre strand (Irving, 2023); as I note later in this chapter, 'the fibre project' described in this dissertation contains 96 such strands. Fibre is also a highly durable and stable medium, being less susceptible to outside interference and more resilient over long distances, offering the lowest possible latency coupled with a high degree of reliability (that is, less downtime). Along with its green credentials, the underlying technologies being significantly more energy efficient than the alternatives (Gilmore, 2019, p. 1), these various technical characteristics form the basis for fibre's commonplace labelling as an essentially 'future proof' technology (Crawford, 2020).

But whereas undersea fibre-optic cables have served as the backbone for point-to-point routes of dense information exchange for the better part of thirty years (Starosielski, 2015, p. 1), local access to fibre – that is, access to fibre at the middle mile and, in particular, last mile – has historically been limited. While it is well beyond the scope of this introduction to attempt to summarise the many reasons behind this relative lack at the middle mile and last mile, two factors bear particular mention. First, whereas the costs of investment in backhaul can be quickly recouped through the sale of bandwidth to third-parties, the middle mile and last mile legs of a network are less easily monetised, and are typically the most expensive legs of the network to build. The result, as Troulos and Maglaris (2011) have written, is that

‘[d]espite the winner -takes-all potential of swift Fiber-to-the-Home (FTTH) deployment, operators […] prolong the exploitation of their ‘copper monopoly’ and refrain from deploying FTTH unless impelled by competition’ (p. 842). In addition to this, scholars have argued that investment in fibre at the middle mile and last mile has historically been hampered by the enduring perception that the market was not ready for fibre – that is, that ‘the demand for services was not there’ (Renner, 2012, p. 10), and that there were ‘no applications for which residential subscribers would require the additional capacity’ (ibid, p. 2). Thus, to borrow briefly from the language of economics, in terms of both demand and supply, the widespread availability of fibre was, until relatively recently, largely written off as an ‘economically non-viable’ (Papacharissi and Zaks, 2006, p. 67) proposition.

Nevertheless, over the past ten years, investment in and construction of fibre, particularly at the middle mile and last mile, has grown at an explosive and unprecedented rate, in a phenomenon which industry professionals refer to as the ‘FTTx trend’ (NAI Group, 2023). While the emergence of the FTTx trend cannot be reduced to any singular ‘cause’ (or effect, for that matter), in historical perspective, it may be seen as the culmination to decades of slow-moving but comprehensive efforts to ‘fix the pipes’, as the architects of the first generation of broadband infrastructures recognised from the outset that ‘[a]ll broadband distribution systems need upgrades before they can fulfil their promise on a mass scale’, as Platt (2001, p. 8) wrote in *Wired* magazine. Alternatively, the FTTx trend might be seen as an indication of the growing recognition on the part of policy-makers that fibre constitutes a ‘strategic infrastructure’ (Analysys Mason, 2020, p. 23), the expanded provisioning of which is now an objective high on many agendas. Driven by the notion that ‘… a ubiquitously networked society connected over high-capacity networks…will provide social, political, economic, and cultural benefits’ (Benkler, 2010, p. 23), there is an emerging consensus among policy-makers, academics, and industry professionals alike that reliable, high quality

abundant access over commodity fibre networks will define and be critical to the next generation of broadband connectivity (Rajabiun and Middleton, 2013).

Perhaps more so than any other factor, however, the FTTx trend has tended to be explained as a response to rapidly-rising annual bandwidth demands associated with the standardisation of cloud-based computing, tactile internet and immersive media, and advanced mobile technologies – all of which require fibre at the backhaul, at very least, in order to function. On the basis of Nielsen's Law (Nielsen, 2023) – an empirically-grounded conceptual metric, first put forward by usability consultant Jakob Nielsen in 1998, which has shown that individual bandwidth demands grow by approximately 50% per year – aggregate bandwidth demands are already approaching a level that, in the long-term, only fibre-based networks will be able to effectively meet.

Fibre to the country

The global growth rate of fibre is difficult to overstate. While ten years ago, at the time of writing, Skouby et al. (2014) wrote that, '…a fibre infrastructure is virtually non-existent in many countries' (p. 285), today there are more fibre builds underway or in the planning stages than ever, with a recent report by the OECD (2023) noting that fibre has for the first time overtaken cable to become the primary fixed broadband technology across the OECD's 38 member countries, including an increase of nearly 19 percent in the past year alone[2].

But the FTTx trend is notable not only for the speed at which it is occurring, but also for *where* it is happening. Indeed, while scholars such as Graham and Marvin (2001) had already noted an 'enormous investment … into new optic fibre' (p. 6) some twenty years ago, they were quick to underscore that this was a 'rapidly emerging global archipelago of *urban* optic fibre grids' almost exclusively 'concentrated in the urban cores of the World's 50 financial

[2] The biggest growth was in Costa Rica, Israel, Greece and Belgium which all increased fibre connections by more than 80% in 2021. The share of fibre in total broadband is now at 50% or above in 13 OECD countries, standing above 50% in Chile, Finland, Luxembourg, New Zealand, Norway, and Portugal, and above 70% in Iceland, Japan, Korea, Latvia, Lithuania, Spain and Sweden.

capitals'. They added, 'such networks serve no other places' (p. 1; emphasis added). But whereas more fatalistic projections have long-presumed that the broadband infrastructure serving rural areas 'will be more expensive and at least one generation behind urban areas' (Grubesic, 2003, p. 266), recent years have seen an increasing number of previously unserved or underserved rural communities successfully developing and deploying state-of-the-art fibre-based networks (Hynes and Kelly, 2018) – and while the rate of growth has varied, the same trend holds across the globe, whether in Australia, Brazil, or Tanzania (Renner, 2012; Byanyuma et al., 2013; Tanzanian Ministry of Communication, Science and Technology, 2013).

This should not, however, be taken as an indication of a sudden paradigmatic shift among incumbents, nor to imply that market forces have compelled it. Instead, the expanded provisioning of rural fibre networks has typically come as a result of concerted local efforts to secure the infrastructure, efforts motivated by the belief that it carries the potential for 'economic and social benefits across a range of sectors for rural dwellers' (Ashmore et al., 2015, p. 265), including 'as a means of preventing rural municipalities from depopulation' (Briglauer, et al, 2019, p. 78). Thus, while many such rural fibre networks are still 'very much in the process of being rolled out' (Singer et al., 2015, p. 1), those involved in their development have argued confidently that it is now only a matter of time until '[r]ural and remote communities will […] have the same digital opportunities as urban centres' (Connected Coast, 2022, n.p.).

As the physical infrastructures of fibre have expanded, so too have the cultural visibilities of fibre. As Nugent (2017) notes, '[d]iscourses around…fibre optics, ultra-fast broadband and 'big data' are often posed in very high-stakes terms', often hailing the coming of 'a Fourth Industrial Revolution [involving] a fusion of technologies resting on advanced digital connectivity' (p. 3). These discourses are often posited in economic terms, where the

instrumentalities of fibre to economic growth are framed as all-but-assured. Driven by the notion that 'fixed Next-Generation Access (NGA) networks are […] the *sine qua non* of future economic growth' (Troulos and Maglaris, 2011, p. 842), statements like '[t]he socio-economic benefits of fiber are beyond question' (PPC Broadband, 2020, p. 2) are both pervasive and persuasive, and form the basis to enlivened speculations as to the varied applications that fibre might (but never, it seems, might *not*) be put toward in the future. A recent report by technology consultants Analysys Mason (2020), for example, outlines how,

> '[I]n the public sector, FTTP will accelerate the development of 'smart cities', by enabling the application of IoT technology to utilities and services in public spaces…in retail, full-fibre networks will improve the quality of AR/VR to enable the adoption of these technologies in online shopping…in education, FTTP will enable enhanced digital learning [including] virtual learning in the form of Immersive Virtual Learning Environments (IVLEs) and virtual field trips…in healthcare, the higher bandwidths provided by FTTP will permit more detailed remote patient monitoring using smart sensors [as well as] remote video consultation and surgery' (p. 21).

Meanwhile, in the best-selling '*Fiber – The Coming Tech Revolution and Why America Might Miss It'*, Crawford (2020) begins the chapter 'The Fiber Future' with an indexing of the numerous fibre-facilitated advanced technologies on display at South Korea's 2018 Winter Olympics, including interactive holographic projections, the world's first 5G-connected car, and Augmented Reality (AR) walking tours, before reminding the reader: 'What makes these astonishing feats of communications transport possible…is South Korea's extensive fiber optic network' (p. 5).

It remains to be seen how, and to what ends, fibre will ultimately be put. In any case, the imaginative and deeply affective character to renderings such as these are useful not only for highlighting the centrality of fibre within broader narratives of modernity, progress, and

growth, but for establishing that fibre – 'the network architecture for the future' (Analysys Mason, 2020, p. 23) – is at once technical and *imaginative* in its constitution.

Part two – Haida Gwaii



Fig. 1. Looking across at Xayna *Maude Island* from the vehicle deck of the K'wuuna.

Xaaydlaga Gwaayaay *Islands at the edge of the world*

Haida Gwaii – about 480 kilometres long, and never more than 85 kilometres wide – is a mountainous and heavily-forested tract of islands in the North Pacific. If one were to trace a line from their southern extremity to their north-western point, the islands would be situated between the parallels of 51°50' and 54°15', and the meridians of 130°54' and 133°10'W. Separated from the mainland by KandaliiGwii *Hecate Strait*, Haida Gwaii is divided into two more-or-less equally-sized halves – Xaaydaga Gwaay.yaay iinaGwaay *Graham Island* to the north, and T'aaxwii XaaydaGa Gwaay.yaay iinaGwaay *Moresby Island* to the south – their respective shorelines punctuated by streams from eight hundred separate watersheds. Geographic descriptions of Haida Gwaii tend to teeter on the spectacular almost as a matter

of course. Dowie (2017), for example, describes the islands as 'a visual, sonic stage so unique and bizarre a place that it could easily have been the set for Avatar' (p. 4). For its part, the Haida Nation describes the islands as 'an isolated archipelago of forest, muskeg and ocean, shaped like a bear's canine tooth shrouded in swirling clouds' (Council of the Haida Nation, 2004, p. 2).

With just under 5,000 inhabitants spread across some 10,180 square kilometres, the islands' population density of 0.49 inhabitants per square kilometre makes it the third-least populated of any on earth, just after Svalbard and the Falkland Islands – or, to put it in further perspective, four times *less* densely populated than either Mongolia or the Western Sahara. Residents are more-or-less evenly spread out between a total of seven communities, which include the incorporated municipalities of Daajing Giids, Gamadiis Llnagaay *Port Clements*, and Tlaga Gaawtlaas *Masset*; the unincorporated communities of Tll.aal *Tlell*, Taaw Tldáaw *Tow Hill*, Ts'iinuu Gandlaay *Miller Creek*, HlGaa Gaat'as *Lawn Hill*, and K'il Kun Llnagaay *Sandspit*; and the Haida communities of Hlgaagilda *Skidegate* and G̲aaw *Old Massett.*

Haida Gwaii is the ancient and unceded territory of the Haida Nation, who have occupied the islands since time immemorial. Archaeological finds in the form of tools, fish weirs, and other artifacts represent some of the oldest archaeological finds in what is now Canada, and date back more than thirteen thousand years (Dowie, 2017, p. 13). Guided by Haida laws such as yah'guudang, the Haida Nation have stewarded the islands, which are today home to some of the world's last remaining tracts of intact coastal temperate rainforest, considered a globally significant repository for biological diversity[3]. Accordingly, as the Haida Proclamation of the Constitution of the Haida Nation asserts,

[3] As laid out in the Constitution of the Haida Nation, 'Yah'guudang – our respect for all living things – celebrates the ways our lives and spirits are intertwined and honours the responsibility we hold to future generations. Yah'guudang is about respect and responsibility, about knowing our place in the web of life, and how the fate of our culture runs parallel with the fate of the ocean, sky and forest people'. See: Council of the Haida Nation, 2004, p. 3.

Iid kuuniisii asii id gii isda gan. Tllgaay ad siigaay Gan t'alang aaxana ad yahguudang. Huu tllguu Giidan hlk'inxa gaa.ngang xaayda hllng.aay gud giijaagids, gaay Gaaganuu gam gina daaGang.nga id gwii is hllnga Gang ga. XaaydaGa Gwaay.yaay Gaaganuu iid xaynanga ga. Asii gwaay.yaay guu, iid kuuniisii xaynang.nga, ad siing.gwaa'ad gan. Sah 'Laana Tllgaay Gaa id gii kyaagang.ngaay Gaaw aan t'ang naaxang sGwaan.nang Gas ga. Iid sihlGa ga xaynangas gii t'alang t'aas.slas, asii kyang.gaay llgaay 'waagii kilxii gang ga.

The Haida Nation is the rightful heir to Haida Gwaii. Our culture is born of respect; and intimacy with the land and sea and the air around us. Like the forests, the roots of our people are intertwined such that the greatest troubles cannot overcome us. We owe our existence to Haida Gwaii. The living generation accepts the responsibility to insure that our heritage is passed on to following generations. On these islands our ancestors lived and died and here too, we will make our homes until called away to join them in the great beyond. (Council of the Haida Nation, 2004, n.p.)

Nevertheless, and while the pre-contact population of the islands numbered in the tens of thousands scattered across several dozen seasonal village sites, introduced epidemics of smallpox and other infectious diseases devastated the population through the late-nineteenth and early-twentieth century, ultimately reducing the number of Haida to just over 500, who relocated to the current-day communities of Hlg̱aagilda *Skidegate* and G̱aaw *Old Massett*. The survivors of this upheaval were then subjected to the further injustices of the *Indian Act*, a notorious piece of Canadian legislation which included an outright ban on the potlatch and which facilitated the forcible removal of Haida children to state-sponsored, church-run residential and day schools, where the merest form of Haida cultural expression was met with harsh recourse.[4]

[4] The potlatch ban was part of legislation forbidding the practice of the potlatch, passed by the Government of Canada under section 149 of the *Indian Act*, in force from 1885 to 1951. See: Swanky, 2012; Council of the Haida Nation, 2018.

Nevertheless, Haida custom, law, and language have not only survived, but are flourishing, and although Haida remains a critically endangered language, recent decades have seen a resurgence in the learning and revitalising of the surviving dialects of Xaayda kil and Xaad kil, largely thanks to the work of Elder-led organisations like the Skidegate Haida Immersion Program (SHIP) and Haida Gwaii Mentor Apprentice Program (HGMAP). Today, it is not uncommon to hear Haida and yaatz xaadee *non-Haida* alike incorporating small amounts of Xaayda kil and/or Xaad kil into daily conversation, to hear of a weekend spent with chinaay *grandfather* and nanaay *grandmother*, who meant to pass on their haawa *thank you* for the tip on where to find k'aaw *herring roe-on-kelp* this time of year[5].

As Dalzell (1981, 1989a, 1989b) notes in her series of meticulously researched local histories of the islands' early settler communities, wave upon wave of prospective yaatz xaadee *non-Haida* residents have arrived over the past century, as a result of which the islands' population now consists of a roughly even mix of Haida and yaatz xaadee *non-Haida*. Over the past several decades, population decline has been of growing concern, with many younger residents compelled to leave (if only for awhile) by the relative lack of educational opportunities or career-advancement prospects (Weiss, 2018).

The contemporary political landscape of the islands is shaped in large part by the Council of the Haida Nation (CHN), the elected government of the Haida Nation and main political force on Haida Gwaii, whose sustained efforts to achieve self-determination and (re)establish the Haida's rightful claim to Title has seen a series of precedent-setting legal actions, thanks to which the Haida Nation enjoys an unusual degree of legislative autonomy (Dowie, 2017). Perhaps the most high-profile of these battles came as a result of the 1985 Athlii Gwaii *Lyell Island* protests, which resulted in the formation of the first formal organisation of Haida and yaatz xaadee *non-Haida*, as well as, concurrently, the establishment of the Council of the

[5] Throughout this dissertation, I use the Xaayda kil spelling.

Haida Nation (CHN), and the launch of the ongoing *The Minister of Forests, et al. v. Council of the Haida Nation and Guujaaw* case, known locally simply as 'the Title case'[6]. While it is beyond the purview of this introduction to elaborate much further, Weiss' (2018) '*Shaping the Future on Haida Gwaii: Life beyond Settler Colonialism'* offers a particularly useful and in-depth account of the ascendancy of Haida political structures and their resonance for life beyond the islands' shores; in the later *Discussion*, I draw on concepts introduced in this book, particularly that of 'Haida homecoming'.

It is worth further noting that, though the name has since been 'given back', Haida Gwaii was, for a comparatively brief period of time when set against the longue durée of Haida (pre)occupation, known as the 'The Queen Charlotte Islands' – so named in 1787 by captain George Dixon, who named them after one of his ships, itself named after Charlotte of Mecklenburgh-Strelitz, wife of the United Kingdom's then-ruling monarch King George III. The project of 'giving back the name' has since caught on further (Dickson, 2022); in 2022, the town briefly-known as Queen Charlotte was re-established as Daajing Giids, with plans in place to restore the names of each of the other present-day settlements to their original Xaayda kil/Xaad kil. Along with 'the Title case', 'giving back the name' forms one of the many contemporary nodes, or *articulations* (Clifford, 2001), of Haida self-determination, a broad conceptual but fundamentally action-oriented framework which, in the later *Discussion*, I propose 'the fibre project' can make constructive contributions to.

[6] *The Minister of Forests, et al. v. Council of the Haida Nation and Guujaaw* is a groundbreaking claim seeking a declaration that the Haida Nation holds 'Aboriginal Title' over all of Haida Gwaii including the seabed resources of over half of KandaliiGwii *Hecate Strait* and 320 kilometres into the Pacific Ocean. Described by Gill (2010) as 'arguably the most sweeping indigenous rights claim in the world, and one of the most important land claims in Canadian history' (p. 18), the dispute stems from the fact that while ninety-four percent of forested lands on Haida Gwaii are claimed by the Crown, the provincial government only established treaties with the Haida for three percent of the land, in contravention of Great Britain's *Royal Proclamation of 1764* which called for a formal agreement or treaty to be signed before an Indigenous population could be disturbed from their 'title to the land'. In Canadian legal history, 'the Title case' is often mentioned in the same breath as the landmark 1973 *Calder v British Columbia (AG)* case, which confirmed the existence of Title at a conceptual level, as well as the 1997 *Delgamuukw v British Columbia* case, which affirmed that Title had not been extinguished by colonisation or settlement. In the later *Discussion*, I note how 'the Title case' features in certain narratives of 'the fibre project'.



Fig. 2. A microwave radio tower at the top of 'The Heights', Hlgaagilda *Skidegate.*

A brief history of broadband (on Haida Gwaii)

Scholars such as Ribes and Finholt (2009) describe how infrastructures evolve through constant negotiation between short- and long-term goals, enacting a 'long now of infrastructure' (p. 375). Despite its common depiction in the public imaginary as a 'faraway', disconnected place, the story of connectivity on Haida Gwaii – what we might call the 'long now' of its development – stretches back decades.

'As far as anyone can remember', as I would be told in the course of carrying out this research project, 'the first computer arrived on Haida Gwaii some time before the fall of the Berlin wall'[7]. Public documents show that basic dial-up service was available in limited areas by the mid-1990s, though residential service did not become widespread until around 2004, when local politicians came together to create '…a regional consortium to deliver

[7] OG. Interview, Daajing Giids, 2020.

broadband… in order for broadband to move forward'[8]. By 2006, these efforts contributed to the construction of a pair of radio towers – one at Ḡaaw *Old Massett* and one on the mainland, at the top of Mount Hays, near Prince Rupert – enabling broadband to the islands by way of the longest over-water radio transmission in the world (CBC News, 2006; Haida Gwaii Observer, 2006).

In an article announcing the achievement in the *Globe and Mail* a short time after, former CHN President and then-Chairman of Gwaii Trust Kilslaay Kaajii Sding *Miles Richardson* commented that, '[t]his is a historic occasion for our islands' communities. We had to overcome many technical and business challenges, but the Gwaii Trust is very proud to have brought this essential infrastructure into our communities' (Canadian Press, 2006, n.p.). 'It was a tough haul'.

Over time, improvements and expansions were made. As more fixed wireless assets were added, connectivity was extended to each of the islands' communities through a complex architecture of relays. As an interim measure, these provided a basic measure of access, such that by 2016 basic connectivity was at very least *available* to approximately 70% of households on-island (though adoption hovered slightly lower). While better than nothing, a 2016 blog post from Tlaga Gaawtlaas *Masset* -based software engineer James Hiebert sums up the frailties to this first-generation network in particularly vivid terms:

> *'Haida Gwaii's network is certainly not perfect. Our 4000 residents are connected to the Internet by an overwater microwave link (Microwave Digital Radio or MDR). It provides about 300 Mbps of bandwidth for the whole island, which is not great. Bandwidth is limited enough to be metered and we have to pay a hefty sum to buy it (around $2 / GB). It's susceptible to weather interruptions, particularly in the winter when the gales blow our tower off alignment or the rain, wind and clouds provide*

[8] See: Gwaii Trust. (2004a, n.p.): 'An All-Island Leaders meeting was held at the request of the Gwaii Trust Society on May 11, 2004 in Port Clements, BC.'

> *enough atmospheric interference to limit our data throughput. During last night's storm, I was down to around 20 KBps*' (Hiebert, 2015a, n.p.)

In the years since, Skidegate-based non-profit middle mile provider GwaiiTel, in partnership with other local funding bodies, has responded to rising demand by undertaking a near-continuous cycle of upgrades to the network, re-investing money earned through the sale of bandwidth to third-party retail Internet Service Providers (ISPs) in order to maximise available bandwidth and carrying capacity across the terrestrial network. Upgrades carried out between 2011 and 2015 increased bandwidth on the backhaul link from 70Mbps to 360Mbps, while further upgrades saw its capacity rise to 700Mbps, 800Mbps, 1GBps, and ultimately 1.3GBps. End-user demands have to a large extent driven these upgrades; as Figure 3 illustrates, peak bandwidth usage has increased year over year throughout the history of the network, frequently approaching capacity.

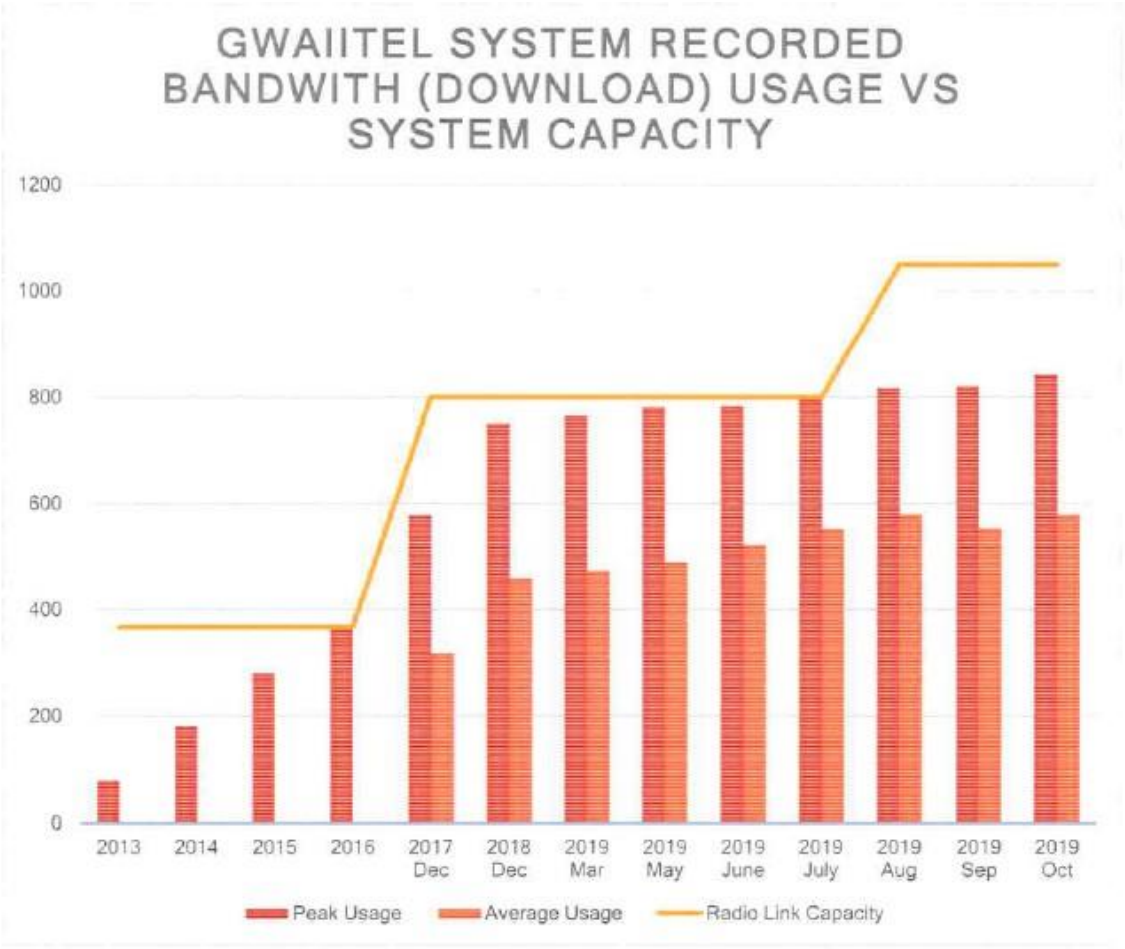


Fig. 3. Recorded bandwidth against total system capacity, 2013 to 2019. Source: GwaiiTel. (2019). GwaiiTel Annual Report 2019, p. 5.

Alongside efforts to secure 'best possible' fixed wireless architectures in the interim, plans for some form or another of on-island fibre-based infrastructure can be traced back to 1995, when a working group was established within the then-newly-formed Gwaii Trust with the express purpose of investigating the feasibility of providing the islands with 'internet at, or better than, the standards you could get in any urban setting'[9], as one of the chief architects of the plan would later describe it to me in the course of an interview. Those involved recall that the plan initially struggled to gain traction, particularly within the yaatz xaadee *non-Haida*

[9] MR. Interview, Skidegate, 2022.

municipal governments on-island, who described it as ‘overkill’ and economically unjustifiable.

More concrete plans for what would become ‘the fibre project’ were not established until 2015, when the Gwaii Trust commissioned a feasibility study. Entitled *Evaluation of Development of Broadband Infrastructure Serving Haida Gwaii* (Lund, 2016), the report laid out a roadmap both to expanding capacity and capability of the existing network, and to constructing and operating a full-fibre network, concluding that this was the only way to create a ‘future proof’ network and address the long-standing issues of *capacity* – which it described as the network’s ability ‘to carry increasing traffic volume across a wider area of Haida Gwaii’ (Lund, 2016, p. 11) – and *reliability* – described in the report as the ability ‘to remain ‘in-service’, despite power outages, equipment failures, failures in third party networks, weather- related outages, etc.’ (ibid).

As the report specified, the chief motivation to any such future network was to ‘bring Internet service capabilities equivalent to those available to users in urban markets to residential and commercial users on Haida Gwaii’ (p. 3). Though the exact routing of the backhaul link remained unspecified – posed instead as an-open-ended question: ‘…generally, Old Massett / Masset region to Prince Rupert?’ – *Evaluation of Development of Broadband Infrastructure Serving Haida Gwaii* was critical to the development of ‘the fibre project’ in that it laid out a concrete, long-term investment roadmap, including the construction of ‘[a] terrestrial fiber optic link from Masset to Skidegate’, ‘the establishment of fiber to commercial sites of interest’, ‘a marine fiber optic link from Haida Gwaii […] to the B.C. mainland’, ‘a marine fiber optic link from Skidegate to Sandspit’, and the establishment of ubiquitous last mile access to every household (p. 2, 4). The report is also notable for concluding with an explicit prediction that ‘[e]nd user expectations of broadband Internet

service quality will increase as the manner in which Internet service use evolves' (Lund, 2016, p. 15).



Fig. 4. Visual markers of 'the fibre project'.

'The fibre project'

'What could fibre do for us?', begins a slide delivered by a group of Haida Gwaii-based broadband activists at the 2017 edition of the British Columbia Broadband Association (BCBA) Conference. 'Take the water out of the Hecate Strait and connect us to Canada and the world. Move us from geographically and technically isolated to skyping Africa. Allow our youth [to] become creators of content rather than strictly receivers' (GwaiiTel, 2017, slide 2).

Although colloquially referred-to in the singular, 'the fibre project' is perhaps more accurately described as a series of overlapping initiatives culminating in the provision of a 'full-fibre' network with ubiquitous availability to all endpoints on Haida Gwaii. To describe it in strictly physical terms, then, 'the fibre project' is a Fibre-to-the-Home (FTTH) network

which currently provides minimum 1 Gbps symmetric service to end-users on Haida Gwaii. Designed as an open-access Passive Optical Network (PON)[10], it is an example of a 'brownfield' project – involving the upgrading of existing broadband infrastructures, as opposed to a 'greenfield' project, in which broadband infrastructures are established for the first time (Hambly and Rajabiun, 2021) – and has been guided by two broad technical objectives, one relating to the construction and operation of a ubiquitous 'deep fibre' terrestrial network, the other to the establishment of a backhaul connection to the mainland by way of a subsea cable.

The first strands of what would become 'the fibre project' were laid in 2010, when a roughly 15-kilometre portion of middle mile was laid between the Daajing Giids village office and the Hlg̱aagilda *Skidegate* Fire Hall. The most extensive work was carried out between 2016 and 2018, when the network was extended from north to south, ultimately connecting G̱aaw *Old Massett* and Hlg̱aagilda *Skidegate*. Further extensions to the middle-mile were subsequently made into the communities of Taaw Tldáaw *Tow Hill*, Gamadiis Llnagaay *Port Clements*, Tll.aal *Tlell*, HlGaa Gaat'as *Lawn Hill*, and Ts'iinuu Gandlaay *Miller Creek*, and later to K'il Kun Llnagaay *Sandspit*. Today, the middle mile architecture comprises roughly 117 kilometres of fibre collectively owned by the islands' communities, managed by GwaiiTel[11]. The middle mile architecture consists of a mix of submerged and aerial cabling, the latter being more commonly used in the southern communities, whose geology make the prospect of digging and trenching much less feasible.

[10] Open access refers to a network management practice that allows independent service providers to access the network infrastructure under regulated non-discriminatory terms. The premise is to not allow monopolies over infrastructure to extend into a monopolies over services relying on that infrastructure.

[11] Specifically, the organisational structure of GwaiiTel mandates that elected representatives from each of the islands' seven municipal and Haida leadership bodies – which include the CHN, Village of Masset, Old Massett Village Band Council, Village of Port Clements, Skeena-Queen Charlotte Regional District Areas D and E, Skidegate Band Council, and Village of Daajing Giids – are tasked with advising the board of directors of GwaiiTel, who are themselves elected to a term of two years.

The middle mile is considered to 'begin' in G̲aaw *Old Massett* and 'end' in Hlg̲aagilda *Skidegate*, and provides connectivity (both dark and lit[12]) to all communities of Xaaydaga Gwaay.yaay iinaGwaay *Graham Island* and, by way of a second dedicated subsea cable, to the community of K'il Kun Llnagaay *Sandspit* on T'aaxwii XaaydaGa Gwaay.yaay iinaGwaay *Moresby Island*. The middle mile backbone includes seven community-facing Points-of-Presence (PoPs) which serve as distribution branches off of the main backbone, each PoP providing a 1 Gbps service interface (with room for expansion up to 10 Gbps) feeding into GwaiiTel's 1 Gbps DWDM fibre backbone. If only to illustrate the magnitudes of difference entailed, it is worth noting that construction of the middle mile increased the islands' *intra*net capacity by roughly 10,000 times the previous threshold.

The backhaul proved the most elusive leg of the network. In July 2016, for example, communications between the provincial government and municipal leadership of Daajing Giids referred to the subsea cable as still being 'in the conceptual stage'[13], more than six years after work on the middle mile had begun. In late 2018, however, plans were at last announced for the critical backhaul component as part of the larger Connected Coast project[14]. Ultimately 'landed' in late summer 2022, the backhaul cable now follows an 87-kilometre route from Prince Rupert, south to Bonilla Island, from where it crosses KandaliiGwii *Hecate Strait* to a landing site near Tll.aal *Tlell*, on the northeastern corner of Xaaydaga Gwaay.yaay iinaGwaay *Graham Island*, connecting the islands into a larger 3,500 kilometre loop linked into the Vancouver Internet Exchange.

Installation of the last mile leg has proceeded on an intermittent basis since 2018; although initially overseen by Haida Gwaii-based retail Internet Service Provider (ISP) Gwaii

[12] Where 'lit' fibre refers to cables that are currently in use by a service provider to transmit data, and 'dark' fibre refers to cables that are currently not in use.
[13] See Appendix L for a letter of comment received by the village of Daajing Giids, dated July 2016.
[14] The Connected Coast Network is a partnership between CityWest (a wholly-owned corporation of the City of Prince Rupert, the nearest mainland settlement to Haida Gwaii) and the Strathcona Regional District (SRD) providing subsea fibre backhaul access to a total of 139 rural and remote coastal communities, including 48 Indigenous communities, along the Pacific coast from north of Prince Rupert, to Haida Gwaii, south to Vancouver, and around Vancouver Island.

Communications (GwaiiComm), that company's acquisition in January 2020 shifted responsibility to Mascon (a subsidiary of Canadian incumbent Telus), as well as to CityWest (formerly CityTel). At the time of writing, all but a handful of homes on-island have been provided with last mile access – and as I allude to in a later section of this dissertation, a portion of those 'without' remain so on the basis of choice ('*This very lack*', Chapter 6 – *Mobilities*). As a result of this patchwork-approach, the network has a somewhat convoluted ownership structure in which middle mile is operated by GwaiiTel, backhaul is operated by the Connected Coast Network (CityWest and the Strathcona Regional District), and last mile is operated by both CityWest and Mascon.

Allowing for access to all strands at all locations, such that access to any one strand can be patched to any other desired location within the network, the architecture has been 'future-proofed' through the over-provisioning of strands in anticipation of future need. At present, 72 of the 96 strands between G̲aaw *Old Massett* and Hlg̲aagilda *Skidegate*, and 12 of the 24 strands between Hlg̲aagilda *Skidegate* and Daajing Giids are currently 'unlit', giving the network considerable room for further capacity expansion.

At least from today's vantage point, the overall construction costs of 'the fibre project' are difficult to accurately estimate, not least because the different components have been overseen by different (and sometimes now-defunct) entities. Nevertheless, the detailed cost estimate provided by Lund (2016) – approximately $31,000,000 – provides a partial and likely somewhat conservative estimate. With a total population less than 5,000, the per capita costs of 'the fibre project' are therefore somewhere in the region of $6,200 CAD, or a per household cost of around $16,570 CAD (assuming c. 1,870 households on-island). These exceptionally high build costs have been subsidised in full through a combination of grants provided by federal, provincial, regional, and local bodies, including substantial contributions

from the CHN and Gwaii Trust. As a result, ‘the fibre project’ has come at no direct cost to island residents.

Summary

‘*Railroad tracks, with the peculiar and unmistakable dream world that attaches to them, are a very impressive example of just how great the natural symbolic power of technological innovation can be.’* (Benjamin, 1999, p. 32)

As in so many other rural, remote, island contexts, end-users on Haida Gwaii have historically contended with the consequences of their reliance on comparatively unstable and bandwidth-limited wireless broadband technologies. But following years of concerted struggle, an altogether different connective ecology is emerging. Fully operational for just over a year, ‘the fibre project’ now provides symmetric, Gigabit capable connectivity to every endpoint on Haida Gwaii.

Which begs the question: how – or rather, how *come*? That is to say, what is it that has motivated the residents of a geographically-isolated, sparsely-populated island to attempt infrastructuring at such scale (Bowker and Star, 1999; Smedberg, 2019), and what structures have made it possible? What does it feel like, and what is at stake, in moving from a connective reality informed by the principle of constraint to one of abundance?

In the chapters which follow, I take the position that, like the railroad tracks of Benjamin’s (1999) imagination, fibre, as infrastructure, is more-than-material (Barry, 2015), being at once technical *and* imaginative in its constitution. To that end, this dissertation takes a broadly infrastructural approach and provides an ethnographically-informed investigation into the pursuit, construction, maintenance, repair, and situated usages of ‘the fibre project’ as a means to examine the local legibilities to a globally-emergent infrastructure. In the next

chapter, I outline the broad academic literatures against which the study is set, and from which it draws, before expanding upon the research questions which have guided it.

Chapter 2 – Literature Review

Overview

In order to better establish the academic backdrop against which this research project is set, this chapter provides an overview of relevant literatures from a range of scholarly conventions and disciplines, broadly concerning the sociomaterialities of broadband development and deployment in rural and remote community contexts. In an attempt to reduce the conceptual and methodological ambiguities to this otherwise vast literature, a systematic review process was used to establish three overlapping paradigmatic approaches, or genres, which I describe as *structural approaches*, bearing an emphasis on institutional determinants of broadband development and deployment; *sociocultural approaches*, emphasising the social and political agency of network-building, often with an attunement to the phenomenological and perceptual facets to broadband infrastructures; and *critical approaches*, focused more explicitly on the distributive politics of broadband infrastructures and on questions of power, representation, and the material bases of digital inclusion/exclusion.

Following the main literature review, I establish the overall rationale and aims of this research project in the *Research Statement*. From here, I elaborate upon the core *Research Questions* and conclude by laying the groundwork for an expanded conceptualisation of 'the fibre project' in the *Conceptual Framework*.

Review process

To better identify and categorize the range of existing literatures informing this project, I undertook a systematic review of social scientific and humanistically-inclined academic research broadly pertaining to the socioeconomic impacts of broadband development and deployment (particularly in rural contexts); policy papers and grey literature concerning the governance and institutional development of broadband infrastructures; ethnographic and

sociocultural approaches to the study of broadband infrastructures (including a small number relating specifically to fibre); and critical infrastructural scholarship on broadband (including, in particular, critical rural and critical Indigenous perspectives).

Undertaken as a form of scoping review – an approach which Arksey and O'Malley (2005) suggest is among the best suited for literature reviews on broad topics where many different study designs might be applicable – an initial search for the keywords 'rural broadband'; 'broadband development'; Indigenous broadband'; 'fibre broadband'; and 'rural fibre[15]' in Google Scholar, SCOPUS, and the SOLO database retrieved just under 1,100 articles, manuscripts, and reports. After limiting the search to peer-reviewed articles, conference proceedings, manuscripts, and government reports, the total number was reduced to 235.

Structural approaches

Structural approaches to the study of rural broadband infrastructures may be broadly said to consist of those which take the position that 'a combination of geography, public policy, and commercial investment in information infrastructure combines to create geopolicy barriers that…structure the ability of rural citizens to access the Internet' (Nicholas, 2003, p. 287).

Methodologically, structural approaches tend to employ comparative frameworks, quantitative methods, and document analysis. Focused principally on the macro and meso-level factors influencing broadband development – what Nicholas (2003) refers to as 'geo-policy barriers', or those 'chokepoints [and] mechanisms of control created through the interaction of geography, market forces, and public policies' (p. 287) – studies in this vein typically unfold in one of two frames. In some instances, broadband is treated as the actant, its presence or non-presence being employed as something of an independent variable in

[15] Note that I included both the American spelling, 'fiber', and British/Canadian spelling, 'fibre', when searching so as to minimise the chance of omission.

order to assess (and in some cases, quantify) its ‘impact’ upon the economic vitality of a particular community, region, or nation. In other cases, the relationship is reversed, with the diffusion and/or relative availability of broadband being taken as a measure of the efficacy of a specific supply side intervention (e.g. tax incentives, bylaws, or differing models of provision, corporations, standard-setting bodies).

In either case, such studies typically proceed from the view that ‘the two main issues with regard to broadband provision in rural areas are that the technological capability is limited (and therefore, limiting) [and] that commercial provision is unfeasible’ (Galloway, 2007, p. 646). While much of this literature converges around the notion that significant public intervention (in the form of direct subsidies, for example) is needed in order to achieve some of the more grand ambitions of universal access, scholars working in this space also note how such proposals have often been met with an ambiguous response from incumbent providers, who argue that ‘public interventionism will crowd-out private investments and distort market conditions and innovative dynamics’ (Troulos and Maglaris, 2011, p. 843).

Policy

Informed by the notion that broadband development unfolds largely as a result of ‘geography, state-intervention and telecommunications regulation’ (Papacharissi and Zaks, 2006, p. 71), the literature of public policy has long formed the backbone to a ‘…robust discussion regarding rural telecommunications, rural development and the digital divide’ (Ali, 2018, p. 5). Many such studies have focused on a specific geography of interest. In their mixed-methods analysis of the regulatory landscape of the United Kingdom, for example, Nardotto et al. (2015) assess the efficacy of ‘local loop unbundling’ on broadband penetration and performance, while Gerli and Whalley (2021) explore ‘how community networks and public-private partnerships have contributed to promoting the delivery and adoption of superfast broadband across the rural UK’ (p. 1).

A considerable share of the policy literature concerns the broadband landscape of the United States (e.g. Larose et al., 2011), where scholars describe a regulatory mentality favouring ‘market self-regulation and [which] views government involvement as a danger to technological innovation’ (Papacharissi and Zaks, 2006, p. 64). In a particularly thorough meta-analysis of the American broadband policy landscape, Canfield et al. (2019) describe rural broadband development as being a product of six specific overlapping factors, namely, ‘(1) technology, (2) hardware costs, (3) financing, (4) adoption, (5) regulatory/legal, and (6) management’ (p. 1). In an earlier paper, Cambini and Jiang (2009) provide a similarly comprehensive overview of the literature concerning the impact of regulatory interventions on broadband investment.

In order to develop a more robust commentary on cross-national policy measures, other studies have adopted a comparative framework. Briglauer et al. (2019), for example, examine the effectiveness of various European state aid policies for rural broadband deployment, ultimately finding that rural municipalities in receipt of state aid ‘have a significantly higher broadband coverage at higher speed than non-aided municipalities’ (Briglauer et al., 2019, p. 68). Other studies have evaluated the efficacy of public support programs for rural broadband deployment, on access and price regulation (e.g. local-loop upgrades) (Duso et al., 2021), or on local aid programs in spurring investment in physical infrastructure (Kandilov and Renkow, 2010). Although by now somewhat dated, Belloc et al. (2012) provide a particularly comprehensive account of cross-national policy influences in a paper investigating the impact of a vast array of public policies on wireline broadband penetration [and] diffusion across 30 OECD countries from 1995 to 2010.

Where fibre-based technologies have formed the specific focus of such research, a disproportionate share of the policy literature has centred on a small number of Scandinavian and Asian nations, tending to conclude that their high rates of per capita fibre deployment, in

both rural and urban contexts alike, are a result of significant state intervention and public subsidisation[16]. More recently, policy research concerning rural fibre has begun to diversify into other regions of the world (Ramirez and Richardson, 2005; Ellershaw et al., 2009; Prieger, 2013; Whitacre et al., 2014a, 2014b), and has expanded to include cross-national frameworks as well, as in Aravantinos et al. (2021), who use regression analysis to analyse the efficacy of tariff regimes at promoting Fibre-to-the-Home (FTTH) network investment across the European Union. In a paper examining European municipal broadband strategies based upon an elite interviewing method, Troulos and Maglaris (2011) analyse the emergence of 'infrastructures with the direct or indirect participation of local authorities, municipal electric utilities, citizens cooperatives or social housing associations' (p. 843).

In Canada, scholars describe a broadband policy landscape conceived of 'mostly in physical terms and as a problem for markets to tackle' (Howard et al., 2010, p. 116), a landscape Hallstrom et al. (2017) describe as being governed by an 'if you build it, they will come' approach (p. 4). Unfortunately, 'building it' can be extremely costly, and for this reason Papacharissi and Zaks (2006) argue that the subsidization of public backbone infrastructure is 'an especially important form of government subsidy in countries like Canada, which are less compact and densely populated' (p. 71). In a constructive account of Canadian broadband policy, Taylor (2018, p. 744) suggests that the dominant paradigm informing Canadian policy-making in regard to rural broadband has long been one of *equality of access* – that is, of working to ensure the presence of at least *some* basic broadband infrastructures in roughly equal proportion in rural and urban areas alike.

Characterising the Canadian policy landscape in slightly different terms, Markey et al. (2012) describe a recent shift, such that the above-mentioned focus on *access* has given way to one on centred upon *equity*, driven by a growing recognition that 'it is not enough to just

[16] These include Japan, South Korea, Singapore, Denmark, Finland, and Sweden.

get Internet – reliable, high-speed Internet is needed' (p. 18). Hallstrom et al. (2017) likewise conclude that Canadian policy-making has undergone a recent shift in emphasis, increasingly recognising that '[t]he digital divide is no longer an issue of availability', and that a more proactive approach is needed in order to address 'larger (and often ignored) issues [of] equity of access *and* quality' (p. 18; emphasis added).

Economic impacts

Scholarship concerning the economic impacts of rural broadband provisioning is extensive. As Hudson (2013) writes, '[r]esearchers have taken several approaches to analyze the impact of telecommunications and more recently, broadband, on economic development. Macroeconomic studies have analyzed multiyear and multi-economy data sets, typically examining communications infrastructure investment and GDP growth or employment. Microeconomic studies at the firm level have examined broadband impact on productivity and growth in sales or revenues' (p. 45). Such studies have often departed from the position that '[i]nsufficient internet access is holding back local economies' (Canfield et al., 2019, p. 1), and have sought to directly measure the economic outcomes associated with increased broadband availability in a particular prescribed area (Lehr et al., 2005; Galloway, 2007; Czernich, et al., 2011; Kolko, 2012; Fabritz, 2013; Whitacre et al. 2014a; Canzian et al., 2015; Whitacre and Manlove, 2016; Grubesic and Mack, 2017; Kim and Orazem, 2017).

While in general terms studies of the economic impacts of rural broadband provisioning have been informed by the view that, as Canzian et al. (2015) succinctly summarise, 'the availability of broadband technology is beneficial for local economic growth' (p. 18), a diversity of methodological routes has been taken in the course of analysing and describing these impacts. As Briglauer et al. (2019) write, '[w]hile earlier papers of this literature strand mostly provided descriptive evidence on the associations between broadband infrastructure and socio-economic outcomes, more recent papers typically apply micro-econometric

methods (fixed effects, difference-in-differences, matching, quasi-experimental designs) that aim at identifying causal effects of broadband infrastructure on socio-economic outcomes' (p. 1). In one of the more methodologically multi-faceted such studies, Jahangard and Pourahmadi (2013) examine the 'causal effects' of broadband infrastructure on economic growth using a country-panel approach over the period 1999 to 2008, ultimately concluding that, 'the effects of introduction and distribution of broadband on economic growth…are significant and positive' (p. 1); similar assertions are made in Arnold et al. (2018). Representing a more micro-economic orientation, sector-specific studies of the economic impacts of broadband development have also been undertaken, such as Shideler et al.'s (2007) study of broadband-initiated organisational change across a number of rurally-situated natural resource industries.

Scholars such as Whitacre et al. (2014a, 2014b) have led efforts to more concretely quantify the economic impacts of broadband infrastructures in rural areas. In what the authors claim to be 'the first study to conduct an impact analysis with respect to next-generation broadband technologies', Canzian et al. (2015, p. 2) analysed how the mere presence of Next Generation Access (NGA) networks – a broad moniker which specifically includes fibre – impacted upon the yearly performance of businesses in a rural region of Northern Italy. In line with the consensus view that economic output is strongly positively correlated with local access to high-capacity broadband infrastructure, Canzian et al. (2015) conclude that the presence of such infrastructures is associated with 'a significant increase in annual sales turnover of about 40 percent and an increase in value added of roughly 25 percent over the period of two years' (p. 1). Notably, only a handful of studies have ventured to suggest that the economic benefits of fibre, and broadband technologies more generally, may be tempered by the lack of propensity for growth displayed by many rural businesses (Galloway, 2007).

Building on the aforementioned scholarship concerning the relationship between broadband and local economic outputs, a small but growing body of work has found that 'higher access to broadband, regardless of the specific estimator used, has a positive impact on remote rural housing values' (Deller and Whitacre, 2019, p. 2149). In one of the more intriguing such studies, Deller and Whitacre (2019) found that 'higher access to broadband…has a positive impact on remote rural housing values' (p. 2150), while noting that this only appears to be the case up to speeds of around 100 Mbps. Indeed, Deller and Whitacre (2019) write that although 'remote rural housing values are positively impacted by higher access', the single-largest impacts 'are seen for categories with the lowest speed thresholds, suggesting that having at least some higher-speed access is highly valued by rural county residents but that higher speeds are discounted'(p. 2149). Thus, they conclude that 'there are declining returns to speed availability, with access to at least some type of Internet being more valuable than having only a very high-speed connection accessible' (p. 2135).

These claims of diminishing return are challenged by a number of other studies which have focused exclusively on the economic impacts of fibre on rural housing values. In a study of the microeconomic impacts of rural fibre at the household level, Kashian and Zenteno (2014) used a combination of survey data and county-level property assessments to establish that the provisioning of a Fibre-to-the-Home (FTTH) connection was associated with a 2.7 percent increase in rural house prices – roughly similar to the inclusion of a pool. Similar figures have since been replicated elsewhere (Ali, 2021, p. 22). Along slightly different lines, Singer et al. (2015) sought to 'precisely observe [how] deployment of a specific [fibre] technology' impacted upon regional employment figures. Through regression analysis, Singer et al. (2015) estimate that 'fibre deployment to 100 percent of a region is associated with an increase in employment of approximately 2.9 percent' (p. 1), adding that '[i]n other words, even in regions which already have broadband, upgrading broadband infrastructure to

FTTP is expected to result in an almost 3% increase in employment in that community' (p. 1). In the context of this study, debates surrounding the (purported) impacts of fibre on employment figures and housing values animate several of the vignettes within Chapter 6 – *Mobilities*.

Sociocultural approaches

Where structural approaches tend to dwell upon the meso- and macro-level institutional determinants of broadband development and deployment, sociocultural approaches to the study of rural broadband are generally characterised by their emphasis on the social and political agency of network-building *per se*, and assert that 'broadband is not about technology, policy, or markets' so much as 'its about people' (Ali, 2021, xviii). Sensitive to 'the contextual distinctions of the social and structural conditions of remote and rural life' (Collins and Wellman, 2010, p. 1347), and often drawing from the literatures of rural sociology, development studies, and human geography, studies in this vein serve as a reminder that the process of building, accessing, and maintaining broadband infrastructures is always 'a fundamentally place-based and local phenomenon' (Ali, 2021, p. 133).

Borrowing from the language of development studies and human geography, a considerable share of this literature approaches rural broadband development through the closely-related analytics of resilience, sustainability, and/or liveability (Skerratt, 2010; Townsend et al., 2015; Hynes and Kelly, 2018; Briglauer et al., 2019), often concluding that 'an increase in broadband coverage allows workers to live in these rural municipalities – and prevents these areas from depopulation' (Briglauer et al., 2019, p. 69). Adopting the analytic of resilience, scholars such as Rajabiun and Middleton (2013) argue that by 'making such communities more attractive places to live and conduct business, reliable broadband infrastructure serves as a platform for diversifying local economies, increasing the long term local tax base, and reducing the need for higher levels of governments to subsidize rural

communities' (p. 8). Townsend et al. (2015) similarly adopt a framework of resilience to analyse the importance of broadband to business owners, drawing on interviews conducted in rural Scotland, while studies such as Ashmore et al. (2017) describe how '[t]he concept of community-led superfast broadband' has become 'inextricably linked to community identity' (p. 415) and the emergence of a sense of community resilience. Methodologically, sociocultural approaches are distinguished by their tendency toward qualitative and/or mixed-methods frameworks, including interviews, participant observation and engagement, archival analysis, and surveys.

Community and alternative networks

Framing broadband infrastructures as 'socially invested resources' (Mignone and Henley, 2009, p. 136) driven by locally-emplaced 'creative agents […] actively shaping their own endogenously managed networks' (McMahon, 2014, p. 1), many studies within this genre often emphasise the importance of 'keep[ing] the Internet in local hands' (Ramillo, 2018, p. 5). Often describing the impetus for such projects as a response to 'market failure' (Ali, 2021), and how, '[l]acking broadband infrastructure, small, remote communities…[have] decided to build their own' (Renner, 2012, p. 15), one prominent sub-genre thereby considers the emergence and governance of alternative network delivery models[17], such as municipal broadband cooperatives, community-owned middle mile networks, or regional non-incumbent providers (Gerli, 2019).

Often offering a processual view of infrastructuring (Bowker and Star, 1999; Smedberg, 2019), studies in this vein see broadband infrastructures as emerging 'from the community outwards, rather than from the vantage of the state or the service provider inwards' (Finlay, 2018, p. 61), and situate community-led efforts to secure high-quality infrastructures within

[17] As definitions vary across the literature, I use the terms 'alternative network' and 'community network' interchangeably, working from Ortiz and Tapia's (2008) description of community networks as 'small and locally based, often comprised of non-profits, unincorporated, municipally supported, hybrid partnerships, usually constructed from off the shelf hardware, action and results oriented and possessing a mission to support both social and economic development' (p. 2).

longer narratives of localism and community self-determination. Treating the planning, construction, and maintenance of broadband infrastructures as potential vectors of collaboration, skill-sharing, and co-production, scholarship in this genre describes occasions for 'the development of agency, social capital, and empowerment' (Winter et al., 2014, p. 3), and considers how the processes of materialising broadband can constitute 'a tool for inter-community and national development' (Roth, 1999, p. 5). Crabu and Magaudda's (2018) case study of the establishment of a community-owned network in a rural region of Northern Italy, for example, is archetypal of studies which seek to develop an understanding of 'the alignment between the technical work implied in building this bottom-up infrastructure and the political and cultural frameworks that move people to participate' (p. 149). Works such as Gaved and Mulholland (2010) are archetypal of an ethnographically-informed methodological approach which has sought to study the development and evolution of community networks 'from the ground up' (p. 2).

A countervailing perspective to the largely celebratory outlooks of the above-mentioned approaches can be found in the small number of studies which have sought to highlight the organisational precarities to community and alternative networks, particularly given that they have 'often relied on the extraordinary efforts of a few talented volunteers and a commitment to build and rely on their own cooperative networking and access infrastructure' (Song et al., 2018, p. 8). Among the most comprehensive sources of information, commentary, and analysis of community and alternative networks is the Global Information Society Watch's 2018 report *Community Networks,* which provides national profiles of a total of 43 different nations, including a number of nations whose telecommunications ecology is rarely discussed in such depth elsewhere, such as Benin, Ghana, Kyrghystan, Seychelles, and Zambia.

Given their focus on participatory and 'bottom-up' processes, ethnographic research frameworks feature prominently within this strand of the literature. Notably, however, the

empirical emphasis to the overwhelming share of ethnographic engagement with community and alternative networks is restricted to first generation fixed broadband and/or wireless infrastructures, with dial-up, satellite, microwave radio, and cellular technologies among the most common. Powell and Shade (2006), for example, provide an overview of community and municipal wireless projects in Canada, while Wong (2008) describes the emergence of a co-operative wireless provider, and Middleton and Crow (2008) compare a number of municipal Wi-Fi networks throughout the Eastern provinces of Canada.

These differences in media notwithstanding, studies with particular relevance to my own project include Sandvig's (2012) exploration of an autonomously managed, solar-powered regional wireless broadband network in the Mesa Grande reservation, given its concern with the 'felt impacts' of 'going from Internet non-users to daily users' (p. 184) in an Indigenous North American context; Jensen's (2021) '*Fragmented Digital Connectivity and Security at Sea*', a highly-idiosyncratic analysis of connectivity aboard sea-faring container ships which provides a glimpse into the ways in which 'uneven and often unreliable digital connections shape the patterns and routines of everyday life' (p. 1); and Hobbis and Hobbis' (2022) account of the 'brokers' involved in the construction of broadband infrastructures in the Solomon Islands, which highlights 'how nonhuman and human infrastructural assemblages, and the brokers that operate as assemblers within them, give rise to localised Internets' (p. 851).

Anticipated impacts

An altogether more speculative and phenomenologically-inclined strand to this genre has sought to examine '…how the Internet in general, and the switch to superfast broadband specifically' is perceived by rural end users (Ashmore et al., 2015). Among the first studies of this sort was Hampton and Wellman's (1999) mixed-methods analysis of Canada's 'First Interactive New Home Community', in which all homes were equipped 'with a series of

advanced communication technologies supplied across a high-bandwidth local network', and in which the authors sought to understand 'how having no-cost, very high speed access to the Internet affects the kinds of interpersonal relations that people have with friends, relatives, and neighbours' (p. 475 – 476). Explicitly framed as an attempt to 'peek into the future', to a time when '…low-cost, high-bandwidth systems will […] proliferate' (Hampton and Wellman, 1999, p. 480), a similar approach can be found in studies such as Hynes and Kelly (2018), in which the authors compared the perspectives of rural residents in Canada and Ireland, specifically probing the *anticipated impacts* of overhauled broadband systems. Studies of this sort have tended to be undertaken in the wake of acute moments of infrastructural flux; in their study of local perceptions toward internet connectivity in a remote corner of Chile, for example, Correa and Pavez (2016) collected data in the period immediately following the provisioning of infrastructures.

While the bulk of these studies have focused on the positive, hopeful, and otherwise aspirational dimensions to rural broadband provisioning, a small number have explored the inverse: that is, how local sentiments toward newly-initiated broadband infrastructures may sour, or how the prospect of broadband development can at-times be met with resistance and dissent. Starosielski (2015), for example, details how the laying of a backhaul fibre cable was resisted by rural Hawaiians due its perceived connectedness to broader colonial legacies of control and surveillance, while, in a study of rural end-users in rural California, Burrell (2016) describes encountering 'scepticism', proposing that this may derive from the unique sociocultural context, with many residents being rigorously committed to 'environmentalism and […] preserving the natural beauty and ecological integrity of the area' and harbouring 'anti-corporate or more generally anti-establishment views […] not unusual in Western rural and historically 'frontier' regions of the country' (p. 39).

Critical approaches

A sprawling conceptual landscape deserving of an entirely separate literature review, critical approaches to the study of rural broadband development are characterised by a shared concern over the embedding of power relations, with respect both to the discourses and materialities of infrastructure. Proceeding from the view that 'technology is neither neutral nor deterministic' (Zanolli et al., 2018, p. 42), and frequently around a conceptualisation of infrastructure as 'material, rough, and colonial' (Estrada and Lehuedé, 2022, p. 6) critical approaches to broadband see infrastructure as a terrain of struggle. In the work of critical technology scholars such as Alexander and Pal (1998), for example, issues of power are at the core of technological change, the allocation of resources being determined only through agonistic tussle (Mouffe, 2013). Reflecting their broader concern with the critical interpretation of power and control in the distribution of resources, numerous studies in this vein have drawn from the tradition of the critical political economy of communication (e.g. McChesney 1995; Winseck and Young Jin 2011; Pickard 2014), asserting that differential access to infrastructure 'is not simply a 'natural' consequence' (Paisley and Richardson, 1998, p. 2) of geography, technology, class, or any number of other discrete categories so much as a reflection of political and ideological imperatives (ibid).

A number of the more innovative methodological approaches to the study of broadband development can be found within studies of this genre. Ortiz and Tapia (2008), for example, take a critical discourse approach to analyse policy and public discourse around municipal broadband development, focusing on 'the way in which public officials discuss and document the goals of…municipal-community [broadband] projects' (p. 2) in order to 'examine the relationship between the claims-making activities around such interventions […] and the perceptions of the actual impact of those initiatives on this divide' (p. 1) through a broadly digital ethnographic approach. Theoretically, critical approaches to the study of rural broadband infrastructures have been phrased in the diverse idioms of Marxism, feminism,

and post/de-colonialism, among many others, and form part of broader, cross-disciplinary conversations concerning the notions of data colonialism, digital sovereignty, and 'the decolonial turn in data and technology research' more generally (Couldry and Mejias, 2023, p. 786)[18]. While each such framework brings its own set of emphases and conventions, all are linked by a conceptualisation of society as an evolving social plane, 'with some at the centre and some at the margin' (Yu, 2011, p. 660). For the purposes of concision, I restrict the remainder of my discussion of this genre to scholarship informed by the emergent literatures of *critical rural studies* (Ali, 2018, 2021) and *critical Indigenous studies* (Lewis, 2016; Duarte, 2017)[19].

Critical rural and Indigenous perspectives

Often sharply critical of market-driven approaches to rural broadband deployment, an emergent literature of critical rural studies has argued for an expanded conception of 'the rural' writ large, and, drawing from the work of critical geographers such as Harvey (1990) and Massey (1994, 1999, 2005), has sought to establish how the rural is constituted by multiple shifting, tangled, and dynamic networks, of which infrastructures are a part. Combating what Ali (2018) describes as 'urbanormativity' (p. 6) and characterising rural broadband policy-making as having historically been driven by the 'politics of neglect' (Raboy and Taras, 2004), critical rural scholars have described how market-led approaches have historically failed rural end-users (Ashmore et al., 2017), forcing them to take matters into their own hands, as it were.

In a similar vein, scholars working at the intersections of Indigenous studies and critical infrastructure studies have characterised the community development of broadband

[18] It should be noted, however, that terms like 'colonialism' can have very different connotations across disciplinary lines. Where Couldry and Mejias's (2023) 'data colonialism thesis' describes a 'data landgrab' (p. 787), scholars such as Tuck and Yang (2012) have argued vociferously that 'decolonization is not a metaphor' (p. 2).

[19] Recognising that 'Indigenous' is a multi-scalar term which can be read in numerous ways, my own use of the term is in line with what Clifford (2001) might call 'its stronger, autochthonous, First Nations, version' (p. 483) and is used here principally with reference to the Indigenous peoples of present-day North America.

infrastructures as part of a strategy of 'digital demarginalization' (Budka, 2015, p. 1) being pursued by Indigenous peoples worldwide. Situating the common experience of infrastructural under-provisioning vis-à-vis non-Indigenous communities within a *longue durée* of 'infrastructural violence', scholars such as Sandvig (2012) note how many Indigenous communities find themselves 'offline by design', their reservation[20] lands having been conscientiously 'selected in order to isolate Native populations' (p. 172). To that end, authors such as Schultz and Rainie (2014) and Mignone and Henley (2009) frame community-led broadband initiatives as both symbolic and material artefacts of digital self-determination (McMahon, 2011). Articulating broadband infrastructures as both facilitative of, and themselves a *form* of, sovereign action, Indigenous scholars such as Duarte (2017, p. 101) have similarly expanded the discourse around digital self determination by arguing that,

> 'Tribal leaders exercise sovereignty when they assert rights-of-way for constructing towers and laying cables on or near tribal lands. They assert sovereignty when they demand […] a tribal priority for licensing spectrum. They assert sovereignty when they tax providers of internet services to peoples on tribal lands. They assert sovereignty when they remind federal authorities to respect tribal broadband efforts as a matter of self-determination.'

For the purposes of this dissertation, Duarte's (2017) '*Network Sovereignty: Building the Internet across Indian Country'* has proven a particularly important point of reference, given its commitment to examining 'the tangible material aspects of the internet', including 'fibre-optic cables, server rooms, towers, wide area networks, and Internet service providers – and how these come to be on Native land' (p. 52). Other ethnographically-informed studies of Indigenous community-led broadband development carrying particular import for my own study include Cullen (2005), who describes the connectedness of wireless technologies to the

[20] Note that 'reservation' is the term in use in the United States, while in Canada the term in use is 'reserve'.

self-governance efforts of the Navajo Nation; McMahon (2014), offering a social history of cooperatively managed satellite network infrastructure; and O'Donnell et al. (2011), who detail the development of community-owned wireless assets in Fort Severn First Nation.

Linking both critical rural and critical Indigenous approaches are their firmly materialist stances: McMahon (2011), for example, writes that, '[i]deally, every First Nations community in Canada would have locally owned and/or managed broadband infrastructure and related technologies' (p. 11), and in a later article argues that broadly-defined 'control' forms an 'important [component] of self-determination' (McMahon, 2014, p. 17). At the furthest end of this spectrum are those who assert that only 'community control […] can guarantee that the power relations linked to ICT will not derail it to the detriment of community members and organizations' (Mignone and Henley, 2009, p. 140).

Research statement

While each of the above genres of scholarship have offered a qualitatively distinct outlook on the contexts and consequences of rural broadband development, a number of critiques might also be levelled on the basis of both a 'gap spotting' and 'problematization' based approach (Alvesson and Sandberg, 2011). First, existing research has been marked by a certain degree of technological-determinism, such that broadly-defined 'change' is causally (and casually) presupposed as a natural consequence of the mere provisioning of the physical infrastructures of broadband. In studies such as Selouani and Hamam (2007), for example, the authors explicitly undertake to measure 'evidence of social transformations *induced* by high-speed, always on, Internet connectivity' (p. 1; emphasis added). From an infrastructural perspective, this is at best an oversimplification, as '[c]hanging technology will always be only one factor amongst many others: political, economic, cultural, and so on' (Mackenzie and Wajcman, 1999, p. 3).

In addition, much of the existing literature contains a certain empirical fuzziness as to the precise systems under study; lacking more precise operationalisation, the effective inter-changeability of terms such as ‘high speed broadband’, ‘superfast internet’, ‘ultrafast internet’, and ‘next generation technologies’ can obscure just as much as they reveal. Moreover, as I noted in an earlier section of this chapter, in those cases where the systems under study *have* been more effectively described, the focus has usually been on first generation fixed broadband and/or wireless infrastructures (e.g. Powell and Shade, 2006; Middleton and Crow, 2008; Wong, 2008). While certain productive resonances may still be had, the fundamental differences that exist between such first generation fixed broadband and/or wireless infrastructures and more contemporary fibre technologies can limit the import of studies such as Pejovic et al. (2012), for example, whose fascinating study of Internet use in rural sub-Saharan Africa was premised on a network providing download speeds of 128 Kbps and upload speeds of 64 KBps, necessarily implying a context of limited access.

In a more general sense, embodied ethnographic engagements with(in) contexts of rural broadband development are few and far between – and as Peronard and Just (2011) note in a study of end-user motivation in rural Denmark, much of what does exist has focused on ‘the supply side of broadband roll-out, while the demand side has been somewhat neglected’ (p. 691). That is to say, in those instances where rural broadband has been the focus of direct ethnographic study, it has tended to emphasise the perspectives of parties external to the community itself. As a result, as Peronard and Just (2011) conclude, the enduring ‘generalised and instrumental perspective on demand-side issues, with its lack of emphasis on people’s needs and wants, provides little knowledge of the motivations behind broadband adoption […] more attention should be paid to the use and significance of broadband diffusion, particularly in rural areas’ (p. 692).

Likewise, there is a certain irony to the fact that, despite confident assertions from policymakers and academics alike that '[f]ibre… is as central to the next phase of human existence as electricity was a hundred years ago' (Crawford, 2020, p. 9), few examples exist of these propositions being either tested or attested to, in an ethnographic sense. Indeed, despite what would seem its clear potential as an object of study (Chun, 2006), ethnographic engagements with the specific media of *fibre* are exceptionally scant, with Starosielski's (2011, 2012, 2015) investigations of the undersea fibre networks of Fiji, Guam, and Hawaii being the notable exceptions to what has otherwise been a tendency to treat fibre 'as a vector rather than as a material infrastructure' (Starosielski, 2015, p. 229).

Recognising the need for more ethnographically- and critically-informed scholarship concerning the specific media of fibre, as well as the need to erode the conceptual insularity of fibre as a strictly-technical object, in this dissertation I aim to extend the affective vocabularies (Berger, 1972) and aesthetic terminologies (Ngai, 2015) of fibre as an incremental step to making sense of the 'mess and mythology' governing the contemporary emergence of fibre-based networks in rural broadband markets[21]. To that end, this dissertation is guided by two core research questions, the conceptual and empirical emphases of which are outlined in greater detail in the sections which follow.

Research questions

Taking inspiration from theories of infrastructure in which 'form is loosened from technical function' (Larkin, 2013, p. 335), including cultural anthropological and critical infrastructural scholarship broadly committed to a view of infrastructures as 'more-than-material' (Barry, 2015, p. 1; Star, 1999; Edwards, 2003; Parks, 2009; Bowker et al., 2010; Larkin, 2013; Pepperell and Law, 2015; Starosielski, 2015; Appel et al., 2018), the first of

[21] Where 'mess' constitutes one of the forms by which infrastructures are imagined into being. As Dourish and Bell (2011) write: '[w]hen we talk of the mess, we want to suggest that the practice of any technology in the word is never quite as simple, straightforward , or idealized as it is imagined to be. For any of the infrastructures of daily life…the mess is never far away' (p. 4).

two research questions guiding this dissertation asks, '*What promises are made by 'the fibre project', and how do these correspond with the lived realities of its emergence?*'.

Taking *promises* as emerging between users' perceptions, attitudes, and expectations; between the materiality and functionality of technologies; and between the intentions and perceptions of designers (Harvey and Knox, 2012; Anand et al., 2018), the centring of the analytic of promise opens space for a consideration of both the technical and nontechnical dimensions of 'the fibre project' (Larkin, 2018, p. 175). As Larkin (2018) writes,

> 'a promise can refer to a vow, or a commitment, but its other meaning refers to the coming to be of a future state of affairs, the idea we have that someone or something holds promise. Its referent is not to the here and now of things but to an uncertain future that infrastructure is to bring about and institutes a temporal deferral that refuses to deliver something in the present' (p. 181).

Describing such promises as constructed and performative discourses involving 'both expectation and desire, frustration and absence' (Larkin, 2018, p. 181), and consisting of material-discursive practices manifest in its semiotic, aesthetic, and discursive forms[22], this research question thereby looks to the ways in which 'the fibre project' has come to both articulate, and itself be seen as an articulation *of,* a diverse set of ethical claims and affective investments (von Schnitzler, 2013). Put differently, through this question, I consider how, rather than remaining as symbolic assertions, certain promises have come to be hard-wired, with varying degrees of success, into the underlying materialities of 'the fibre project'. Recognising that too great a focus on the promise of infrastructure has at-times led critics to charge that such frameworks err on the side of naïve optimism (Menon, 2019, p. 288), I extend the question of promise to that of its failures, theorising the interstices between

[22] Where material-discursive practices 'are not connections of material and discourse, but inseparable, entangled, ongoing phenomena' (Barad, 2007, p. 903), and where, following Edwards (1996), I take discourse to be a self elaborating 'heterogeneous ensemble' combining 'techniques, technologies, language, and practices elaborated at multiple sites' (p. 41).

promissory anticipations and the lived realities of emergence as sites of *friction* (Tsing, 2004).

Building off of this, the second research question asks, '*What are the infrastructural imaginaries of fibre on Haida Gwaii, and how have these changed over time?'.* Adopting Parks' (2009, 2015) analytic of *infrastructural imaginaries* – that is, 'ways of thinking about *what* infrastructures are, *where* they are located, *who* controls them, and *what* they do' (Parks, 2015, p. 355, emphases in original) – this research question seeks to establish how certain heuristics, mythologies, and other forms of narrative encounter have been used to render the infrastructural complexities of fibre in locally-legible terms, as well as how the embodied emergence of 'the fibre project' has influenced its imaginative rendering over time. Seeing such imaginaries as a site of interplay 'between material and perceptual worlds, where concepts cohere, forces pull and attract, and things, discourses, subjects, and objects are framed, contested, and brought into being' (Parks, 2015, p. 357), this question is underpinned by notions of *socio-technical imaginaries* (Jasanoff and Kim, 2015)[23], and points toward a consideration of the embeddedness of imaginaries within a diversity of sites, objects, and discourses comprising the broader *infrastructural space of Haida Gwaii* (as I elaborate upon in the opening sections to the next chapter).

Thus, where existing accounts of fibre have typically centred upon its *effects*, broadly conceived, the research questions guiding this dissertation seek a correspondent account of its *affects*, and serve to reorient 'the fibre project' from a series of coincidentally interlinked cables, trenches, and switchboards into an 'excessive fantastic object [generating] desire and awe in autonomy of its technical function' (Larkin, 2013, p. 333).

[23] Notions of the 'infrastructural imaginary' are themselves intellectually indebted to the far broader lineage of scholarship concerning 'the imaginary', and are often used in a context where, several decades ago, 'culture' or 'cultural beliefs' would have been used instead. Strauss (2006) provides a particularly thorough deconstruction of the use of the term. Among the theorists to have proposed alternative characterisations of 'the imaginary' are Castoriadis (1975), Sartre (1940), Anderson (1983), Casey (1971), Marcus (1998), and others. For my purposes, Taylor's (2002) conceptualisation of the 'social imaginary' bears calling out for its description of 'the way ordinary people 'imagine' their social surroundings…not expressed in theoretical terms, but carried in images, stories, and legends' (p. 1).

Conceptual framework

In responding to the above research questions, I take a broadly *infrastructural* approach (Star and Ruhleder, 1994; Cantillon and Stevenson, 2023). Varied and eclectic in their emphases, infrastructural approaches can prove useful as a means to undercut universalising presumptions about socio-technical change, and offer theoretical insight into the processes by which they come to matter by treating 'the material and cultural as hyphenated, each closely implicated in, and part of, the other' (Amin, 2014, p. 137).

To that end, I conceive of 'the fibre project' as at once a technological and imaginative artefact – or *social mnemonic*, as Knox (2017) describes – and, additionally, as a *sociomaterial assemblage* (Star, 1999) unfolding through an open-ended, labile process of *infrastructuring* (Bowker and Star, 1999; Smedberg, 2019). Throughout, I draw on concepts of *affective infrastructure* (Ortner, 2005; Parks and Starosielski, 2015), which call for 'attention to the embodied, affective relationship that people experience with material forms [and] the ways in which things carry latent stories of their entangled pasts' (Knox, 2017, p. 368), the literature around which has been used to consider the myriad moods, dispositions, and sensations generated in subjective encounters with infrastructural sites and/or processes (Latour, 1993; Redfield, 2000; Graham and Marvin, 2001; Barker, 2005; Harvey and Knox, 2012; Larkin, 2013; Anand et al., 2018). Taken together, this framework allows for a consideration of 'the fibre project' not only in terms of its physical forms, but also in terms of its metonymic character, including the stories told of its development, the practices afforded by its activation, and the broader relational terrain on which it rests.

Chapter 3 – Methods

Introduction

In this chapter, I outline the epistemological foundations and practical considerations that have informed my overall research strategy, from project design through to data collection and analysis, and describe both my broadly ethnographic *methodology* and the specific *methods* comprising it [24]. Beginning with an overview of ethnographic research paradigms, I move on to describe each of my constituent methods of data collection – including participant observation, interviews, surveys, and photographic documentation – through a series of brief episodic fragments highlighting the process and particulars of each, while giving pause to reflect on the unique ethical and positional circumstances entailed. In the closing sections to the chapter, I outline the analytic procedures and logics that have guided the process of analysis and, subsequently, the writing of the ethnographic account, and chart the process of moving 'from notes to narrative' (Ghodsee, 2016). The chapter concludes with a series of reflexive commentaries.

Methodology

Ethnography

The questions and context at the heart of this project – questions of promise, becoming, and materiality, set against a backdrop of infrastructural flux – necessitate an ethnographic approach. Ethnography is a complex of epistemological framings, methodological techniques, and writing practices concerned with the study of global processes, as experienced locally. Broadly qualitative in outlook, ethnographic approaches recognise that symbolic systems are not merely additive to or reflective of human existence, but constitutive of it (Geertz, 1988). From a contemporary ethnographic standpoint, all spaces are said to be equally cultured:

[24] Where *methodology* refers to the overarching principles that direct a research project, and *methods* refers to the distinct tools and techniques used in data collection or analysis.

whether a subsea cable landing site, a forest, or a digital messaging platform, 'culture' is seen to embed within everyday spaces and objects. Infrastructures can thereby serve as productive sites of ethnographic inquiry. Well-suited to situations of fluidity (Brewer, 2000; Boellstorff, 2006, p. 32) and the processes of meaning-making that surround them, ethnographic approaches to infrastructure, as Star (1999) has pointed out, have tended to focus on relational settings in which otherwise invisible infrastructures become visible – not necessarily physical infrastructures *per se*, but the practices, materials, and settings of infrastructur*ing* (Bowker and Star, 1999; Smedberg, 2019).

Following Gusterson (1997, p. 116) – who has argued for 'polymorphous engagements', involving an eclectic approach to data collection, from a disparate array of sources and sites – the overall research approach undertaken in the course of this study may be described as a mixed-methods, multi-sited ethnography, combining participant observation, interviews, surveys, archival analysis, and photographic documentation. Owing principally to the still-fickle nature of the islands' broadband infrastructures at the outset of my fieldwork, I relied primarily on embodied methods of data collection – that is, in-person, on-site, and face-to-face – as the practical limitations to a more explicitly *digital ethnographic* approach (Boellstorff, 2006) were made plain in the course of a conversation with a trusted source on-island prior to my departure: 'A study about the Internet, yes… a study *through* the Internet, no'[25]. Data collection and fieldwork was carried out over a 20-month period between September, 2019 and May, 2021[26].

Field site

Over the course of several decades of reflection, ethnographers working across a range of disciplinary terrains have called into question the traditional conception of the field site as a

[25] GR. Personal communication, Skype, 2018.
[26] Note however that this represents only my time on-island; a number of key supplemental archival materials were added after the fact, while my membership on the board of directors of GwaiiTel extended from February 2020 to December 2023.

bounded space containing a 'whole culture' (Gupta and Ferguson, 1997), arguing that the mapping of social research onto spatial terrain requires not only a spatial but also a material and imaginary rendering of the field site in question (Wakeford, 1999). This is especially true of infrastructural ethnographies, because, as Larkin (2013) writes, 'discussing an infrastructure is a categorical act […] a moment of tearing into those heterogeneous networks to define which aspect of which network is to be discussed and which parts will be ignored' (p. 330).

Accordingly, while Haida Gwaii may serve as the geographic locus to the study, I do not take the geographic boundedness of the islands as an *a priori* boundary marker, and instead engage in a boundary drawing practice (Barad, 2007, p. 135), in order to describe 'the fibre project' within a broader *infrastructural space of Haida Gwaii,* which together comprise 'the stage on which the social processes under study take place' (Burrell, 2009, p. 182). Drawing upon the network approach to multi-sited ethnography (Appadurai, 1990; Bhabha, 1994; Marcus, 1998), the aptness to such an approach stems both from the objective qualities of 'the fibre project' itself – designed from the outset as an 'all islands infrastructure' – and from the theoretical and conceptual grounding of the broader study within literatures describing both infrastructure and 'culture' itself as being constituted by intersection and flow (Hannerz, 1992; Castells, 1996, 2005; Clifford, 2013).

In practical terms, Marcus (1998, p. 79) has suggested several possible models by way of which a network approach may be used to lend conceptual and theoretical coherence to a research project; my own approach might be said to tack most closely to his imperatives both to 'follow the object' and to 'follow the metaphor'. To that end, and in line with a conceptualisation of the field as a heterogeneous network incorporating 'physical, virtual, and imagined spaces' (Burrell, 2009, p. 181), I describe the *infrastructural space of Haida Gwaii* as one composed of fixed and moving points – including spaces, people, and objects

(Hannerz, 1992) – occupied by human and nonhuman *constituents* (Burrell, 2009) linked through communities of both locality and practice[27].



Fig. 5. Outer deck of the *MV Northern Adventure*.

Methods

With ethnographic methods, 'planning, going, thinking, interpreting, and writing are not separate means of getting to the product' (Markham, 2003, p. 1); the lived experiences of data collection and analysis are an important facet to the knowledge they inform. In the sections which follow, I outline my constituent methods of data collection through a series of episodic fragments, each centring upon an instance of particular methodological, epistemological, or ethical significance. Told in this manner, my intention is to simultaneously outline my

[27] It is worth noting that while such a network approach may be at odds with conceptualisations of the 'field' present in much of the existing anthropological literature broadly relating to Haida Gwaii, it is more-or-less consistent with the contemporary self-descriptions of Haida Gwaii-based communities and organisations themselves. In its 2012 annual report, for example, the Gwaii Trust describes the communities of Haida Gwaii as being 'both unique and similar', given their shared experience of 'island life', including economic and infrastructural barriers due to the islands' geographic isolation. See: Gwaii Trust, 2012, p. 15 – 20.

research methodologies *in situ*, while providing the reader with a degree of introduction to the infrastructural space of Haida Gwaii. In the first of these, I outline the process by which the research project took shape in the planning and pre-fieldwork stages.

Making myself useful

In the fall of 2019, I reached out to Jaahljuu *Graham Richard*, a friend I had made on one of my first trips to the islands, and whose position within the CHN included oversight of research partnerships. Speaking over the phone – he in Hlgaagilda *Skidegate* , me in Oxford – I did my best to articulate my proposal as he walked me through the CHN's Research Permit Application process, a requirement for any would-be researcher wishing to undertake research on Haida Gwaii. Nearing the end of the conversation, he posed a simple question: 'The real question is…what is this going to give to the community? What will you do to *make yourself useful*?'

It was a question reiterated in the Research Permit Application form he sent me some time later, which included questions like 'How do you ensure reciprocity and balance in your research and process?' and 'How will your project benefit Haida Gwaii communities in the short and long-term?'. This was to be expected; as Kotaska (2019) notes, unsolicited research projects involving Indigenous peoples are increasingly assessed based on benefits to the community and longer-term interests (p. 30). On Haida Gwaii, a history of opportunistic, asymmetric research encounters has given rise to a particularly stringent set of local research protocols. As Weiss (2018) writes, it has long been the case that '[r]esearchers come and go, taking advantage of Haida hospitality and generosity, but rarely do they make concrete contributions to the community' (p. 22). I sat with these questions for some time. Evidently, the vaguely-defined 'contributions to knowledge' I had initially outlined as key outcomes of my research weren't going to cut it. 'A book doesn't count. We've had enough books written about us', Graham would later tell me. Whatever else it might contribute, it was made

abundantly clear that my research would need to take the form of active engagement (e.g. Freiere, 1970) and be pursued in the spirit of reciprocity (Tuhiwai-Smith, 1999; Kimmerer, 2013; Simpson, 2017).

Seeking ways to 'make myself useful', I compiled a list of my skillsets – grant writing, media production, proofreading, and so on – and then did my best to comprehensively 'map' any and all organizations on-island to which I thought I might be able to contribute in some capacity or another. It soon became clear that youth-oriented creative media projects were in high-demand; 'Anything that goes beep seems to fill up pretty quickly', as one informant told me.

Eventually, I was put in touch with Luptaagaa *Robert Vogstad,* a Daajing Giids-based carver and First Nations resource worker at GidG̲alang K̲uuyas Naay Secondary School (GKNS). Over the course of several months, we traded emails and phone calls, gradually solidifying plans for what was to be a six-week workshop (free of charge and open to any islands residents aged 16 or over) culminating in the creation of a number of fully-functional, camera-mounted drones constructed in Haida formline motif. Envisioned it as a sort of 'socially-embedded design' project (Stokes et al., 2014, p. 1) a subsequent funding application explained that, '[t]he workshop will conclude with the mechanical structure being overlaid with a distinctly Haida 'exoskeleton' composed of yellow cedar and polyurethane composite'. Unfortunately, these workshops never came to pass. Despite our best efforts, the emergence of the COVID-19 pandemic forced the workshops' cancellation less than a week before they were due to begin in late March 2020.

Following further conversation and adjustment to my research proposal, in the spring of 2019, I submitted my Research Permit Application to the CHN. As I waited to hear the outcome, I did what I could to prepare for fieldwork in other ways. At Oxford, I enrolled in courses such as *Ethnographic Portraiture* and *Advanced Qualitative Methods,* submitted my

divisional ethics checklist and risk assessment forms, and completed a number of short courses in research ethics. Alongside this, I enrolled in a number of courses at the UCL Documentary Institute, sensing that the emphasis on intensive, participatory media-making would help prepare me for the workshops which lay ahead. I received approval from the CHN (and later, the Skidegate Band Council) in March 2019, and approval from Oxford's Division of Social Sciences a few weeks later. A copy of the email from the CHN approving my Research Permit Application can be found in Appendix A.

Bags packed, I took out travel insurance, flew to Vancouver, bought a used car, and set off on a 1,503 km northbound journey to Prince Rupert, from where I would sail westward to Hlg̲aagilda *Skidegate*.

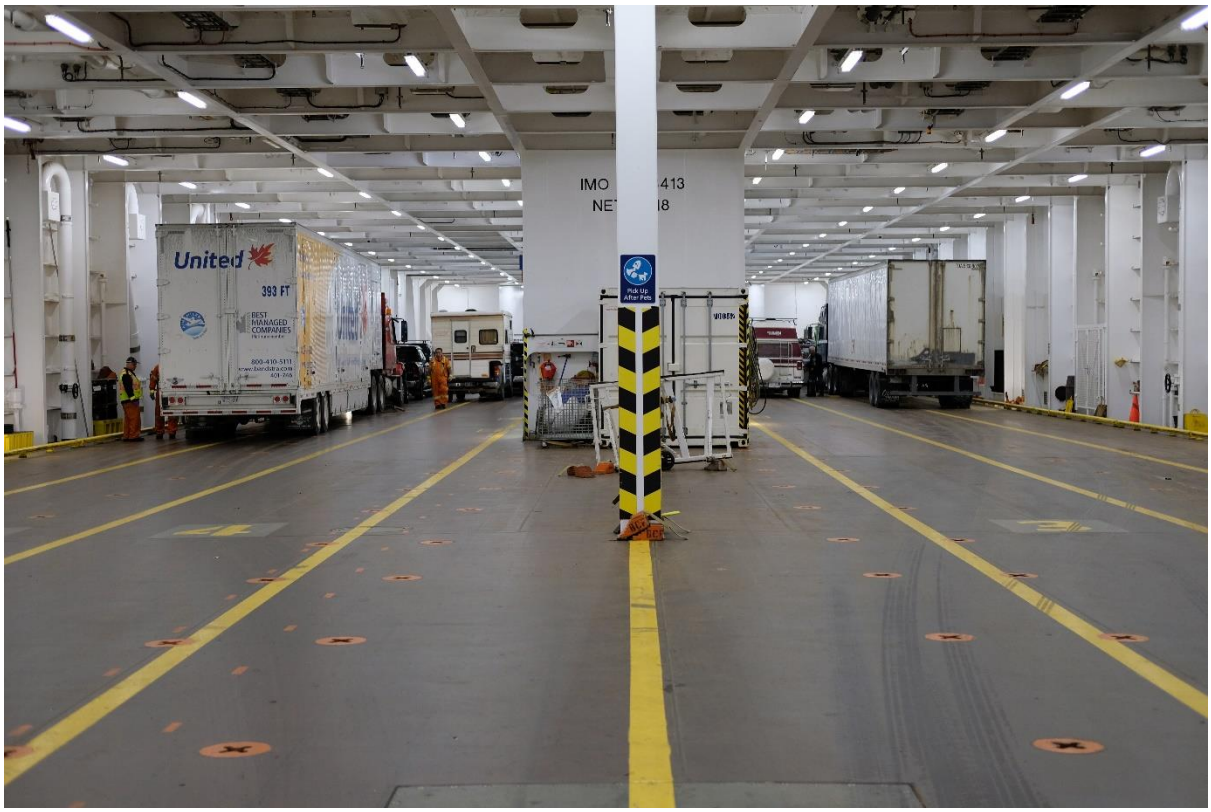


Fig. 6. Vehicle loading bay of the *MV Northern Adventure.*

Tluu GuuG̲aaw Hll Gaayinda in dii ga

Xaayda kil is not a language one just 'picks up', and no matter how many times I try, I can hardly tell a K'-pinch from a G̲-underline. But here I was, in line to board, eight years after I

had first visited Haida Gwaii. ‘Never too late to brush up on my common phrases and basic vocabulary’, I thought to myself. Handing over the creased white receipt – *Lane 01, Booking R-2200, October 8 2019, REF#B192268118, $180.60* – I drove forward onto the loading ramp. Tluu GuuGaaw Hll Gaayinda in dii ga: ‘*I am going on a boat trip*’.

Leaving the car in the vehicle bay, I walked to the outer deck, took a deep breath, and gazed out at the sea. The boat began to push off, ambling counter-clockwise from shore. The dock came slowly into view, port side, where an orange windsock flapped limply atop a barnacled beam pole in what little breeze there was. That uncanny smell – cedar, diesel, seaweed, bracken – hung in the mist, and for an instant I found myself in one of those Proustian olfactory flashbacks.

Then the rain began. To be expected, I suppose, in a region which sees just shy of three metres of rainfall every year. I made my way inside. Opening the heavy metal door, I stepped forward, narrowly avoiding a collision with a uniformed woman hurrying past with an armful of sickbags. ‘It’s gonna be a rough one, folks’, she announced, calmly and confidently, to no one in particular.

Having prepared for this eventuality, all those within earshot now calmly reached for their purses and pockets, from whose depths emerged pill bottles brimming with anti-nausea medications. Realizing she had left her supply in the vehicle bay, a grey-haired woman turned to the young couple near her and pleaded: ‘How about one ondansetron for two Gravols? Three? They’re the ginger ones, easier on the stomach.’ Soon enough, the waves had reached two metres, then three, then four. As the boat began to rock, thundering catatonically into the seabed as if the captain were searching for a dropped keepsake just below the water’s surface, I did all that I could to keep my composure. Bracing myself against a wall, the eight-hour journey seemed to stretch on for eternity until, mercifully, the boat slowed for approach at K’aant’a Xyah *Skidegate Landing.*

As the loading ramp lowered, I pulled out a black Moleskine notebook, cracked the spine, and quickly scrawled what would be the first of many memos, notes-to-self, and observations written over the next 20 months: '*5:58am. Arrived by ferry. Hated every minute. Travel to Haida Gwaii is not something to be taken lightly*.'

Spot the outsider

As newly-arrived fieldworkers tend to do, I spent the first few weeks of my stay on Haida Gwaii idly stumbling around. As I did so, I took fieldnotes. Preferring to either write these by hand or to dictate them as voice-notes, I set aside several nights a week for their transcription, keeping them in a single Word file on my Desktop. Some entries were inward-looking, some squarely observational, and some hardly seemed to start at all: '*Mushroom foraging in morning. GPS. Landslide*'[28], read one. Only a handful could truthfully be said to have contained the 'core elements' to a well-written fieldnote (Chiseri-Strater and Sunstein, 2011).

I quickly reached out to everyone I knew on-island (which numbered around fifteen). In these early days, it seemed unwise to be overly-frugal with my time, and putting myself out there seemed liked the right thing to do. Within a few weeks, I found myself with invitations to all manner of things, few of which seemed to have anything to do with my research project *per se*: a village council meeting, a bake sale, a beach party, a potluck. In the weeks that followed, I reached for every opening that presented itself, hoping that in their own little ways, each outing might open my eyes to something else.

One evening, Linnaea, with whom I was living at the time, asked if I had any plans the following weekend. The Annual Clan Tournament was due to start in Hlgaagilda *Skidegate*, and the Haida Gwaii Radio Society – a newly-launched, locally-hosted internet radio station for which she was the lead coordinator – planned to live-stream coverage through their website. Basketball, after all, is just about the only thing more Haida than *k'aaw*. 'For the big

[28] Fieldnotes. 26 October, 2019.

tournaments, we get a lot of people living off-island tuning in', she explained. 'Everyone in the village will be there'. There would also be fried bannock and deer stew, she reckoned. I needed little further convincing.

A few days later, I visited the local print shop, where I printed several hundred copies of my A4 recruitment poster, surveys, informational leaflets, and various other materials. With the still-warm stack tucked safely into my backpack, I walked to the southern boundary of Daajing Giids – just past the turnoff to Rennell Sound, where the pavement runs out – and walked up the laneway of a cedar-shingled, single-story house. I knocked. No one was in. Opening the letterbox, I folded a leaflet, dropped it in, and carried on my way. Such was my daily routine for the next few weeks, as I tacked up posters, delivered flyers, and hung leaflets wherever I could: to the rear wall of a rain shelter, inside the door of the laundromat, in the dust jackets of weathered books at the roadside lending library. An example recruitment leaflet can be found in Appendix B.

I knew full well that the majority of these leaflets were likely destined for the burn pile. Still, my intention was to carry out a systematic, randomized sampling strategy by visiting every second house from the south end of Daajing Giids to the north end of Hl̲gaagilda *Skidegate*. Despite being reasonably certain that the resultant data would only ever be used in an exploratory and descriptive capacity, I reasoned that in adopting such a sampling strategy I would at the very least be leaving the door open to a range of more sophisticated, though as-yet-unspecified, *post hoc* testing further down the line. Weeks later, standing at the entrance to a kilometre-long driveway guarded by a Karelian bear dog and encircled by bullet-ridden 'No Trespassing' signs, I found myself reconsidering the feasibility of such an approach. A convenience sample would suffice.

Monotonous as it sometimes felt, I tried to remind myself that the simple act of walking was a productive intervention in its own right. Even if no one called, at least I was

establishing my visibility in the field. Day by day and door by door I felt a burgeoning sense of familiarity with my surroundings, and, as time went on, a degree of rapport with those I met along the way.



Fig. 7. A survey recruitment poster tacked inside a lending library in Daajing Giids.

Circling, scribbling, surveying

By late autumn, it seemed as though my recruitment materials, now in nearly every rain shelter and mailbox south of K'aant'a Xyah *Skidegate Landing,* were having the intended effect: '*Hey there, got your poster, interested in taking your Internet survey*', began one text message I received in response. I followed up as quickly as I could, arranging timeslots throughout the week in order to complete the surveys, in-person, with a growing list of people.

Pearce (2002) argues that using survey methods can 'lead to improved theories, suggest alternative measures, and reveal sources of error in the methods being used' (p. 104).

Nevertheless, surveys are a divisive method amongst ethnographers. After all, ethnographic work aims to escape the concepts, categories, hierarchies, and presumed relations that structure quantitative research methods and formal surveys, and many have charged that the standardized, inherently proscriptive nature of survey-based research is anathema to the basic aims of a method which aims toward nuance and embodiment of meaning (Pearce, 2002; Hine, 2000, 2008, 2015). I confess to sympathizing with that assessment, and should state outright that their inclusion was by no means motivated by a desire to assume the role of detached observer or to search for quantifiable 'trends'.

Rather, in the context of this study, the surveys were intended firstly as a means of providing a holistic sense of broadband adoption and use – mirroring the approach taken by Selouani and Hamam (2007) in their study of the social impacts of broadband availability in rural Acadia – and secondarily, as a supplement to the interviews I would later go on to conduct, as Pearce (2002) notes their utility as a means of identifying anomalous cases and aid in 'the selection of ethnographic informants' (p. 103).

The survey measure was based largely on the Oxford Internet Survey (OxIS), a broad, census-length survey which acts as an 'authoritative source of information about Internet access, use and attitudes - and the difference this makes for everyday life' (Dutton and Blank, 2013, p. 3). As a model measure, OxIS had a number of appealing qualities: not only was it among the most robust and comprehensive surveys in regular use by social scientists of the Internet, but it came in three distinct but mutually-comparable versions: one for Internet *users*, one for *non-users*, and one for *ex-users*. In the context of Haida Gwaii, a region which has long held appeal for a critical mass of counter-culturalist yaatz xaadee *non-Haida* in search of escape from the trappings of modernity, I suspected the latter two versions might at some point come in handy. An abbreviated copy of the survey can be found in Appendix C.

Altogether, over the course of my fieldwork I completed surveys with 162 individuals, of which 142 were broadly classified as 'users', 11 as 'non-users', and 9 as 'ex-users'. At just over ten pages, the survey took an average of 45 minutes to complete, and consisted of sub-sections ranging from basic attitudes toward local service provision (e.g. 'Overall, I am happy with my Internet Service Provider') to more abstract probes as to the conceptual basis of the understanding of internet infrastructures (Flichy, 2007; Mory, 2020) (e.g. 'All communities should have equal access to high-speed Internet'), arranged on a 5-point Likert scale, from *Strongly Agree* to *Strongly Disagree*. While some survey respondents preferred that I read the questions aloud and circle their responses on a 'master copy', most asked to be provided with their own copy, circling responses as they went. Prior to starting, I encouraged each survey respondent to ask any further questions and reminded them that they reserved the right to withdraw at any point, as well as to rescind their data after the fact, up to a period of six months.

Aside from the basic numeric data it provided, the survey – or rather, the social interactions entailed by the delivery and completion of the survey – provided two further and altogether more unexpected sources of data. First, many surveys were returned to me with a respondents' 'colour commentary' scribbled in the margins, from elaborations on a point of personal interest, to smiley faces, to asterisks denoting points of contention with the wordings of specific questions. Several of these provided the basis for subsequent interview questions.

Richer still were the 'talk-alouds' (Kuusela and Paul, 2000) in the form of unprompted, vocalized tangents. In one instance, a middle-aged man sighed audibly while circling a response and, pausing, asked: 'Do you ever think that the Internet is a bit like God? I mean, it's everywhere and nowhere all at once. Like a cloud. Is that why they call it 'the cloud'? And what would that make fibre? A hydra?'[29]. It was a rhetorical and nonsensical question,

[29] GD. Personal communication, Daajing Giids, 2020.

of course, posed in the way one talks to a television when no one else is in the room, but it was also far from a one-off. In retrospect, I suspect that the sheer length of the survey had something to do with this, such that by the 40-minute mark, certain respondents had been lulled into a state of disarmament. In any case, I made note of these momentary mutterings in my fieldnotes, and in follow-up interviews, occasionally relied upon them as a source of elicitation and ‘autoconfrontation’ (Mollo and Falzon, 2004, p. 532).



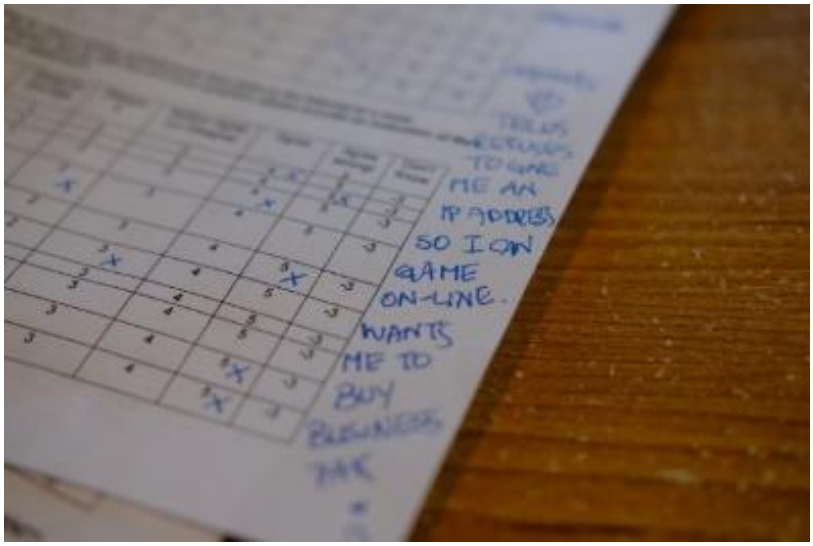




Fig. 8. Survey respondents at work.

Putting pen to paper

One Friday afternoon in late autumn I drove past the Hlgaagilda *Skidegate* Community Hall – 'the small hall', as it's locally known – where an artisan market and business fair was taking place. I pulled over, parked, and walked up the front steps. Inside the hall were five rows of neatly-arranged plastic tables, each draped in colourful cloth, each displaying the wares of a different local vendor, from soap-makers to kayak suppliers to math tutors. Several dozen visitors milled about, ambling from one table to the next. At the far end of the room, I spotted a banner for the *Haida Gwaii Trader*, the islands' finest (*and only) local news magazine.

Sitting to the right of the banner was Shellene, the editor and publisher, whose face I swore I recognized from somewhere. I walked over and began to flip through a stack of back issues. '*What's newsworthy on Haida Gwaii?*', I wondered; fishing derbies, bake sales, road closures, and gun safety courses, if the current issue's community events calendar was anything to go off of. Turning the page, my eye fell to a black and white textbox, which began: *Are you a community minded individual interested in helping us maintain and continue to build Haida Gwaii's Internet infrastructure? Internet access is important to the health of our communities and we need strong individuals to assist GwaiiTel in continuing to improve access to high speed Internet on Haida Gwaii*.

Details of an annual general meeting followed, along with an invitation for applicants for a vacancy on the society's board of directors – a voluntary role requiring 'no more than 10 hours per month'. I made a note of the date and time[30]. Shellene introduced herself and asked if I was new in town, a question to which I'm sure she already had the answer. I told her that

[30] A copy of this advertisement can be found in Appendix K.

yes, I was, and then did my best to explain the nature of my being there by outlining my research project. We carried on speaking.

I asked how long the *Trader* had been running, and told her that once, years ago, I had written for my campus newspaper. 'We could aways use another writer', Shellene commented, in what I initially mistook for a joke. 'Seems like the sort of thing a lot of people would be interested in reading about. Five hundred words, ten cents a word, once every two months, on…something to do with your research. Think it over'. I assured her I would. Shortly thereafter, the winning raffle ticket numbers were called out, as a consequence of which I found myself presented with an aluminium baking tray overflowing with Rice Krispy squares, salted-caramel brownies, and home-made macaroons.

I reflected on my conversation with Shellene over the next few days. I supposed that the prospect of writing a 500-word column once every two months wasn't outside the realm of my ability, but was less certain of the ethical implications of doing so. I reached out to my supervisors for their guidance, and was encouraged to think of this as an opportunity to share my emergent findings in a public capacity, a sort of 'member check-in' at volume. Ethnographers have used fieldwork blogs and other public fora as means of sign-posting what they've seen, heard, and sensed for decades (e.g. Lyon's (1999) 'Weekly Updates from the Field'). Reflecting on the experience of writing a column in a provincial newspaper in the midst of his fieldwork during the COVID pandemic, Jackson (2020, p. 7) writes:

> '*To write for a provincial newspaper… looks back to older historical traditions, those of the antiquarian, the collector of curiosities, and the historian of things local. Newspaper columns have regularly offered up space for reports of the findings and jottings of historical, archaeological and folklore societies, and for reflective content*

> *along the lines of: 'on this day in …', '… of yesteryear', '… then and now', '… past and present', and 'nostalgia"*.

As a sort of public access field diary in line with Gusterson's (1997) encouragement of ethnographers to build spaces of dialogue with their informants, it seemed an opportunity to build a bridge 'between the personal and public spaces of fieldwork' (Saka, 2008, p. 2), and it was in this spirit that I followed up with Shellene a few days later. If nothing else, I reasoned, it might get me into the habit of writing a bit more.

Each of the six columns I wrote over the next 12 months centred upon a slightly different topic broadly related to connectivity on-island. In one, I dwelled upon the impacts of a recent month-long network outage; in another, I considered how the COVID pandemic had brought attention to the material basis of 'digital divides'. At Shellene's suggestion, the column was titled 'High-Speed on Haida Gwaii'. The first of these made it to print just before Christmas 2019, the last in January 2021. Every two months, another scramble to produce 500 words, another opportunity to take stock.

Integration

I returned to 'the small hall' for GwaiiTel's annual general meeting on a dreary afternoon in late November. There were just three members of the public in attendance. Though I had made attempts to engage with the organization long before arriving for fieldwork, the membership had until now proven elusive. Here, face-to-face with four of the five board members, I was hopeful that I might finally be able to ask a few burning questions. A speakerphone was positioned in the centre of the table, through which the disembodied crackle of the society's Calgary-based industry adviser bellowed and echoed through the room. A clock ticked. A foot shuffled. Copies of the annual report were passed around. I took a few extra.

At precisely one o'clock, the society's then-Chair of the Board stood. He began by introducing himself – a formality, really, as everyone in the room was either a neighbour, a relation, or both – before galloping into an enlivened summary of the society's key events over the past year: sustained increases in IP traffic ('as predicted, just like last year, and the year before'), capacity upgrades to a radio tower on the north end of the island ('though we might not need it much longer'), more good news about upcoming grants ('looks like the last bits of fibre along Tow Hill Road are going to be in the ground by next year'). Lastly, an audit report, projections for the year ahead, and a reminder to 'get those applications in'. Discussion followed.

Though the prospect of joining the board of directors was admittedly way beyond the level of commitment or epistemological intimacy (Chuang, 2015, p. 1) that I had arrived with expectations of, I left the meeting encouraged by the then-Chair to submit an application. It was a publicly-advertised position, and, as with the column, it seemed to represent a novel 'variety of openness' to fieldwork (Zeitlyn and Lyon, 2012, p. 97), an opportunity not to retreat from but deepen my research interventions and '[turn] it to advantage' (Burawoy, 1998, p. 5). Some time later, I emailed the then-Chair my cover letter, application form, and resumé. Two months later, having all but forgotten about it, I received an email from the society's General Manager, the subject line of which read: *'Welcome aboard!'.*

My tenure on the board of directors of GwaiiTel would ultimately extend from February 2020 to December 2023, during which time I was named Secretary-Treasurer, attended monthly meetings (last Monday of the month, beginning at 6:15pm PST), co-wrote annual reports, provided signing authority on various network upgrades, and was granted access to decades worth of archival materials in the form of emails, interviews, conference presentations, financial audits, audio recordings, photographs, IP transit reports, and a host of other materials. In an effort to formally and openly establish the parameters to my data

collection practices within the organisation, I consulted with those already on the board and established these, on-record, at one of my first monthly board meetings. A copy of these meeting minutes can be found in Appendix D.

While my time on the board of GwaiiTel represented the single longest form of participant engagement that I undertook at any point throughout my fieldwork, it was by no means the only one. In late August 2020, for example, I was hired by the CHN to serve as Internet Connectivity and Accessibility Program Coordinator, in which capacity I oversaw a digital literacy and device-lending program called 'iPads for Elders' (further details of which can be found in the vignette 'Tl'l Yahda *Making things right*' in Chapter 5 – *Software*). I stayed in this role until March, 2022, managing the program remotely for a number of months once I had concluded the in-person components to my fieldwork and returned to London. In the fall of 2022, the iPads for Elders program was short-listed for an Award of Merit for Excellence in Community Engagement by the British Columbia Museums Association.

Through such engagements, I found myself entangled within decision-making processes surrounding the development and deployment of on-island broadband infrastructures in ways I could not have anticipated. On the one hand, this 'thickness of presence' (Mollerup, 2017) was enabling of new relations. On the other hand, there were moments when it proved constraining, such that as a 'complete member researcher' (Adler and Adler, 1987), I sometimes found myself unable to ask those 'dumb' questions I might have been able to ask as a true 'outsider' (Mercer, 2007; Naaeke et al., 2010).

Sitting for a chat

In any fieldwork context, Martin (2017) writes, 'trust comes with habituation' (p. 54). Patience and presence beget propinquity, I suppose. With interviews, one of the most effective qualitative methods to 'investigate normative assumptions about technology'

(Marwick, 2013, p. 112), this means that it can take time to know who the right people are to ask, let alone what to ask of them. And so it wasn't until the winter of 2020, roughly four months into my fieldwork, that I began to arrange the first semi-structured interviews.

Using a combination of purposive (Guetterman, 2015; Palinkas et al., 2015) and snowball sampling (Patton, 2002; King, 2009), and using my emergent survey data as a guide, I generated a list of potential informants. Most of the individuals who I approached were happy to be interviewed, though five declined, three citing a concern about my ability to guarantee confidentiality, one indicating that they were simply too busy to find the time, and one indicating that they didn't much care to be involved in 'another anthropology study'.

Altogether, I conducted a total of 62 semi-structured interviews. Varying in age from 18 to 94, each occupying a qualitatively different position within the infrastructural space of Haida Gwaii, the individuals I spoke with included IT consultants, reclusive homesteaders, commercial fishermen, Elders and knowledge keepers, educational professionals, local politicians, network engineers, technical consultants, construction workers, filmmakers, hereditary chiefs, carvers, composers, dog walkers, librarians, journalists, counter-culturalists, and many others. To ensure that my interview strategy neither overlooked nor transgressed any prescient cultural protocols, I consulted with contacts at the Haida Gwaii Museum (HGM), who provided guidance, along with a set of the museum's own interview protocols, initially designed for conducting semi-structured oral history interviews with Elders, which proved hugely beneficial (e.g. 'When you sit together: respect your host of knowledge as you would the host of a potlatch – by making a proper acknowledgement. Thank them for having you; situate yourself within your Nation, ie: your name, lineage/clan, mother/father, and recognize any familial or alliance to your host. Speak highly of your host and humbly of yourself; acknowledge business at hand; thank your host again'). An excerpt of these interview protocols can be found in Appendix E.

Owing to the wide range of interview participants, I did not create a singular interview script. Instead, the interviews were guided by a set of indicative questions designed to surface the resources, materials, flows, lived experiences, and affects of 'the fibre project'. The interview scripts included a mix of structural ('open') and attribute ('closed') questions, sequentially organised in such a way that they might suggest a 'journey' (Brewer, 2000, p. 32), with more basic questions posed earlier and more abstract questions later. A wide range of themes were surfaced in the course of these interviews, including the resources required to build the physical infrastructures comprising 'the fibre project'; the learning experiences individuals involved had accrued or encountered; who was seen to hold sway over its development; and the felt impacts of its (apparent) completion. A sample interview script can be found in Appendix F.

Most interviews lasted between 30 to 90 minutes. Where they were conducted as synchronous, in-person interviews, I used my phone to record the conversation; where they were conducted over video-call, I recorded in-screen. In all but a handful of cases I used a semi-structured approach, as it maximised the opportunity for my respondents to provide insight into their own experiences while keeping the conversation within the bounds of my research questions (Kvale, 1996; Robson, 2014). I later transcribed the interviews manually, verbatim, so as to maximise contextual details and colloquialisms.

After each interview had been transcribed, I allowed participants to review the transcripts, so that any potentially harmful, commercially-sensitive, or otherwise sensitive information might be omitted or censored, ensuring that the power to define what was included or excluded remained with the informants themselves. None chose to redact any portion of their transcript. Moreover, because of the small size of the community, I provided my informants with the option to anonymise or pseudonymise their data. While several requested pseudonyms, an even greater number participated on the specific condition that their names

would *not* be anonymised. The names of characters used in this dissertation should therefore be understood as having been produced not under conditions of strict anonymity, nor of direct exposition, but in dialogue with individuals and organisations aware of their potential to be identified. Where they have been provided to me, I have used Xaayda kil and Xaad kil given names, with gratitude.

From a methodological standpoint, the social distancing requirement introduced as a response to the COVID pandemic significantly complicated my ability to conduct interviews. As the prospect of in-person interviews dimmed, I began to reconsider how I might more fully integrate digital ethnographic methods into my approach. Thankfully, the feasibility to carrying out interviews at-distance and over video-call improved exponentially as my fieldwork progressed, as improvements to the underlying network brought gradually improved bandwidth, stability, and latency.



Fig. 9. *Xyallaga Daaguuyah* Desi Collinson wears a facemask bearing the crest of the Haida Nation.

Sickness walking

As COVID dug in, the contours of the social landscape around me – and with it, the methodological tools available – began shifting dramatically. Knocking on doors, popping by to say hello, sitting for a chat; none of this seemed entirely appropriate or practical anymore. Even the Farmer's Market, that staple of the Saturday social calendar, was postponed until further notice. For the first time, I understood the meaning of the word *kenopsia*: that eerie, forlorn atmosphere of a place usually bustling with people, now abandoned and quiet.

COVID was taken very, very seriously on Haida Gwaii. As a result of proactive, stringent measures put in place by the CHN, it wasn't until late July, 2020 that the first case was recorded on-island. More than a few attributed this sense of diligence to the cultural memory of smallpox, epidemics of which eviscerated the Haida population in the late 1800s and early 1900s. Within a matter of weeks, messaging from the CHN had explicitly established the connection, with COVID referred to as St'ii kaa *Sickness walking*, the very term used to refer to smallpox. 'The Haida people know the cost of disease', wrote one local author while reflecting on the parallels. 'With a history 14,000 years long, the Haida memory of epidemics that swept through the archipelago in the 1800s, wiping out over 98% of the people, is still very close. The will to protect precious Elders was strong' (Cullis-Suzuki, 2020, p. 2).

As I scrambled to find workable adaptations, I wondered whether I might be wise to simply get in a few further rapid ethnographic engagements (Sangaramoorthy and Kroeger 2020), wrap things up, and head back to Oxford. Looking for ways of filling the days in this new 'universe of solitudes' (Bhattacharjee, 2021, p. 47), I busied myself in whatever ways I could. For awhile, I turned to 'review work' and 'desktop research' (Knoch, 2020, p. 2). I read, too, with Yanis Ritsos' *Diaries of Exile* proving to be an unexpectedly apt but not-altogether-comforting account of the author's experience of the 'quiet violence' of life as a prisoner in solitary confinement.

One day, I went for a walk. Staring up at the cathedral of cedar overhead, it occurred to me that there were far worse places to be rudderless and adrift, and that my own predicament was not so different from that of a marooned G.I., sentenced to wait out the war under the awning of a coconut tree somewhere in the Pacific. Something within me shifted, and I felt a renewed sense of gratitude for the very possibility of being *here*, of all places.

On the walk back, I bumped into Leona, with whom I had completed a survey a few months earlier. Leaning on the front fence of her garden, she asked if I might have time to do 'a bit of yard work over the weekend'. Against the backdrop of a life increasingly lived through the screen, something about the physicality of 'yard work' appealed. Not being one to overthink things, I bought some rubber boots, borrowed a pickaxe, and rummaged through the back shed of my rented accommodation in search of a spade.

Over the next few months, I was hired by others to do yet more yard work, and so found myself with an unexpectedly productive methodological innovation, a means of continuing to build relations with informants (outdoors, at a safe distance) despite the limitations of the pandemic (to say nothing of its positive impact on my own mental health and well-being in the midst of an ever-changing fieldwork context). In this yard work I found a much-needed release, a plunge into hypo-frontality, the 'deep now'. It felt like an act of resistance in the face of invisible death, and I even considered for a moment that it might have a degree of theoretical merit, not so different from the sort of walking methodologies described by de Certeau (1984), Vergunst and Ingold (2016), or Springgay and Truman (2021). And so, as the world burned, I planted tulips.



Fig. 10. Leona holds up an earthworm.

Would you mind if I take a picture?

Wherever I went, my camera followed. Rarely was there enough time to focus too much on matters of composition. It's often that way with photos: 'Life moves, so you grab what you can with the camera as it passes by' (Anderson, 2011, p. 2).

Photographic methods formed an important part of my overall research strategy on several grounds. As a mode of uncovering the poetics of 'the fibre project' (Larkin, 2013) – that is, of seeing it 'as a sensory landscape that both extends and works on human being and sociality in its dwelling' (Amin, 2014, p. 139) – photography allowed me to complement the more conventionally-textual data within my corpus with what de Certeau (1984) describes as *poetic evocation*. My equipment consisted of a Fuji XT-3, a tripod, and three short lenses, a combination of equipment which necessarily impacted my approach. Restricted to a handful of slightly wide, prime lenses, I had no choice but to get close to my subjects, to interact with

them, and to open myself up to questioning. *What are you taking photos of? Why? Who are you, anyway?*

Photographic approaches have been a mainstay of ethnographic research for decades, and an accepted tool in fieldwork practice since the 1920s (Gold, 2004; Irving, 2007). Over time, however, ethnographic approaches to photography have been haunted by an unproductive dualism. As Larsen (2008) writes,

> 'On the one hand, there is the so-called realist school that theorises photography itself; its proponents are concerned with understanding the 'naked', pre-discursive nature of photography (Bazin, 1967; Barthes, 2000). In 'The ontology of the photographic image', Bazin argues that photography's nature is its 'essentially objective character' derived by being an inherently truthful and unbiased technology […] on the other hand, there is the discourse/semiotic approach (Berger, 1972; Burgin, 1982; Tagg, 1988; Kember, 1998). Here photography is argued to be social and historical rather than technical; the social is constitutive of what photography is and photographs are seen as 'man-made' and 'embodying a way of seeing' rather than 'mirrors of nature' […] ideological artefacts, always coded' (p. 144).

At the heart of this dualism is a tension between photography as representational practice and photography as social practice (Sontag, 2002). Differing approaches have developed over time; Collier (1967) was among the first to describe the use of photos in research interviews, and since then several methods (e.g. photo-elicitation) have been described as to how photography can be used in qualitative interviewing to make sense of daily life (e.g., Liben and Szechter, 2002; Clark-Ibanez, 2004).

In the course of my fieldwork, I made conscious efforts to leverage the productive capacity of the camera as a social tool (e.g. Collier, 1967; Crowe, 2003; Bourgois and

Schonberg, 2009; Wright, 2018). Reflecting on his experience of taking photos in the field, Schwartz (1999) describes how, '[t]he camera itself became an important means of entering into the social life of the community…My picture-taking provided residents with an obvious reason to start up a conversation' (p. 125). Later, as metadata, the photos also encouraged me to reflect more seriously on the circumstances in which they were taken: What did it say of my positionality at the time, for example, that so many of my earliest photos were absent of people, a sort of descriptive record of architectural and ecological features? My selective use of triptychs throughout this dissertation is intended to borrow from Larsen's (2008) 'nonrepresentational approach', their sequencing representing an attempt to capture everyday spaces of flow more so than a singular, authoritative frame.

Following Bey (2019), who describes providing his subjects with an instant print of the now-discontinued Polaroid type 55 film in order to 'deepen and extend my engagement with the person I was photographing' (p. 62), I offered copies (digital as well as physical) to those I took photos of, doing so both as a practice of accountability and as some small compensation for their time. In the time since, some of these photos have gone on to have lives of their own. One became a Facebook profile picture, several were used in local publications, and one was printed, framed, and hung above a mantelpiece. In November 2023, two were used in Jiixa's obituary in the *Globe and Mail*. All photos in this dissertation are my own. None have been edited, colour-corrected, adjusted, or modified in any way.



Fig. 11. A shock-resistant hard-drive sits in the rain.

Analysis

Data management

Van Maanen (2010) argues that any ethnographic project involves three overlapping tasks: 'fieldwork, headwork, and textwork' (p. 218). Although in practice the boundaries between these were forever in flux, it was only once I had marked the 'official' end to my fieldwork that I pivoted more substantively toward the latter two stages.

Split across a pair of thoroughly utilitarian, shock-resistant external hard drives, my initial corpus consisted of 312 pages (or 208,890 words) of typed fieldnotes and memos, just over 8,000 photographs, 162 completed surveys, 62 interview recordings, and around 50 gigabytes worth of other archival miscellany ranging from screenshots to audio recordings to press

releases. To aid with the process of indexing, I used a range of software suites including Zotero, Devonthink, and NVivo.

Coding and Analysis

Once a degree of order had been brought to the corpus, I began the long and endlessly-iterative process of analysis. Given its open-ended nature and suitability for large bodies of data, I adopted an approach grounded in reflexive thematic analysis (Lakoff and Johnson, 1980; Aronson, 1995; Boyatzis, 1998; Attride-Stirling, 2001; Charmaz, 2006; Joffe, 2011; Braun and Clarke, 2013; Kiger and Varpio, 2020; Wutich et al., 2021), using an inductive coding process to establish its analytical parameters.

In broad terms, thematic analysis involves the search for patterns in qualitative data, which are then refined into fewer, more abstract categories (themes), not unlike Glaser and Strauss' (1967) grounded theory method (Charmaz, 2006). Procedurally, I followed Braun and Clarke's (2006) widely-cited, step-wise approach, beginning with the initial step of simply familiarising myself with the data through a process of deep reading. Next, I carried out a pile sort (Burton, 1975; Boster, 1994), which allowed me to work through each data type individually. Noting the emergent codes in a reflexivity journal (Nowell et al., 2017), this process ultimately produced in the region of 220 individual codes. As the number of codes grew, I then began to search for *nodes* and *themes*, which is to say, clusters of codes (e.g. *Radio Tower*; *Cable; Transceiver*) that might be grouped under a larger heading (e.g. *Physical Infrastructure*).

Through an iterative process, certain surface (syntactical) themes emerged. As I worked through the data, the process of merging, expanding, and otherwise refining these categories eventually led to a reading for latent (semantic) themes, through which I began to establish certain intuitive analogies between form and ideological content; in semiotic terms, this

involved a parallel consideration both of syntagm and paradigm. Once these themes had begun to solidify, I looked for exemplar scenes, statements, and figures around which I constructed a more final list.

As the themes cohered, I wrote summaries to identify their ‘essence’ (Braun and Clarke, 2006, p. 92), and began to ‘read for theory’, comparing and contrasting against existent constructs. It was at this stage that a deeper form of infrastructural inversion (Bowker and Star, 1999) began to come into play, that is to say, toward the defamiliarization of elements not normally attended to by way of their foregrounding. Through further synthesis and triangulation (Seale, 1999), this iterative ‘theory-data dialogue’ (Jerolmack and Khan, 2017, p. 3) allowed for the inter-weaving of my informants’ firsthand perspectives, my own impressions and observations, and the insights of outside theory. A copy of the codebook (containing all initial codes, along with emergent themes) can be found in Appendix G.



Fig. 12. My writing space in Daajing Giids, in the midst of a power outage.

Genre and structure

However one defines ethnography – as a craft, effectively synonymous with storytelling (van Maanen, 1988), or more expansively as 'a way of knowing and being rather than a strict interpretive or qualitative method' (Markham, 2003, p. 1) – the act of writing, through which the ethnographic account takes shape, is always at once methodological and ideological in scope. To 'write culture' is an act of interpretive authority which necessarily involves decoding one culture while recoding it for another (Barthes, 1972; Markham, 2012), through which a certain discourse emerges – and, as Clifford (2001) writes, such discourses are inherently partial, always involving the 'cutting up and combining of linguistic elements, always a from a vastly greater repertoire of semiotic possibilities' (p. 477), stitched together *post facto* so as to strengthen their cohesion.

At the writing stage, Burrell (2009) writes, '[t]he practical problem for researchers becomes the challenge of foregrounding – how to pull something coherent forward from such overlapping and intertwined social terrain' (p. 184). To that end, most contemporary ethnographic writing falls within the confines of one of three broad genres, each governed by their own approach to 'the challenge of foregrounding' – namely, *realism*, *confessionalism*, and *impressionism* (Markham, 2003; van Maanen, 2010; Ghodsee, 2016). Whereas realism is distinguished by its striving toward 'a rendering of the actual, a vitality phrased' (Geertz, 1988, p. 143), and confessionalism with a more inward orientation (e.g. Michaels, 1997), impressionism is governed by a set of conventions – textual identity, fragmented knowledge, characterization, and dramatic control, among others[31] – encouraging of a more liberal embellishment of contextual details (Fish, 1970; Murfin and Ray, 2003) and an orientation toward the 'poetics of ethnography' (Clifford, 1988). In practical terms, impressionistic tales

[31] See: Van Maanen, J. (1988). *Tales of the Field*. Chicago: University of Chicago Press. 'Chapter 5: Impressionism'.

therefore often include non-linear narrative structures, multiple narrators, a prioritisation of dialogue and scene building over rote quotation, and other 'affective stylistics' (e.g. sensory details, metaphor, synecdoche) which (so its adherents hope) combine to create an altogether more penetrating and humane account. Though I make no claim to have stayed between the lines at all times, my aim in this dissertation has been to create one such impressionistic account.

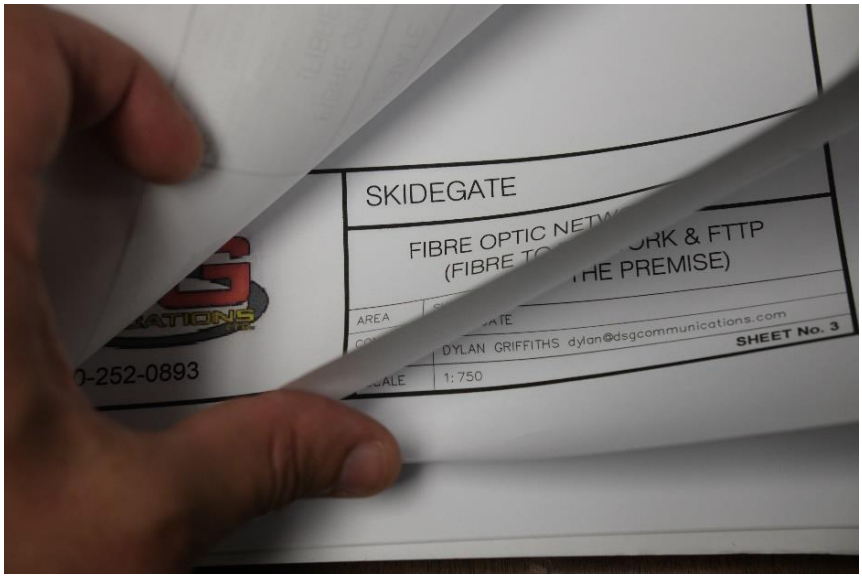
Reflections

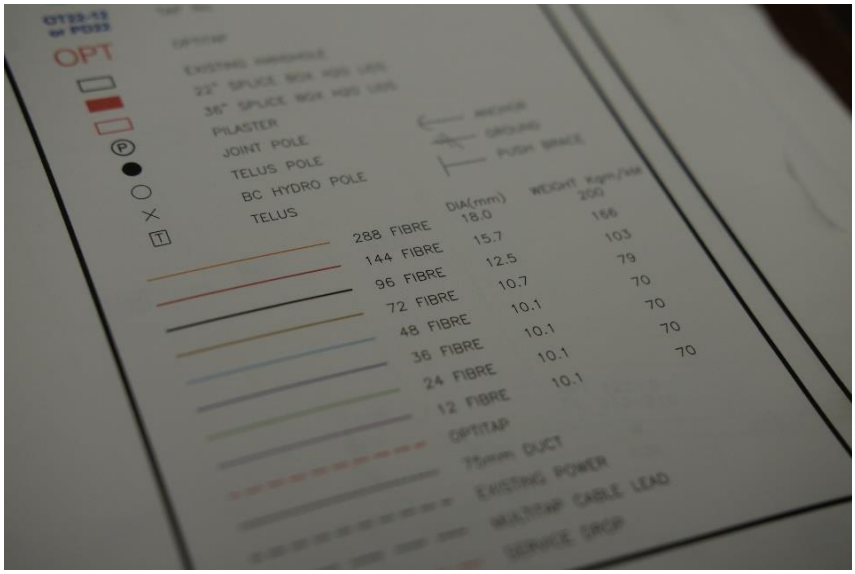
As I outlined in the opening sections to this chapter, I carried out data collection over a 20-month period between September, 2019 and May, 2021 (though my membership on the board of GwaiiTel extended to December 2023). Suffice it to say that this was a uniquely labile, and not always straightforward, timeframe in which to be undertaking study of 'the fibre project': when I began my fieldwork, most end-users were customers of locally-based ISPs such as GwaiiComm, construction of the middle mile and last mile components to the network was steadily ambling along, and while the eventual landing of the subsea backhaul cable had been assured, the exact date was still far from established. By the end of my fieldwork, meanwhile, GwaiiComm had been acquired by a subsidiary of Telus, the subsea backhaul cable had been landed, and all but a handful of homes in the most remote enclaves had been connected to the terrestrial network. The conceptual and methodological difficulties entailed by this were numerous – above all, the difficulty of establishing precisely *what* 'the fibre project' consisted of, in a very tangible sense, at any given moment.

Along with these shifts in the form of 'the thing itself' (Winner, 1980, 1986), I found my own sense of positionality evolving over the course of the project. Initially, I was acutely aware of the conspicuousness of my presence, and of my labelling as *another academic*. Fair enough: as Weiss (2018) outlines in '*Shaping the Future on Haida Gwaii: Life Beyond Settler Colonialism'*, ulteriorly-motivated academics have come and gone from Haida Gwaii for

more than a century, ‘taking advantage of Haida hospitality and generosity’, but ‘rarely do they make concrete contributions to the community’ (p. 22). A degree of suspicion was probably merited.

As time went on, I found myself with the distinct sense that I was becoming known by a more diverse set of labels. Most pertinent to the matter of reflexivity, I also found myself developing closer relationships with others. Chief among those whose perspective I would seek in moments of need was Jii<u>x</u>a, among the first people I had met on my initial trip to the islands in 2013. Roughly a year after completing my fieldwork, I returned to Hl<u>g</u>aagilda *Skidegate* to enjoy the immense honour of adoption into the Skidegate Gidins/Naa ‘Yuuwans Xaaydaga (Big House People) clan, where Jii<u>x</u>a bestowed me with the Xaayda kil name *Gaa.buu*. Jii<u>x</u>a passed away in September, 2023, and her inclusion in this dissertation (Chapter 6 – *Software*) comes only after conversations confirming her comfort with my doing so. For the reader with a more positivistic inclination, such ‘closeness’ may lead to questions of impartiality. Respectfully, I tend to agree with Oakley (1981) that ethnographers *must* be emotionally invested in their relationships with informants in order to carry out ethical research (Hoang, 2015).





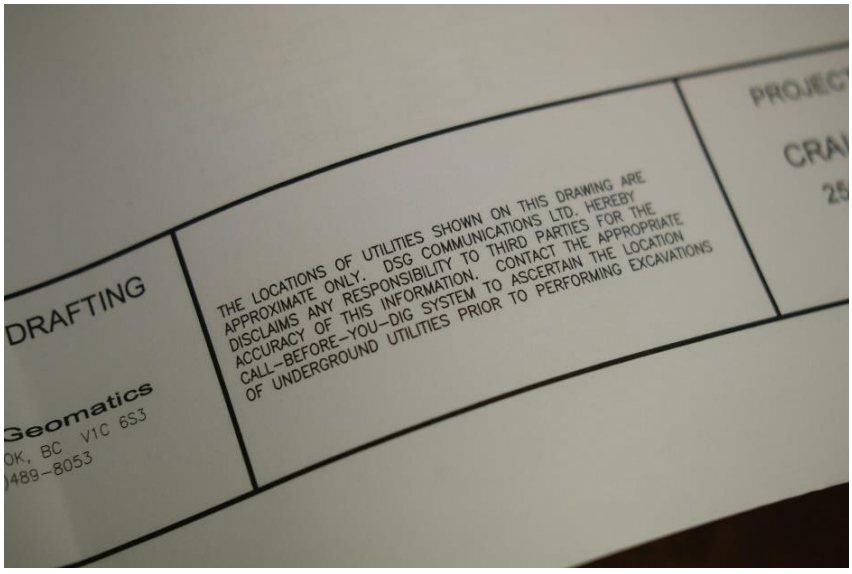


Fig. 13. ‘As-built’ diagrams describe the physical lay-out of ‘the fibre project’.

Chapter 4 – Timescapes

'Infrastructures configure time, enable certain kinds of social time while disabling others, and make some temporalities possible while foreclosing alternatives.' (Appel et al., 2015 p. 15)

Introduction

In this chapter, I respond to Larkin's (2013) question of the 'when' of infrastructure, as well as to Starosielski's (2015) call to narrate cables 'past the moment of initiation' (p. 23), in order to develop a series of vignettes describing numerous temporal forms of 'the fibre project', where *form* refers both to the physical infrastructures themselves as well as 'the process by which it has come into being ' (Larkin, 2015, p. 2).

This chapter is divided into three overlapping vignettes. In '*Trench, bore, stitch, fasten*', I provide a glimpse into the process of installing the 'last drop' – the final leg of any full-fibre network – and highlight the manual, visceral, and fundamentally processual nature of infrastructuring (Bowker and Star, 1999; Smedberg, 2019) as fibre is extended from curb-side to home. Next, in '*The act of waiting*', I describe the anticipatory discourses surrounding the long-delayed subsea backhaul cable, underscoring the disjuncture that has existed between an assurance of imminence and the lived realities of its perennial elusiveness. Lastly, in '*Yesterday's problem*', I explore how processes of breakdown, maintenance, and repair feature in both the present and future tenses of 'the fibre project', by narrating the causes and consequences of three separate network outages – each apparently stemming from a different source – which impacted the islands over the course of my fieldwork.

Drawing inspiration from Tsing's (2015, p. 23) metaphor of temporal polyphony, this chapter serves to situate 'the fibre project' firmly in and *of* time 'rather than as an agent or

force impinging on it from the outside' (Jackson, 2016, p. 171), while revealing its fundamentally relational character, thanks to which 'the fibre project' has evolved along developmental paths requiring that it be seen not as objective or static, but as a flow or *becoming* (Ingold, 2011) at continuous risk of breakdown.

Foreground

On the face of it, Haida Gwaii is distinctly lacking in infrastructure. Along the entirety of Highway 16 – around 130 kilometres long, the islands' only continuous paved road – there is but one traffic light, and few other signs giving directions along the way. But whatever invisibility other infrastructural assemblages might enjoy, 'the fibre project' is the exception to the rule. Construction crews have been a fixture on the landscape for over a decade; most are male, most local, though some are sub-contractors from off-island who come in specifically for the work.

Since the first strands to what would become 'the fibre project' were laid in 2010, construction of each leg of the network has proceeded at a different pace. To some extent, this unevenness is a product of the broader environmental and geographic realities in which it sits, and where storms, earthquakes, and other *force majeure* so often impose, knocking plans off course. It's also an indication of the unique cultural landscape across (and within) which 'the fibre project' is becoming (Ingold, 2011): from piles of old fish bones and desiccated cedar at the base of a culturally modified trees (CMT) to burial sites, watercourses, and the web of buried timbers left over from the old plank road between Tll.aal *Tlell* and Gamadiis Llnagaay *Port Clements*, the process of installation has not only taken time, but revealed it. 'It's a unique place to do this', as one contractor dryly remarked in the early days of the project (Hudson, 2016, p. 3).

Slowly but surely, the network has expanded. Today, the middle mile comprises roughly 117 kilometres of fibre, a mix of submerged and aerial cabling, considered to 'begin' in

G̲aaw *Old Massett* and ‘end’ in Hlg̲aagilda *Skidegate*, and providing connectivity (both dark and lit) to all communities of Xaaydaga Gwaay.yaay iinaGwaay *Graham Island* and, by way of a second dedicated subsea cable, to the community of K’il Kun Llnagaay *Sandspit* on T’aaxwii XaaydaGa Gwaay.yaay iinaGwaay *Moresby Island*.

Of the three legs to the network, backhaul was slowest to arrive. Though described as ‘an as soon as possible situation’ by local leadership in 2010, and while the blueprint to what would become ‘the fibre project’ initially envisioned it as landed by September 2018, it would not be landed until late summer 2022. For many, the landing came with a palpable sense of relief, an indication that, at last, ‘the fibre project’ was complete. Contrasted against the ‘*Island Internet*’ (Chapter 5 – *Software*) preceding it, the backhaul – vernacularised simply as ‘the real internet’ – seemed to represent a moment of long-overdue resolution.

In a symbolic sense, many saw the landing of the backhaul as a tangible instance of inter-connection to the mainland, and with it, a key temporal marker. Then again, Haida Gwaii is already deeply imbricated in global flows (Tsing, 2015; ‘*Homecoming*’, Chapter 6 – *Mobilities*). As Tlaga Gaawtlaas *Masset*-based writer Susan Musgrave (2015) describes,

> ‘Over the years we’ve had our share of bounty swept overboard from cargo ships hit, mid-ocean, by imperfect storms or rogue waves. Thousands of Tommy Pickles cartoon heads, dozens of sports-theme fly swatters, rubber ducks, 3 million Lego pieces […] hockey gloves, and of course 60,000 Nike cross-trainers that have been, since 1990, circling the globe like a convoy of waterlogged canoes’ (p. 223).

And just as this ‘wash-up’ provides a frequent reminder of the islands’ embeddedness within global flows, so too does ‘the fibre project’ sit within a broader assemblage of energy grids, weather patterns, transportation routes and other ostensibly peripheral elements, each providing the occasional reminder of its ability to knock plans off course. A little over a year

after initiation, it is clear that the landing of the backhaul is not so much a marker of completion so much as it is a moment of transition from one type of work to another.

In response to disruptions caused by, among other things, wayward tractors, misaligned drill-bits, dropped anchors, curious dog-walkers, and poorly-calibrated GPS coordinates, various steps have been taken to better safeguard the system; among these, in late 2023, a series of Earthquake Early Warning (EEW) sensors were added to high seismic risk areas along the subsea cable's route in order enhance the system's robustness. Whatever their cause, in such moments of disruption, the criss-crossing of 'the fibre project' by different temporal and relational regimes is made eminently apparent. Today, the spools of spare cable reserves kept outside the Mascon headquarters in Tlaga Gaawtlaas *Masset*, on-hand to cover the yearly repair cycle, speak both to a growing acceptance of and preparedness for damage.



Fig. 14. An excavator opens a trench while extending the last mile.

Trench, bore, stitch, fasten

What does the process of becoming (Ingold, 2011) look like, at ground-level? In this vignette, I follow the house-by-house fixing-in-place of the final leg of the network, revealing the slow process of 'speeding up'.

In Rithy Panh's film *The Land of Wandering Souls* (2000), the camera follows a family as they dig a trench across Cambodia, in preparation for the laying of the country's first optical fiber cable. The narrator begins: 'Lured form their villages by the promise of good wages, these workers are digging a trench across Cambodia, to carry the nation's first fibre-optic cable…supported by centuries of tradition, they labour in a land littered with dangers.' It's not an easy watch: as the narrator alludes to, in the course of digging, unexploded mines are discovered, a killing field is uncovered, and the health of everyone involved slowly but surely deteriorates.

Whatever else it may offer in the way of commentary as to the hidden labour of modern infrastructure, *The Land of Wandering Souls* is both an unrestrained dwelling on the viscerality of fibre, and a testament to its stubbornly geographic, fundamentally place-based nature. Above all else, after all, to lay fibre is to dig a big trench.

On Haida Gwaii, this stubbornness has added complexities to the process of materialising the terrestrial network in a number of ways. For one, the complexities of working within sensitive archaeological sites have required that digging within G̲aaw *Old Massett* and Hlg̲aagilda *Skidegate* be monitored closely by trained Haida archaeological assistants. The islands' geology has also tended to impose, such that certain sections of middle mile have been submerged, while others have been aerially-suspended: aside from the difficulties of carving micro-trenches into the rocky soils around more southerly communities such as

Daajing Giids, all but 20 kilometres of the middle mile, from Tlaga Gaawtlaas *Masset* to Hlgaagilda *Skidegate*, sits within a high-water table, which can cause buried conduit to slowly float to the surface. It has been both a slow going and geographically uneven process, with some communities receiving last mile connections years before others.

'You really need to cut those bushes back', Jiixa says, pointing in the direction of her powder blue rhododendrons. 'I can't tell a rhododendron from a rhubarb', I respond. After a long winter, the earth is slowly coming back to life.

Jiixa motions me over with a quizzical look. A large, white pick-up truck has pulled into her drive-way. Two men, each wearing an identical hard hat and high-visibility orange work vest, step out of the truck. While one looks at his phone, the other walks to the back of the truck and begins unloading a handful of tools: shovels, a pickaxe, more shovels. 'What the heck? I didn't ask for any holes to be dug', Jiixa says, laughing quietly to herself as she does so.

A few minutes later, another truck arrives. Bigger than the first, this one is connected to a trailer, on top of which sits an excavator, winched to the cab. The hazard lights blink rhythmically as it reverses into place, narrowly avoiding of one the salmonberry bushes. Jiixa opens the back door, and, walking out onto her back deck, asks the men what, exactly, they think they're doing.

'Digging a hole!' one of them shouts back, laughing. 'Well I can see that', Jiixa responds, 'but why?'. Apologising for the disruption, the first man walks over and explains that they're part of 'the road crew', and that over the next few days they'll be laying last mile connections to each home on the block, extending the network from roadside to home. The other man

soon walks over and joins us, and adds: ‘There’s the road crew, the house crew, the nerd crew… a lot of different crews working on fibre’. In a later interview, he would describe the overlapping roles of each such ‘crew’ thusly: ‘When you put fibre in the ground, you build a spiderweb. Everything joins together to a bigger pipe, which joins together to a bigger pipe. So they’re just putting in the plastic tubes, which the fibre will go into, to join up. And where some tubes join with other tubes, they have to put a vault in the ground where they can tie them all together...the road crew extends it from the road, but the house crew are the ones who drill the hole into the house. And sometimes there’s also the nerd crew, at least that’s what we call them, who actually do the splicing – get the whole thing *working*’[32].

Sensing an opportunity to capture some photos of the process, I ask if they’d mind if I shadow them for the rest of the afternoon. They confer; ‘I don’t see why not’.

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[32] JP. Interview, Skidegate, 2022.



Fig. 15. A member of 'the road crew' operates a horizontal drilling machine along a cul-de-sac in Hlgaagilda *Skidegate*.

And so, doing my best to stay out of their way, I followed 'the road crew' around for the day, asking questions as I went. While many were local sub-contractors, others had come from abroad to work on the build: one from Comox, two from Halifax, another from Calgary. 'I've definitely worked in worse places', one tells me.

Wearing cowboy boots and introducing himself as 'Hollywood', I ask one of the younger members of the road crew how many houses they're able to connect in a typical day. 'Up-island, easily ten, maybe fifteen a day – and that's just one or two of us guys. Down south here, the ground slows us down. Way more rocks. A lot less'. Hollywood tells me he has just finished working on a fibre build in Vancouver, a contract which provided newfound appreciation for the difficulties of navigating legacy infrastructure. Rural builds, by contrast, are more straightforward: 'More often than not, you just dig', he tells me. 'And when we get goin', we can really cover a lot of ground in a day'.

Still, there is an unhurriedness to the work. While one man sits on a gas compressor, eating a sandwich, another plays on his phone. Up the block, however, work continues. A directional drill – a Ditch Witch JT520 – imposes itself on the road surface, tearing a channel into which conduit will later be laid. With the damp musk of upturned soil hanging in the air, the operator, a middle-aged man with a focused look, sits perpendicular to the drill arm, manually feeding each new section of steel tubing from an angled stack across from him, his body jostling around with each hydraulic twitch of the machine. ‘Suck it up, Buttercup!’, reads the faded text to his t-shirt.

I can’t help but notice that they don’t seem to be knocking. ‘We lay direct buried cables and droplines to every taxable property boundary whether occupied or not’, the man nearest me says. ‘It’s insurance for the long term so that we don’t need to dig it up and lay more. If we deliberately overbuild the required fibre count, we never need to lay more’.



Fig. 16. Submerged fibre is laid using ‘the sewing machine’.

Wheeling over an industrial-looking machine with a distinctly agricultural aura, Hollywood begins to set up the subsoiler, used to ‘stitch’ the fibre into the earth. I make a comment that it ‘looks a bit like a rhinoceros’ before being corrected: ‘We actually call it the sewing machine’. Looking it over again, it seems as apt a name as any: as the thin orange and black cable is fed through a hollow tube extending off the rear of the frontal blade, the arm plunges headlong into the earth, pulling the subsoiler along in a come-hither motion. The cables come in a few different forms, I’m told – loose tube, ribbon, slotted core – the outer layer usually made of some form of polyethylene to provide protection from the elements.

Directing the subsoiler in as straight a line as possible, Hollywood cuts a shallow trench across the front lawn of the property, along the driveway, until the subsoiler stops, just short of the exterior of the house. From here, he pulls the cable vertically, through a section of grey plastic tubing, extending upward like some dystopian earthworm. Capped by an unremarkable-looking grey utility box containing a series of raised channels and compartments – the Network Interface Device, or ‘NID’, for short – this marks the point of transition between the outdoor drop cable and the indoor connection cable. Leaning his weight into an impact driver, Hollywood fastens the NID in place.

‘Job done’, he decalres. It isn’t, of course: it will be a few days until ‘the nerd crew’ arrive to finish the job, stripping back the fibre’s protective coating, splicing the cable, installing the interior network panel, and connecting the new modem. For now, the connection remains unlit. Smiling to himself, Hollywood remarks, ‘Won’t be too long now ‘til some ambitious landscaper comes along and cuts into it with a shovel’.



Fig. 17. Two workers fasten a Network Interface Device (NID) to the side of a house in Hlgaagilda *Skidegate*.

The act of waiting

What does it mean to label a project as 'complete'? In this vignette, I describe the anticipatory prefiguring of the subsea backhaul cable as progenitor to 'the real internet'.

Time and its passage are the yardsticks by which progress on 'the fibre project' has typically been measured. Almost as soon as the first strands of fibre were laid, the eventual culmination of the project in the provisioning of a subsea backhaul cable was already being described as 'an as soon as possible situation' (Haida Gwaii Observer, 2010, n.p.), with local papers confidently declaring that 'three or four years from now, the whole Haida Gwaii network be connected to the mainland B.C. network by a coastal subsea cable' (Hudson,

2018a, p. 2); 'It will happen – eventually, there's going to be fibre to the island' (Hudson, 2017, n.p).

Despite its prefiguring into the future perfect, the landing and initiation of the subsea backhaul cable was anything but assured[33]. The process of 'getting the fibre in the water', as it was often described, was one racked by delays thanks to issues of permitting, rights-of-way, environmental assessment, severe weather, lack of funding, lack of specialist personnel, and, in one instance, concerns over the potential for disruption to herring spawning grounds. Conceding that the process had moved slower than hoped, local leaders would tell me, 'It's taken us a long time, and we've sat back waiting for Fibre-to-the-Home because of, well, logistics…but as far as we're concerned, the sooner the better'[34].

Prior to the eventual landing of the cable in late 2022 – just over four years later than initially envisioned – a variety of options had been explored. At one point, a group of locals lobbied for Haida Gwaii's provisioning of a node within an extension of the Alaska United Fiber Optic Cable System, a submarine fiber optic cable linking Anchorage and Seattle. On a separate occasion, plans were drawn up to establish a dual-purpose fibre and high-capacity electric (hydro) line, though regulatory complexities and high costs ultimately led that proposal to be abandoned.

Following years of delay, an announcement came in late summer 2022 that it was time, at last, for the cable to be landed. Originally planned to land at Nee Kun *Rose Spit*, the cable was ultimately re-routed to Tll.aal *Tlell*, cutting the overall distance considerably.

[33] See Appendix L for a letter of correspondence between the provincial government and then-mayor of Daajing Giids describing the subsea backhaul cable as being 'at the conceptual stage'.
[34] LP. Interview, Daajing Giids, 2021.

On the day of the planned landing, I drove to the landing site to get a sense of the 'transition environment', to use the industry parlance, where the network would go from 'wet' to 'dry'. Standing along a rocky stretch of beach looking east, squinting to see the vessel coming into view, I was alone except for the sound of waves and sandpipers. As I waited, the tide moved out, and clouds moved in. As the wind picked up, it became clear that the landing would need to be postponed once more. 'Just not worth risking the vessel, the crew's safety, not to mention the cable itself. That stuff is *expensive*', I was told on the phone later that evening.



Fig. 18. Trawlers at work in Yakoun Bay.

Eventually, though, the day did arrive, as a weather window allowed just in enough time to carry out the subsea install. The cable-laying ship, sent up from Port Alberni, had been berthed in Prince Rupert for the better part of three weeks. It was in, in effect, a retro-fitted

barge: a flatbed vessel, stacked busily with shipping containers, spools of fibre cable, a series of small cranes, cable chutes, saddleback dynamometers, cable tanks, gantries, stonkers, rope lockers, and all the rest. A fairly obscure vessel, in other words, save for the hooked appendage off its side, which hinted at its capacity to crawl and dig along the ocean floor like a plough – not unlike a subsoiler – leaving a trench for the cable to be lowered in at a depth of roughly a metre.

Working westwards, a precise record of the cable's route was retained by the ship's onboard software, logging the as-laid path while accounting for cable properties, forces on the cable, the seabed contours, ship manoeuvring, ocean current movements, and a host of other factors. Altogether, in the course of just a few days, 87-kilometres of fibre were laid, establishing the first physical link between Haida Gwaii and Bonilla Island, just off the west coast of the mainland.

Today, there are no conspicuous markers of the cable landing site. Aside from the land markers jutting up from the sand – two simple triangular structures, each about 15 feet high, topped with a white circular board in the centre of which is painted a small red dot, and whose alignment, when viewed from the ocean, indicates to a ship that they are directly on top of the cable – there are no plaques, no monuments, no salient indications whatsoever of the long and circuitous routes taken to get here.

However discrete it might be to the eye, the discourses surrounding the cable landing make clear that for many, its landing marked a key moment in the lifetime of 'the fibre project', its initiation serving as a heuristic of resolution and closure to a years-long struggle. Several days after the cable landing, I found myself at Jag's café in Hl̲gaagilda *Skidegate*. It's the sort of place people get together and chat for an hour or two, and I couldn't help but overhear the animated conversation occurring at the table next to me, where two friends were describing their mutual disbelief that the subsea cable had at last been landed. The first,

speaking loud enough for others to hear, described how very forward she was looking to at last making use of ‘the real internet’. Delay contrasted with completion: ‘Thank fuck for that’. ‘Not a moment too soon’. ‘It’s about time’. ‘It all worked out in the end’.



Fig. 19. A sign at the post office in Daajing Giids following a network outage.

Yesterday’s problem

Is there really such a thing as ‘full fibre’? In this vignette, I describe how the interventions of elements ostensibly peripheral to ‘the fibre project’ call into question the ontological boundedness of the thing itself.

Over the years, Haida Gwaii’s end users became accustomed to the frailties of a network served by the longest overwater point-to-point microwave link on earth. Owing to the

frequency with which they have historically occurred, business owners have had to devise I-O-U systems during periods of sustained outage: 'Everybody on the island just adjusts that way, right? If it's not working, it's not working', noted Skidegate Band Council Chief Councillor Billy Yovanovich in a local newspaper article (Haida Gwaii Observer, 2022, n.p.).

That these network outages were largely the result of the physical characteristics of the underlying network was widely understood, to the point that the occasional two, three, or ten-day network outage became something of a regular fixture in the (storm season) calendar. In interviews, network technicians involved in the installation and repair of the islands' previous generation of fixed wireless infrastructures painted a picture of a precarious, temperamental network ill-suited to Haida Gwaii's precipitous weather patterns: 'Even when the weather was good, it was bad. Like when it was sunny: with the [microwave link] the tides would reflect and phase cancel…so there would be certain times, when the tide was just right, where your internet would cut out'[35]. But it was par for the course. As one woman told me, 'You blank it out: the sun shines one day and you forget that it rained every other day'[36].

Against this backdrop, the promise of reliability – which, in the technical literature of broadband, is commonly measured in downtime, or the amount of time a given network is offline versus online – has proven to be one of the most potent of the imagined affordances (Nagy and Neff, 2015) of 'the fibre project'. Encoded into the very design of the network, planning documents determined that the network should 'be capable of *absolute reliability without regard to power failures and weather events*, as it [will] be the transport layer for data, E-911 service, voice communications, video, and sensors and instrumentation, and, quite literally all other digital services' (GwaiiTel, 2016, n.p., emphasis added). The lived realities are not quite so absolute.

[35] PD. Interview, Daajing Giids, 2022.
[36] JL. Interview, Daajing Giids, 2020.

One

Three months into my fieldwork, I experienced what would be the first of several hurricane-rated storms. I had been warned by those more in-the-know of a strong didxuusda taajuu sGa *westerly wind* due to pick up near midnight, so wasn't entirely surprised when, halfway through the night, I heard a loud thud, as though something had fallen on the roof. By the following morning, as the frontal system moved inland, the storm eased.

Back on the mainland, however, a wall of snow and sleet continued to envelop the mountaintops around Prince Rupert, ultimately triggering an avalanche which would cause extensive damage to the tower site, severing the islands' connection to the broader internet. Further details were initially sparse but began to trickle in through text messages received through the local emergency response system: 'Technicians have been dispatched. Weather and snow conditions are complicating the response. It is estimated that as of noon today (Thursday) it will be a minimum of 48 hrs before internet is restored.'

The impacts of the outage would become clearer over the coming days. Unable to process mail, the post office closed. Unable to access patient records, the hospital resorted to a paper-based filing system. At the convenience store in Daajing Giids, where cash was the only viable form of payment, the strategic placement of playing cards, non-drip candles, reflective heat blankets, dominoes, and waterproof matches next to the cash register seemed to serve as a subtle reminder of the likely need to buckle down for the long haul.

Repairing the damage to the tower would prove to be an extremely complex and lengthy process. The first complication was to ascertain who, or what, was at fault. Technicians from GwaiiTel, CityWest, Distributel, and Nokia/Alcatel Lucent were all dispatched, each reasoning that it was probably the responsibility the other. Access to the tower site, remote at the best of times, was complicated by its encasing in a 3-metre-thick snowpack. With the road impassible except by snowmobile, it ultimately took a team of network technicians

hiking up the mountain on snowshoes, hauling food and fuel with them, before the problem was narrowed to a damaged feedhorn. ‘The snow is soft so trying to lug equipment up hill by foot for a km isn’t really feasible either as you sink waist deep in spots’[37], wrote one of the crew in an SMS update. And then there were the supply chain limitations, as the replacement component would first need to be assembled, using parts sourced from Germany, then shipped from Texas. And so we waited. It would be months until the problem was fully resolved.

In the meantime, life took on a momentarily more analog pace. Seeing it as an opportunity for reflection, I wrote about the network outage in that month’s *Haida Gwaii Trader*, where I did my best to call out a sense of it’s having caused disruption, in the Heideggerian sense (Heidegger, 1927; 1962).

[37] GG. Personal communication, Daajing Giids, 2021.



Fig. 20. A signpost near Tll.aal *Tlell* indicates the presence of submerged fibre.

Two

Proponents of fibre have long contended that it offers a way out of the cycle of breakdown, interruption, and repair that plague so many other broadband technologies. Fixed in place several feet beneath the earth, each strand of fibre offers a physical, point-to-point connection affording a stability simply unavailable in any other form of broadband technology. Tucked away and out-of-sight, submerged fibre, in particular, is seen to offer the most secure and weather-proofed form of connectivity possible. Articulating these affordances in the most locally-legible of terms, a recent promotional leaflet noted that because '[o]ur fibre network doesn't require radio waves or microwave technology and comes right into your home' and 'since it's buried underground, you won't be impacted by storms or trees falling on telephone poles'[38].

As with all other major infrastructures – water, sewage, telephone, electrical, and so on – the location of fibre conduit is carefully recorded and registered, such documentation providing one of the key 'strategies of insulation' (Starosielski, 2015, p. 165) for its safeguarding. The efforts undertaken to physically safeguard the network are nowhere more apparent than in the thousands upon thousands of orange-tipped wooden stakes lining the ditch along Highway 16, each indicating the presence of submerged fibre. In practice, however, many of those I would speak with seemed to agree with the assessment that 'nobody really knows where the conduit is – except Jim, and even he doesn't really know'[39]. Jim, after all, is perhaps the only person to have witnessed the materialisation of 'the fibre project' from its genesis, having been involved in both the construction of the network and having previously been the owner of one of the numerous, now-defunct local Internet Service Providers (ISPs) that once operated on-island. But as Jim will concede, even his knowledge has its limits, largely due to the inaccuracies of GPS thanks to the interference of tree cover:

[38] CityWest. 'High-speed Internet Arrives Soon on Haida Gwaii'. Promotional leaflet, October, 2021.
[39] TW. Interview, Skidegate, 2021.

‘I’ve gone with a GPS, even at the Tlell River Bridge to get a reading of the bridge, and then I go on Google Maps and put in those lat-long, [and I think] ‘that’s not the bridge!’ It’s just not accurate. You might *think* you’re on top of fibre, and the maps might *say* you are, but you might still be 30 feet away from the real location’[40]. To borrow briefly from the language of cartography, then, certain nodes in ‘the fibre project’ contain a distinct lack of correspondence between their *mapped truth* and the *ground truth*.

The fuzziness to the precise routing of the network naturally presents a number of problems, not least as there are so few people equipped to handle fibre repairs on-island. ‘If the fibre gets damaged, I’m going to call on Jeff to repair it’ (Hudson, 2016a, p. 3), as one person was quoted as saying in an interview with a local reporter. What if Jeff wasn’t around? What if Jeff slept in, or forgot to charge his phone? As a matter of necessity, Jeff has since been joined by others, as snapped aerials and severed cables have rapidly become a mundane feature of the network.

‘Another direct fibre hit’, read today’s email. This would prove to be a more isolated outage. Having narrowed the issue to the subsea connection between K’il Kun Llnagaay *Sandspit* and Hlg̲aagilda *Skidegate*, initial information suggested that it might have been caused by a deliberate act of sabotage. The actual cause – a curious beachcomber who, discovering an unusual-looking cable extending from the water, decided to give it a tug – made it no less memorable.

Fibre strikes on the terrestrial network, in particular, have grown too great to count. Once, a backhoe operator severed a portion of middle mile while excavating in the area of Gumdiis

[40] JP. Interview, Skidegate, 2022.

Creek, cutting off throughput to the southern half of the islands. Another time, a logging truck tore down several hundred metres of aerial fibre just north of Hlgaagilda *Skidegate*, a problem which required flying in a repair crew by helicopter from Terrace, some 350 kilometres to the east (Hudson, 2016b). On another occasion, a tractor crushed an exposed section of conduit before it could even make it into the ground. Most recently, a dropped anchor near the Browning Entrance, south of Prince Rupert, caused the cable to be sheered in two: 'Judging by the amount of pleasure craft in the same bit of water I wouldn't be surprised if this becomes an annual event if not more frequent'[41], wrote one of those involved with repairing the cable in an emailed response at the time. Any promise of immunity to interference has by now evaporated thanks to the frequency of incidents in the short time frame since the initiation of the network.



Fig. 21. Damaged cable roughly 6km south of Tlaga Gaawtlaas *Masset*.

[41] SH. Personal communication, Skidegate, 2022.

Three

There is a certain irony to the fact that, despite the islands' frequent representation as a sort of Arcadian ecological paradise, the lone source of commercial power to Haida Gwaii comes by way of an aging combination of diesel-powered generators (owned and operated by BC Hydro) and a storage hydro-electric system (owned and operated by Boston-based Atlantic Power Corporation). The hydro plant at Gawu Kuns Siiwaay 'Yuujuu *Moresby Lake* provides about 80% of the south grid's power – except in the drier months, when there isn't enough water to produce electricity – and every year, Haida Gwaii uses around 10 million litres of diesel. Residential needs constitute just over half of the total electricity consumed every year.

While local organisations have long advocated for greater 'energy sovereignty' for the islands[42], various proposals for solar, offshore wind, tidal, and other alternative energy sources have, thus far at least, fallen short. The power distribution system serving the islands is divided into two separate 'grids', with diesel generators in Tlaga Gaawtlaas *Masset* providing power to the 'North Grid' (consisting of Gamadiis Llnagaay *Port Clements*, Tlaga Gaawtlaas *Masset,* Ḡaaw *Old Massett,* and Taaw Tldáaw *Tow Hill*), and a combination of diesel and hydro-electric systems providing power to the 'South Grid' (consisting of Tll.aal *Tlell*, Ts'iinuu Gandlaay *Miller Creek*, HlGaa Gaat'as *Lawn Hil*l, HlGaagilda *Skidegate* , Daajing Giids, and K'il Kun *Sandspit*). In the fall and winter months, the frailties of this grid are made frequently and eminently apparent.

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[42] These include the Swiilawiid Sustainability Society, a community non-profit actively exploring the potential for small-scale renewable energy in the form of geothermal, biomass, and tidal technologies.

By now I had become better prepared for, or at least more accustomed to, the violence wrought by storm season. Still, there is a distinct sense of physical vulnerability imparted by the snapping of cedars six feet in diameter. As I sheltered inside in order to avoid the worst of a north-easterly so strong I feared the house might simply be swept away, I opened a book and lit a candle. There seemed a particular aptness to the way in which Jim Harrison described his own surroundings: '*While I ate, lightning hit a tamarack, which exploded with fire and then was doused by rain so intense it rattled the window*' (Harrison, 2002, p. 94). As it happened, the house stood firm. The same could not be said for the generators powering the 'South Grid'.

In the bar that night, we drank by flashlight, and in the semi-circles of light, I struck up a conversation with a man who, so he said, had tried to email me just the day before in response to my call for survey respondents. The email never reached me, of course, as the outage had disconnected us all once more. A millwright by training, he seemed to have more knowledge than most – and certainly, more than me – as to the intricacies of electrical power systems, and reasoned that for all that the core assets of 'the fibre project' might ultimately prove comparatively stable, the vulnerabilities of the power grid had been overlooked by 'whoever built the damned thing'. 'I mean, you've seen the chaos when the power goes out', he commented. 'Feels a bit like putting the cart before the horse, you know?'.



Fig. 22. Signs of breakdown at the Point of Presence (PoP) near Tlaga Gaawtlaas *Masset.*

Summary

Across three vignettes charting the multiple temporalities of 'the fibre project' at a diversity of nodes within the network, this chapter has situated 'the fibre project' firmly in and *of* time 'rather than as an agent or force impinging on it from the outside' (Jackson, 2016, p. 17). Intended to demonstrate that questions of '*when* is an infrastructure' are 'no less central than questions of what, where, or for whom' (Jackson, 2016, p. 171; emphasis added), these vignettes drew attention to the mutability and transience to an otherwise-objective assemblage, opening up questions in regards to who decides when a project is complete; as Gupta (2018) writes, 'the inauguration of an infrastructural project that announces its completion is […] always an ideological act' (p. 75).

In '*Trench, bore, stitch, fasten*' I drew attention to the processual nature of 'the fibre project' by showing the everyday labouring of 'the road crew' involved in last mile installation. Drawing attention to the processes of incremental fixing which have seen the gradual extension of fibre from curb-to-home, this vignette showed 'the fibre project' as an open-ended and arduous process at times 'governed by a temporality of slow movement' (Burrell, 2020, p. 302).

Next, in '*The act of waiting*', I centred the temporalities of the subsea backhaul cable, describing the 'connection narratives' (Starosielski, 2015) used to frame the consequences of its arrival. Described by Starosielski (2015) as those in which 'the technological connection of the cable's two ends becomes the climax of the story', such that 'the splice is aligned with a binary change of state from international separation to connection' (p. 67), this vignette showed how such connection narratives animate much of the discussion concerning 'the fibre project', and are used to establish the backhaul cable as progenitor to an imaginary state of 'the real internet'.

Building on this, in '*Yesterday's problem*', I explored how processes of disruption, breakdown, maintenance, and repair feature in the past, present, and future tenses of 'the fibre project', in order to establish that fibre '…continues to have a story even after it lands' (Starosielski, 2015, p. 87). In this vignette, I showed how, as Gupta (2018) writes, 'without the work of maintenance, the work of construction does not last' (p. 76). Through this vignette, I further showed how 'the fibre project' 'hooks into an emergent infrastructural configuration […] until it persists in afterlife as a thoroughly metasomatized entity' (Bowker, 2015, p. 1). In line with the view that infrastructures are seldom built *de novo* so much as they are brought into being on top of already existing infrastructures that both constrain and enable their form (Star, 1999), such temporal irruptions (Starosielski, 2021) call attention to the interdependencies of 'the fibre project' on a raft of disparate infrastructures – as well as to the network's persistent vulnerability to disruption at a single point of failure.

Together, this chapter has explored how 'the fibre project' is made temporal, as well as how it is 'grafted onto an already-existing world', coexisting amidst a multiplicity of infrastructural forms (Anand, 2015, p. 2). Together, these stories speak to temporalities of pre-emption, premeditation, and 'anticipatory reconfiguration' (Burrell, 2020, p. 291), as well as to the uneven temporalities of fibre's deployment; as Jackson (2016) writes, '[w]here some are made to move faster, others are forced to wait' (p. 181).



Fig. 23. Tsunami evacuation notices, such as this one near the 'big hall' in Hlgaagilda *Skidegate*, stand as testament to the violence of the islands' prevailing weather systems.

Chapter 5 – Software

'Builders of a future inherit a past that they reshape.' (Marvin, 1988, p. 52)

Introduction

This chapter concerns people involved in both the making and making *right* of fibre, with each of the three vignettes providing a different vantage point (Star, 1999) into the peopled ecology of 'the fibre project'. Throughout, I take inspiration from Simone's (2004, 2021) notion of 'people as infrastructure', Hobbis and Hobbis' (2022, p. 852) notion of 'human infrastructures', and Herman and Ausubel's (1988) notion of 'software' in order to render 'the fibre project' not as a singularly material entity ready for 'use', but as 'an infrastructure generating possibilities of acting' (Simone, 2021, p. 134) through affective – and often hidden – labour.

In '*Island Internet*', I focus on the loose network of individuals involved in the planning and construction phases of 'the fibre project' as a means to explore the factors which have compelled certain actors to move the project forward, the negotiations that have kept the initiative ongoing, and how, as one informant put it in the course of an interview, '[c]ertain people, certain dynamics between people…changed the way things operated and progressed'[43]. A vignette told from the perspectives of those involved in the materialisation of the terrestrial network – the 'stuff you can kick', as Parks (2015) puts it – it shows how 'the fibre project' exists both within and *as* a complex network of interested parties, as much a product of technical decision-making as the mediation of congealed social interests.

Following this, in 'Tl'l Yahda *Making things right',* a vignette set against the backdrop of pandemic-induced closures and adaptations to established ways of doing, I highlight '[t]he

[43] JP. Interview, Skidegate, 2022.

affective and emotional labour' (Facer and Buckczyk, 2019, p. 180) driving local efforts to leverage 'the fibre project' in service of broadened digital inclusion. This vignette draws on my experiences of leading a digital literacy program while employed as the Internet Connectivity and Accessibility Program Coordinator for the CHN and describes how 'the fibre project' has facilitated diversified strategies of digital and social inclusion.

Lastly, in '*The language work*', a vignette focusing on the imagined affordances of 'the fibre project' (Nagy and Neff, 2015) vis-à-vis the cultural imperative of language revitalisation, I consider how 'the fibre project' has created the conditions of possibility for an increasingly digital workflow within the Skidegate Haida Immersion Program (SHIP), and show how Haida knowledge keepers and language learners have responded to an emergent taken-for-grantedness of connectivity.

Through these vignettes, this chapter brings attention the sociality of hard infrastructures – which is to say, to the ways infrastructure 'attracts people, draws them in, coalesces and expends their capacities' (Appel et al., 2018, p. 4). In addition, it underscores that the social and political implications of 'the fibre project' do not reside intrinsically within its physical properties, and that the mere provisioning of such infrastructures is only the first step to what must ultimately be 'an ensemble of social and technical solutions' (Ortiz and Tapia, 2008, p. 3). Lastly, it shows that more than just 'making sense' of a 'new' technology (e.g. domestication) and more than simply changing their habits to fit a new technology (e.g. articulation), local cultures can be constitutive of global infrastructures rather than subordinated by them, being 'materially located and made sense of in socio-culturally specific ways' (Burrell, 2020, p. 301).

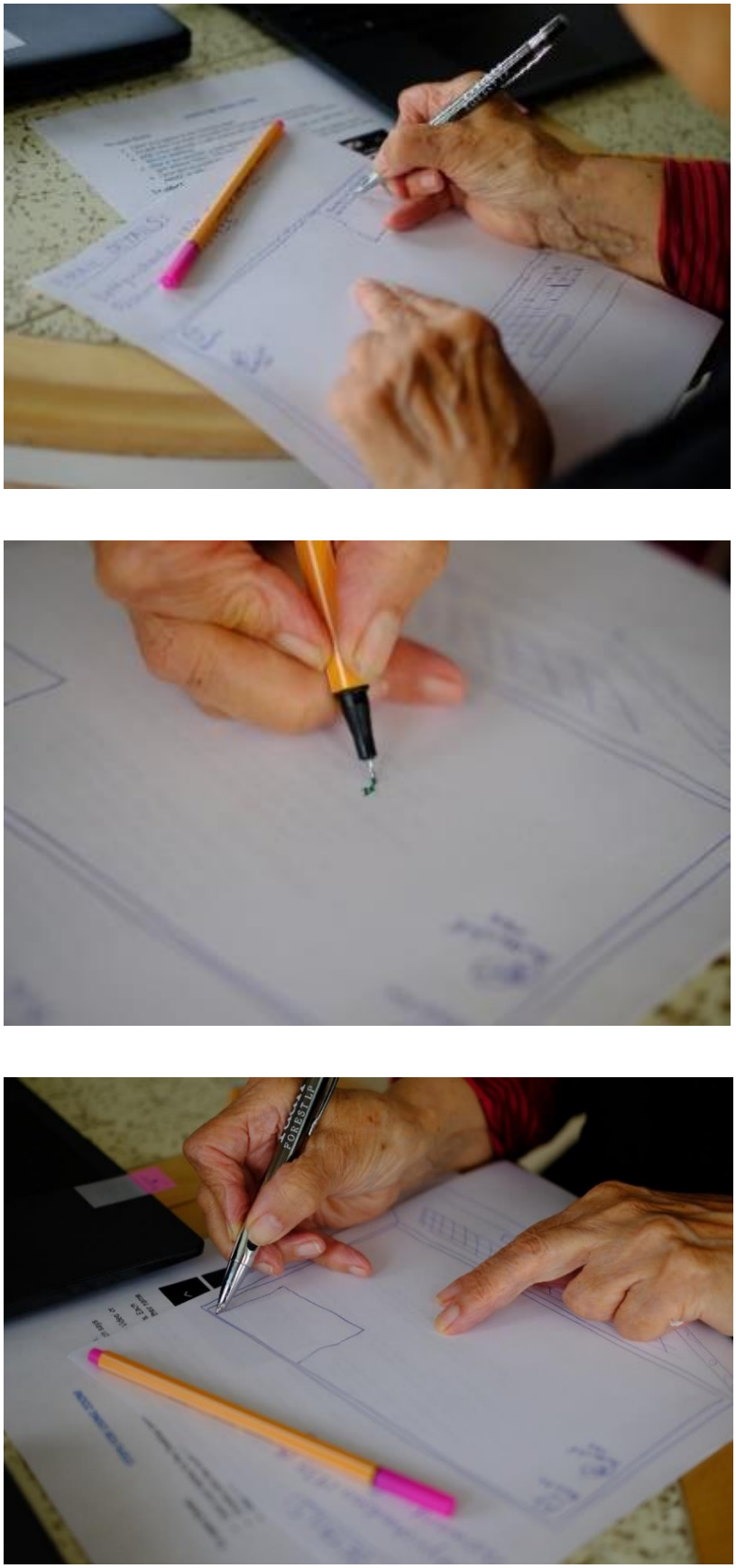


Fig. 24. A participant in the iPads for Elders program draws a diagram.

Foreground

Haida Gwaii is very much its own place. People make their own fun. Forced by circumstance to be nice to one another, a deep-seated sense of volunteerism, or mutual aid, is evident everywhere you look, from the unmatched selection at the thrift shop in Daajing Giids, where prices are strictly negotiable, to the donation jar which sits at the till of the convenience store collecting change for various causes. Inter-generational living arrangements are commonplace, and not only of economic necessity.

There is also a deep-seated sense of resourcefulness. People recycle as a matter of necessity, find new usages for old things. As Tlaga Gaawtlaas Masset-based writer Susan Musgrave (2015) writes, ‘we don’t have gourmet warehouses or high-end kitchen shops selling gadgets that promise to make living simply easier, like a Dancing Can Opener that gyrates in time to the coffee grinder, or an automatic ice-crusher. In Masset we have the Thrift Shop. All you have to do is focus on what you need, and chances are excellent that you will find it for sale, for less than a dollar, on Thursday afternoon or on Saturday morning, when the Thrift Shop opens its doors’ (p. 14).

Halibut is fished year round (but come closer to shore in the summer months). Sea urchins, chiton, sea cucumbers and octopus are gathered in the summer, as are sea asparagus, bull kelp, clams, razor clams, mussels, and cockles. Salmon runs bring pink and Coho salmon. In fall, people forage for chanterelles, boletes, chicken of the woods, and hedgehog mushrooms. Others gather spruce tips. Some jig for rockfish and lingcod. Many gather Dungeness crabs in summer, which is also a good time to catch shrimp and prawns. Volunteerism and resourcefulness are very much a part of the story of how ‘the fibre project’ came into being: ‘You improvise, right?’, Paul, a network engineer involved with construction of the islands’ original 802.11a architectures, posited to me in the course of an

interview. ‘One thing about Haida Gwaii is…if you’re not a jack-of-all-trades, you’re not going to make it out here’. Pausing for a moment, he tells that, ‘Growing up, I had to know how to weld. I had to know how to build, I had to know how to plumb, I had to know how to do electric, I had to know how to do cars; it didn’t matter what it was – you had to know how to run machinery. You had to figure it out’[44].

It has taken many ‘supporting acts’ (Parks, 2015, p. 370) to materialise ‘the fibre project’, each of whose structures of knowledge have helped organize material resources, and vice versa. The discursive and collaborative anchor to local broadband development for the better part of two decades, the cast of actors has shifted and not all organisations once involved still exist. Financed largely by local funding bodies such as the Gwaii Trust, the build-out has been governed by a certain DIY ethic, captured in the Haida saying Ging gang Hla Tllgaad *Do it yourself,* or *ad hocness*, to borrow from Shils (1981). Those involved described how it took ‘an awful lot of crawling through the woods’[45].

From the perspective of those outside the immediate web of its materialising, it can sometimes appear that ‘the fibre project’ has proceeded in a haphazard, even random fashion, with one cul-de-sac provided with last mile and the other…not. It has simply been a social fact: service quality has varied widely from one community to the next. ‘We’ve built what we could, when we could’, as one person would tell me.

With physical access now extended to all but a handful of outlying homes on-island, many speak of a growing sense of *reliability* as a particularly salient feature to the islands’ emergent connective realities. At the same time, not everyone is equally emplaced to make meaningful use of these emergent conditions of possibility, and organisations like Literacy Haida Gwaii have for years brought attention to the fact that the provisioning of physical infrastructures is only the first step.

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[44] PD. Interview, Port Clements, 2021.
[45] JL. Interview, Masset, 2021.



Fig. 25. A weathered business card for one of the islands' numerous, now-defunct ISPs.

Island Internet

Through whose efforts has 'the fibre project' come into being? In this vignette, I chart the (inter)actions of those brokers (Hobbis and Hobbis, 2022) involved in the materialisation of the terrestrial network.

In her bestselling book *Fiber – The Coming Tech Revolution and Why America Might Miss It*, Crawford (2020) writes, '[f]or localities to believe a complicated infrastructure initiative like fiber is possible, there has to be someone with budget, staff, knowledge, and authority who pushes the project along – at least rhetorically' (Crawford, 2020, p. 168). The development and deployment of fibre is a complex affair, as she writes, and the motivation to both pursue it and persist in the drive often resides with a single individual, or so-called

'network champion': 'absent a decisive, empowered person dedicated to keeping things moving, it is almost impossible to carry off a fiber installation' (ibid).

'The fibre project' has had no such champion. Instead, construction of the islands' terrestrial network – which today consists of roughly 117 kilometres of fibre running the length of Xaaydaga Gwaay.yaay iinaGwaay *Graham Island* and, by way of a second dedicated subsea cable, to the community of K'il Kun Llnagaay *Sandspit* on T'aaxwii XaaydaGa Gwaay.yaay iinaGwaay *Moresby Island* – has come about as a result of the combined efforts of a critical mass of *brokers* (Hobbis and Hobbis, 2022) with varying levels of commitment and expertise.

Among the local organisations which might be placed at the centre of these brokers is GwaiiTel. Variously described as a 'pseudo-ISP', a 'gatekeeper', and a 'policy driver', GwaiiTel is a non-profit, non-incumbent middle mile provider owned by the communities of Haida Gwaii and managed by an elected board of directors[46]. As laid out in the organisation's 2020 *Annual Report*, GwaiiTel has historically been driven by a mandate to,

> 'do all things necessary or desirable in order to encourage, improve, plan, obtain financing for, obtain regulatory consents, permits and licences for, build, own and operate (either directly or through one or more subsidiaries, contractors or agents) communications systems of any sort for use between persons resident on Haida Gwaii between the communities of the Islands and between such persons and communities and any other places in the world' (GwaiiTel, 2020, p. 2).

[46] As I noted in the earlier *Methods* chapter, I served on the board of directors of GwaiiTel from February 2020 to December 2023, during which time I was named Secretary-Treasurer. In an effort to formally and openly establish the parameters to my data collection practices within the organisation, I consulted with those already on the board and established these, on-record, at one of my first monthly board meetings. A copy of these meeting minutes can be found in Appendix D.

In practice, the mandate has been understood in a more singular sense: the completion of 'the fibre project', which is itself understood to include the construction of '[a] terrestrial fiber optic link from Masset to Skidegate', 'the establishment of fiber to commercial sites of interest', 'a marine fiber optic link from Haida Gwaii […] to the B.C. mainland', 'a marine fiber optic link from Skidegate to Sandspit', and the establishment of ubiquitous last mile access to every household (Lund, 2016, p. 4).

Focusing entirely on the middle mile – the portion of any network most difficult to monetise – GwaiiTel used revenue earned through network access fees, along with considerable contributions from local, provincial, and federal funding bodies to build out the portion of the network with the weakest business case. Alongside GwaiiTel, installation of the last mile – along with retail service provisioning – fell to a loose network of network engineers, millwrights, mechanics, and other tinkerers united under the common moniker of the *Cable Cowboys* – the name apparently deriving from their shared experiences of installing and maintaining the coaxial cable systems that once served the islands. An unspoken but mutually understood agreement was struck, whereby local oversight was split more-or-less evenly between these two groups of brokers.

By focusing on the middle mile, GwaiiTel would enable local ISPs to deliver retail broadband Internet services to commercial and residential end-users across Haida Gwaii. By focusing on the last mile, the Cable Cowboys could generate employment, compete with other providers to lower costs, and (occasionally) access funds unavailable to GwaiiTel, given its non-profit designation. Over the years, partnerships between them allowed for the leveraging of the structural affordances of each. At the same time, GwaiiTel's primary reliance on public funding meant that roll-out often proceeded in a geographically idiosyncratic and uneven way: 'We've built what we could, when we could'[47], as one former

[47] JL. Interview, Masset, 2021.

board member would tell me. Documentation along the way has often been less-than meticulous. During one recent network asset audit, it was discovered that a 144 strand cable was used in one portion, as opposed to the standard 96 across the rest of the network. 'How and why is anybody's guess', as one commented.

There were distinct differences in the organisational cultures. While GwaiiTel has historically maintained a fairly close working relationship with the CHN and Gwaii Trust, the Cable Cowboys made few interventions into public life unless strictly necessary. Nevertheless, they were united by a common vision of building a long-lasting, 'future proof' architecture. The sentiment was captured in a local newspaper, which quoted on network technician as saying, 'Do it once, do it right' (Hudson, 2016a, p. 2).

They were also united by a common understanding of 'the fibre project' in essentially physical terms, the end-goal being the provisioning of maximally-capacious and stable architecture. 'We are an engineering company, at the end of the day'[48], as one person would put it in the course of interview. Or, as another would explain in response to an emailed question in the early stages of my fieldwork, '[o]ur internet challenges here are related to our remote islands location, and finding the means to accommodate the increasing demand for, and use of high quality internet services. The challenges are primarily technological'.[49] To that end, as several would stress in interviews, the idea was to build 'something that we wouldn't even have to think about once it was in the ground. Not having to fiddle with it down the line, as result of weather, as a result of whatever, was a big part of why we did it the way we did it'[50].

[48] RT. Interview, Daajing Giids, 2022.
[49] NB. Personal communication, Daajing Giids, 2019.
[50] JL. Interview, Daajing Giids, 2019.



Fig. 26. Exterior of the GwaiiTel-owned Point-of-Presence (PoP) in Tll.aal *Tlell*.

Thanks to the network's penchant for unreliability, in the days when the system remained tethered to a single point of connectivity between Ga̱aw *Old Massett* and Mt Hays, GwaiiTel had historically provided its services to ISPs on an 'as is, as available' basis with no commitment to any specific service level. Contracts between GwaiiTel and its ISP customers specifically excluded any guarantee of service availability or service quality. To quote from Section 8, Exclusion of Warranties – *Limitations of Liability* from the GwaiiTel standard service agreement:

> '…GWAIITEL does not guarantee error-free or uninterrupted operation of the Services, and the Services are provided on an 'as is' and 'as available' basis. Except

> as expressly provided for herein, GWAIITEL makes no warranties, representations or conditions of any nature whatsoever, either express or implied, and all warranties, representations and conditions are, to the extent permitted by applicable law, excluded' (GwaiiTel, 2018, p. 8).

And yet, back in 2018, four years before the backhaul connection was landed, one of the local ISPs began advertising 'fibre internet' packages. Not long after the first portions of middle mile were in place, a *Business F1,000* package ($300 CAD a month) would provide 1,000GB of data, priority response status, free website hosting and maintenance, and a free static IP address (upon request). That the plan retained a monthly data cap and specified that 'fiber speeds are subject to traffic volumes on the network' is telling, as these packages were of course 'fibre' only in a very limited sense, coming by way of what would have been more accurately described as a *hybrid fibre* network which remained severely constrained by a lack of backhaul capacity. Still, in the conventions of the industry, '[a]s soon as one part is fibre, you apply that label, 'fibre', as if it's all fibre'[51], explained one network engineer involved in the build. The result, as another reflected in mechanically analogic terms, was that 'we had a Cadillac being powered by an Edsel'[52]. Unmet expectations soon followed.

In early 2020, local ISP Gwaii Communications (GwaiiComm) announced that it had been acquired by Mascon, a subsidiary of Canadian incumbent provider Telus. An immediate source of friction (Tsing, 2004) within the broader circle of local brokers, the announcement came without prior consultation, a few days before Christmas, and with the caveat that there

[51] NC. Interview, Daajing Giids, 2021.
[52] TW. Interview, Skidegate, 2021.

was a degree of urgency that a number of time-sensitive requests be attended to lest the whole thing fall apart. While the Cable Cowboys were quick to assert that it was their business how they ran their business, or whether they wanted to be in business at all, the acquisition came in apparent contravention of a funding agreement that the network assets not be sold for a period of 'at least five years upon completion'.

For their part, the selling parties framed it as a matter of efficiency, reasoning that in the long term, the economies of scale at the disposal of an off-island entity like Mascon were simply greater, and that accessing such economies of scale was in the best interest of network maintenance. In any case, this marked the end of the era of ownership of the last mile. In subsequent interviews, many would describe GwaiiComm's purchasing by Mascon as having transgressed a norm of public good, describing how individual economic interests had been placed above others, and reckoning that 'conversations had probably been going on for months [by the time of the announcement], and with every installation they were doing with public money – with public money! – they were basically just adding to the eventual price tag when they would sell. It just really irked me'.[53] Others objected to the sale on the basis that, in bringing about the end of (a portion of) local accountabilities through consolidation, it represented 'a bit of a Google problem'[54].

This goes some way to explaining why, in interviews and in everyday conversation alike, I found the collective memory of locally-owned last mile to be one largely defined by its strongly negative undertones. 'People fucking *hate* the internet provider here', said one informant, raising her voice for added effect[55], in one of my earlier interviews. 'Like we are *done* with them. It's all a bit Mickey Mouse, you know?'. In the wake of the sale to Mascon, another described in an email how, 'I seriously almost cried when I heard they had sold to

[53] YB. Interview, Daajing Giids, 2020.
[54] DR. Interview, Daajing Giids, 2021.
[55] AP. Interview, Daajing Giids/Zoom, 2021.

Telus…they sell it back to Our Dark Overlords, like they aren't rich enough already. I don't understand: they live here too. Is money really the only thing that talks?'[56].

Past wrongs have not been easily forgotten. As one person would reflect in the course of an interview, 'The local option always sounds great, but it's not so great when the single customer services employee who you and seven of your neighbours are trying to get hold of, on their personal number, takes a holiday or just doesn't particularly like you'[57].

As architectures have improved, so too have ways of doing changed within the ranks of GwaiiTel. It should tell you something of the state of things at the time that, for the first six months of my attendance at the organisation's monthly meetings, we relied on a telephone conference call system. These days, however, meetings are held online – as are the annual general meetings. Joining the video-call a few minutes before 9pm from my flat in London, a series of familiar faces begin to appear across my screen.

'Can you hear me? Can y – '

'Hello? Can you hear me?'

'All good'

Silence

'Yep! I was just goi – '

Laughter

'Sorry no, you go ahead.'

'Okay, great'.

[56] JS. Personal communication, Tlell, 2020.
[57] AP. Interview, Daajing Giids/Zoom, 2021.

There is a problem with the connection. The issue, of course, is on my end. Derek, the auditor, begins with his financial report, cheerily assuring those gathered that ‘a clean audit opinion was provided’, before noting how amortisation has impacted upon the society’s overall financial standing and how the previous year’s damage to the tower at Mount Hays continues to impact upon our accounts payable. Someone notes that we’ve been finding it difficult to secure a new underwriter, reckoning that the standardisation of fibre has made the insurance of ‘old’ fixed wireless infrastructures just a little less appealing, not least as climate-change related weather events seem to be increasing the number of insurable loss events to them each year.

Much of the next half hour’s conversation revolves around the increased interest being shown by various off-island entities in acquiring the middle mile assets. Few can deny that it would make more sense for things to be under one roof, or at least a few less roofs, if only to make for a more stream-lined, more efficient chain of logistics. ‘Now that we’re getting to the point where we’re on the cusp of high-speed connectivity for all islanders, I think we’re kind of kicking around the question and the discussion of you know, ‘where does GwaiiTel go next’? Have we not achieved our mission and vision once we are at that place of connectivity for the people of Haida Gwaii?’, asks one board member.

Terri responds without missing a beat: ‘Yeah, this isn’t the first time we’ve wondered if we haven’t reached the end of our mandate. I guess the real question is ‘does the membership *want* change?’. After awhile, a member of the public, identified only by their 626 area-code, interjects: ‘I think the membership *does* want change’. The comment gets to the heart of one of the paradoxes of ‘the fibre project’ – namely, that in pursuing ‘the fibre project’ on the basis of a mostly-physical conceptualisation, and having apparently delivered on that mandate, GwaiiTel now finds itself straining to articulate its own need for existence, and with fewer ways to finance the maintenance or upgrade of existing assets. With backhaul traffic

migrated to the subsea cable, less money is coming in, and with 'the fibre project' widely understood to have been 'completed', questions have been posed as to what exactly is being gained by 'keep[ing] the Internet in local hands' (Ramillo, 2018, p. 5).

'Hasn't GwaiiTel's function, historically, been about more than this sort of technical decision-making? That's a part of it, but it's also been an advocate for the communities' needs', asks one board member. 'I guess GwaiiTel's value add has been to think and to provide advice and expertise that's not strictly about the business end. It's more functioning as that advocate, facilitator, something like that... having our finger on the pulse of what's happening locally, not just about the nuts-and-bolts and engineering part of it'.

Another adds their two-cents: 'If GwaiiTel were to end with this big purchase of infrastructure, then it would be like, 'we did our jobs, we got the islands good internet'. I think we can walk away happy with that. We don't necessarily need the ownership. I think we just needed to get the job done. As long as someone is handling it, and it's going to be a net positive for residents…that's fine. Is it such a bad thing?'. Several members of the board nod in agreement. 'I suppose our goal has always been to kinda…put ourselves out of business, wind it down when we're satisfied that the vision has been accomplished, and step out of the way', adds one.

Today, the prevailing opinion among those best-positioned to act would seem to be that the further consolidation of assets, under as few roofs as possible, would serve the best interests of end-users. Having delivered upon a mandate interpreted as the provisioning of maximally-capacious and stable architecture, one board member would later reflect: 'We did it when there was no alternative. And so, in that regard, I think it was a huge success, and GwaiiTel served its purpose'. Pressing them as to whether there would still be a space for

local ownership in the future, they responded: ‘Look, our days are probably numbered. But we delivered on our mandate. So you tell me if that’s good or bad’[58].

[58] JL. Interview, Masset, 2021.



Fig. 27. Fibre is spliced along the side of the road in Daajing Giids.

Tl'l Yahda *Making things right*

What comes after access? In this vignette, I call attention to the locally-emplaced actors and ethics driving efforts toward digital literacy and inclusion.

By the summer of 2020, pandemic-induced discussions around digital inclusivity and digital divides, broadly conceived, had taken on a mundane normalcy. On the radio, hour-long prime time slots were dedicated to discussions surrounding disparities of access between urban and rural, between north and south, and between Indigenous and non-Indigenous end-users. This spotlighting effect was as true on Haida Gwaii as anywhere, with local leadership quickly noting that the persistent social isolation of certain residents – particularly those older, lower-income residents – had only been accentuated. Interested as I was in the materialities of the internet, this put me in the unexpected position of having a somewhat *en vogue* research topic. Whereas just a few months earlier I had occasionally found that my attempts at explaining my interest in 'the fibre project' were met with bemusement[59], it now seemed as though everyone had something to say on the matter.

And so it wasn't all that unexpected when I received a Facebook message from a friend-of-a-friend asking if I might consider lending a hand with a newly-launched program tentatively named 'iPads for Elders'. 'Feels like it could be a good fit?', they noted, attaching a few background documents. Funded by the Council of the Haida Nation, the background materials elaborated on the iPads for Elders program as a locally-shaped response to a global pandemic, made technologically feasible by way of 'the fibre project', which aimed to foster digital inclusion by providing technical and financial support to older residents, on lower

[59] As one informant put it in an email: 'Your degree sounds peculiar, but it's great that you're able to engage your passion(s)… this is going to sound like an insult and I promise I don't mean it that way, but it's a little bit like when I learned that table tennis had been admitted as an Olympic sport' (JS. Email, 8 March, 2020).

incomes, without access to a networked device (e.g. iPad). As a write-up by the CHN would later describe, the program was three pronged in its approach, aiming to broaden *Access*, recognising that 'Not everyone has an internet connection or devices', to assist with *Affordability*, as 'Not everyone can afford to get online', and to improve *Digital literacy*, as 'Not everyone knows how to use technology like smartphones, tablets and web browsers' (Archer, 2021, n.p.).

The materials described a remote position, with an anticipated workload of no more than two days a week, and stressed that an unexpected staffing shortage required that someone be found, as quickly as possible, to lead the program. Although the optics of my entering into an employee-employer arrangement as a component of fieldwork didn't seem entirely straightforward, and while 'tech for good' projects have been the subject of sustained critique over the years, I was reassured by the fact that the program had already been designed more-or-less in full, my proposed role being less designer than manager. Thinking it over, it seemed a plausible and productive means to 'make myself useful', as Jaahljuu *Graham Richard* might have put it.

In order to get a few more details, I arranged to speak with Jisgang *Nika Collison*. Seconded from her usual role as Executive Director and Curator of the Haida Gwaii Museum at Kay Llnagaay to oversee the newly-formed Community Economic Response Unit within the Secretariat of the Haida Nation, Jisgang *Nika Collison* oversaw the unit within which the iPads for Elders program sat. That phone call proved enlightening in a number of ways. First, Nika stressed, the point of the program was not to evangelise, nor even to assume productive uptake: 'There may be people who really aren't interested. If they say no, we can't force them'.

More importantly, she stressed that the program had been explicitly designed to be accessible by Haida and yaatz xaadee *non-Haida* Elders alike: 'When people from outside the

communities hear about the program, they think it's designed to service one specific racial group. When we say 'Elders', people think, 'Oh, we're just talking about Haida Elders here'. That's not how we look at it'. As she further explained, 'Finding a balance and making sure that people are looked after in the non-Haida communities is a really important principle for us to be honouring. It's called Tl'l Yahda *Making things right*. Look it up, it's one of our laws!'.

After a pause, she added: 'Dad used to say 'all the bad things that were done to us through residential schools, through the Sixties Scoop, it's on our shoulders to heal'. And I guess that's part of what you guys call reconciliation in Canada. We were excluded – excluded right here on our own land for years! With the potlatch ban, for example. So part of that is being able to Gud Gii AanaaGung *Look at one another* again, 'cuz we know the pain of exclusion. So why would we do that to others? Dad always used to emphasise that – 'reach out, make connections with one another, heal'. So, to me at least, that's what it means to 'make things right'[60].

And so it was that by the following Monday, I found myself hired as 'Internet Connectivity and Accessibility Program Coordinator', provided with a CHN-domain email address, and entrusted with oversight of an uncomfortably large program budget[61].

[60] Along with Yahguudang *Respect*, Ad Kyaanang tlaagang *To ask first*, and Gina Waadluuuxan gud ad Kwagid *Everything depends on everything else*, the principle of Tl'l Yahda *Making things right* is one of the foundational Haida laws codified into a distinctly Haida structure of co-management and governance, and which one finds in broad local circulation. While far beyond me to claim deep knowledge of the principle of Tl'l Yahda *Making things right*, through conversations with those more-in-the-know, a basic understanding of its qualities has formed. Among these, a central facet is the imperative to social inclusion, as Jisgang *Nika Collison* highlighted. But Tl'l Yahda *Making things right* can also be understood in a restorative sense, that is, as an imperative to 'make things right' through the correction of a perceived wrongdoing. In an alternative sense, Tl'l Yahda *Making things right* can also be read as a compelling to action with conformity to an imagined ideal of conduct – that is, to 'do it right', in a normative sense; this is probably closest to the definition of the term offered in the most recent editions of the SHIP Glossary and other publications of the Skidegate Haida Immersion Program (see: SHIP, 2016, p. 243 and SHIP, 2021, p. 27: 'if an act is not done with respect or consent, or is witnessed, you must make it right').

[61] Further details of my role, including details on structure and reporting lines, can be found in the copy of my employment contract provided in Appendix M.

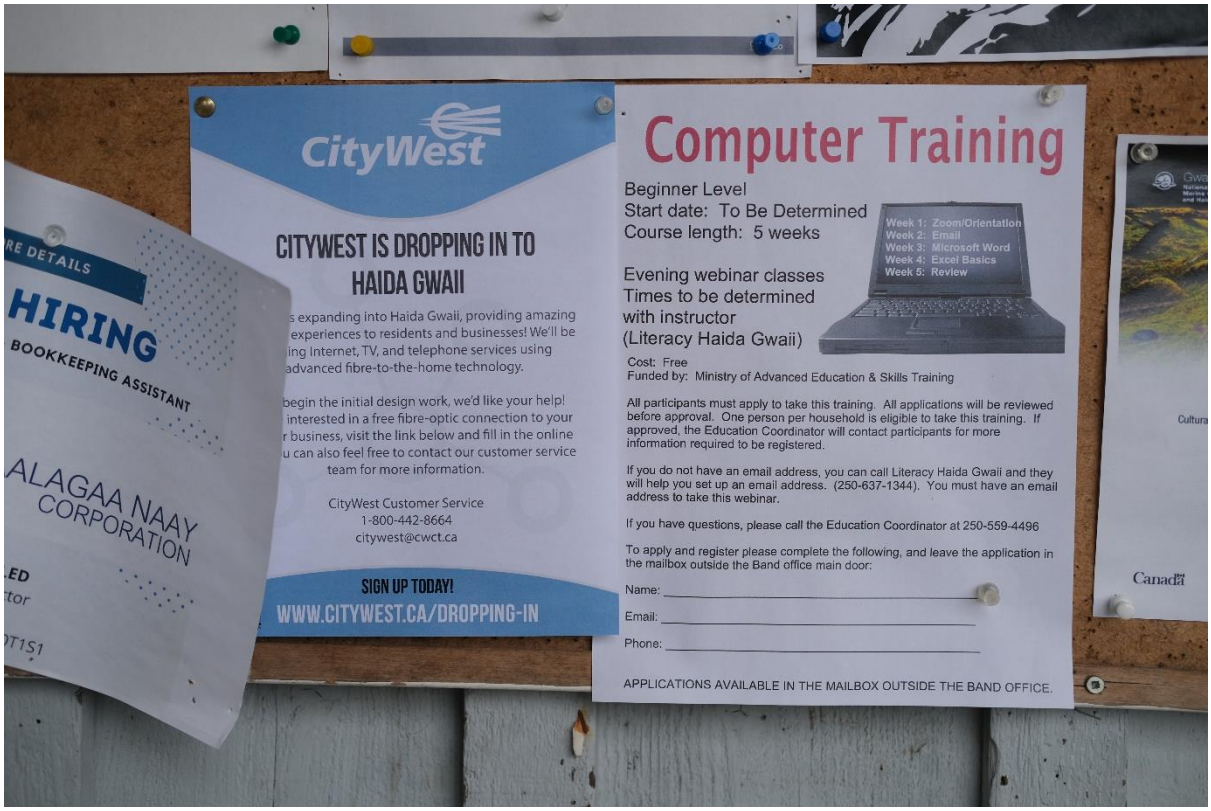


Fig. 28. On the noticeboard outside the gas station in Hlgaagilda *Skidegate*, leaflets promote digital literacy training while reminding residents to register their interest to receive a last mile connection.

Working with organisations like Literacy Haida Gwaii (who have for years hosted a free weekly seniors' 'tech drop-in' session at the Daajing Giids seniors' centre), the Vancouver Island Regional Library (VIRL) network (who, likewise, have provided 'computer training' in one way or another for years), and the Haida Gwaii Adult Day Program, a long-standing social outreach program based in Ḡaaw *Old Massett*, the first order of business was to develop a list of potential program participants.

Not leaving it to chance or assuming that those most-suited would simply find the program for themselves, a seven-person team of volunteer 'community liaisons' was enlisted, and proactively reached out to individuals within their respective communities. Tackling the matter of *access* proved relatively straightforward. Using the bulk of the program budget up

in the process, we ordered 40 iPads – along with a few additional bits-and-pieces like keyboard extensions, screen magnifiers, and other assistive technologies – onto which was installed remote device management software in order to allow access from afar, in case of, say, a lost password. Each program participant was then provided with their own iPad, initially on the basis of a long-term loan, but ultimately with full ownership of it.

Tackling the matter of *digital literacy* proved slightly more complex. Because roughly half of the program's initial intake of 35 participants could be described as *low* to *non*-users, most having never previously had a home broadband connection, the writing and design of the core learning materials proved to be both a challenging and enlightening process. It had not occurred to me previously, for example, that there might be something inadvertently jargonistic to the simple question of 'How strong is your Wi-Fi connection?' or that the instruction to 'Download an app' might require some elaboration. Thus, in a certain sense, the first challenge was to reflexively unlearn my own established terminologies of technology, to practice a sort of defamiliarization, so that the materials might prove helpful to as wide a range of participants as possible. An excerpt of the main instructional booklet can be found in Appendix H.

Owing to the need for social distancing, the program's commitment to providing one-on-one technical support was initially something of a logistical struggle. We relied on a mix of telephone calls, mimed instructions from the other side of a window, and, where the participants had enough existing understanding of technology that it allowed for it, online sessions. Once social distancing restrictions were lifted, in-person training quickly became the preferred medium.

Over time, we got to know one another. Some owned cats. Some made muffins. Some were gregarious. Some were unwell. Some passed away. Some couldn't remember who I was. Most were in their seventies, and many described a sense of 'disconnect' with

technology as a result of not knowing who to turn to for help. ‘If I had known sooner, I would have been on it!’, said Liz, 93 at the time, her Glaswegian accent still lingering despite having settled in Hlg̲aagilda *Skidegate* some five decades prior. Like several others in the program, Liz had at one point owned a computer but had long ago decided that the monitor served her best as a footrest.

In interviews, they were often frank and self-deprecating, describing a sense of embarrassment and shame at not being able ‘to use the Internet’. Others enrolled in the program only with great reluctance, and after asking not to be identified so as not to be ‘seen as needy’; ‘You know how it is in small towns, right?’ one asked. ‘Someone hears you need help with one thing and then it’s ‘oh they need help with another thing’, and they go off thinking that I’m getting older than I really am!’[62]. A community liaison attached to the program would later reflect that, in their experience, the chief obstacles to improving digital literacy were not technical so much as intra- and interpersonal: ‘People are reluctant to talk about their fears and issues in front of others. The one-on-ones are time consuming, but they are the most transformative for folks. Fear is a huge barrier. Fear of trying, fear of making mistakes, fear of being left behind’[63].

[62] IB. Personal communication, Skidegate, 2021.
[63] XD. Personal communication, Port Clements, 2022.

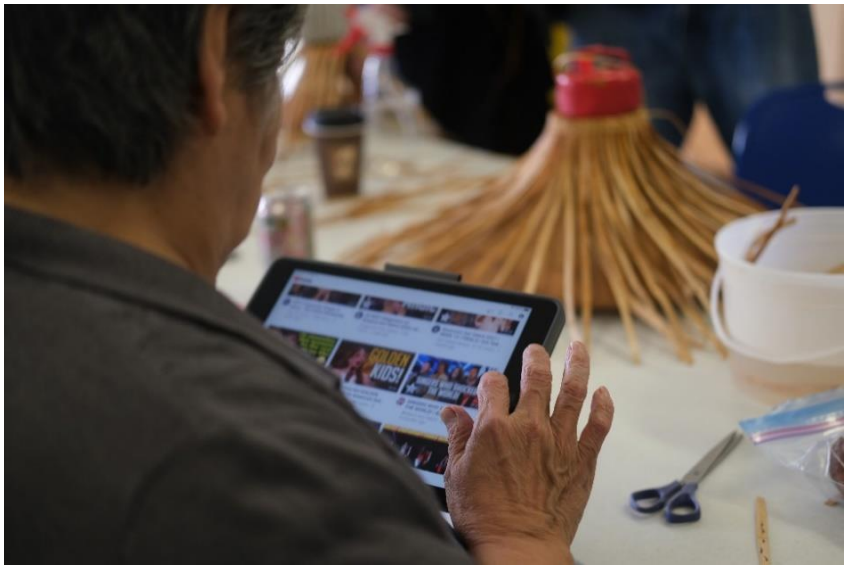






Fig. 29. An Elder takes a break from hat-weaving to watch a YouTube video at the Adult Day Programme in Gaw *Old Massett*.

For all that it may afford in other ways, the basic costs of living on Haida Gwaii can be exceedingly high. By way of example: one box of granola bars, one 600g bag of plain flour, one medium-sized container of spinach, one 140g block of cheese, and one jar of pickled jalapenos will set you back $61.42 CAD, while six bottles of Gatorade, one small bag of Brussel sprouts, one small pack of bacon, and one 200g jar of slivered almonds comes to $52.60 CAD.

While a wealth of literature has found cost to be among the most powerful mediators of low or discontinued use (Eynon and Geniets, 2012), it became clear within a short time after launching the program that the paramount importance of affordability exceeded all expectations. This represented a certain logistical challenge, as the original program budget contained far less for subsidisation of monthly service charges than it did for the purchase of devices.

Although not a program participant herself –'I've got Jiixa to help me when I forget passwords', she would tell me, laughing, 'but not everyone does' – a solution would be offered by IIjuu Xiilaay *Isabel Brillon*, or 'Auntie Isabel' to most, who suggested that the program contact Mascon – who, following their acquisition of GwaiiComm, had recently established themselves as the primary retail Internet Service Provider (ISP) on-island – in an effort to negotiate a partnership of sorts. 'I'm sure they would see the benefit too', she reasoned, before suggesting that she start by writing a letter. Overhearing this, Jiixa would interject: 'You've always been a little bit of a hell-raiser, eh?'.

With IIjuu Xiilaay *Isabel Brillon*'s letter serving as a template, others soon stepped forward to share their own view as to the need for financial assistance, and what began as a

letter soon became a letter-writing campaign. I'll spare you the details – actually, I've been asked very explicitly to omit them, for matters of commercial sensitivity – but the end result was that everyone had their bills paid. A copy of the letter from IIjuu Xiilaay *Isabel Brillon* can be found in Appendix I, while Appendix J provides additional letters of support from the Council of the Haida Nation (CHN), Haida Gwaii Mentor Apprentice Program (HGMAP), and Skidegate Haida Immersion Program (SHIP).

The language work

To what ends is fibre put? In this vignette, I describe the emergent conditions of possibility afforded by 'the fibre project', and in particular, by the promise of reliability.

A morphologically complex language with significant dialectal and orthographic variation, Haida is a linguistic isolate in which a single word often carries the meaning of what would be an entire clause in English[64]. As the opening pages to '*That Which Makes Us Haida*' describe, '[t]he old people say there were as many dialects of the Haida language as there were Haida clans: at one time numbering well over thirty' (Haida Gwaii Museum, 2012, p. 9). Today, linguists recognize three surviving dialects: Xaad kil in southeastern Alaska, Xaad kil in G̲aaw *Old Massett*, and Xaayda kil in Hlg̲aagilda *Skidegate*, as well as one extinct dialect, originating from the Gang̲xid territory in the southern-most region of Haida Gwaii.

The Skidegate Haida Immersion Program (SHIP), founded in 1998, is the epicentre of efforts to preserve and revitalise Xaayda kil. Established by 16 fluent Elders, SHIP operates out of litl'xid Naay *House of Chiefs*, on Front Street, along the water's edge in Hlg̲aagilda *Skidegate*, and is in many a cultural centre point of the community. Every Monday to Friday,

[64] Even within a single dialect, published orthographies (e.g. Swanton, 1905; Enrico, 1983, 1991, 2003, 2005) often differ in details, such as the encoding of particular diacritics or which morphemes/enclitics are written as separate words or joined.

from 10am to 2pm, for the better part of 30 years, fluent Elders and newer learners convene to record translations of Xaayda kil, to devise altogether new words, and to simply sit and be amongst friends. Niissii Guujaaw (2019) describes the founding intentions of SHIP as being two-fold: 'Their main goal was to save the Haida language. The second goal was to have the school be everything that residential school was not' (Guujaaw, 2019, p. 11).

I first dropped in at SHIP in 2013, during one of my first visits to the islands. SHIP is open to the public, and, as it was a Wednesday, there was work to do. It was a memorable introduction, as, within seconds of entering, an older woman who would later introduce herself as Jiixa sauntered over to me and placed a knife in my hand: 'Anyway. I need you chop some sgaawsids *potato* for the j'aam *fish stew*'. For the rest of the morning and into the early afternoon I remember simply sitting and listening – or, 'waking up my ears', as GwaaGanad *Diane Brown* says – while Elders took turns at the microphone under the awning of the SHIP flag.[65] Arriving on-island to begin my fieldwork, it seemed a good place to return.

[65] A blood red crab in Haida formline motif set against a black background, the SHIP flag was designed by Gid Kinjuuwas (Chief Cumshewa, *Ron Wilson*, who also held the name Giitsxaa) after attending the ten-day Xaayda kil immersion program that initiated SHIP. As elaborated upon in '*That Which Makes Us Haida*', 'something moved him to paint a crab'; he explained, 'We, as crabs, should help each other out of the pot rather than dragging ourselves back down' (Haida Gwaii Museum, 2012, p. 102).



Fig. 30. SGaan Lwahagang *James Maguire* cuts salmon while preparing lunch at the Skidegate Haida Immersion Program (SHIP).

Robyn Kimmerer (2013) describes the 'grammar of animacy' to be found in Indigenous languages. But 'the language work' at SHIP also rests upon a certain *animacy of grammar*: Xaayda kil, after all, is not static but in a constant state of flux. There weren't always Xaayda kil words for things like Aaxad Tll'gaay *Internet* (literally, net around globe) or Xang sk'aad *Facebook* (literally 'face recognize/know') – but then, there weren't any Aaxad k'aalang llGaayga *Internet web developers* (literally 'web writer expert') back then either. Understood as part of living and embodied practice, a political act 'representing broader community goals of self-determination' (Turin and Pine, 2019, p. 2), the day-to-day practice of 'the language work' is varied. Oftentimes, mornings are spent recording audio for educational materials. Other times, the work revolves around the translation of texts, whether from English to Xaayda kil, or vice versa. When the nearby general store wanted to know how to label the

aisles, it was the Elders at SHIP who suggested they might place Tll Skunxa Gan *cleaning supplies* in Aisle 4, and assorted Gina Ga Taa Gyaa Dahxuu *grocery items* in Aisle 5.

At times, it is an intuitive act. When there is dissensus, Luu asks the Elders what they feel is 'the most right' of several options. And when the first take of a recording doesn't quite cut it, Luu, listening closely over a pair of monitor headphones will interject: 'Asing asing *Again*!'.

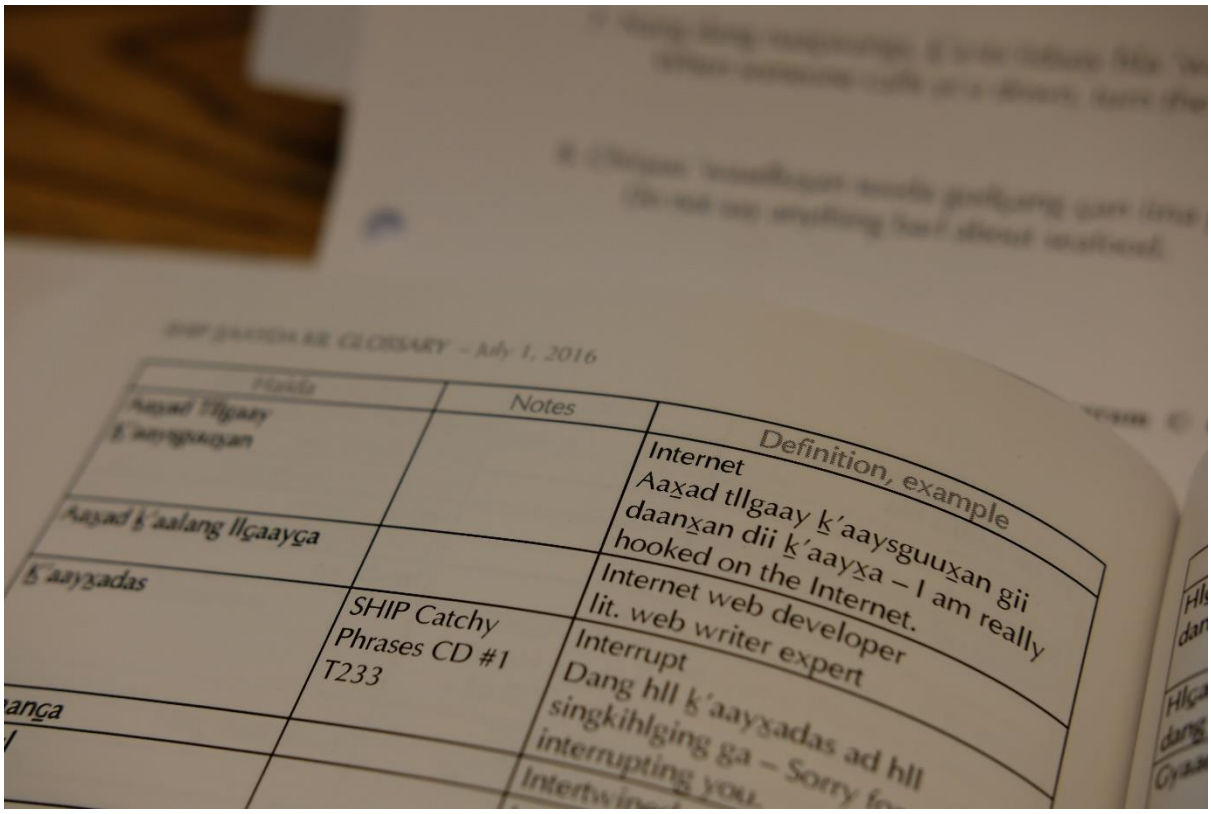


Fig. 31. The SHIP Glossary, showing the entry for Aaxad Tllgaay *Internet*.

Over the years, SHIP has produced over 300 CDs, roughly 100 children's books, dozens of specialist phrasebooks (such as the 'Flirty Handbook', in which one can find useful pickup lines such as 'Be the oolichan grease to my dried fish'), and the magnum opus, the HlGaagilda Xaayda kil K'aalang *Haida Glossary*, the most recent edition of which contains 1,038 pages of entries, each painstakingly recorded, along with notes as to the origin of

specific terms or place names, examples, and, where a recording has been made, where a spoken example can be found within the vast audio archive.



Fig. 32. SGaamsgid *Harold Williams Sr.* sits at the microphone while recording at SHIP.

Behind the scenes, the workflow has historically been decidedly analog. In fact, aside from the large computer monitor in the centre of the room, allowing Elders to read from a prepared (large font) script during recording sessions, the laptop used by program manager SGaanas *Denver Cross* is, most days, just about the only conspicuously digital artefact in the room – excluding, of course, the Gina kaa Gii kihlgulas *cell phones* tucked out of view.

Luu Gaahlandaay *Kevin Borserio* tells me that the process has changed little in the past twenty years: after recording onto a master copy, a CD is then mailed to a sound engineer in Nanaimo, some 1,000 kilometres south, by courier. SGaanas *Denver Cross,* who has recently

taken over management duties at SHIP, would later joke, ‘I bug him about it, about the fact that he’s still living in the year 2000.’

But this approach is as much a matter of personal preference as it is a refection of technological necessity. It’s not as though the idea of introducing new technologies into the process wasn’t there; in 2017, a Xaayda kil language app was even developed, and remains available for download on most app stores. But the minimal uptake of that app is telling: in the face of persistent connective instability afforded by the islands’ historic fixed wireless network assets, the basic conditions of possibility were simply not in place to allow for a more direct integration of new, and fundamentally *networked*, ways of doing. To rely on cloud-based technologies would have been futile to the point of impossibility. To pay licensing fees for software that might only work half the time in summer, and never at all in storm season, would have been wasteful. To prioritise the expansion of the organisation’s digital footprint when there was scarcely enough bandwidth to send an email, let alone upload hundreds of gigabytes worth of high-quality audio files, would have been ill-advised. ‘There wasn’t much point in trying [to use the Cloud] when we couldn’t get signal most days’, Luu Gaahlandaay *Kevin Borserio* would tell in the course of a conversation over lunch one day.



Fig. 33. Luu Gaahlandaay *Kevin Borserio* and SGaanas *Denver Cross* share a laugh.

The COVID pandemic had a rather unique character on Haida Gwaii. As I elaborated upon in the earlier *Methods* chapter, the cultural memory of introduced epidemics prompted an immediate, proactive, and stringent response from the CHN, which all islanders, Haida and yaatz xaadee *non-Haida* alike, turned to as the principle authority for effective local management of the pandemic. In what would be the first of many such measures, on March 18, 2020, the CHN issued a travel advisory limiting travel to and from the islands. Those few individuals allowed to travel to Haida Gwaii from the mainland were required to seek authorization from the CHN and be granted a permit. As Figure 34 attests to, those unwise enough to try their luck without authorization were met at either end of the now-only-twice-weekly ferry by a blockade.

Workshops were cancelled, schools were closed, flights were grounded, and the sound of singing and drumming on the beach ceased. Within two weeks, all but two businesses on the south-end of the islands had been shut. On Haida Gwaii as elsewhere, restrictions on social gathering required that adaptations be made on-the-fly. While local leaders recognised the potential for remote work, the fact remained that the basic feasibilities of migrating toward a fully-online mode of learning had not been tested, at SHIP or elsewhere. On top of this, the islands' backhaul connection was still being provided by GwaiiTel's radio-link between G̲aaw *Old Massett* and Prince Rupert, with the subsea cable still over a year from being landed. Nevertheless, the middle mile and last mile legs of 'the fibre project' *had* recently been extended both to the SHIP building itself, litl'xid Naay *House of Chiefs,* as well as to individual Elders' homes. Thus, while bandwidth remained limited thanks to the backhaul bottleneck, the coincidental timing to this work provided both a visual reminder of the improvements being undertaken and, from an end-user perspective, a dramatic improvement in the overall *reliability* of the system. And so, with few alternatives, it seemed worth a shot.

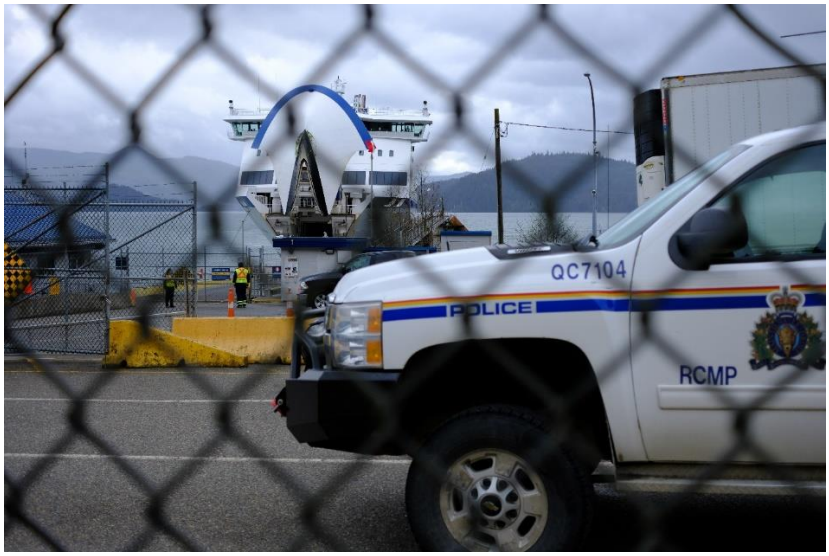






Fig. 34. A blockade was established after the CHN issued a travel advisory limiting travel to and from the islands.

Luu Gaahlandaay *Kevin Borserio* and SGaanas *Denver Cross* got to work, ordering one laptop per Elder; given the need to type, it seemed a better option that, say, an iPad. Aiming toward minimalism, SGaanas then set up each laptop ahead of time, removing all but two icons from the desktop to reduce the chances for confusion. A recent publication from SHIP summarises what happened next:

> '*With monies from the Council of the Haida Nation and Skidegate Band Council, we were able to purchase computers for each of our SHIP members in order to have ZOOM classes in September. While we would certainly prefer to have been together in the iitl'lxid Naay (SHIP Longhouse), this pandemic had other plans. So thanks to ZOOM we have kept our Knowledge Door open while our SHIP Longhouse Wooden Door remains closed for the protection of our people…Each morning when we come together on the computer screen, there are smiles, there is love, and there is community. Elders and students continue to shine, grow, and learn from each other'* (SHIP, 2021, p. 17)

I joined Jiixa and IIjuu Xiilaay *Isabel Brillon* for the very first day of what would come to be known as 'online SHIP'. Mutually-recognised as a 'techno-nanaay', Jiixa hardly needed the help; sitting in her regular spot next to the window in the kitchen, the table in front of her was a still-life of technologies of differing vintages and types: a CD player, an iPad, a laptop, not to mention the books. But IIjuu Xiilaay *Isabel Brillon* – Jiixa's first cousin, and one of her closest friends – was an altogether less confident user of computers, and had come over for the support. 'Only time I miss SHIP is if I'm sick', she tells me. 'I just wanted to make sure nothing went wrong!'.



Fig. 35. IIjuu Xiilaay *Isabel Brillon* writes a note on the first day of 'online SHIP'.

Just past 10am, IIjuu Xiilaay *Isabel Brillon*, sat at the far end of the table from me, opened her new laptop and double clicked the icon in the centre of the screen. A dialogue box opens. Then another, this time bearing a series of squared, pixelated, but nonetheless familiar faces. She motions for Jiixa to join her. Jiixa smiles: 'Let's just watch this for a bit'. Many of the Elders on-screen are flanked by younger family members. I seem to not be the only one drafted in to offer technical support. 'Guudangada', Jiixa says, laughing. 'What does that mean?', I ask. 'Guudangada', she says again. 'Watching carefully over things'.

One by one, thirteen individual speaker boxes slowly populate the frame. As each new person joins, they are greeted by a look of joy. After around ten minutes of chatting, GwaaGanad *Diane Brown* leads a prayer, while Luu Gaahlandaay *Kevin Borserio* welcomes all those who have joined: 'We're trying to keep the knowledge door open, through Zoom,

even while the wooden door is closed'. While the intricacies of mute/unmute are worked out by others, Jiixa uses the 'clap' emoji, much to everyone's delight.

And so it went, day by day, for some eighteen months. No one could deny that it was somehow *different*, and where SHIP has relied on an immersive pedagogy, seeking opportunities for Sk̲'aadG̲a Gud ad *learning together*, many seemed to feel that the individuated nature of 'online SHIP' seemed to detract from its sociality. As IIjuu Xiilaay *Isabel Brillon* would later put it, 'It's about the language, of course, but it's not *all* about the language. We miss eating together and seeing others when they walk in. And dii gwaii *Bingo*, I sure miss that too'.

For his part, program manager SGaanas *Denver Cross* would later tell me that despite initial concerns that the online format might not lend itself well to the tonal intricacies of Xaayda kil, that hadn't tended to be the case: 'Even if there is a slight difference, I'll be able to put two and two together and figure out what an Elder said. Like, if they wanted to say, 'I love you', instead of 'Dang xaagii K'uugaga', it might sound more like 'Dang xaagii kuugaga' – you know, with that plain 'K' in there instead of a 'K-pinch'. And that would mean 'I cook you', so it would be pretty obvious, and then we would just work through it, you know?'. On balance, he reckoned, the move online had in many ways *benefited* the language work, if only by making it more efficient: 'Overall, I think it's actually made our work way more efficient. More time to do the paperwork and figure out the plan for the rest of the school year. We can be a bit more focused and just get down to business'[66].

Crucially, in addition to providing the means to continue the language work under challenging circumstances, the emergent reliabilities of 'the fibre project' – in both a technical and imaginative sense – facilitated the creation of an entirely new cultural repository: as nearly all 'online SHIP' classes were recorded, the resulting archive provides a

[66] DC. Interview, Skidegate, 2021.

record not merely of the outputs of 'the language work' – in a new and distinctly audio*visual* form, it should be pointed out – but offer a record of the processes underlying it: the process of negotiating the creation of new words (e.g. Aaxad Tllgaay *Internet*), of coming to a consensus as to the 'most right' option.

With fibre in-place, a burgeoning sense of reliability – not absolute, but relative – has begun to take hold. Jiixa would liken the felt dimensions to the impacts entailed by a community's transition from well water – not terribly clean, drawn from the source as needed, with effort – to drinking water – clean, abundant, available 99 times out of 100: 'Soon, we forget that it was ever any different. We leave the tap on. We run the bath for longer, whenever we like'.

'Online SHIP' having ended for the day, Jiixa directs me to open the metal filing cabinet tucked in the far corner of her weaving studio. Five rows of densely-packed manilla dividers slowly slide forth. Inside are dozens of cassettes, 8-tracks, and other recordings on long-obsolete formats, containing labels like 'Nanaay Chinii Steamboat', 'Our Clan Names', and 'Haida Songs by my Grandpa'. Jiixa tells me this is just a portion of the recordings which she and her sister Golie recorded in their childhood: 'Dad used to play the mandolin and the banjo on some of them', she tells me. 'One Christmas they bought my brother a reel-to-reel, so obviously they wanted us to use it to record them'. While she has yet to decide exactly where they're best-suited to being archived – 'I might put them on YouTube, might give them to SHIP, who knows' – the time has come, she feels, to digitise the collection.

For now, our task is to locate a recording of her late-uncle – 'my favourite storyteller', who had learned the craft in 'the old way' through listening and reciting around the fire, only

to be stopped the moment a single word was spoken out of place – as she's hoping to share it at tomorrow's class. After locating the tape, we go back upstairs. Settling on the couch, Jiixa picks up her iPad. She needs to cross-reference a few of the words from earlier. 'Sometimes they're different so you need to check both', she tells me.

Keeping her head down in concentration, Jiixa props the iPad up with a pillow while using her 'good hand' to flick through a pdf copy of the SHIP Glossary, which she keeps pinned to the home screen. ''dllXaats'ii'. That's what happened to me! *Lost my balance*'. ''Gaa.buu'. That's a fun one to say. *Weathervane scallop*'. ''Daws.T'iiwaay'. Oooh, I was wondering about that one! *Small purple urchin*.'

While Jiixa's parents spoke almost exclusively in Xaayda kil to one another, they rarely, if ever, spoke it to their children: 'I guess it was because of the potlatch ban,' Jiixa would speculate at one point. These days, Jiixa tells me, Xaayda kil brings her comfort, and she does her best to speak it daily. But as her illness has progressed, her voice has weakened. 'Linda went out into the bush and got some liquorice fern the other day', she told me. 'That made my voice a bit stronger'.

Her work done for the day, Jiixa closes the SHIP Glossary and opens a new tab: 'Look, did you see that they're raising a pole in Rupert?'. She beckons me over. On the screen, a live-stream provided by regional radio station CFNR shows a memorial pole in the process of being raised, a dozen people gathered at its base while the pole is hoisted into place by thick marine ropes, taught from the weight of the pole. Observing that 'this sort of thing' would have been out of the question just a few years ago, Jiixa positions the iPad on the table beside her and watches intently.

After awhile, I think to ask: what other facets of life might soon go online? 'Well, like you've seen, so much about the language work is changing that way', she says, before changing her mind: 'Well I guess...everything but also nothing', she says, laughing. 'It's the

same but different. But that's one of the reasons I thought it would be good to get started on this digitising. Now that we see it can work'.

I can't help but ask: 'But once the recordings are out there, doesn't it worry you that they might fall into the wrong hands?'. Jiixa responds by twisting her brow into a look of half-joking-judgment: 'No. It's more important that it's out there. I can't control what other people do with it, but it's better off out there than nowhere at all. Heck, maybe we'll have an online potlatch some day. I don't see why not. I saw an online pow-wow last week. That might be fun!'.



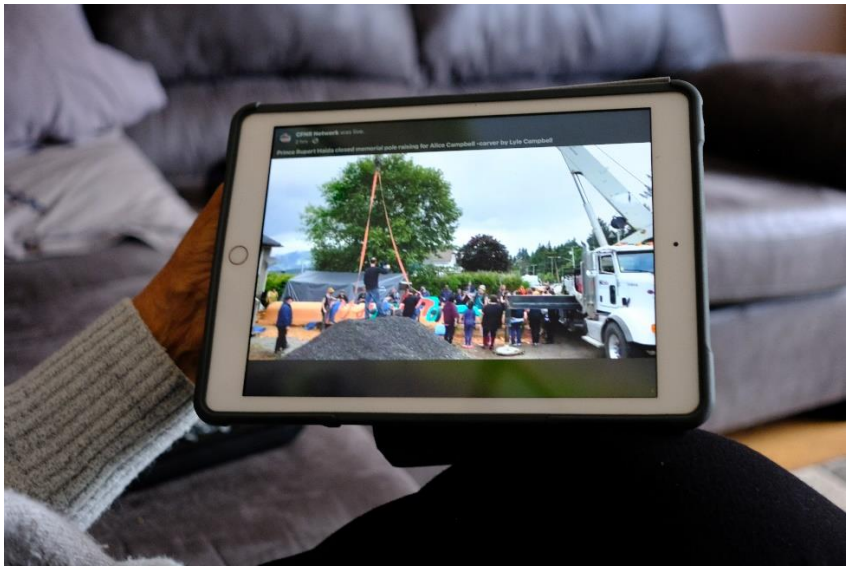




Fig. 36. Jiixa watches a live-stream of a memorial pole raising on her iPad.

Summary

Infrastructural relationships are commonly described as ‘hard’ or ‘soft’, a legacy of economic thinking, in which ‘hard’ infrastructure described certain physical facilities while ‘soft’ infrastructure referred to social enablers of action, such as human capital or innovation. While the hard-soft binary is necessarily reductive, in the context of this chapter it is nevertheless helpful for bringing to light the fact that, in Latour’s (2000) apt phrasing, technologies are ‘full of people’ (p. 10). Accordingly, this chapter has explored the peopled ecology of ‘the fibre project’, dwelling on the perspectives both of those involved in the materialising and maintenance of its physical infrastructures, as well as those on the ‘receiving end’ (Edwards et al., 2009, p. 371).

Each of the vignettes provided a qualitatively-distinct vantage point (Star, 1999) into the relational character of ‘the fibre project’. In ‘*Island Internet*’ I showed how the becoming (Ingold, 2011) of ‘the fibre project’ has provided an occasion for social assembly (Schwenkel, 2018), the materialisation of its terrestrial network, in particular, coming about thanks only to the concerted efforts of a loose network of locally-emplaced *brokers*. Calling attention to the ‘supporting acts’ (Parks, 2015, p. 370) whose structures of knowledge have organised material resources (and vice versa), this vignette went against the grain of more conventional framings of community-led broadband development, in which the process of coproduction is treated as an inherently collaborative and constructive undertaking, by highlighting that the process of coproduction is one marked by both technical *and* social difference (Hess, 1995, p. 21).

Describing the diverse labour costs involved in the materialisation of the terrestrial network, I noted that despite their shared concern for maximising available *capacity* and *availability* across the network, the brokerage of ‘the fibre project’ was also one mediated by

competing regimes of legitimacy, claims to expertise, and socioeconomic interests, each colouring the actions of those involved, in a process which has at-times had a more agonistic overture (Mouffe, 2013). Moreover, rather than assume that the individuals most intimately involved in the shaping of the physical infrastructures of 'the fibre project' necessarily possess an already formed (or, at least, recognised) expertise, in this vignette I illustrated how expertise and authority have at-times emerged from improvised practices 'performed amid partial knowledges and intransigent materialities' (Appel et al., 2018, p. 13). In the concluding portion of this vignette, I alluded to what might be called the paradoxical *quality of self-erasure*: namely, that by delivering on the mandate to secure both a subsea cable link and a full-fibre terrestrial network, the ostensible 'completion' of 'the fibre project' marks a certain existential endpoint to the very social infrastructures which drove its becoming (Ingold, 2011).

Following this, in 'Tl'l Yahda *Making things right*' I called attention to one of the numerous self-supporting communities of practice facilitated by 'the fibre project' by drawing on my time as Internet Connectivity and Accessibility Program Coordinator for the CHN. Describing the three-pronged approach taken by the iPads for Elders program to broaden *Access*, recognising that 'Not everyone has an internet connection or devices', to assist with *Affordability*, as 'Not everyone can afford to get online', and to improve *Digital literacy*, as 'Not everyone knows how to use technology like smartphones, tablets and web browsers' (Archer, 2021, n.p.), I showed how locally-emplaced actors have made efforts both to distinguish between matters of access, availability, and adoption (Manlove and Whitacre, 2019) and to broaden the productive uptake of digital technologies through tailored, locally-resonant approaches to social outreach. Accordingly, this vignette serves to highlight that the mere availability of physical infrastructures is by no means a guarantor of their situated and

meaningful usage, and that questions of access often belie the hierarchies and idiosyncrasies of access amongst those that do.

In this vignette, I further described how a distinctly Haida ethic of mutual aid, based on the principle of Tl'l Yahda *Making things right*, was central to the shaping of the iPads for Elders program, particularly in terms of the decision for eligibility to be open to both Haida and yaatz xaadee *non-Haida* Elders alike. An illustration of the widespread understanding across the infrastructural space of Haida Gwaii that 'true access involves more than availability; it also includes affordability and adoption' (Hudson, 2013, p. 44), as well as an example of what McMahon (2020) has described as an 'Indigenous-led […] demand side intervention to support digital inclusion' (p. 2), this vignette forms part of the basis for a subsequent discussion of the infrastructural imaginaries of 'the fibre project' *as political artefact* in the *Discussion*, where I describe it as one among many 'articulations' (Clifford, 2001) within an expanded conception of digital self-determination.

Lastly, in '*The language work*', I showed how 'the fibre project' has augmented the sociomaterialities of learning practices among Xaayda kil knowledge keepers and language learners at SHIP. The vignette began by outlining that, in the face of persistent connective instabilities, the integration of new, and fundamentally *networked*, ways of doing has been hampered both by technical constraints and a certain organizational 'lock in' – a state of affairs which Papacharissi and Zaks (2006) describe as occurring 'when the switching costs forbid the adoption of the newer technology' (p. 72). However, owing both to the pressures of adaptation imposed by the COVID pandemic and to an emergent *taken-for-grantedness* of connectivity, I showed how the imagined affordance (Nagy and Neff, 2015) of (relative) reliability has established the basic conditions of possibility (Larkin, 2018, p. 183) to altogether new ways of doing 'the language work', and of being together.

In exploring the peopled ecology of ‘the fibre project’, this chapter has brought attention to the messy contexts of both its design and situated usages, and countered the idea that changes in physical infrastructure lead inexorably to changes in social form (Graham and Marvin, 2001). Highlighting the coevality of ‘the fibre project’ as both social *and* physical infrastructure, this chapter has shown ‘the fibre project’ to be both generative of new social infrastructures and contingent on those preceding it, to be both a shaper of social action and itself the outcome of social action. Taking inspiration from Simone’s (2004; 2021) notion of ‘people as infrastructure’, Hobbis and Hobbis’ (2022, p. 852) notion of ‘human infrastructures’, and Herman and Ausubel’s (1988) notion of ‘software’, this chapter has shown ‘the fibre project’ to be not so much a singularly material entity ready for ‘use’, but ‘an infrastructure generating possibilities of acting’ (Simone, 2021, p. 134) through affective, and often hidden, labour.



Fig. 37. Exterior of a home in Hlgaagilda *Skidegate,* following the extension of last mile.

Chapter 6 – Mobilities

'People are like trees, and groups of people are like forests. While the forests are composed of many different kinds of trees, these trees intertwine their roots so strongly that it is impossible for the strongest winds which blow on our islands to uproot the forest. For each tree strengthens its neighbour and their roots are inextricably intertwined. In the same way the people of our islands composed of members of nations and races from all over the world are beginning to intertwine their roots so strongly that no troubles will affect them. Just as one tree standing alone would soon be destroyed by the first strong wind which came along so is it impossible for any person, any family, or any community to stand alone against the troubles of this world.' (Chief Skidegate (Lewis Collison), 1966, n.p.)

Introduction

In this chapter I show how conceptions of space and time are contested as part of the sociotechnical change entailed by the development and deployment of 'the fibre project'. A rumination on 'the fibre project' in relation to the 'moving geographies' (Appadurai, 1990) of Haida Gwaii, it builds on Graham and Marvin's (2001) notion of 'technological mobilities' (p. 11) through five overlapping vignettes of infrastructurally-mediated flow, movement, and exchange.

In the first vignette, '*Coffee in Tlell*', I establish how, against a backdrop of economic stagnation and population decline, 'the fibre project' is qualified as instrumental to local economic development initiatives, animating aspirational narratives of renewal. Building on this, '*Not another Tofino*' centres on a townhall event in Daajing Giids, where a presentation from council prompts speculation as to the potentially disruptive impacts of 'the fibre project' on the local housing market. Next, in '*Homecoming*', I appropriate Weiss' (2018) notion of 'Haida homecoming' to describe how 'the fibre project' is constructed as a node to the

broader project of ‘re-aspora’, through a vignette centred on the experience of a recently-returned Haida filmmaker. Following this, in ‘*Digital settlers*’ I provide an ethnographic portrait of a recently-arrived yaatz xaadee *non-Haida* couple for whom the calculus of relocation rested largely upon the guarantee of widely available fibre, demonstrating how a once-sparse infrastructure is increasingly seen as a prerequisite of mobility.

Finally, in this ‘*This very lack*’, I introduce the reader to the minority of residents whose encountering of ‘the fibre project’ is informed by a decidedly more Mephistophelian vision of technology and modernity, and from whose shared schema of Haida Gwaii as a space of technological refuge arise deep-seated misgivings as to the probable social impacts of ‘the fibre project’. Together, this chapter serves to underscore that, as Starosielski (2015) writes, fibre is always ‘constructed in relation to historically specific social and environmental imaginations’ (p. 29), and in the process of its becoming, reorients lived connections across distance and difference (Clifford, 2013).







Fig. 38. A boy pushes a paper boat out to sea near K'aay Llna'gaay.

Foreground

It can at-times feel as though Haida Gwaii is a long way from anywhere. Equidistant from Luxor, Machu Picchu, Nineveh, and Timbuktu – as Musgrave (2015) so helpfully describes – the older Xaayda kil name, Xaaydlaga gwaayaay *Islands at the edge of the world* attests to the sense that the islands are somehow unto themselves.

Haida Gwaii is the ancient and unceded territory of the Haida Nation, who have occupied the islands since time immemorial, and today comprise roughly half of the islands' permanent residents. Alongside those on-island, most of whom live in Hlgaagilda *Skidegate* and Ḡaaw *Old Massett*, the islands' two present-day Haida settlements, the Council of the Haida Nation estimates that somewhere around half the total Haida population live off-island. Describing these 'populations in motion' in '*Shaping the Future on Haida Gwaii: Life Beyond Settler Colonialism*,' Weiss (2018, p. 63) notes that while some of this movement is voluntary, some is compelled on the basis of a desire for further education or career advancement. To that list of compelling factors might be added the islands' historic lack of connective infrastructures.

While it was only in 2019 that the last of the islands' communities received mobile coverage (cell service, for the Canadian readership), things have changed rapidly since. With full-fibre connectivity now available at all endpoints on-island, what has for so long has been a source of consternation is now, increasingly, seen as a source of competitive advantage. To many of those involved in local economic development efforts, 'the fibre project' is seen to offer the potential to attract newcomers, both in the form of people and, so its hoped, new business. And though the islands' population is showing signs of stabilising (Statistics Canada, 2021) decades of gradual population decline have led many to wonder whether 'the fibre project' might offer new ways of drawing people in – and, just as importantly, allow them to put roots down.

At the same time, it goes without saying that the islands have long been a magnet for those in search of a place elsewhere to the familiar rhythms of the centre (Dalzell, 1981, 1989a, 1989b; Musgrave, 2015). For those whose attraction to the islands comes on the basis of a desire to escape the dromology of modern life (Virilio, 1977; 2006), 'the fibre project' does not sit easily within long-established spatial imaginaries prefiguring infrastructural absence as an essential feature of the islands. For some, then, the technological mobilities entailed by 'the fibre project' are less spatially emancipatory as they are unwelcome incursions. It's often this way: '[while] major technological shifts are often couched in the rhetoric of irresistible, linear, essentially positive technological progress from one more efficient, powerful or convenient device or system to the next...technological changes often provoke nostalgic, anti-modern accounts of loss and decline' (Yusoff and Gabrys, 2011, p. 11).



Fig. 39. Red cedar logs sit in a sorting facility at the edge of Hlgaagilda *Skidegate*.

Coffee in Tlell

'When can we start'? In this vignette, I describe how 'the fibre project' is prefigured as central to local economic development efforts, particularly in relation to the attraction and retention of new residents.

For the past few decades, Haida Gwaii's economy has been in a spot of bother. Once driven by primary resource extraction, particularly in the form of raw timber export and commercial fishing, the transition from a space- to a place-based economy (Markey, 2012) has been a gradual one. For many, moonlighting and contract-juggling have become the norm, often involving a combination of fixed term contracts with local government or seasonal work in ecological tourism. 'You take what you can get', as one person would put it in the course of an interview. 'That's how it is out here. You either work five jobs at once or not at all'[67].

As growth has stagnated, the annual outflow of recently-graduated high school students has become increasingly entrenched, and increasingly worrisome. 'Youth and workforce retention is a growing concern', as one locally-commissioned market study coolly summarized it (Gwaii Trust, 2017, p. 4). 'It's a complex issue', say most, without adding much more. While few would go as far as suggesting that this exodus is directly attributable to the historic precarity of the islands' network infrastructures, there is nevertheless a widespread acknowledgement that it has not helped matters: 'It has been the albatross around our neck,'[68] reflected one individual.

'We have been steadily losing people and we are losing our children…we need to be able to ensure they have a way to make a living where we are' (Leask, 2015, p. 4), insisted one

[67] JM. Personal communication, Skidegate, 2021.
[68] JL. Interview, Zoom, 2021.

local broadband activist in a 2015 interview, while laying out the case for the subsea backhaul cable. 'We need to create the material conditions in which…we can attract amazing people… [and] we can *retain* amazing people' (ibid, emphasis in original).

Against that backdrop, local economic development societies have at-times framed 'the fibre project' as nothing short of providential. As the director of one such Daajing Giids-based society put it in the course of an interview, 'I think we're naturally going to see the progression of the knowledge worker here. I don't even think I need to advertise it, I think it's just going to happen. When you look at distributed companies, they are a logical solution. You could potentially headquarter companies here – they would have a very small footprint but open up a potentially larger tax base [and] widespread fibre would hypothetically be a way to solve our employment crisis. Honestly, under the 'attracting businesses' silo of economic development, virtual or distributed companies is really the only way you could go'[69].

'I think if we do get really fast, reliable internet, you could have all kinds of people here: could be animators, people working on films, you know. A submarine cable could help things so much. It's going to have such a positive influence on the economy.'[70] Berry sits across from me, a freshly-made cappuccino resting on the coffee table adjacent. Originally from the Netherlands, he first moved to Haida Gwaii a little over 20 years ago, settling for a time in Gamadiis Llnagaay *Port Clements* before venturing 'down south' to Tll.aal *Tlell*. A fisheries biologist and marine planner by training, Berry is blunt and matter-of-fact in a way that sits perfectly with my preconceptions of Dutch-ness: 'Look', be begins. 'Forestry is dying, and therefore your town is dying. But if you can attract ten or twenty computer geeks and

[69] JRT. Interview, Zoom, 2021.
[70] BW. Interview, Tlell, 2021.

convince them to establish a bit of a community, well…they really don't use up any resources. They don't hunt or fish. I'm not saying it needs to be the Silicon Valley of the North, but…' Berry pauses: 'Anytime people can do Internet-based work on the islands, I think it's good. It's bringing in outside money, and that gets distributed. That's always a good thing and should be encouraged'.

Rising to fetch himself another coffee, Berry adds: 'The only thing is the weather sucks. I always say that if we had the climate of California, there would be a million people living on Haida Gwaii. But we don't. It's been raining for three months straight'. Berry unearths an iPad in amongst a stack of papers in front of him. Turning it on, he tells me that, aside from the handmade chocolates he's recently started selling at the farmer's market (the white chocolate and chanterelle variety having found particular popularity), much of his free time these days goes into drawing comics, as part of a series he's titled 'Islanders'. He passes me the iPad. This one, he tells me, ran in the local newspaper a few years ago.

On the screen, two cone-headed stick figures sit on a bench, while a single sheet of paper floats by, carried by the wind. Turning toward their neighbour, the first stick figure asks: '*What was that?*', as the paper floats out of frame. '*The new phone book*', the other responds. 'Sometimes all you can do is laugh', Berry chuckles.



Fig. 40. Attendees gather at a townhall event in Daajing Giids.

Not another Tofino

How will we stay a community? In this vignette, I describe how promissory narratives of economic renewal collide with speculations as to the micro-economic impacts of fibre, and show how 'the fibre project' is established as an antagonist of 'rural gentrification' (Phillips, 2010).

If, as I earlier proposed, the mark of a successful technology is to 'become infrastructure' (Dourish and Bell, 2011, p. 95), then the inclusion of 'the fibre project' on this evening's agenda – alongside such other pressing local matters as a proposed expansion to the local walking trail network, an application for roadway re-zoning, and details on septic tank retro-

fitting – should give some indication as to the central place it occupies in the politics of the everyday.

A dozen rows of plastic chairs fill the long rectangular room of the community hall. At one end of the room, a lectern and projector; at the other end, a medley of home-made refreshments and a 30-litre silver drum coffee machine. I overhear someone say they're anticipating a crowd of over 100, and that for those who couldn't make it, the Haida Gwaii Radio Society – a recently-launched local internet-radio streaming service providing coverage of sporting events, local politics, and the odd potlatch – has arranged to live-stream the event.

A white board labelled 'COMMENTS' sits near the front entrance, with a small stack of pens and dry-erase markers in a pile nearby. Two sheets of A4 paper have been affixed to the top of the whiteboard. '*What do you Love* ***<3*** *about our community that you don't want to change?*', asks one. '*What would you* ***change*** *if you could?*', asks the other. A patina of pastel sticky-notes dots the surface beneath.

Among those already seated, copies of the evening's agenda are passed around. Flipping to the second page, I note a textbox outlining the village's inaugural 'Resident and Business Attraction and Retention Strategy', part of council's broader efforts to develop a ten-year strategic plan. It's a remarkably candid and detailed document, four pages of which outline the community's perceived 'strengths', 'weaknesses', 'opportunities', and 'threats'. The next page contains a frank assessment of present-day realities ('Dead zones and inconsistent coverage in the community for high speed internet') contrasted against long-term aims ('Subsea cable provides high speed internet so residents can work anywhere - doing global business remotely)'.

Lisa, the longest-serving member of council, walks to the microphone and asks if we might all, kindly, begin to take our seats. Tapping the microphone, she addresses the crowd:

‘One of the strategic priorities for council is to ensure that our community planning takes into account – and addresses – any infrastructural deficits that could impact the attraction of new industries and businesses. So that’s a big part of what we’re here to talk about tonight’. Mayor Olsen chimes in, his booming voice needing no further amplification: ‘It’s really important that we hear what you love about this community, but also how we tackle the problems into the future. How do we find a new Warren for the City Centre grocery? Or what about the boys down at the tire shop – who is going to take over when they retire?’, he asks. Pausing for a moment, he continues: ‘I grew up here, a lot of us grew up here, and it’s a wonderful place to raise a family. We need to bring more people here…so like, with fibre, it’s going to be possible to live and work for everyone. So that’s something we’re going to be taking into account as we develop our resident attraction strategies over the next couple years’.

Wheeling the whiteboard over to the lectern, Mayor Olsen begins peeling off the sticky-notes, arranging them neatly into colour-coded piles before reading them aloud: ‘*What do you Love* ***<3*** *about our community that you don’t want to change?*’, asks the first in the pile. ‘I love that everyone knows one another’, reads the response. ‘*What would you* ***change*** *if you could?*’, asks the second. ‘Better internet’, reads the response.

A report from council gets underway a short time later. Several in the audience take this as an opportunity to check their phones. Questions follow. Hands shoot up. A woman near the back is the first to speak: ‘I’ve heard you talk a lot about economic development, but…I suppose my question is, what is council actually doing to help?’. The members of council respond, one by one, the overall message being ‘all that we can’. An intermission follows. Some head for the coffee machine, others venture outside to stretch their legs by the water’s edge. I opt for the latter group, and soon find myself speaking with Tim, a web developer in his mid-20s. Tim tells me he’s only been on-island for about five months, having previously

lived in the surf town of Tofino, and before that, in Victoria, the provincial capital, where he worked at a tech start-up. 'I'm just kind of making this gradual path northwards, you know, in search of surf and peace, I suppose', he tells me. Tim has lived in quite a few places over the past few years, the common threads being sand, surf, and sun. He tells me he's always felt a certain magnetism to places one can 'get away from it all': '…it's a breath of fresh air in some ways, right?', he comments. 'I mean, myself coming from like, start-up tech world, it's like…here it's a little bit different, right? There's another force at play'[71].

A grey-haired woman strides over to us and joins in the conversation. She introduces herself as Gail and asks what brought each of us to the islands. Tim explains that he's been recruited to design a digital selling platform for local artisans: 'Like an Etsy for Haida Gwaii', he explained. The project is already a few months behind schedule, but he isn't particularly worried: 'We're moving on island-time…But it's moving along.' The novelty of an 'Etsy for Haida Gwaii' is lost on neither Gail nor myself: a few years ago, proposing something of the sort would have been ludicrous. What would have been the point? You can't sell much pottery if you can't upload a jpeg. Now, it seems only natural. A sign of the times.

I ask Tim if he has plans to make Haida Gwaii a permanent home: 'At this point, it's too early to tell. That takes a certain type of person perhaps…And I don't know if I'm there yet', he responds. 'Does that make me a digital nomad?', he asks, laughing.

A few people have begun to file back indoors. Intermission over, we cut the conversation short, head inside, and return to our seats. The final presentation of the evening is delivered by the chair of the local housing development association, who shares details of a proposed

[71] TF. Personal communication, Daajing Giids, 2019.

social housing complex near the site of the old hospital. Questions follow. Rising from her chair, a woman confides that in recent weeks she's begun receiving weekly phone calls from property development companies: 'And Re-Max, they left a note on my front door, a sticky-note, saying they'd give me three times the market value'. This seems to touch a nerve.

Nodding in agreement, a young man to her left stands and adds: 'It's a scary state of affairs. We can't have Haida Gwaii become another Tofino. I want us to stay a *community*, not to become a place for wealthy people to come and purchase on-spec… and I don't know how we are protecting ourselves against that. I don't want us to become a community of two-to-fivers!'[72]. The comment appears to require little further elaboration: Tofino, the great sell out, the Instagram-friendly worst-case-scenario, rural gentrification (Phillips, 2010) at its most overt. I cannot help but feel a certain sense of awkwardness on Tim's behalf.



[72] As far as I've been able to establish, a 'two-to-fiver' is a local pejorative used to describe those transient, socially-disconnected, career-oriented new arrivals either unwilling or unable to adjust their tastes and expectations to the realities of island life. So named for the typical length of their fixed-term contracts – two to five years – there is strong overlap with Pinkerton's (1981) description of a class of government-employed 'rotaters' (p. 23) in Daajing Giids in the mid-1970s, a group perceived by others as having 'never mentally [left] the urban setting which spawned them and to which they aspire to return' (p. 162).

Fig. 41. A member of council responds to a question.

In recent years, the local rental and housing market has been significantly altered by an increasing numbers of homes being transitioned from year-round rentals to vacation rentals, an increased number of purpose-built vacation rentals, and speculation from off-island prospective buyers; local housing commission reports openly acknowledge that tensions surround '…Airbnb in the community and the pressures the service has put on the housing market' (NCRD Electoral Area D, 2022, p. 7)[73]. As the discussion period gravitates further toward the matter of land speculation, a phenomenon which many seem to feel is connected to a recent wave of comparatively-affluent off-island buyers making opportunistic investments, another audience member speaks up: 'That housing has been removed from the market, and I don't agree with that. I really don't. I think we do have to find a way to provide short-term and long-term housing for tourism and economic growth and for people to have housing up here…maybe there's a way to cap speculation on homes, where if you're coming here you have to move here and live here. You can't just come up here, buy land, create something that you're then not there for. So, there's ways to do this and control this in a healthy way that can provide opportunity for lots of people – but mostly for us, mostly for locals.' [74]

Gail is next to raise her hand. 'As a realtor', she begins, 'if the village is saying they're going to go out and recruit people from off-island on the basis of faster internet, well I would have a concern as to what that might have, as a knock-on effect, for the market'. No one can

[73] The notable exception to this was in Electoral Area D, an area comprising the islands' most rural regions, whose housing needs assessment report noted that survey respondents 'feel that homeowners should have the freedom to use their property as they see fit'; See: NCRD Electoral Area D, 2022, 'Housing needs assessment report', p. 7. It is also notable that of the five housing needs assessment reports released by the islands' municipal governments in the past five years, the report from Electoral Area D is also the only one to explicitly speculate as to how the availability of fibre could negatively impact local housing markets, noting that as connectivity 'becomes more affordable and reliable in the coming year or two, this price pressure could further accelerate' (p. 26).
[74] TH. Personal communication, Daajing Giids, 2019.

deny the conspicuousness of the Sotheby's signs along the ocean-facing properties of Tow Hill Road or in the window of the hardware shop along Front Street in Tlaga Gaawtlaas *Masset*. The real question, then, doesn't seem to be *whether* they will come, but *where* they, and everybody else, will live.



Fig. 42. A luxury real estate sign in the window of a hardware shop.

Another woman chimes in, taking the conversation away from the matter of land speculation, *per se*, and toward the matter of spatial representation, offering an analogy: 'Remember when there used to just be a barge?', she asks the crowd. 'You know, once the ferry service started people's expectations of access – well, outsiders' expectations of their access to Haida Gwaii – changed'. She pauses for a moment, as if to check we're all following along. 'And maybe it's the same with the internet, you know, as it's starting to

improve… I just wonder, you know, long term, how…how does that change people's thoughts on this place?'.

The chair of the local housing development association rises, calmly explaining that while he sympathizes with the concern, it may be a bit overstated, and that it's for that very reason that 'we're actively looking into co-operative housing models'. Then, in a welcome resolution to the tension in the air, he segues into a story: 'I was at an event recently and the mayor of Whistler said, '*Dammit, you guys in Vancouver, you can sell one house and buy three here*'. And then the mayor of Nanaimo said, '*You guys in Whistler can sell one house and buy three here*!'. And then the mayor of Port Alberni said '*Look, you guys could buy our whole town*''. Polite laughter punctuates the silence. 'I guess there's some small comfort in knowing we're not the only ones', mutters the woman to my left.



Fig. 43. Children run after school along Front Street, Hlg̲aagilda *Skidegate*.

Homecoming

How might fibre facilitate the return of those abroad? In this vignette, I consider how the emergent connective ecologies of 'the fibre project' are seen to open the door to 're-aspora'.

Rounding the northward bend of Highway 16 at K'aay Llna'gaay, Front Street comes into view. I pass Jag's, then Rosie's, slowing the car to a crawl as I near the Unity Pole. Like most others along this particular stretch, Nang K̲'uulas *Patrick Shannon*'s house – he sometimes still refers to it as 'nanaay and chinaay's house', though it's been over a decade since they passed it on – is bordered by a sharply-sloping front garden and a lengthy staircase extending upward from the sidewalk.

I first met Patrick around ten years ago, a few years before work on 'the fibre project' had begun in earnest. At the time, broadband on Haida Gwaii was unstable, unreliable, and exceptionally bandwidth-limited, something which could never quite be counted upon when you needed it. Frustrated but motivated to help, Patrick had at the time recently joined the board of directors of GwaiiTel, where he had advocated for a more technologically-neutral approach to network development, believing that 'the fibre project' ought to be seen as one among several systems serving the islands in the longer-term. 'I was paying on average $200 per month for a nominal amount of bandwidth, at very inconsistent speeds', Patrick recalls of this period. 'At certain times of the day, everyday, it was completely unusable – and I had some of the best Internet because I'm on Front Street, where it's mostly Elders who didn't use it that often.'[75] Never one to hide his techno-optimism, he once described in an interview that, 'My dream, my goal, is to see Haida Gwaii be the technology hub of Northern B.C.' (Leask, 2015, p. 2).

[75] PS. Interview, Skidegate, 2020.

Once inside, Patrick offers me a coffee, and, returning to the kitchen, pours himself one as well. There's been another power outage, and Patrick has invited me and a handful of others over for a night of boardgames. He's done the place up a bit since I was last here; on the wall behind him, a thin black bookshelf displays a row of collectible Star Trek figurines, neatly positioned next to an antique 16mm film camera.

While waiting for others to arrive, we get caught up. He asks about my doctoral research; I ask him how 'the fibre project' has influenced his plans to move back to Skidegate. Patrick, like me, can sometimes have a long-winded approach to anecdote, so begins with a story: 'So, there's about 130km between Skidegate and Old Massett, right?', he begins. 'Before the internet, north end kids and south end kids hardly ever interacted… and when we did, those interactions were mainly negative. There was a real sense of rivalry and the only time we would meet was at a dance or event – especially basketball games. It was tense. Usually there would be at least one fight that would break out. I guess you could say our only connections were forged in a competitive space. It was pretty rough'. He pauses.

'Some of that was a matter of resentment: The south benefited disproportionately from the creation of Gwaii Haanas, where you had government officials and academics in the south. Then the military base pulled out of Ḡaaw *Old Massett*. That took half the residents and sent the north into an economic decline. So…so a multitude of factors led to that tension. But a lack of opportunity to connect contributed to that distance. But since then, since getting broader Internet coverage, we've been able to use technology to break down those barriers. Now, kids know one another. They talk, they share ideas, they start all-islands working groups on issues that matter to them.' He pauses again. 'So you know if that's anything to go off…I mean, if that's the sort of positive impact we've seen with the Internet the way it's

been until now, I have faith in the days ahead. I feel good about what fibre could kickstart here'[76].

Patrick has spent the majority of the past five years on the road, jumping from project to project, having established himself as one of the most sought-after Indigenous filmmakers in North America. 'Always on the move', I comment; 'It's been out of necessity, trust me', he responds. A few weeks here, a month there; I doubt this is what Clifford (2013, p. 51) meant by 'Indigenous commuting'.



Fig. 44. Fibre lies along a trench in Hlgaagilda *Skidegate*.

Patrick has just begun to tell me about a new documentary he's begun to develop – 'the story of basketball on Haida Gwaii, told through the history of the All Native Basketball Tournament' – when the doorbell rings. Inviting us to the kitchen table, Patrick returns with a

[76] PS. Interview, Skype, 2019.

large rectangular box, and asks if we might want to start with a boardgame of his own making: 'The Haida Gwaii Game'. ('It's a working title'). The playing surface consists of an aquamarine blue topographical map of Haida Gwaii – all of it, from Nee Kun *Rose Spit* to Kunghit Island – split across four panels. The basic premise, Patrick explains, 'is to acquire resources and then give them away at a potlatch'. Each player controls the movements of their respective clan, with canoes used to move between winter and summer settlements. Land-based movements are dictated by a roll of the dice; water-based movements are dictated by currents indicated by thin white arrows.

I grab a handful of the thimble-sized, 3D-printed polymer playing pieces, which consist of totem poles, longhouses, and war canoes, and each of which appear to have gone through several design iterations. The dice bag is passed clockwise, while Patrick hands out resource cards, each containing a short list of instructions and details. Patrick tells us he has plans for an updated version of the board game, a Xaayda kil version, in which language will feature as a direct mechanism of play: 'Speak English, even once, and you're penalized'.

Play gets underway. 'Coming and going has always been a fact of life on Haida Gwaii', Patrick comments, moving his playing piece three places to the left, shunting the table slightly as he does so. 'Back in the day, we used to summer in one village, and winter in the next. And don't forget that in the 1900s a lot of Haida left for work in Victoria, Vancouver, San Francisco…'[77]. Patrick nudges a raven-topped totem pole one square to the right, collecting five salmon. 'And it's the same in other Indigenous communities. People are always going away for schooling and work. 'Urban refugees', they're called'.[78]

[77] In his fieldnotes from an early expedition to the region, Boas (1888) notes the significance of these labour migration patterns: 'The stranger coming for the first time to Victoria is startled by the great number of Indians living in this town…we met them everywhere. They dress mostly in European fashion. The men are dock workers, craftsmen, or fish vendors; the women are washerwomen or working women… [they] have become indispensable to the labour market and without them the province would suffer great economic damage' (p. 629).
[78] PS. Interview, Skidegate, 2020.

Boardgames have never really been my thing. Three hours later, I'm the first to be knocked out, having squandered the last of my winter salmon stocks in an ill-conceived trade for k'aaw.

A few weeks after playing 'The Haida Gwaii Game', Patrick and I sat down for an interview. I wanted to ask more about his experience of leaving the islands, of becoming an 'urban refugee' as he had put it, and of the influence of 'the fibre project' in mediating his decision to return. 'Our shitty Internet wasn't *the* reason, but it was certainly a big one', he tells me. There came a point, he says, of acute awareness that the islands' bandwidth limitations had left him 'few options *but* to move. I was really getting some momentum with film-making and…video files are heavy, and physically sending hard-drives costs a lot. I couldn't work from here, from home. No way.'[79]

With each successive departure and return, Patrick tells me, he has felt the cultural consequences of time away: 'it took some time to learn how to be back on Haida Gwaii'[80]. In the simple act of 'being at home, as Haida', he tells me, 'village life' imparts a sort of cultural immersion, an insurance against acculturation, that he might never become 'completely city': '…you have a real different perspective when you're completely city... you don't go hunting, fishing, all those things'.

'With fibre, the idea is…I won't need to be in Vancouver quite so much, I won't need to rent an empty apartment in Montreal just in case some work comes up. That's becoming a feasible thing now. Suddenly we've got internet that seems unlimited, that works all the time, and costs half as much. It's awesome', he tells me.

[79] PS. Interview 2, Skidegate, 2020.
[80] PS. Personal communication. Skidegate, 2020.



Fig. 45. Jay and Deccy fish along a creek near K'il Kun Llnagaay *Sandspit*. For a growing number of would-be residents, fibre acts as a powerful lure.

Digital settlers

Where does fibre 'stack up', in amongst a broader hierarchy of needs? In this vignette, I describe how the availability of fibre is increasingly described as a 'prerequisite' to relocation on the part of prospective residents.

The physical landscape of Haida Gwaii is not for the feint of heart. Famously rugged and breathtakingly beautiful, the islands' frequent labelling as 'the edge of the world' (Gill, 2010; Musgrave, 2015) is not without geological merit: sitting at the edge of the continental shelf, Dowie (2017) writes that, '[t]here are few other places on the planet with shorelines as hostile to man and nature. Together, wave and wind toss huge boulders and massive driftwood

timbers over tall bluffs, smashing them into spruce forests that have somehow survived centuries of bombardment' (p. 2).

And while that's served the islands well in some respects – tourists *love* waterfalls – neither the rocky terrain nor the unyielding coastal storm fronts which sustain it are in any way conducive to the optimal functioning of the line-of-sight reliant, fixed-wireless network on which the islands historically relied for backhaul. One day things would work, the next they wouldn't. One person lives within a 'serviceable area', their neighbour doesn't. As an article in one of the local papers aptly put it, the result was that while some 'already enjoy Internet speeds fast enough to stream videos, others are limited to snail's pace email, and then only when their connections work' (Hudson, 2016b, n.p.). Luck of the draw.

While inventive residents have certainly found ways around this, some even taking online courses or carrying out limited term remote work contracts, prior to the initiation of 'the fibre project', the fickle nature of connectivity made the prospect of full-time remote work entirely out-of-reach for most. A 2015 blog post from a software engineer residing in Tlaga Gaawtlaas *Masset* provides a glimpse into what this has historically looked like:

> '*For the last sixteen months, when I 'go to work' everyday, I walk from one room in my house to the other room in my house, sit down in front of a pair of giant computer monitors, a web cam, and start talking to people 1000 kilometres (that'd be 1 megametre) away. Im extremely lucky to be one of the people who can work anywhere, as long as I have a reliable internet connection…When Rosie and I were talking about whether we could move up to Masset, on Haida Gwaii, I was a little concerned about the remoteness and whether I could stay in good contact. Afterall, I had worked on survey boats a few hundred kilometres north of here off of a VSAT internet connection and it was pretty awful Low bandwidth. Long delays. It was pretty much impossible to anything interactively. I could make it work, but it was*

> *substantially less productive. Not to mention that I was only responsible for myself and didn't have to manage anyone, like I do now*' (Hiebert, 2015a, n.p)

For many I spoke with, the establishment of ubiquitous full-fibre connectivity has single-handedly brought into view the possibility of location independent remote work – or, 'computer jobs', as one would succinctly put it. David, a digital marketing specialist, and Heidi, a closed-caption transcriptionist, are one of a growing number of recently-arrived yaatz xaadee *non-Haida* from 'off-island' whose arrival was only made possible by the promise of fibre.



Fig. 46. A sign is affixed to a piece of wood, ready for display at the boundary of Daajing Giids. Soaring real estate values have become a source of local concern.

I met Heidi and David just a few weeks into my fieldwork, after Heidi recognised me as 'the internet survey guy', and asked if I might be interested in volunteering every-so-often at

the Seniors' Centre in Daajing Giids, where a tech support program was offered every Friday afternoon. Today, I find myself seated in their front garden, bounded by a stand of birch overlooking Xayna *Maude Island*. As Heidi draws the screen door behind her, Zappa, the couple's three-year old Golden Retriever, wags anxiously indoors.

Heidi and David arrived on Haida Gwaii four years ago, having first travelled to the islands as part of a tenth wedding anniversary gift to one another. They were living in Victoria at the time, and to say that David's health had taken a turn for the worse would be to undersell the severity of the situation. 'I had kind of done all of the doctoring I could', David tells me. 'At some point we thought, 'Well, maybe it'd be easier to manage in a place that's a lot more calm and close together, and in some ways easier to manage, easier to live in''[81].

Heidi agrees: 'David looked better than he did in months, so I was like, 'We *need* to move here'. That was it'. It took less than a week of being on-island for them to establish a basic timeline of their planned relocation, but before the plan could be put in motion, they needed a few assurances – chief among these, details as to projected timeline of 'the fibre project', as this, Heidi explains, was the guarantor to ensuring the seamlessness of 'importing [their] city jobs'. The first conversation they thought to arrange, then, was not with a real estate agent or bank but with the owner of a now-defunct Daajing Giids-based Internet Service Provider (ISP) involved in the build.

'I asked them what the situation was', David recalls. 'Whether this really was happening, and if so, *when*'. Just to be safe, they secured an additional mortgage, an insurance policy of sorts in the event that they would need to pay for the cost of last-mile installation out-of-pocket: 'We had been quoted sixty thousand for that…and we were willing to pay it. That was a strong incentive for us', David tells me, before backtracking. 'Maybe incentive isn't the right word. More like *prerequisite*'. Heidi nods in agreement: 'We needed water, power,

[81] DA. Interview, Daajing Giids, 2022.

firewood, and fibre internet. Those were, and are, our utilities. We put more consideration into the Internet connection than we did the property value or the house itself, or really any other factor when we were looking to buy. It was the first item on the list…we couldn't have moved here, at least not then, without that'.

It begins to rain. We step inside. The lay-out to Heidi's office, just off the main hallway and encircled by a sprawling split-level bookshelf, speaks to the very online nature of her daily routine as a live-stream closed captioner: three large, wall-mounted flatscreen monitors, several rows of keyboards, and a generator, off of which extends a 52kb modem. 'A back up, just in case', Heidi explains.

In the four years since moving, Heidi and David have established a deep attachment to place and a strong integration into the broader community: 'This is our home… our forever home', Heidi tells me, smiling. David has recently started selling Montreal-style bagels at the Saturday Farmer's Market, his salted spruce-tip variety being a particular crowd-pleaser. Heidi, meanwhile, has recently opened a bookstore, after initially launching it as an online shop. (A Facebook ad from the other day: 'Shop from the comfort of your couch, bed, or toilet'...'the Amazon experience without the problematic billionaire'). I notice a copy of Timothy Ferriss' *The 4-Hour Work Week* on the shelf just behind David and make some passing comment that, in a way, David and Heidi arrived on Haida Gwaii as the first wave of digital nomads. Heidi laughs, then corrects me: 'Digital *nomads*, no. More like digital settlers, I guess. Although, you know, I don't *love* that word. Anyway, we knew what we were getting ourselves into, and we came without the intention of leaving.'

'When we moved', David adds, 'we actually both felt like we were on the crest of a potential wave, because we were watching this happen in other communities too…where people move to the middle of nowhere, somewhere, because of similar reasons. You know, there's more people doing internet jobs'. I ask him if this prediction has played out. 'Yes and

no'. Heidi jumps in: 'Even in the short time we've been here, Haida Gwaii's gone from a place you lived on or moved to *despite* the Internet to, with fibre, a place you live *because* of it'[82]. But, she adds, 'Good internet doesn't mean shit if you can't buy a house. If you can't find a place to live, who cares if you have email? All of that is secondary if you can't sleep anywhere'.

[82] HA. Interview, Daajing Giids, 2022.



Fig. 47. Jess butchers a rabbit.

This very lack

Might 'the fibre project' have a Janus face? In this vignette, I bring into view the minority of islanders whose encountering of 'the fibre project' is marked by ambivalence and dissent.

The drive north passes quicker than expected. 'There's a certain amount of counterculture people on-island, I guess I'd call them…or that's what some people might call them out there... you know, more independent people. I guess I'm one of them', Jess says, laughing. 'Some people would call us rednecks, but I prefer the term *yippieneck*'[83]. The local paper later provides a preliminary definition: 'Yippieneck' – a redneck logger turned yuppie businessman turned hippie logger activist' (Morris, 2022, p. 16).

A healthcare worker by training, since arriving on Haida Gwaii ten years ago, Jess has made conscious efforts to 'cut out technology' wherever possible, and concedes that while it may be impractical to fully disconnect, if it were up to her, connectivity would only be allowed in certain prescribed geographies of the islands: 'There need to be limits on what things, and what sorts of *places* especially, are connected to the Internet', she tells me on the drive. 'Like take Gwaii Haanas. The whole idea is that there is nothing there. *Get used to it*!', she says, laughing to herself. 'I'm worried sometimes that development is going to affect that… I see this place as a little haven away from modern day tech crap'.

The collection of ice-cream pails at my feet, each overflowing with chanterelles, boletes, and the occasional hedgehog mushroom, are testament to our autumn morning well spent. Arriving back at her property a little after noon, Jess wastes little time busying herself with the next task. 'Those will go great in a stew with some rabbit', she comments, gesturing

[83] JS. Personal communication, Tlell, 2021.

toward the pail. ‘Do you eat meat? Do you want a rabbit? A treat, on me’. I ask if I can help. ‘No need’, she responds. Probably for the best.

Jess walks over to the rabbit enclosure, where a new litter has been born just a few days prior. Tucked into a small nest lined with discarded fur, their skin is matte, and their eyes still closed. One has not made it through the night: ‘there’s usually one that doesn’t make it’, Jess says, scooping its body into one hand while latching the enclosure with the other.

We walk over to a separate cage, where a grey Belgian Giant sits in solitary ignorance of what is about to befall it. Securing the rabbit by its hind legs while standing firm on a steel re-bar positioned under its chin, Jess pulls up. The sound is unambiguously chiropractic. The rabbit goes limp. Suspending the carcass from the apex of a ladder using a short piece of twine, Jess reaches for a pair of scissors, creates an incision near the neck, and begins to pull away the skin. Her hands busy with the work of dismemberment, Jess returns to a line of conversation from earlier in the day, and begins telling me how, for her, the magnetism of Haida Gwaii has always been equal parts ‘its remoteness, the mystical quality that surrounds it’ and the opportunity to live an altogether more self-sufficient existence. ‘I’ve got one sharp knife and a garden. That’s all the technology I really need.’

Dragging the knife between the rabbit’s shoulder blades, Jess deftly carries on the work of butchery. ‘I definitely don’t look at Haida Gwaii as the cutting edge of technology. Like, in fact, I suppose…I was drawn to it *because* it’s back to basics, it’s down to earth. Those are qualities that I value, and they’re qualities I think you need if you’re going to escape the materialistic world where everything is flashy and fast. Like, I wanted something that’s *slow*. The land, the animals, those are things that really matter to me. It’s that very lack that I so love’, she tells me.

In her illuminating ethnography of Daajing Giids, Pinkerton (1981) describes how, among the numerous waves of yaatz xaadee *non-Haida* to visit Haida Gwaii over the years, the roughly twenty-year period between 1960 and 1980 saw a particular concentration of young, idealistic American emigres, many lured in by the promise that it might prove germane to the pursuit of an existence concerned with 'ecology, alternate energy', an orientation toward freedom from work, and 'a gradual 'expansion' in the amassing of tools, skills, boat, truck, etc. to enhance their use of the environment' (p. 27 – 30). The islands' geographic remoteness was not incidental in this respect, as it is in such 'faraway places' that so many have seen the possibility of transcendental escape.

Though many of this wave have since moved on (whether in an ideological, geographic, or mortal sense), others, like George[84], have remained. Describing himself as part of 'the last generation who remember a time before the Internet'[85], George agreed to meet me for an interview so that I might become better informed as to the reasons why he harbours such distrust, as he puts it, toward 'the fibre project'. Jess provided the introduction, in a roundabout way.

It's a little after 9am when I set out to find George, who for the past six months has been living rent-free in a cabin on a quarter-section of Crown land 'about two miles' inland from the highway. Not coincidentally, the approach is next to impossible to identify; George tells me he's 'doing everything I can to let the original older trail become overgrown and unfindable'. Enclosed by a corridor of sprawling, evenly-spaced second-growth cedar and spruce, the cabin sits just a few metres from the rusted husk of an abandoned bailer, adjacent to what was once a homestead. Ferns, New Zealand broadleaf, and a crush of other dense deciduous shrubbery crowd out the base of most trees, all of which seem to lean inward somewhat, bowed by the relentlessness of the westerly wind.

[84] Name changed at request.
[85] GK. Interview, Tlell-ish, 2022.

A self-described Luddite, George lives a solitary life of conspicuous parsimony. He does not own a television, nor a mobile phone, nor a laptop. The bulk of his annual income comes from seasonal work on fishing boats and, in the autumn months, foraging for chanterelles, though he estimates this is likely only to be the case 'for a few more good years'.

Inviting me inside, he takes a seat across from the fireplace. The shelves, or what remain of them, are lined with books whose titles suggest an over-riding concern for matters of personal wellbeing, skill-building, and environmental stewardship, interspersed with a certain New Age sensibility; 'Chemtrails, HAARP, and the Full Spectrum Dominance of Planet Earth', 'Under An Ionized Sky', and a copy of the *Whole Earth Catalog* round out what looks to be a collection built up over many years. Though modest in size, through an intricate series of micro-hydro-generators, gravity-fed water pumps, and retrofitted solar panels, George has managed to equip the cabin with both running water and electricity, free of charge, free of surveillance, free of taxation. Dotting the exterior of the room are a series of small, dark grey pucks – orgone crystals, or 'Tower Busters', proponents of which, I would later learn, attest to their capacities to transmute negative energy into positive energy, enhance sleep and overall health, boost plant growth, and, most importantly for George's purposes, reduce the presence of electromagnetic pollution caused by the presence of large-scale electrical networks.

Indeed, as George would go on to tell me, his sensitivity to 'electrosmog' is part of the very reason he has remained on Haida Gwaii for so long. 'Out here there are fewer towers', he tells me, while turning on the Acoustimeter, a device used to detect the presence of radio frequencies, which he keeps by the door. I've left my mobile at home, as asked – 'no cameras, no phones' – and so do what I can to jot notes as we speak.

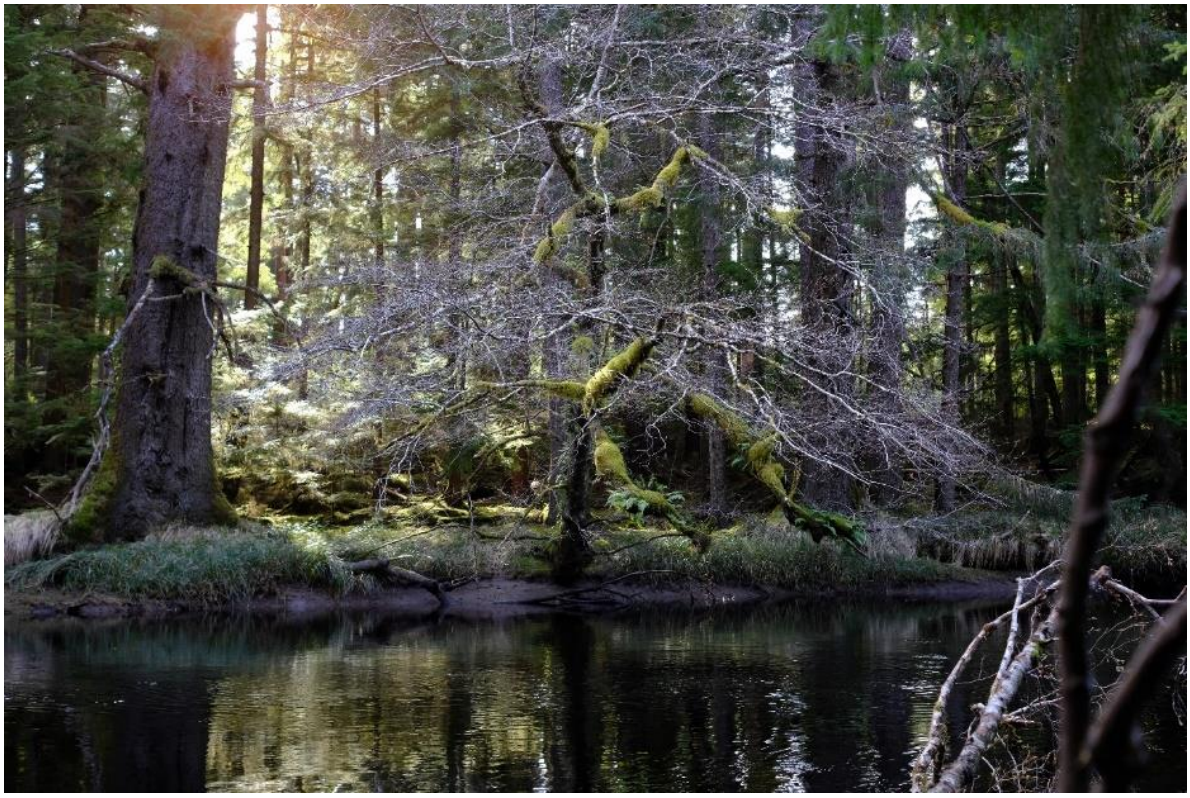


Fig. 48. Moss-laden tree branches hang over Tll.aal Gandlaay *Tlell River*.

There is a palpable quality of nostalgia to his story-telling, many stories seeming to take the form of trial and triumph, stories of adversities faced in 'the early days': 'There were no cell phones, no ferry service, and not much anything else. Back then, it was different. People drove all these beat up pickup trucks and stuff. There were a lot of hippies, and I was one of them. We lived in shacks, squatted in old cabins…It was very remote. You had to come on a barge'. He pauses before launching into an anecdote that, in retrospect, does something to contextualise the resistance with which 'the fibre project' has at times been met with, particularly in these more rural and sparsely-populated regions of the islands: 'When the ferry was proposed, not everyone celebrated. I was one of the people protesting against the ferry: 'We don't want the ferry! It's going to ruin this bay!', that kinda stuff'.

Then, as now, he tells me, there are some, like himself, who feel that the 'essence' of the islands is eroded in the process of infrastructuring. This is part of the reason why, he reckons,

a proposed road upgrade was recently rejected by a group of residents in the area of Dead Tree Point: 'It was the same with the towers. They couldn't get people to agree to it [out here]. Nobody wanted it. The idea being, as soon as we get any sort of infrastructure, our taxes will go up. Look – we don't *want* service there. It's not an inconvenience', he adds.

Jars of wild caught salmon, freshly grown herbs, and locally-sourced salts dot the countertop, each a marker of an apparent striving for total self-sufficiency. We head outside, where George, an accomplished carpenter, is eager to show me his new hand-forged adze in action. In the midst of smoothing a plank, George tells me of his worry that the expansion of 'the fibre project' – an island wide grid, by definition – is leading to a proliferation of 'electrosmog' on-island, and that for the first time in forty years, he's begun to consider whether it may be time to relocate. Putting aside his own health, he tells me, 'the fibre project' could bring decay of other forms, too: 'I've spent a lot of time in Guatemala, and one of the things that I witnessed when I was there was the arrival of electricity into one of the villages. After it arrived, people would still gather at meals, would still come together, but now instead of speaking they would be watching television or something', he comments. 'So, I think if we get super fast internet…well that might just totally erode social structures'.

'It's like when they built a bridge to Prince Edward Island and like…all of a sudden we're connected. Well, a lot of people moved here because they *weren't* connected. And now all of a sudden there's this connection. You know, you've got the physical connections: you got the ferry, flights every day. And now this? That changes things. Some people just don't want any of this stuff on the islands'. He pauses for a moment. 'But I'm sure it'll come. Most people in town seem to think it necessary at this point, and kind of inevitable too, I think. 'Progress', or whatever'.



Fig. 49. The performance of self-sufficiency.

Summary

Through five overlapping vignettes concerning the relationship between the 'moving geographies' (Appadurai, 1990) of Haida Gwaii and the 'technological mobilities' (Graham and Marvin, 2001, p. 11) entailed by 'the fibre project', this chapter has explored 'the fibre project' as an agent of spatial reconstruction with capacities, both real and imagined, to '…reconfigure the relationship between the local and global,' (Dourish and Bell, 2011, p. 111). To that end, in '*Coffee in Tlell*', I called attention to certain local economic narratives by way of which 'the fibre project' has come to be centred in aspirational narratives of economic resurgence. Demonstrating its perceived instrumentality both to the attraction of new residents and to the retention of those already on-island, this vignette considered how the robustness of the islands' broadband infrastructures, long a source of consternation, have in a short span of time come to be seen as a potential source of competitive advantage; as I quote Berry as saying, 'Anytime people can do Internet-based work on the islands, I think it's good. It's bringing in outside money, and that gets distributed. That's always a good thing and should be encouraged'.

Offering a point of contrast to the vignette before it, in '*Not another Tofino*' I drew attention to the burgeoning anxieties which surround the potential impacts of 'the fibre project' on an already-strained local housing market, and to its conceptualising as a component of 'rural gentrification' (Phillips, 2010). Problematising more straightforward accounts of the 'net benefit' of rural fibre provisioning by centring 'the fibre project' in the always-active conversation of locality, through this vignette I charted the emergent frictions (Tsing, 2004) opened up by the proactive recruitment of new residents on the basis of the ubiquitous availability of full-fibre connectivity. Highlighting that '[t]he construction of spaces of mobility and flow for some […] always involves the construction of barriers for others (Graham and Marvin, 2001, p. 17), this vignette served as an illustration of the 'power

geometries' (Massey, 1994) embedded within 'the fibre project', whereby 'some initiate flows and movement, others don't' (ibid, p. 156).

Whereas a limited but growing body of literature has examined the impacts of fibre on rural housing values (Kashian and Zenteno, 2014), concluding that 'higher access to broadband, regardless of the specific estimator used, has a positive impact on remote rural housing values' (Deller and Whitacre, 2019, p. 2149), this vignette problematised more apolitical accounts of the microeconomics of rural fibre by bringing attention to the differential impacts entailed by any such 'positive impact', as well as to its intersections with a more generalised set of fears over transience and a desire to escape 'atmospheres of human temporariness' (Simone, 2021, p. 1345). As I quote one townhall audience member as saying, 'I want us to stay a community, not to become a place for wealthy people to come and purchase on-spec… and I don't know how we are protecting ourselves against that'.

In '*Homecoming*', I described how 'the fibre project' is constructed as a node to the broader project of 're-aspora' – or, to borrow Weiss' (2018) term, 'Haida homecoming'. Providing resolution to an 'infrastructural mess' (Dourish and Bell, 2011) which has long constrained the prospect of permanent return, this vignette demonstrated how 'the fibre project' reinforces the social certainty of Haida Gwaii as a site of perpetual and inevitable return, and with it, 'the social certainty that Haida who leave will always come home' (Weiss, 2018, p. 52). Dwelling on the personal experience of Nang K̲'uulas *Patrick Shannon,* a Haida filmmaker only recently-returned to Skidegate on a permanent basis, this vignette underscored how 'the fibre project' is seen to provide the means to be Haida in 'a more than local sense', without 'sacrificing attachments to place' (Clifford, 2001, p. 47), a means of being *a l'aise* with the contemporary world from the comfort of the village (Clifford, 2003, p. 66). In activating 'the fibre project' as a component of 'Haida homecoming' (Weiss, 2018), this vignette consciously situates 'the fibre project' within contemporary conversations as to

the digital self-determination of Indigenous peoples (Budka, 2015; McMahon, 2014; Duarte, 2017; Lewis, 2016). Picking up on this as a component to its imagining *as a political artefact*, I explore these ideas in greater detail in the later *Discussion*.

In '*Digital settlers*', I brought attention the capacities of 'the fibre project' to '…reconfigure the relationship between the local and global,' (Dourish and Bell, 2011, p. 111) by centring the lived experience of one recently-arrived yaatz xaadee *non-Haida* couple, for whom fibre was a key mediator within the broader calculus of mobility. Through this brief ethnographic portrait, I noted how a once-sparse infrastructure is increasingly prefigured as necessity; as Heidi described, '[e]ven in the short time we've been here, Haida Gwaii's gone from a place you lived on or moved to *despite* the Internet to, with fibre, a place you live *because* of it'[86]. This vignette anticipates later points of discussion as to the relational character of fibre, as well as its capacities to reorient the relational politics of place (Massey, 1994).

Finally, in this '*This very lack*', I brought light to the minority of residents for whom 'the fibre project' is encountered as antithetical to the cultivated 'place-centred ideolog[ies]' (Takeda, 2015, p. 161) around which they have come to know, and spatially characterise, the 'essence' of Haida Gwaii. Describing an afternoon spent with George, a self-described Luddite whose sensitivity to 'electrosmog' he feels to be under threat by the unwelcome encroachment of 'the fibre project', I provided a basic archetype of the small but motivated group of primarily yaatz xaadee *non-Haida* residents who reject the more promissory narratives of 'the fibre project' out of hand. Centred on the perspectives of those for whom infrastructural absence is an essential feature of the dominant spatial imaginary of Haida Gwaii, in this vignette I described how, through the enactment of spatial taboos designating certain spaces as simply 'inappropriate' for fibre, the act of infrastructuring (Bowker and

[86] PS. Interview, Skidegate, 2020.

Star, 1999; Smedberg, 2019) is seen to undermine a fundamentally primeval 'essence' of place – and with that, the threat of departure. Nuancing more singularly optimistic accounts of 'the fibre project', '*This very lack*' thus served to establish that for all it may be evangelised as a 'tool for good', normative renderings of fibre are decidedly more varied than is often let on.

As an aside, it is worth highlighting that this is not the first time a vocal minority of predominantly yaatz xaadee *non-Haida* have opposed a local infrastructure project. As Pinkerton (1981) describes in her ethnography of Daajing Giids, debates over municipal incorporation became a source of local friction throughout the 1960s and 1970s, In terms broadly reminiscent of the present-day encountering of 'the fibre project' by self-described 'yippienecks' and 'Luddites', Pinkerton (1981) notes how '[t]he issue of incorporation had become one of the symbolic points at which individuals involved in local cultural life resisted being overwhelmed by the forces of bureaucratization, urbanization, and industrialization…a vote against incorporation was for them a statement about the legitimacy of local life styles' (p. 32). Crucially, Pinkerton (1981) further notes that over the following decades, the issue of the day shifted once more, with a vocal group of mostly yaatz xaadee *non-Haida* eventually protesting the introduction of a ferry service: '…the issue around which confrontation and struggle centred was the proposed passenger and car ferry linking Skidegate to Prince Rupert twice a week' (p. 367). It bears reiterating that in the course of our interview, George made direct allusion to having participated in these ferry protests.

Together, the vignettes comprising this chapter have served to underscore the capacities, both real and imagined, of 'the fibre project' to reconfigure spatial imaginaries of place, and to the embeddedness of 'the fibre project' within narratives of technological mobility. In addition, it has spoken to the varied affective registers of encounter, through which 'the fibre project' may be articulated both as a source of hope and anxiety, the locus of both *increase*

and *decrease* narratives (Martin, 2017, p. 202). I expand upon these ideas in the *Discussion* which follows.

Chapter 7 – Discussion

Introduction

As the foregoing chapters have established, 'the fibre project' is a great many things to a great many people. Pedagogical, performative, and conceptually unruly, its heuristic adaptiveness is evident from the sheer diversity of vantage points (Star, 1999) that exist as to precisely what, when, or for whom it *is*. Employing a broadly infrastructural approach, in the preceding chapters I have provided an ethnographically-informed investigation into the pursuit, construction, maintenance, repair, and situated usages of 'the fibre project' as a means to examine the local legibilities to a globally-emergent infrastructure. Treating it as an exemplary form of affective infrastructure (Knox, 2017; Facer and Buchczyk, 2019), these chapters have shown the numerous and divergent ways in which 'the fibre project' has taken on social and affective meaning beyond its technical objectives and functionality.

Fibre is more-than-material (Barry, 2015). Taking 'the fibre project' as at once a technological and imaginative artefact, the vignettes comprising these chapters brought attention to, among other things, the sociality and fundamentally 'peopled' (Latour, 2000) nature of 'hard' infrastructure (Chapter 5 – *Software*); the capacities, both real and imagined, of 'the fibre project' to reconfigure spatial imaginaries of place, and to the embeddedness of 'the fibre project' within narratives of technological mobility (Chapter 6 – *Mobilities*); the instrumentalities of 'the fibre project' within efforts to preserve and revitalise the Haida language (Chapter 5 – *Software*); the relational ontologies of 'the fibre project', and its interconnectedness with ostensibly 'separate' infrastructural assemblages (Chapter 4 – *Timescapes*); the fundamentally processual and incremental materialities of 'the fibre project' (Chapter 4 – *Timescapes*); and to the varied affective registers of its encounter, being both a source of hope and anxiety (Chapter 6 – *Mobilities*).

In this chapter, I return to these points, elaborating upon them as a way to develop a deeper account of the relational, political, and affective entailments of 'the fibre project'. Throughout, I trace the promises which have driven its materialisation (Larkin, 2013, 2018) while describing the infrastructural imaginaries (Parks, 2015) by way of which it has come to be situated within broader relational and political assemblages. Specifically, I describe the *promise of transformation* (as contrasted with the lived experiences of *ambivalence* and *dissent)*; the infrastructural imaginaries of 'the fibre project' *as convergence,* contrasted with *dissolution*; the *promise of reliability* (as contrasted with the lived experiences of *breakdown*); and the infrastructural imaginaries of 'the fibre project' *as political artefact,* including its *political instrumentalities* and *political materialities*.

Theoretical framework

As a point of reminder, the research questions guiding this dissertation were introduced in the earlier *Literature Review* chapter. The first of these research questions asked, '*What promises are made by 'the fibre project', and how do these correspond with the lived realities of its emergence?*', while the second asked, '*What are the infrastructural imaginaries of fibre on Haida Gwaii, and how have these changed over time'?*. Reduced to their extreme, these questions might be combined and posed a slightly different way: *What is 'the fibre project' metonymic of, how have things changed over time, and why does it matter?.*

In the earlier *Conceptual Framework*, I introduced a certain number of the 'load bearing concepts' (de Bolla, 2013) used to respond to these questions, and which can be found throughout this dissertation. However, I have yet to describe the broader framework of understanding through which I have read the social-technological relationship – that is, to describe how it all fits together. Given the material-discursive character to these research questions, I sought to develop a framework which allowed for an accounting of processes of sociotechnical change as both a discursive and material outcome. For the purposes of this

study, an approach grounded in a framework of the *social shaping of technology* is perhaps the most apt (Mackenzie and Wajcman, 1999).

While Russell and Williams (2002) note that the social shaping of technology approach does not refer to any one theory, and that there is active debate over which approaches should be included in the term, a crucial aspect to any such approach is that it allows for the exploring of the material consequences of technical choices while avoiding a tendency toward technological determinism. Conceiving of the relationship between technology and society as one of 'mutual shaping', social shaping theories concede that the imagined properties of the material world constitute the potential to shape social outcomes, while at the same time insisting that matter *matters*. Also useful for the purposes of responding to the above research questions, social shaping approaches are well-suited to providing a more historically-considerate account of sociotechnical change (Braudel, 1970); Marvin (1988) is one of the many I have leaned on in practice. Throughout, I have also drawn from Knox's (2017) method of *material diagnostics*, involving 'an attention to the affective qualities of material engagement [which] opens the way to an understanding of material relating that neither overemphasizes the ontological power of materials themselves nor simply returns us to a familiar grid of power relationships' (p. 368). In adopting this approach, I investigate the promises and infrastructural imaginaries of 'the fibre project' not only in terms of their (semiotic) *content*, but crucially, within the broader context of their action: *who* said them, *where* they have come to be embedded, and *how* they are made manifest in both symbolic and material form.

Other frameworks could have worked too, each offering a somewhat different weighting along the material-discursive curve. The assemblage emphasis of Actor-Network Theory (ANT) for example – interested in the diverse props, as Law (1994) might put it, that sustain human action and in the way such props are held in place long enough to do so (Latour,

1988) – sees the everyday understanding of 'objects' as an effect of a particular arrangement, or assemblage, and would have offered a productive, if somewhat *too* material of an emphasis. Meanwhile, theories in the tradition of the social construction of technology (Pinch et al., 1987; Bijker and Law, 1992) insist that the situated meanings of technology cannot be properly understood without first understanding how that technology is embedded in its unique social context. Through a framework informed by literature of social shaping (Mackenzie and Wajcman, 1999), however, in what follows I have considered the mutual interactions of the semiotic and the social, theorising the interstices between the imaginative renderings of 'the fibre project' and the lived realities of its emergence as sites of friction (Tsing, 2004; Knox, 2017).

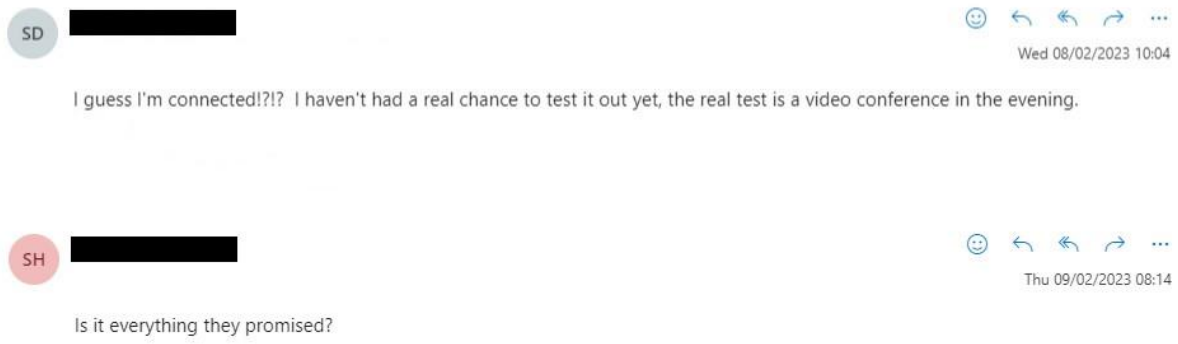


Fig. 50. 'Is it everything they promised?'. Screenshot, personal communication.

The promise of transformation

On Haida Gwaii as elsewhere, the master narrative of fibre has long been that of transformation. Broadly construed as an agent of change, the prefiguring of 'the fibre project' as transformative has come in numerous forms. A narrative in circulation long before I began my fieldwork, one provincial government official described the future perfect socioeconomic impacts of 'the fibre project' by drawing an analogy to the changes wrought by the Trans-Pacific railroad, in asserting that 'fibre is the new railroad of the 21st century…just as

essential as that now for survival, I would say' (Government of British Columbia, 2018, n.p.). Often framed in the form of *increase narratives* (Martin, 2017, p. 202; Appadurai, 2013), the promise of transformation established 'the fibre project' as both a fundamentally disruptive and fundamentally constructive artefact. As I quoted one local politician as having declared during a funding announcement, 'We've really needed this…everything depends on it' (Hudson, 2018a, p. 3).

As I alluded to in the *Introduction*, narratives of transformation were deeply embedded within the organisational logics to those various brokers (Chapter 5 – *Software*) most directly involved in its construction. A slideshow delivered at the 2017 edition of the British Columbia Broadband Association (BCBA) Conference, for example, began: 'What could fibre do for us?', before elaborating: 'Take the water out of the Hecate Strait and connect us to Canada and the world. Move us from geographically and technically isolated to skyping Africa. Allow our youth [to] become creators of content rather than strictly receivers' (GwaiiTel, 2017, slide 2). Local newspapers have likewise featured confident assertions from federal, provincial, and local politicians that the provisioning of fibre would be 'transformational to people's lives here on the island' (Bailey, 2022, p. 1).

At times, the promise of transformation was articulated in *geographic* terms, drawing on its purported capacities for time-space compression. In the course of an interview, one individual explained, for example, that 'although we're known for being one of the most isolated places in BC, fibre would really reduce the strain of that isolation, or even get rid of it. Like, the distance wouldn't matter any more'[87]. More often than not, however, the promise of transformation was framed in explicitly *economic* terms. As an illustration of this, in '*Coffee in Tlell*' (Chapter 6 – *Mobilities*) I noted how to those involved in local economic development efforts, 'the fibre project' was at-times described as nothing short of

[87] FJ. Interview, Skidegate, 2021.

providential. As the director of a local economic development society put it in the course of an interview, 'I think we're naturally going to see the progression of the knowledge worker here. I don't even think I need to advertise it, I think it's just going to happen. When you look at distributed companies, they are a logical solution. You could potentially headquarter companies here – they would have a very small footprint but open up a potentially larger tax base [and] widespread fibre would hypothetically be a way to solve our employment crisis'[88]. Wanting to better establish whether this was simply a reflection of their faith in the more general notion that '… a ubiquitously networked society connected over high-capacity networks…will provide social, political, economic, and cultural benefits' (Benkler, 2010, p. 23), or that 'the fibre project' would be of specific benefit to the local economy of Haida Gwaii, I asked them to elaborate, to which they responded: 'Yes, Haida Gwaii, like…transitioning away from our dependency on resource based economy becomes a reality'[89].

Discourses of transformation were at their most auspicious and audible in the immediate lead-up to the landing of the backhaul subsea cable, conversations around which seemed to take the moment of its landing, and subsequent initiation, as a 'settling' of sorts, marking a transition from a state of movement – a 'project' in Latour's (2005) terminology – to one of stasis – an 'object', in Tsing's (2004). As I hoped to establish in '*The act of waiting*' (Chapter 4 – *Timescapes*), for many, the backhaul subsea cable, specifically, ultimately became a sort of *object of affection* (Schwenkel, 2018). In proposing the landing of the subsea cable as the temporal locus of transformation, a moment of no return, commentaries such as these were in keeping with the 'connection narratives' described by Starosielski (2015). That these commentaries were also frequently shot through with a sense of good riddance for 'the mom n' pop operations' that had preceded them only served to underscore the felt urgency of

[88] JRT. Interview, Zoom, 2021.
[89] Ibid.

departure from ‘Island Internet’ (Chapter 5 – *Software*) to ‘the real internet’ (Chapter 4 – *Timescapes*).

Just as they were apt to amplify discourses of transformation more generally, local news media frequently reinforced the backhaul-centricity of connection narratives: not long after the backhaul cable was landed, a local reporter described the sense of *reprieve* from ‘years of slow, low-quality internet speeds’ that ‘have taken a toll on everyone’ (Haida Gwaii Observer, 2022, n.p.). Promotional leaflets dropped on doorsteps and tucked into mail boxes in the months before the cable landing anticipated this equation, describing how ‘[t]he subsea fibre optic link will run straight from the shore landing to your home or business’, and assured that end-users ‘will have direct access to massive bandwidth right to your door, and […] internet without any data caps or overage fees’[90]. It is worth pointing out, of course, that backhaul does *not* run to a home or business *per se* – that’s the job of middle mile and last mile. Technical fallacies notwithstanding, the equation of the backhaul subsea cable with the ‘completion’ of the broader project may be said to be premised on an imaginary of the moment of initiation as one of technologically mediated rupture (Bassett, 1997, p. 550). Posited as the missing piece to the puzzle, the transformative quality to the backhaul cable was often couched within a broader temporal narrative establishing the islands’ legacy fixed wireless systems as ‘old’ and fibre as ‘new’. With a system no longer comprised of anything *but* such ‘new’ technology, so the story went, change was surely just around the corner.

While it was the economic form of such narratives of transformation that I most often encountered, others would dwell on a more subjective quality of transformation, that is, a sort of phenomenological reorientation to the basic idea of connectivity in the wake of its landing, describing how they were ‘thinking about connectivity in a different way’, how ‘it’s something we can take for granted now’ and how ‘it becomes part of the furniture’[91]. Others,

[90] CityWest. ‘High-speed Internet Arrives Soon on Haida Gwaii’. Promotional leaflet, October, 2021.
[91] PS. Interview, Skidegate, 2021.

of course, resisted vociferously the suggestion that 'the fibre project' had, or would ever, impact upon their established ways of moving through, being in, or looking at the world. As one person explained in memorably descriptive terms, just as they would not be any more compelled to use a hammer if they fell into possession of 'an entire shed full of them'[92], the mere availability of 'more Internet' would do little to nudge their behaviour one way or the other.

Ambivalence

Contrary to the more promissory narratives of economic renewal that surround it, many I spoke with were quick to note that from today's vantage point, at least, the direct economic consequences of 'the fibre project' appear rather mundane. Likewise, despite its projected capacities to 'Take the water out of the Hecate Strait' (GwaiiTel, 2017, slide 2), 'the fibre project' does not appear to be the progenitor of altogether new spatial geometries. And where they do exist, as I explored in Chapter 5 – *Software,* any *cultural* transformations entailed are perhaps best described as being subtly augmentative: 'It's the same but different', as Jiixa put it (Chapter 5 – *Software*).

For one reason or another, talk of 'the fibre project' was at times met with a shrug. Stressing that it was more of a 'convenience' than 'critical', some reasoned that the probable impacts of 'the fibre project' were quite simply being overstated. Weighed up against a litany of other pre-existing local imperatives, 'the fibre project' was, to borrow a literary term, seen as something of a *MacGuffin* – 'an object of perceived value that moves the plot forward, but which holds little intrinsic value' (Brinklow et al., 2019, p. 3). As one person would put it, 'Faster internet won't make the sun come out'[93]. Articulating one version to this more realist account of sociotechnical change, another argued that, '…sometimes I think we can get carried away with how much importance we place on the [fibre] project…improved

[92] JL. Interview, Masset, 2022.
[93] SS. Personal communication, Tlell, 2021.

connectivity is just one piece to a much broader hierarchy of needs and wants in our community'[94].

Others proposed that it was unlikely that 'the fibre project' would in any way dramatically enhance the islands' competitiveness in attracting new residents precisely because Haida Gwaii was not alone in its experience: up and down the coast, they noted, other similarly-situated communities have also been building their own infrastructures. 'If anything', they argued, 'that just makes all the other stuff more important'[95]. (If only for posterity, it should be noted that at the time of writing, the links between Haida Gwaii and Prince Rupert, and between Prince Rupert to Scarlett Point are the only portions of the broader 3,500 kilometre backhaul loop of the Connected Coast network to have been fully initiated).

Others seemed to meet 'the fibre project' with ambivalence not because they discounted its probable social impacts but because they felt that it detracted from other issues of local import. When pressed to elaborate on which *specific* imperatives it detracted from, several brought up the issue of *Title*[96]. In such cases, Title was described as 'way more important', 'a bigger issue', and 'more consequential'[97]. Fair enough: the restitution of land and resolution of land and ownership rights is undoubtedly a more substantive issue. In other instances, as I highlighted in Chapter 6 – *Mobilities*, the ambivalent tone of encounter stemmed from its characterisation as a source of friction within a severely-strained housing market (Tsing, 2004). Concerns such as these were raised at the townhall event in Daajing Giids ('*Not*

[94] RH. Interview, Masset, 2021.
[95] DF. Interview, Daajing Giids, 2021.
[96] While it is well beyond the purview of this discussion to fully expand on 'Title', the crux of the matter can be had from the curt description of the 1993 *Gwaii Haanas Agreement* provided in the inside cover of the CHN-published '*Athlii Gwaii: Upholding Haida Law At Lyell Island*' as one 'in which both nations agree to disagree on Title to the area' (Collison, quoted in CHN, 2018, inside cover). In brief, then, 'Title' refers to the ongoing land claims dispute between the Haida Nation and the government of Canada, formally known as *The Minister of Forests, et al. v. Council of the Haida Nation and Guujaaw*, seeking a declaration that the Haida Nation holds 'Aboriginal Title' over all of Haida Gwaii including the seabed resources of over half of KandaliiGwii *Hecate Strait* and 320 kilometres into the Pacific Ocean. Described by Gill (2010) as 'arguably the most sweeping indigenous rights claim in the world, and one of the most important land claims in Canadian history' (p. 18), it sits at the very core of the broader project(s) of Haida self-determination.
[97] TW. Interview, Skidegate, 2020.

another Tofino'[98], Chapter 6 – *Mobilities*), where the recruitment of new residents on the basis of widely available fibre formed the basis for conversation as to the issue of 'two-to-fivers'.

Dissent

Further along the spectrum of ambivalence were those who encountered 'the fibre project' with palpable dissent. As Appel et al. (2018) write, 'the affective relationship between people and infrastructure… is not always positive' (p. 19). To illustrate this point *in situ,* in Chapter 6 – *Mobilities,* I described my time spent with George, a reclusive, self-described 'Luddite' who saw 'the fibre project' in decidedly negative terms. Although one of the more direct in his views, George was neither the first nor last to dismiss more promissory narratives out of hand and insist that 'the fibre project' was a sort of *harbinger to decline*. For this group of almost exclusively yaatz xaadee *non-Haida,* the promise of transformation was countered by *decline narratives* (Martin, 2017, p. 202), some drawing on tropes concerning the 'disconnection' of humankind in both an ecological and existential capacity, others concerning the dromology of modern life (Virilio, 1977; 2006).

Whether on the basis of a desire to escape the obligation to be communicable or on the basis of a more generalised aversion to modern technology, these voices of dissent were linked by their common origin story of having at one time or another explicitly sought out Haida Gwaii on the basis of its relative *absence* of infrastructure ('*This very lack*', Chapter 6 – *Mobilities*). Their descriptions of place often emphasising the islands' distinctions *from* rather than relations *with* the wider world, they would describe how 'always on, ever-present' connectivity would 'take people further away from the land', or how it was simply

[98] For the Canadian readership, the title of this vignette will require as little elaboration. For the non-Canadian reader, Tofino is a popular surf destination and town on the Northwest coast of Vancouver Island, several hundred kilometres south of Haida Gwaii's southern point. As Kumar and Vaugeois (2018) note, Tofino has come to be strongly associated with surf-heavy, digitally-enabled 'lifestyle tourism'.

'inappropriate' to 'get high-speed internet out there', on the basis that it would 'change the nature of the place'[99]. These were, in essence, declarations of spatial taboo.

Notably, the geographic locus of these appeals as to the 'inappropriateness' of fibre invariably centred upon Gwaii Haanas – which is important precisely because Gwaii Haanas is the only part of the broader islands of Haida Gwaii *not* to be impacted by 'the fibre project', the furthest stretches of middle mile not extending more than a few kilometres into K'il Kun Llnagaay *Sandspit,* the only present-day settlement on T'aaxwii XaaydaGa Gwaay.yaay iinaGwaay *Moresby Island.* That the technical character of the network did not appear to be central to their conception of the spatial politics of 'the fibre project' underlines both the multiplicity of meaning-makings that have come to be inscribed within the network, as well as how such inscription is largely independent of its actual functioning or material design.

As convergence

As I noted in the introductory chapter of this dissertation, the ontological singularity implied in the moniker 'the fibre project' belies its plurality. Describing the 'doubly relational' character of infrastructure, Harvey et al. (2017) describe infrastructures as consisting of 'extended material assemblages that generate effects and structure social relations…doubly relational due to their simultaneous internal multiplicity and their connective capacities outwards (p. 5). Along a similar conceptual path, Larkin (2013) writes that the 'peculiar ontology' of infrastructures lies in their being 'things *and also* the relation between things' (p. 329; emphasis added).

'The fibre project' is at least doubly relational. In the first sense, many I spoke with emphasised its character as an enduring social assembly (Schwenkel, 2018). While Burrell (2018) describes the constitution of interactional space (Burrell, 2018), and Ingold (2011)

[99] GG. Interview, Tlell-ish, 2022.

refers to spaces of *correspondence*, I will here use the term *convergence*, as I think it best captures something of this ontological dualism. In Chapter 5 – *Software*, I brought attention to one such relational reading of 'the fibre project' by showing how the structures of knowledge of various 'supporting acts' (Parks, 2015, p. 370) have both organised material resources, and vice versa. In the monthly board meetings of GwaiiTel, townhall events hosted by the Cable Cowboys, or the committees of the Gwaii Trust, the convergences of 'the fibre project' have formed critical spaces of 'organizing work' (Ribes and Finholt, 2009). As Lougher and Rodden (1993) have noted, the success of large-scale infrastructuring often rests on such organizing work, and on the ability to 'effectively organize the activities of the specialists involved' (p. 228). Fibre networks do not just 'unfold' or 'emerge'. As Crawford (2020) writes, '[f]or localities to believe a complicated infrastructure initiative like fiber is possible, there has to be someone with budget, staff, knowledge, and authority who pushes the project along – at least rhetorically' (p. 168).

'The fibre project' is seen as a collective achievement. This much can be gleamed from its official framing, the Gwaii Trust (2018) noting how it has served '…to bring islanders together and build partnerships between communities that had historically operated on very different tracks' (p. 2). In the many interviews I conducted with board members and network technicians involved in various aspects of the project's development, this 'coming together' was highlighted continually as having afforded a strengthening of commitment. At the same time, the process was not without its frictions (Tsing, 2004). In '*Island Internet*' (Chapter 5 – *Software*), I brought attention to one such source of friction by describing how the combined efforts of the Cable Cowboys, GwaiiTel, and various other locally-emplaced brokers had made possible the becoming (Ingold, 2011) of the terrestrial network, while at the same time underscoring that they also occasionally butted heads. While collaborative, in these convergences there was also agonism (Mouffe, 2013).

In the second sense of the relationality of 'the fibre project', in Chapter 4 – *Timescapes* I called attention to the ways in which 'the fibre project' may be seen as a material convergence, the exposed frailties of certain supposedly 'future proof' nodes suggesting that 'the fibre project' does not correspond to a singular, fixed entity, but remains tethered to a pastiche of technologies both old and new, rusted and glinting, dented and dazzling. In vignettes such as '*Yesterday's problem*', I called attention to the layered temporalities of 'the fibre project' by describing my own subjective encounters with *breakdown*, while in '*Trench, bore, stitch, fasten*', I noted how different legs of the network have been built at different paces, the often slow (or, at least, slower than hoped) work of installing the terrestrial network attesting to its 'throwntogetherness' (Massey, 2005, p. 149).

A further relational view of infrastructure sees it as happening 'in practice, for someone, and when connected to some particular activity' (Star and Ruhleder, 1996, p. 112). Accordingly, in 'Tl'l Yahda *Making this right*' and '*The language work*' (Chapter 5 – *Software*) I showed a further source of convergence when I drew attention to the altogether new spaces and practices of care (de la Bellacasa, 2017) which have emerged in response to 'the fibre project', and in anticipation of the fact that, absent concerted efforts to foster digital inclusion, the mere availability of the physical infrastructures of fibre will not guarantee their broader access. In such convergences, key articulations of difference are made between matters of *access, availability* and *adoption*. In this respect, the convergences of 'the fibre project' include local initiatives like the iPads for Elders program, and out of which come questions of care, both with regard to ethical implications and the type of work it generates, and 'the question of who cares for whom and the affective relationships that go along with this practice' (Schabacher, 2018, p. 56). Out of such convergences has come the identification of affordability as a particular area of need, and, as Mackenzie and Wajcman (1999) contend, 'economic shaping *is* social shaping' (p. 21).

Dissolution

As the project reaches its conclusion, the visibilities to 'the fibre project' are slowly receding. Lawns only recently punctured by the subsoiler have begun to grow over. Aerial crews no longer block traffic quite as frequently. And with bandwidth no longer conceived of as something in limited supply, the apparent need to congregate, strategize, and otherwise discuss the materialities of connectivity has diminished. Schwenkel (2018) describes how infrastructure, as social assembly, can galvanize both the formation *and dissolution* of collectives. These capacities of dissolution were made clear in '*Island Internet*' (Chapter 5 – *Software*), where I described the unilateral decision of certain brokers to sell their assets to Mascon, a subsidiary of Telus, thereby bringing about the end to local oversight of the last mile. I further noted that, in part due to the framing of the backhaul cable as a temporal marker to the 'completion' of the broader project, today there is animated discussion as to the long-term need for, capacities for, and financial viabilities of locally-owned infrastructure in a broader sense.

One set of voices asks whether, in 'selling off the assets', the islands might be 'giving away the kitchen sink'[100]. In this there are echoes to academic debates in the early 2000s, when concerns over the consolidation of North American broadband markets led Papacharissi and Zaks (2006) to note that '[w]ithout open access of multiple ISPs to the cable infrastructure, a few cable-affiliated companies […] can dominate broadband Internet access easily…and act as 'gatekeepers' (p. 69). Apparently anticipating the parallels, in '*Island Internet*' (Chapter 5 – *Software*), I noted how one informant described this as the continuation of 'a bit of a Google problem'[101], which has seen local ownership structures slowly eroded over a period of years.

[100] JL. Interview, Masset, 2020.
[101] DR. Interview, Daajing Giids, 2021.

Nevertheless, the prevailing opinion among those best-positioned to act would seem to be that the consolidation of all three legs of the network – backhaul, middle mile, and last mile – under as few roofs as possible would serve the interests of end-users, both as a result of the economies of scale available, and as a matter of efficiency. In this there is a paradoxical quality of social self-erasure (or, *dissolution*): having fulfilled the mandate of 'getting fibre in the water', the dissolution, or at least structural reconstitution, of the very convergences which brought it into being is presented as a natural endpoint. 'As long as someone is handling it, and it's going to be a net positive for residents…that's fine. Is it such a bad thing?'[102], asked one former board member, while another informant argued, 'It's been nice to be able to have our own local thing, but I don't think that that is what people think is the most valuable part of it. They just want a comparable service to the mainland'[103]. Whatever the outcome, the fluidity to the conversation begs certain questions: Are ownership and control synonymous? Why must the burden of capacity-building be borne by rural communities themselves? Is community-led broadband development always generative?

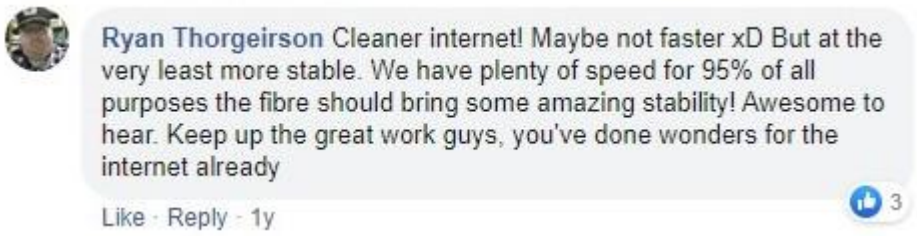


Fig. 51. 'Cleaner internet!' The promise of reliability. Screenshot, Facebook.

The promise of reliability

In the technical literature, reliability is commonly measured in downtime, or the amount of time a given network is offline versus online. A more holistic definition is offered by Navarro

[102] PS. Interview, Skidegate, 2020.
[103] CC. Interview, Daajing Giids, 2020.

et al. (2018), who describe it as 'the quality of being trustworthy or performing consistently well' (p. 14). A longed-for but historically-out-of-reach felt dimension of connectivity, reliability might also be understood with reference to Edwards' (2003) notion of *parity*, that is, '…the feeling that things work, and will go on working, without the need for thought or action on the part of users beyond paying the monthly bills' (p. 188). I prefer these latter, more lived terminologies, in that they provide something closer to the experience of 'calm technology' (Weiser, 1991) sensed through objective presence, and of the ability to be momentarily forgetful of its many-layered contingencies.

The affective potencies of reliability have been previously noted in the literature on rural broadband, particularly in the wake of significant momentary infrastructuring (Bowker and Star, 1999; Smedberg, 2019). Burrell (2018), for example, describes how rural end-users in California felt improved reliability to be the most beneficial facet to recently upgraded local broadband infrastructures, proposing that its salience may stem from having 'often experienced network connectivity as something that they could not rely on' (p. 8). As she adds elsewhere, '[f]or many residents, reliability was especially critical. This was certainly the case for those who were self-employed doing work for a distant customer base (such as accounting, document translation, software or Web design), time-bound and deadline driven work (like running a local newspaper), or those running businesses catering to tourists. Residents who had the economic resources to do so, would sometimes keep a second network connection as backup' (p. 7).

In the case of 'the fibre project', the promise of reliability was encoded from the earliest stages of its planning through to, and beyond, the moment of its initiation. Network planning documents determined that the network should 'be capable of *absolute reliability without regard to power failures and weather events*, as it [will] be the transport layer for data, E-911 service, voice communications, video, and sensors and instrumentation, and, quite literally all

other digital services' (GwaiiTel, 2016, n.p., emphasis added). As I expand upon shortly, the promise of *absolute* reliability has very clearly not been achieved. Nevertheless, the overall reliability of the system, in the eyes of most, is much improved. Thus it might be said that the promise of reliability is widely seen to have been realised in a *relative* sense.

In interviews, on social media, and in everyday conversation, the vernaculars of this emergent sense of reliability were numerous. Some described 'the fibre project' as having offered 'cleaner internet' (Figure 51), while others described in more generic terms that it had brought about 'always on internet…like you get in Vancouver'[104]. As another put it in the course of an interview, 'the fibre project' had afforded 'the feeling that you just know its going to work'[105]. Interviews with those involved in various legs of construction provided a glimpse into the vernaculars of reliability among those tasked with making it material. Reflecting a common position as to the goals of *invisibility*, one described the network design as having been driven by a desire to create '[s]omething we wouldn't have to fiddle with once it was in…that we would never need to upgrade, even think of again once it was in there…something that we could basically forget about'[106].

As I described in '*Homecoming*' (Chapter 6 – *Mobilities*) the alignments of the promises and lived experiences of reliability have allowed those like Haida filmmaker Nang K̲'uulas *Patrick Shannon* to not only maintain connections at-distance, but to continue his work as a filmmaker 'from the village': 'we've got internet that seems unlimited, that works all the time, and costs half as much. It's awesome.'[107] In Chapter 5 – *Software*, I brought further attention to the ways in which the imagined affordances (Nagy and Neff, 2015) of reliability are driving pedagogical change in the '*The language work*', where I highlighted how 'the fibre project' has provided a technological substratum facilitative of new *ways of doing* – a

[104] KV. Personal communication, Daajing Giids, 2022.
[105] GV. Personal communication, Port Clements, 2020.
[106] PD. Interview, Zoom, 2021.
[107] PS. Interview, Skidegate, 2020.

moving past of 'lock in' (Papacharissi and Zaks, 2006) – as well as the creation of altogether new cultural repositories (e.g. the recordings of 'online SHIP'). Each of these illustrate the promise of reliability as a determinant of social action in a *strictly* imagined capacity. Writing at the daw of the era of ubiquitous computing, Weiser (1991) wrote how, '…ubiquitous computing will produce nothing fundamentally new, but by making everything faster and easier to do, with less strain and fewer mental gymnastics, it will transform what is *apparently possible*' (p. 8). In a similar sense, the promise of reliability might be said to afford a space of imagination through which the productive leveraging of emergent conditions of possibility is being made real.

Breakdown

In counterpoint to the promise of reliability: just over a year after the inauguration of the network, momentary disruptions across the network, and at various critical nodes, are as common as the causes are varied. This extends a long line of incidents. In May 2020 contractors caused a network outage after digging up a portion of middle mile while building the Gold Creek Bridge, between Gamadiis Llnagaay *Port Clements* and Tll.aal *Tlell*. In December 2022, an outage was caused after a boat dropped anchor in exactly the wrong spot. There are simply too many to list; despite curt verbal warnings, despite the omni-presence of signage, and despite the fact that the precise locations of the subsea cable are available for public download in KMZ (Google Earth file format) and GPX (navigation file), breakdown has become a mundane feature of the broader assemblage of 'the fibre project'.

In technical terms, these moments of breakdown are easily explained as a byproduct of the network's reliance on a single point of connection: whereas more robust networks include multiple delivery modes, 'the fibre project' is reliant on one. But to better explore the affective dimensions of such breakdown, in '*Yesterday's problem*' (Chapter 4 – *Timescapes*) I described the subjective experiences of its navigation. In the concluding portion to this

vignette, I noted how, following a network outage caused by the energy grid, I found myself in conversation with a millwright whose understanding of the intricacies of electrical power systems led him to comment that, for all that the core assets of 'the fibre project' might ultimately prove comparatively stable, the vulnerabilities of the power grid had been overlooked by 'whoever built the damned thing'. 'I mean, you've seen the chaos when the power goes out', he commented. 'Feels a bit like putting the cart before the horse, you know?'.

Comments such as these force a recognition of the relational ontologies of 'the fibre project'. Whereas it's labelling as '*full* fibre' implies existence as a closed system, in moments of breakdown there is an upending of the fallacy that 'the fibre project' can ever truly be 'somehow a material and utterly fixed assemblage of hard technologies embedded stably in place, characterized by perfect order, completeness, immanence and internal homogeneity' (Jackson, 2016, p. 175). Perhaps a more apt term would be full fibre *plus*, where plus stands in for the myriad energy grids, weather systems, transportation routes, and other legacy infrastructures that it is always and forever attached to, and which form part of its ontic whole. To that end, and as a point of contrast to the 'connection narratives' (Starosielski, 2015) noted in the vignette preceding it ('*The act of waiting*'), in '*Yesterday's problem*' (Chapter 4 – *Timescapes*), I showed how breakdown – or, following Starosielski (2021), *temporal irruption* – is in many ways part of the temporal form of 'the fibre project', an assemblage requiring constant performance to accomplish its apparent stability.

In contrast to promissory anticipations of absolute reliability, lived experiences of breakdown show how, as Schabacher (2022) puts it, 'even the performance of the most 'hardwired,' late modern technology systems is crisscrossed by temporal regimes that stem from older, non-modern temporalities of care' (p. 55).

As political artefact

As Boyer (2018) writes, 'Whatever else an infrastructure might be, it must always serve as the foundation that enables something else to happen' (p. 227). A facet to the broader project of *Haida future-making* (Weiss, 2018), the political constitution of 'the fibre project' was made clear to me very early on. Speaking over the phone from Skidegate, Kilslaay Kaajii Sding *Miles Richardson*, former-President of the CHN, explained how in the earliest days of its development, buy-in from the non-Haida municipal councils was low: 'It was really a Haida-led thing for a number of years there'. Below, I outline two distinctive but overlapping imaginaries of 'the fibre project' *as political artefact*.

Political instrumentalities

In '*A Brief (Media) History of the Indigenous Future*', Lewis (2016) describes certain ways in which Indigenous peoples are 'manifesting the future' (p. 2) through creative engagements with digital media infrastructures, and through which they enact 'imaginings of the future state of Indigenous individuals and communities' (p. 7). Understood as an instrumental medium through which articulations (Clifford, 2001) can be made, 'the fibre project' carries capacities for a 'hybridizing of the present' (Lewis, 2016, p. 3) and distinctly Haida political aesthetic address. To illustrate this point, in the concluding vignette to Chapter 5 – *Software,* I described sitting on the couch with Jiixa, watching a live-stream of a memorial pole-raising on the mainland, while discussing the prospect of an online potlatch. Through this, I tried to articulate the deep progressivism and broadly optimistic outlook that pervades among the knowledge keepers and language learners that I was privileged to interview. A recent publication from SHIP puts it this way: 'One day, in our ZOOM class, we recorded 17 new entries for our SHIP Glossary. The Elders are simply amazing! They are extremely progressive, quickly adapting to this brave new world of technology. Their work, revitalizing, restoring, and teaching the Skidegate Haida Language is extraordinary and historic' (SHIP, 2021, p. 17).

Whereas from a Western liberal standpoint, the work of story-telling typically registers as a largely depoliticized act of sharing, it is important to understand 'the language work', of which story-telling is a core part, in its appropriate cultural context. To heed Hopkins (2006), 'stories, specifically those originating in oral traditions, [must] be understood, and defined, according to the ideologies from which they originate' (p. 341). In allowing for an altogether new modality of 'the language work' – what Rancière (2006) might describe as a 'sensory apprehension' (p. 189) – 'the fibre project' is seen as central to the work of preserving and revitalising Xaayda kil, work which transcends the aims of basic linguistic competence and constitutes a key facet of broader goals of self-determination. Following decades of cultural prohibition, to speak Xaayda kil/Xaad kil stands as an act of defiance in the face of a centuries-long struggle for existence; as language learner Jaskwaan Bedard describes, the act of speaking Haida is an assertion 'that we are undefeated. It means that the resolve of our last five generations to keep our culture and language intact, despite an overwhelming onslaught of colonialism, has been rewarded' (Haida Gwaii Museum, 2012. p. 14).

Understood in its appropriate context, the political instrumentalities of 'the fibre project' thus form a key facet to the countering of *temporal deferral* (Fabian, 2002; Weiss, 2018) – a trope of erasure by which Indigenous engagements with 'modern technologies' have been conscientiously minimised from view[108] – in providing a more diversified repertoire of mediation opportunity structures (Cammaerts, 2012) from which Haida voices may be heard (Pechawis, 2015; Hopkins, 2006).

Speaking over Zoom in the midst of the pandemic, Seattle-based Haida PhD student Nicole Kuhn described her encountering of temporal deferral, commenting on the ways in

[108] Strategies of temporal deferral are widespread in classic cultural anthropological engagement with Haida Gwaii. Dawson's (1878) fieldnotes describe that he was 'shocked to find that the Haida wear European clothes and are in possession of telescopes' (Hamilton, 1997, p. 33), and noted his frustrations at attempting to encourage the Masset Haida to wear only 'traditional dress' in his carefully composed and curated fieldwork images so as to minimise the temporal-aesthetic 'transgressions' within the frame.

which 'the fibre project' might provide further proof as to the already-deeply-technological character of contemporary Haida life:

> 'When you're off reserve the Internet is key...a big part of the conversation for me, especially here in the [United States], is just starting by reminding people that we're here, that Native people *exist*. Then, after that, comes the part where you have to explain to them that yes, we also *use technology* and then the third part is to convince them that yes, not only do we use that technology but we *use it in unique ways* and have distinct needs and wants. With fibre…well now we can show people who we really are …people [do often] know about us, but when they do, it's through carving and art and 100 year old texts. That's a part of who we are, but it's definitely not the whole picture.'[109]

Building on ideas of temporal deferral, Tsimshian-Haida writer/curator Marcia Crosby describes a broader 'salvage paradigm' (1991) in which a dominant society attempts to save, through documentation, the culture of another that it considers to be at risk of vanishing as a direct result of the encroachment of 'technologies'. The political instrumentalities of 'the fibre project' within attempts to counter such 'salvage paradigms' were elaborated upon for me by Jisgang *Nika Collison*, who explained how emergent efforts toward *digital repatriation* have come in direct response to the islands' new connective realities:

> 'There's a lot of audiovisual stuff out there that we don't have, and now that we've come out of the bronze age here, with the internet becoming more a part of what we do and how we do things at the museum, we're finding that we can contact more [museums, collections] and *keep more conversations going* at any one time. And then with *giving back the name*, I think the fibre project has helped a lot. It's easier for us

[109] NK. Interview, Zoom, 2021.

> to get our voices out there, get our version of events out there and tell the Haida history of events when we can count on the internet.'[110]

Here it is again worth pointing out the primacy to the imagined affordances (Nagy and Neff, 2015) of *reliability*. New cultural repositories made possible by 'the fibre project' – including, most significantly, the hundreds of recordings of 'online SHIP', which constitute an entirely unique and meaningful audiovisual archive – will need to be handled with care. Anishnaabekwe scholar Jennifer Wemigwans (2019) describes the risk of appropriation and commodification of emergent 'digital bundles', particularly by non-Indigenous audiences. And while these risks were certainly acknowledged, in Chapter 5 – *Software*, I described how Jiixa sternly reminded me, in response to a question over the dangers of misappropriation of digitised stories, that, 'It's more important that it's out there. I can't control what other people do with it, but it's better off out there than nowhere at all'.

Political materialities

A second reading of the political character of 'the fibre project' looks to the material politics of *the thing itself* (Winner, 1980, 1986). In this second sense, 'the fibre project' represents a particular mode of *Haida future-making* (Weiss, 2018) not merely facilitative to, but itself an 'articulated site of Indigeneity' (Clifford, 2001, p. 473).

The material political character of 'the fibre project' was often established through *origin stories*. In interviews, the question of 'when' (Larkin, 2018) often led to questions of 'when the project began, and who was involved'. Nearly all gave the same narrative account, describing its genesis within the Gwaii Trust, shortly after its formation, following the passage of the 1993 *Gwaii Haanas Agreement.* In establishing this chain of events, these origin stories underlined both the contingencies of its development on the commitments of Haida leaders to serve as 'network champions' (Crawford, 2020), while also establishing the

[110] NC. Personal communication, Skidegate, 2021.

basis for its later representation as *itself* a material contestation, or, as one person described, 'a counter-monument' whose politics *precede the use of the thing*. To borrow what seems too apropos a term to pass up, in such narratives 'the fibre project' may be seen as a sort of 'techno-totem' (Hess, 1995) enacting what Larkin (2008, p. 8) has deemed 'infrastructure as representation'.

As scholars such as von Schnitzler (2018) and Anand (2018) have shown in diverse ethnographic contexts, everyday infrastructures can themselves become powerful sites, in a symbolic sense, for the theorization of contemporary politics. In that sense, Boyer (2018) writes, 'infrastructure indexes the politics of the contemporary' (p. 223). The literature of political aesthetics can help to further clarify the imagined *material* politics of 'the fibre project'. From a political aesthetic perspective, politics reside not in the struggle for power (Mouffe, 2013) but in the configuration of a specific space, the framing of a particular sphere of experience, of objects posited as common and as pertaining to a common decision (Rancière, 2006; Larkin, 2013, 2018). Understood as one such object posited as common and as pertaining to a common decision, 'the fibre project' has provided a vector through which a distinctly Haida articulation of 'fair architecture' (Papacharissi and Zaks, 2006) has come to be voiced, both in terms of the encoding of ethics of care in 'hard' infrastructures ('Tl'l Yahda *Making things right',* Chapter 5 – *Software*), and as a form of 'institutionalizing' (Ribes and Finholt, 2009), whereby 'the fibre project' has become generative of a sort of sociopolitical capital, a demonstration of the CHN's capacities as a problem-solver of island-wide issues , for Haida and yaatz xaadee *non-Haida* alike. Accordingly, the material politics of 'the fibre project' might therefore be further described as *prefigurative* (Monticelli, 2022), that is, representing and embodying, in the present, a desired state of future affairs – which is to say, the future-proofing of Haida Gwaii.

In making the above points, two points of clarification are due. First, I do not mean to suggest that 'the fibre project' has by any means *induced* any form of broadly defined organisational or cultural change. As I established in the preceding section, it would be more apt to say that the emergent conditions of possibility, along with a certain number of salient imagined affordances (Nagy and Neff, 2015), have moved things along in ways they already were. Moreover, the broadly progressive outlook that I encountered, and which I have implied as a foundational component of local political imaginaries of 'the fibre project', should not be mistaken for critical short-sightedness on the part of locals. Haida knowledge keepers, language leaners, and political leaders openly acknowledge that as cultural repositories move online, questions of access to loom. But this is nothing new; Haida have long contended with the prying of ulteriorly-motivated outsiders, and have devised their own, internally-regulated systems of information regulation[111].

[111] Writing in the first issue of Haida Laas, the official newsletter of the CHN, in April 1975, the late Ernie Collison outlined the frustrations of dealing with exploitative researchers, being constantly '…inundated by various researchers, adventurers, anthropologists, novel-hungry authors, photographers, and many other people interested in the essence of Haida' (p. 1-2).



Fig. 52. Ferry terminal at K’aant’a Xyah *Skidegate Landing.*

Chapter 8 – Conclusion

As the physical infrastructures of fibre have expanded, so too have its cultural visibilities (Nugent, 2017). Today, fibre occupies a central role in narratives of modernity, progress, and growth, being widely-seen as 'the network architecture for the future' (Analysys Mason, 2020, p. 23). In taking a broadly infrastructural approach, in this dissertation I have provided a critical ethnographic account of 'the fibre project' as a means to chart the local legibilities to a globally-emergent infrastructure. In this concluding chapter, I summarise the overall research project and elaborate upon its wider implications for research, practice, and public discourse.

Summary

At the outset of this dissertation, I described how, in the face of market failure (Ali, 2021), 'the fibre project' emerged as a locally-led response to rising end-user demand. Alongside an interim solution of fixed wireless assets, I described how plans to build what would become 'the fibre project', a colloquialism for a series of infrastructural initiatives culminating in the initiation of a Gigabit capable Fibre-to-the-Home (FTTH) network, began to take shape. As I noted in the *Introduction*, 'the fibre project' was initiated with the express goals of overcoming the challenges imposed by a reliance on interim architecture of fixed wireless assets, including the longest over-water radio-link connection on earth. A connective ecology defined by *constraint* and *unreliability*, it nevertheless made for the occasional good story: as Tlaga Gaawtlaas *Masset*-based writer Susan Musgrave (2015) describes,

> 'when Bill Gates made an incognito visit to Tow Hill Road to stay with my friend Gloria Roth, a.k.a Chipper, (she introduced him as 'Randy', and he blushed 10 shades of red so I knew he knew I was on to him) her internet was down so she brought him to the Moon Over Naikoon Bakery for coffee and a bite to eat. We remember it as 'the

summer Bill Gates picked the raisins out of Wendy's cinnamon buns'' (p. 89).

Seeking a future proof alternative broadband infrastructure, I described how a loose network of *brokers* (Hobbis and Hobbis, 2022) propelled 'the fibre project' from the conceptual stages to its culminating in the initiation of a full-fibre network with availability to all endpoints on island. With this as background, throughout this dissertation I undertook to better establish both the *how* and how *come* of 'the fibre project', and thereby investigated its affective, relational, and political character *in situ*. I did so by responding to two over-riding research questions – namely, '*What promises are made by 'the fibre project', and how do these correspond with the lived realities of its emergence?*' and '*What are the infrastructural imaginaries of fibre on Haida Gwaii, and how have these changed over time?'.*

In responding to these, I adopted a conceptual framework grounded in the literatures of critical infrastructure studies and cultural anthropology (Star and Ruhleder, 1994; Bowker and Star, 1999; Star, 1999; Clifford, 2001, 2013; Graham and Marvin, 2001; Barker, 2005; Ortner, 2005; Harvey and Knox, 2012; Larkin, 2013; Amin, 2014; Parks and Starosielski, 2015; Knox, 2017; Anand et al., 2018; Weiss, 2018; Cantillon and Stevenson, 2023) and a theoretical approach grounded in the literature of the social shaping of technology (Marvin, 1988; Mackenzie and Wajcman, 1999; Russell and Williams, 2002), thereby accounting for processes of sociotechnical change as both a *discursive* and *material* outcome.

The empirical work of this dissertation was split across three core chapters. Engaging principally with the analytics of *promise* (Larkin, 2018) and *infrastructural imaginaries* (Parks, 2015), in these chapters I approached fibre as more-than-material (Barry, 2015), and traced how 'the fibre project', as both a technical and imaginative artefact, has come to be talked about (in some ways more than others), embedded within certain spaces (more than others), and leveraged to various distinct ends. Throughout, I variously examined the social infrastructures that 'the fibre project' both enables and is enabled by (Chapter 5 – *Software*);

the spatial landscapes through which fibre moves, and its capacities, both real and imagined, to reconfigure spatial imaginaries of place (Chapter 6 – *Mobilities*); the centring of 'the fibre project' within efforts to preserve and revitalise the Haida language, and its connectedness to broader political projects of (digital) self-determination (Chapter 5 – *Software*); the layered temporalities of 'the fibre project', including its interconnectedness to apparently 'separate' infrastructural assemblages (Chapter 4 – *Timescapes*); and the varied affective registers of its encounter, being both a source of hope and anxiety (Chapter 6 – *Mobilities*).

In the subsequent *Discussion*, I returned to the points made in the preceding chapters, both in a direct and allusive capacity, in order to further explore how certain promises (Larkin, 2018) and infrastructural imaginaries (Parks, 2009) have found circulation within broader relational, political, and affective structures. Specifically, I described the *promise of transformation* as having established 'the fibre project' as an agent of change, prefiguring it as 'transformative' in both a geographic and economic sense. Noting how broadly anticipatory *increase narratives* (Martin, 2017) in local circulation have long contended that the provisioning of fibre would be 'transformational to people's lives here on the island' (Bailey, 2022, p. 1), I showed how *economic* narratives of transformation, in particular, have seen 'the fibre project' cast as a fundamentally disruptive, and fundamentally constructive, technological artefact. Developing a second analytic, I then describe the infrastructural imaginaries of 'the fibre project' *as convergence*, dwelling on the relational ontologies of 'the fibre project' and describing its 'doubly relational' character (Harvey et al., 2017) as a source of *convergence*. From here, I described how the *promise of reliability,* in both technical and imaginative terms (Edwards, 2003; Navarro et al. 2018), has come to be encoded within broader materialities of 'the fibre project', occupying a particularly salient space within the broader slate of its imagined affordances (Nagy and Neff, 2015). Lastly, I described how infrastructural imaginaries of 'the fibre project' *as political artefact* situate it within the

broader project of *Haida future-making* (Weiss, 2018), in both a *politically instrumental* and *politically material* sense, affording both new modalities of 'sensory apprehension' (Rancière, 2006, p. 189), and itself an 'articulated site of Indigeneity' (Clifford, 2001, p. 473), its politics preceding use.

Throughout, I brought attention to some of the representational and relational paradoxes entailed by 'the fibre project'. As Gill (2010) writes, 'Haida Gwaii is at least in part defined by its separateness from the rest of the world' (p. 22). To that end, in vignettes such as '*This very lack*', I considered how, by extending the territoriality of Haida Gwaii as a bordered entity, 'the fibre project' represents a schematic challenge to long-held spatial imaginaries which have situated Haida Gwaii within the bounds of the 'island versus network schema' (Starosielski, 2015, p. 231). In doing so, I showed how conceptions of space and time are inevitably contested as part and parcel of processes of sociotechnical change, and how, in its (proposed) undoing of the centre/margin cartography which has historically fixed the islands as peripheral to the network, 'the fibre project' has brought into view certain 'rhetorics of scale' (Sheller and Urry, 2006) that challenge established shibboleths of place. Alongside this, I brought attention to the multiple temporal conditions of being (Gupta, 2015, p. 3) which define its ontological character, as well as to its formidable contingencies on a range of decidedly non-technical considerations, including the affective, oftentimes hidden labours of locally-emplaced actors responding to the emergent conditions of possibility afforded by 'the fibre project' through webs of dependencies and practices of care which precede it by some time.

On the basis of this, the over-arching meta-narrative to this dissertation might be summarised thusly: whereas much of the public and academic discourse surrounding fibre has concluded, largely on the basis of its strictly technical characteristics, that it is both an inherently *transformative* and inherently *beneficial* infrastructure – asserting, for example,

that '[t]he socio-economic benefits of fiber are beyond question' (PPC Broadband, 2020, p. 2) – in this dissertation I have shown that the 'effects' of fibre are no more universal than are the registers of its *affective* encountering. Contrary to the more auspicious accounts of its transformational potential, or of its capacities for total reliability, in this dissertation I have shown that the situated usages to which it is put, the subtle augmentations of everyday practice it affords, and the altogether more complex range of subjective experiences entailed in its encounter all suggest that broadly-defined 'change' should not be taken as a natural consequence of the broadened availability of the physical infrastructures of fibre, so much as they should be seen as the first step within a longer, collectively-walked path.

Chapter summaries

Chapter 1 – Introduction

In the introductory chapter to this dissertation, I began by providing an overview of the scope of the study, describing it as a critical ethnographic account of the planning, construction, maintenance, and situated usages of a 'full-fibre' broadband network providing ubiquitous access to all endpoints on the islands of Haida Gwaii. I described the object of study as 'the fibre project' – a colloquialism for a series of infrastructural initiatives culminating in the initiation of a Gigabit capable Fibre-to-the-Home (FTTH) network – before dividing the remainder of the chapter into two halves of roughly equal length, each working together to establish the broad thematic and contextual backdrop to the study.

In *Part one – Broadband,* I provided an overview of various broadband technologies, and noted the distributional bias which has historically seen a disproportionate share of high-capacity fixed broadband technologies situated in densely-populated urban regions of the globe. Next, I provided an overview of fibre-optic broadband technologies – the 'gold standard' of connectivity (Crawford, 2020) – and described the emergent 'FTTx trend', which has seen explosive growth in the development and deployment of fibre networks,

including in a growing number of previously unserved or under-served rural regions. This section concluded with a brief commentary as to the discourses by way of which fibre has come to be seen as 'the network architecture for the future' (Analysys Mason, 2020, p. 23), as a means to stress its constitution as both a technical and imaginative artefact.

In *Part two – Haida Gwaii*, I introduced the reader to the broader geographic, socioeconomic, and political contexts of Haida Gwaii, and provided a brief history of the development of broadband infrastructures on-island. In these sections, I described the concerted efforts of local organisations such as GwaiiTel to both expand and upgrade existing infrastructures as they went. Contextualising the emergence of 'the fibre project' against a backdrop of steadily rising annual bandwidth demands across the islands' network, I noted how 'the fibre project' was pursued with the express purpose of providing 'internet at, or better than, the standards you could get in any urban setting', and was informed by a desire to address the long-standing issues of *capacity* – or, the network's ability 'to carry increasing traffic volume across a wider area of Haida Gwaii' (Lund, 2016, p. 11) – and *reliability*, or the ability 'to remain 'in-service', despite power outages, equipment failures, failures in third party networks, weather- related outages, etc.' (ibid). After providing a descriptive topology of 'the fibre project', the chapter concluded with a summary of the ideas introduced elsewhere in the chapter, and outlined a roadmap to the remainder of the dissertation.

Chapter 2 – Literature Review

To better establish the broad academic backdrop against which this research project has been set, in Chapter 2 – *Literature Review* I undertook a systematic review of a broad range of academic literatures broadly pertaining to rural broadband development, and, in an attempt to reduce the conceptual and methodological ambiguities within, I categorised them into three paradigmatic approaches, or genres. These included *structural approaches*, bearing an emphasis on institutional determinants of broadband development and deployment;

sociocultural approaches, emphasising the social and political agency of network-building; and *critical approaches*, focused more explicitly on the distributive politics of broadband infrastructures and on questions of power, representation, and digital inclusion/exclusion. On the basis of this review, I then established the rationale for the research project, along with its unique aims, in the *Research Statement*, where I noted that the academic study of rural broadband development has tended toward positivism, has been marked by empirical fuzziness as to the precise broadband systems under study, and by a tendency to overlook or otherwise disregard the ethnographic potentiality of fibre, treating it 'as a vector rather than as a material infrastructure' (Starosielski, 2015, p. 229).

Following this, I elaborated on the core research questions informing the research project in the *Research Questions*, which included '*What promises are made by 'the fibre project', and how do these correspond with the lived realities of its emergence?*' and '*What are the infrastructural imaginaries of fibre on Haida Gwaii, and how have these changed over time?'.* Taking inspiration from theories of infrastructure in which 'form is loosened from technical function' (Larkin, 2013, p. 335), including cultural anthropological and critical infrastructural scholarship broadly committed to a view of infrastructures as 'more-than-material' (Barry, 2015, p. 1; Star, 1999; Edwards, 2003; Parks, 2009; Bowker et al., 2010; Larkin, 2013; Pepperell and Law, 2015; Starosielski, 2015; Appel et al., 2018), the first of these research questions drew largely on the analytic of *promise* (Larkin, 2018), treating promises as constructed and performative discourses involving 'both expectation and desire, frustration and absence' (ibid, p. 181).

Meanwhile, the second of these research questions adopted Parks' (2009, 2015) analytic of *infrastructural imaginaries*, or 'ways of thinking about *what* infrastructures are, *where* they are located, *who* controls them, and *what* they do' (Parks, 2015, p. 355, emphases in original), and sought to establish how certain heuristics, mythologies, and other forms of

narrative encounter have been used to render the infrastructural complexities of fibre in locally-legible terms, and how the embodied emergence of 'the fibre project' has influenced its imaginative rendering over time. From here, the *Conceptual Framework* proposed that 'the fibre project' be seen as an ethnographically-graspable locus of study, and laid the groundwork for an expanded conceptualisation of 'the fibre project' as more-than-material, establishing it as an exemplary form of 'affective infrastructure' (Ortner, 2005; Parks and Starosielski, 2015).

Chapter 3 – Methods

In Chapter 3 – *Methods*, I began by offering a broadened conception of the *infrastructural space of Haida Gwaii*. Through a boundary drawing practice (Barad, 2007, p. 135), I situated the study within a network of fixed and moving points – including spaces, people, and objects (Hannerz, 1992) – occupied by human and nonhuman *constituents* (Burrell, 2009), and established the field site with reference to the literature and paradigms of multi-sited ethnography (Appadurai, 1990; Bhabha, 1994; Marcus, 1998). From here, I outlined my overall research strategy, from project design through to data collection and analysis, through a series of brief episodic fragments. Each focused upon a different constituent method of data collection employed over the course of my fieldwork – which included participant observation, interviews, surveys, and photographic documentation – and upon a specific moments of ethical, practical, or methodological significance, these vignettes included *Making myself useful*; Tluu GuuGaaw Hll Gaayinda in dii ga; *Spot the outsider*; *Circling, scribbling, surveying*; *Putting pen to paper*; *Integration*; *Sitting for a chat*; *Sickness walking*; and *Would you mind if I take a picture?*.

I next provided an overview of the analytic methods employed in the course of analysing the data, the basic outlook of which was inductive, interpretivist, and grounded in reflexive thematic analysis (Lakoff and Johnson, 1980; Aronson, 1995; Boyatzis, 1998; Attride-

Stirling, 2001; Charmaz, 2006; Joffe, 2011; Braun and Clarke, 2013; Kiger and Varpio, 2020; Wutich et al., 2021). Describing the iterative process by which I established both surface (syntactical) and latent (semantic) themes, I described the process of moving 'from notes to narrative' (Ghodsee, 2016), and elaborated on the specific conventions of genre through which I have sought to shape this ethnographic account as a form of impressionistic narrative (Fish, 1970; Clifford, 1988; Murfin and Ray, 2003). The chapter concluded with a section entitled *Reflections*, where I described the unique methodological and conceptual challenges of studying 'the fibre project' and offered insight into the evolution of my (sense of) positionality as a fieldworker.

Chapter 4 – Timescapes

In Chapter 4 – *Timescapes*, I highlighted the layered temporalities of 'the fibre project' through a series of vignettes intended to demonstrate that questions of '*when* is an infrastructure' are 'no less central than questions of what, where, or for whom' (Jackson, 2016, p. 171; emphasis added). In '*Trench, bore, stitch, fasten*', I began by asking, '*What does the process of becoming* (Ingold, 2011) *look like, at ground-level*'?. Following the house-by-house fixing-in-place of the final leg of the network, this vignette revealed the slow process of 'speeding up', and served to bring attention to the fundamentally processual nature of 'the fibre project', through a ground-level view of the process of last mile installation. In contrast to the rushed imperatives which characterises many public discourses of fibre – as Nugent (2017) notes, discourses of fibre are 'often posed in very high-stakes terms' (p. 3) – this vignette showed that infrastructuring always occurs in the midst of (and in coordination with) a 'dynamic temporal, spatial, and political environment' (Appel et al., 2018, p. 12).

Next, in '*The act of waiting*', I asked, *'What does it mean to label a project as 'complete'?.* In a vignette charting the anticipatory narratives used to frame the always-already-assured eventuality of the subsea backhaul cable, I drew attention to the 'connection

narratives' (Starosielski, 2015) often used to frame the subsea backhaul cable as progenitor to 'the real internet'. Lastly, in '*Yesterday's problem*', I asked, *'Is there really such a thing as 'full fibre'?'*. In taking up this prompt, I drew attention to the promises of absolute reliability encoded into the architecture of 'the fibre project', before contrasting this with the lived realities of regular breakdown and the imperatives of continual maintenance and repair. Drawing on the subjective experiences of navigating *breakdown*, this vignette served to situate 'the fibre project' firmly in and of time 'rather than as an agent or force impinging on it from the outside' (Jackson, 2016, p. 17), and illustrated how the interventions of elements ostensibly peripheral to 'the fibre project' call into question the ontological boundedness of the thing itself. Through these vignettes, this chapter drew attention to the mutability and transience to what is more commonly presented as a static object, perpetually available to-hand, and opened up questions in regards to who decides when a project is complete, noting, as Gupta (2018) writes, that 'the inauguration of an infrastructural project that announces its completion is […] always an ideological act' (p. 75).

Chapter 5 – Software

In Chapter 5 – *Software*, I engaged with the peopled ecology of 'the fibre project', and brought attention the sociality of hard infrastructures (Appel et al., 2018). In the first of three vignettes comprising the chapter, '*Island Internet*', I asked, *'Through whose efforts has 'the fibre project' come into being?'.* In responding to this, I charted the (inter)actions of those *brokers* (Hobbis and Hobbis, 2022) involved in the materialisation of the terrestrial network. A vignette focused on the everyday interactions and interpersonal dynamics of those involved in the planning, construction, maintenance, and repair of the terrestrial network, as well as the organisational dynamics among them, it provided a glimpse into the at-times collaborative, at-times agonistic (Mouffe, 2013) processes which have shaped 'the fibre project'. In this vignette, I further noted that the apparent 'completion' of 'the fibre project' has sparked

questions as to the long-term benefits of, or at very least organisational structuring of, continued local ownership of the underlying infrastructure: 'as long as someone is handling it, and it's going to be a net positive for residents…that's fine. Is it such a bad thing?', as one informant asked[112].

Turning to those more on the 'receiving end' of the network, in the chapter's second vignette, 'Tl'l Yahda *Making things right'*, I asked, '*What comes after access*?'. Through this vignette, I called attention to the locally-emplaced actors and ethics driving local responsiveness to the 'demand-side' challenges of 'the fibre project', including the need for financial and technical support. Through this, I described the affective and emotional labour (Facer and Buckczyk, 2019) entailed, as well as the crucical distinctions made between *access* and *availability,* whereby the mere provisioning of physical architecture is understood as only the first step to what must ultimately be 'an ensemble of social and technical solutions' (Ortiz and Tapia, 2008, p. 3). Or, in keeping with Crawford (2020), a local recognition that '[w]idely available, inexpensive fiber optic access, by itself, won't make an area thrive' (p. 171). Finally, in '*The language work*', I began by asking, *'To what ends is fibre put?'*. Through this vignette, I described the emergent conditions of possibility afforded by 'the fibre project', and in particular, by the *promise of reliability,* in the context of ongoing language revitalisation efforts at the Skidegate Haida Immersion Program (SHIP). Together, these vignettes served to bring attention to the messy contexts of both the design and situated usages of 'the fibre project', while countering the idea that changes in physical infrastructure lead inexorably to changes in social form (Graham and Marvin, 2001).

Chapter 6 – Mobilities

In Chapter 6 – *Mobilities,* I explored how conceptions of space and time are contested as part of the sociotechnical change entailed by the development and deployment of 'the fibre

[112] TW. Interview, Skidegate, 2020.

project'. Describing 'the fibre project' in relation to the broader 'moving geographies' (Appadurai, 1990) of Haida Gwaii, and building on Graham and Marvin's (2001) notion of 'technological mobilities', the chapter was structured around five overlapping vignettes showing its capacities, both real and imagined, to '…reconfigure the relationship between the local and global,' (Dourish and Bell, 2011, p. 111). In the first of these, '*Coffee in Tlell*', I began by asking, *'When can we start'?* as a means to foreground the widely-circulated economic narratives which have seen 'the fibre project' situated within aspirational narratives of economic resurgence, particularly as regards its (purported) instrumentalities to the attraction of new residents and the retention of those already on-island. Following this, in '*Not another Tofino*', I asked, *'How will we stay a community?'.* A vignette centred upon a townhall event in Daajing Giids in late November 2019, through this I drew attention to the burgeoning anxieties which surround the potential impacts of 'the fibre project' on an already-strained local housing market, and of the potential for 'rural gentrification' (Phillips, 2010) as a result of increased interest from comparatively affluent off-island buyers. In doing so, I showed how more linear promissory narratives collide with speculations as to its micro-economic impacts.

Next, in '*Homecoming*', I asked, '*How might fibre facilitate the return of those abroad*?'. Describing the instrumentalities of 'the fibre project' to the broader project of 'Haida homecoming' (Weiss, 2018), this vignette focused on the experiences of Nang K̲'uulas *Patrick Shannon*, a Haida filmmaker recently-returned to Skidegate after years spent living mostly abroad. Through this vignette, I considered how the emergent connective ecologies of 'the fibre project' are seen to open the door to 're-aspora'. Pivoting toward the lived experiences of prospective and/or recently-arrived yaatz xaadee *non-Haida* residents, in '*Digital settlers*', I asked, *'Where does fibre 'stack up', in amongst a broader hierarchy of needs?'.* In this vignette, I provided an ethnographic portrait of a couple for whom fibre was

seen as a prerequisite to their contemplation of relocation, allowing them to 'import their city jobs'. This vignette served to call attention to the emerging social prioritisation of fibre, underlining a point made in the opening chapter – namely, that in a relatively short space of time, fibre has gone from luxury to necessity.

Finally, in this '*This very lack*', I asked, '*Might fibre have a Janus face?'.* A vignette centred on the perspectives of the minority of residents who view 'the fibre project' through an altogether more critical lens, it showed how technological scepticisms toward 'the fibre project' often derive from the incongruences entailed between their historic, individually-held spatial imaginaries of Haida Gwaii as *infrastructurally absent*, and the lived realities of its infrastructuring (Bowker and Star, 1999; Smedberg, 2019). Nuancing more singular accounts as to the 'good' that fibre may do, this final vignette spoke to the varied affective registers of encounter through which 'the fibre project' may be articulated both as a source of hope and anxiety.

Chapter 7 – Discussion

This chapter began with an outline of my overall theoretical framework, grounded in the literature of the social shaping of technology (Mackenzie and Wajcman, 1999). Establishing its material-discursive basis from the outset, in this chapter I responded to my over-arching research questions and developed a deeper account of the relational, affective, and political character of 'the fibre project'. As a point of reminder, the guiding research questions included, '*What promises are made by 'the fibre project', and how do these correspond with the lived realities of its emergence?*', and, '*What are the infrastructural imaginaries of fibre on Haida Gwaii, and how have these changed over time'?*. In responding to these, I advanced four novel analytics, which included the *promise of transformation* (as contrasted with the lived experiences of *ambivalence* and *dissent)*; the infrastructural imaginaries of 'the fibre project' *as convergence,* contrasted with *dissolution*; the *promise of reliability* (as contrasted

with the lived experiences of *breakdown*); and the infrastructural imaginaries of 'the fibre project' *as political artefact*, including its *political instrumentalities* and *political materialities*.

Taking up the first of these, I described the *promise of transformation* as having established 'the fibre project' as an agent of change, prefiguring it as 'transformative' in both a geographic and economic sense. Noting how broadly anticipatory *increase narratives* (Martin, 2017) in local circulation have long contended that the provisioning of fibre would be 'transformational to people's lives here on the island' (Bailey, 2022, p. 1), I explored how narratives of economic development, predicated on the attraction of new residents on the basis of widely available fibre, have come to gain currency. I also noted how these discourses were at their most auspicious and audible in the immediate lead-up to the landing of the backhaul subsea cable in late summer 2022, and how through 'connection narratives' (Starosielski, 2015) its landing was widely seen to mark a 'settling' of sorts. Calling attention to *friction* (Tsing, 2004), I contrasted the promise of transformation with the lived experiences of *ambivalence* and *dissent*, and noted how the fibre project' is, for some at least, a *MacGuffin* – 'an object of perceived value that moves the plot forward, but which holds little intrinsic value' (Brinklow et al., 2019, p. 3). Concluding this section with further elaboration as to those affective encounters rooted in *dissent*, I noted that together, ambivalence and dissent are illustrative of the fact that, contrary to its public rendering as a singularly beneficial medium, as Appel et al. (2018) write, 'the affective relationship between people and infrastructure…is not always positive' (p. 19).

Taking up the second analytic, I next described the infrastructural imaginaries of 'the fibre project' *as convergence*. Noting that the ontological singularity implied in the moniker 'the fibre project' belies its plurality in both a material and social sense, I described its 'doubly relational' character (Harvey et al., 2017) as a source of *convergence*. In the first sense of its

relationality, I described how 'the fibre project' is seen as a collective achievement, as well as how it has provided critical spaces of 'organizing work' (Lougher and Rodden; Ribes and Finholt, 2009). In a further sense of its relationality, I described how 'the fibre project' exists 'in practice, for someone, and when connected to some particular activity' (Star and Ruhleder, 1996, p. 112), using examples drawn from vignettes such as 'Tl'l Yahda *Making this right*' and '*The language work*' (Chapter 5 – *Software*), to show how 'the fibre project' is generative of new spaces and practices of care (de la Bellacasa, 2017), and out of which have come key articulations of difference between matters of *access*, *availability* and *adoption*. From here, I described the parallel capacities of dissolution, noting that the long-term viabilities of – or at very least structural characteristics – local ownership are a more open-ended question than might be assumed.

Taking up the third analytic, I described how the *promise of reliability* – a longed-for but historically-out-of-reach felt dimension of connectivity – has come to be encoded within the materialities of 'the fibre project'. Characterising reliability in both technical and imaginative terms (Edwards, 2003; Navarro et al. 2018), I described how the promise of reliability has driven planning of 'the fibre project' from the outset, codified in documents determining that the network should 'be capable of *absolute reliability without regard to power failures and weather events*, as it [will] be the transport layer for data, E-911 service, voice communications, video, and sensors and instrumentation, and, quite literally all other digital services' (GwaiiTel, 2016, n.p., emphasis added). Describing the particular salience to the promise of reliability as an imagined affordance (Nagy and Neff, 2015), I describe how, while outages persist, an emergent sense of taken-for-grantedness suggests that the promise of reliability is widely seen to have been realised in a *relative* sense. Contrasting the promise of reliability with the lived experiences of *breakdown*, I noted how, just over a year after the inauguration of the network, disruptions at various critical nodes in the network are

commonplace. Using such breakdown as a point of discussion, I noted how such temporal irruptions (Starosielski, 2021) force a recognition of the relational ontologies of 'the fibre project' in ways often obscured by it's labelling as '*full* fibre'. Iin such moments of breakdown, I noted, there is an upending of the fallacy that 'the fibre project' can ever truly be 'somehow a material and utterly fixed assemblage of hard technologies embedded stably in place, characterized by perfect order, completeness, immanence and internal homogeneity' (Jackson, 2016, p. 175).

Taking up the fourth and final analytic, I described how infrastructural imaginaries of 'the fibre project' *as political artefact* situate it as a facet to the broader project of *Haida future-making* (Weiss, 2018). In this section, I described 'the fibre project' as political in two senses, both of which attest to a distinctly Haida prefigurative (Monticelli, 2022) politics. In a *politically instrumental* sense, I described how new modalities of 'sensory apprehension' (Rancière, 2006, p. 189) afforded by 'the fibre project' have placed it at the centre of 'the language work', work which transcends the aims of basic linguistic competence and constitutes a key facet of broader goals of self-determination. Describing the political instrumentalities of 'the fibre project' as a means of countervailing strategies of *temporal deferral* (Fabian, 2002; Weiss, 2018) – a trope of erasure by which Indigenous engagements with 'modern technologies' have been conscientiously minimised from view[113] – I showed how 'the fibre project' has led to a diversified repertoire of mediation opportunity structures (Cammaerts, 2012) from which Haida voices may be heard (Pechawis, 2015; Hopkins, 2006). Turning to a reading of 'the fibre project' as materially political, I then elaborated on a number of infrastructural imaginaries of *the thing itself* (Winner, 1980, 1986). In this second

[113] Strategies of temporal deferral are widespread in classic cultural anthropological engagement with Haida Gwaii. Dawson's (1878) fieldnotes describe that he was 'shocked to find that the Haida wear European clothes and are in possession of telescopes' (Hamilton, 1997, p. 33), and noted his frustrations at attempting to encourage the Masset Haida to wear only 'traditional dress' in his carefully composed and curated fieldwork images so as to minimise the temporal-aesthetic 'transgressions' within the frame.

sense, I suggested ‘the fibre project’ represents a particular mode of *Haida future-making* (Weiss, 2018) not merely facilitative to, but itself an ‘articulated site of Indigeneity’ (Clifford, 2001, p. 473).

Often established as an explicitly political artefact by way of *origin stories* describing its genesis in the structures of the Gwaii Trust, I described how, borrowing from Hess (1995), ‘the fibre project’ may be seen as a sort of ‘techno-totem’ whose politics precede its use, and through which ‘infrastructure as representation’ is enacted (Larkin, 2008, p. 8). After elaborating on the means by which ‘the fibre project’ has provided a vector for a distinctly Haida articulation of ‘fair architecture’ (Papacharissi and Zaks, 2006), I concluded by arguing that the material politics of ‘the fibre project’ might be further described as *prefigurative* (Monticelli, 2022), that is, representing and embodying, in the present, a desired state of future affairs – which is to say, the future-proofing of Haida Gwaii.

Chapter 8 – Conclusion

In this chapter I have provided a summary of the overall findings, along with a detailed overview of each of the foregoing chapters. Elsewhere in this chapter, I provide a number of directions for future research, as well as describing the project’s contributions and significance to academic conversation, policy directions, and public knowledge. Prior to this, the next section provides a post-script of sorts, detailing certain ways in which the form of ‘the fibre project’ has continued to evolve following the conclusion to my fieldwork.

Epilogue

Following years of effort, end-users across Haida Gwaii now have access to connection speeds of up to 1Gbps for the same price as one would pay on the mainland. But the precise material forms of ‘the fibre project’ continue to evolve. At the time of writing, middle mile is operated by GwaiiTel, backhaul by the Connected Coast Network (CityWest and the Strathcona Regional District), and last mile by both CityWest and Mascon. However, as

noted elsewhere in this dissertation, there is growing likelihood that ownership of the middle mile will soon shift, either by being sold directly to an off-island entity, or through a transfer of ownership pursued through a partnership of the Council of the Haida Nation and one or more such entities.

Conversations as to the long-term viability of GwaiiTel remain active. Though backhaul traffic has been migrated to the subsea cable, GwaiiTel continues to operate the radio-link connection between Ḡaaw *Old Massett* and Mount Hays as a form of redundancy. While available spectrum is limited, GwaiiTel continues to explore the potential of acquiring spectrum in adjacent frequency bands to facilitate further capacity expansions. However, as the link currently operates with a peak capacity of 1.3 Gbps (subject to atmospheric conditions), a growing number of islanders have begun to purchase Starlink terminals, as the underlying technology, although still in its early days, offers far higher bandwidth and lower latency in situations of need (though, it should be underlined, still nowhere near the performance of the fibre network). The willingness of these islanders to pay the considerable up-front and monthly costs of Starlink (around three times the typical monthly broadband service fee for users of the fibre network) primarily as a form of high-capacity *redundancy* would seem to lend credence to the predictions made in the establishing document of 'the fibre project', *Evaluation of Development of Broadband Infrastructure Serving Haida Gwaii*, which posited that '[e]nd user expectations of broadband Internet service quality will increase as the manner in which Internet service use evolves' (Lund, 2016, p. 15).

While the iPads for Elders program has now concluded, a range of similar programming aimed at fostering digital inclusion and literacy continues to be offered on-island. Literacy Haida Gwaii, the Vancouver Island Regional Library (VIRL) network, and the Adult Day Program in Ḡaaw *Old Massett* are but a handful of the organisations that provide free, one-

on-one training and technical support. Financial assistance also continues to be made available through various granting programs of the Gwaii Trust.

Meanwhile, expansions have continued to the Connected Coast network, the broader 3,500 kilometre backhaul loop into which 'the fibre project' links, particularly along the inside coast. Work is underway to commission and initiate the network further south, through the Johnstone Strait, before the end of the year. Following an announcement in late summer 2023, the construction of a second subsea cable appears increasingly likely. While not yet confirmed, this secondary, redundant backhaul link would have an initial capacity of 100 Gbps and would also serve as a back-up for numerous other coastal communities including Kitkatla, Oona River, Lax Kw'alaams, and Prince Rupert (Bailey, 2023). Lastly, following an announcement made on the part of the CHN, Skidegate Band Council (SBC), Old Massett Village Council (OMVC), and CityWest, plans are in place for the establishment of a new retail service provider, tentatively named CityWest Haida Communications Corp, envisioned as owned by the Haida Nation, and co-managed with CityWest.

Future research

In this dissertation I have taken a broadly infrastructural approach and provided a critical ethnographic account of 'the fibre project', as means to investigate the layered affective, relational, and political character to fibre, as more-than-material (Barry, 2015). While future research may benefit from taking altogether different methodological, conceptual, or theoretical choices, below, I outline two potentially productive avenues of research opened up by this study.

Critical ethnographies of fibre

Scholars such as Marvin (1988) have shown that ostensibly 'new' artefacts are more labile in their meaning-making than those labelled 'old'; in time, and with repetition, certain meanings become more concrete and less contestable than others. At a time of unprecedented

growth in the physical architectures of fibre, its critical ethnographic study is particularly important *now*, while still 'new', so to speak. Further research into the cultural visibilities of fibre – including into the specific, situated implications and imaginaries entailed (Parks, 2015) – is badly needed, and the use of further visual ethnographic methods (Larsen, 2008) could prove especially productive.

While future research would do well to follow Marcus' (1998, p. 79) imperative to 'follow the object' and to 'follow the metaphor', an alternative lies in the methods of ethnographic portraiture (Singh, 2021), and which would entail a closer reading of those brokers (Hobbis and Hobbis, 2022) at the core of infrastructuring (Bowker and Star, 1999; Smedberg, 2019). In either case, adopting a processual view of fibre, of the sort advanced throughout this dissertation, would open numerous points of intervention. What is the vantage point (Star, 1999) of the cable itself? From within the manufacturing facility? From aboard the subsea-cable laying ship? While in this dissertation moments of breakdown have formed one component to the overall discussion, future critical ethnographic engagement with the media of fibre could push further into the temporalities of obsolescence, ruin, abandonment, decay, degradation, or decommissioning. That the undoing of an ostensibly 'future proof' technology might carry a certain productive symbolism requires little further elaboration.

While in this dissertation I have shown fibre to be 'full of people' (Latour, 2000), the focus of my attention has nevertheless been limited to those *on-island*. Future research could look toward those forces external to the immediate community – regulators, manufacturers, or vessel operators, to name a few. Moreover, while in this dissertation I have engaged with the materialities of 'the fibre project' at all legs in the network, it should be noted that backhaul has tended to receive a disproportionate share of scholarly attention (Starosielski 2011, 2012, 2015). Future research would do well to undertake more concerted, embodied engagement along the *middle mile* and *last mile*. Aside from fibre, *per se*, the emergent

technologies of Low Earth Orbit (LEO) satellite also offers intriguing new possibilities for critical ethnographic scholarship. While spatial constraints have not allowed me to develop a deeper account of their overlaps, it is notable that in the short time of its availability, the discourses surrounding LEO have taken on a remarkably similar character to those surrounding fibre; as Vogel (2021) writes, quoting a rural resident, 'Starlink is going to change a lot, for a lot of people. We possibly would have bought a house out of town if Starlink was a thing when we were looking' (p. 2). While the extraterrestrial nature of LEO makes engagement with certain components of its operational infrastructure unlikely, engagements with the engineers, designers, launch teams, or others involved in its terrestrial development could add much to both academic and broader public conversations concerning the (evolving) material politics of rural broadband (Shaw, 2022).

Political economy of fibre

While scholars such as Whitacre et al. (2014a, 2014b), Canzian et al. (2015), and Deller and Whitacre (2019) have noted that 'higher access to broadband, regardless of the specific estimator used, has a positive impact on remote rural housing values' (p. 2149), in this dissertation I have shown the political economics of fibre in a less generic light. As I showed in vignettes such as '*Not another Tofino*' (Chapter 6 – *Mobilities*), for example, concerns have been voiced that 'the fibre project' carries a latent potential to aggravate an already-strained local housing market. At the risk of stating the obvious, then, not everyone is a homeowner. While existing research has tended to treat the 'fibre boost' as a welcome byproduct of last mile extension, a more nuanced assessment of the differential micro-economic impacts is badly needed. How might a fibre-facilitated increase in housing prices impact upon local *rental* markets, or on the ability of first-time buyers to purchase a home?

At the risk of further statements to the obvious, not all rural communities have the sort of financial footing from which to entertain the prospect of infrastructuring (Bowker and Star,

1999; Smedberg, 2019) at the scale entailed by 'the fibre project' (which, as I noted in the *Introduction*, has come at an approximate per household cost of $16,570 CAD). Accordingly, while the deployment of fibre in previously unserved or under-served rural regions is accelerating worldwide (Hynes and Kelly, 2018; OECD, 2023), it nevertheless remains the case that in many other areas, satellite and other wireless alternatives will likely continue to be the main broadband infrastructures for the foreseeable future. As a report to the Canadian House of Commons concluded, there is therefore a risk of '…increasing the digital divide as some communities have access to ever more effective Internet services while others continue to lag behind' (Ruimy, 2018, p. 9). Future research into the political economies of fibre would do well to consider the gaps between such 'cabled' and 'uncabled' places (Starosielski, 2015, p. 192).

Lastly, while the expanded provisioning of fibre now sits high on many policy-makers' agendas, this dissertation has brought into view the complexities of both attaining and maintaining such 'strategic infrastructure' (Analysys Mason, 2020, p. 23), and called particular attention to the fact that the *absolute* reliability of any such system is improbable. Accordingly, policymakers and policy researchers would do well to consider how public support might be extended to cover the longer-term operational costs entailed. In a Canadian context, current federal funding programs are limited exclusively to capital granting. Nearly twenty years since Hudson (2006) observed that 'capital investments in infrastructure do not guarantee sustainability in many remote and indigenous regions' (p. 59) of Canada, non-profit broadband advocacy groups such as the British Columbia Broadband Association (BCBA) continue to call for such things; in a recent intervention to the CRTC, for example, the BCBA called for 'ongoing operational funding to support broadband connectivity in rural communities' and noted that '[a]s with other essential services, such as power and telephone,

construction of this infrastructure will only be ubiquitous with the support of ongoing funding' (p. 4, 6).

Contributions

The academic contributions of this dissertation speak primarily to the literatures of critical infrastructure studies and cultural anthropology, and might be situated within the recent ontological turn, which has led to diverse theories about 'how things are' (Tsing 2004; Latour, 2005; Larkin, 2008; Morton, 2013). In the sections which follow, I outline a number of these contributions, offering comment as to their alignment within existing literatures.

Ethnographic accounts of fibre

In this dissertation, I have taken an infrastructural approach to provide a critical ethnographic account of the planning, construction, maintenance, and situated usages of a 'full-fibre' broadband network providing ubiquitous access to all endpoints on the islands of Haida Gwaii. In doing so, this dissertation provides the first critical ethnographic account of the becoming (Ingold, 2011) of a full-fibre network in rural setting. In establishing fibre as more-than-material (Barry, 2015), it has contributed a number of new affective vocabularies (Berger, 1972) and aesthetic terminologies (Ngai, 2015) of fibre. Among these are the *promise of transformation*; infrastructural imaginaries of 'the fibre project' *as convergence*; the *promise of reliability*; and infrastructural imaginaries of 'the fibre project' *as political artefact*, involving both *political instrumentalities* and *political materialities*.

Whereas much of the existing academic literature and public discourse concerning fibre has tended to conceptualise it 'as a vector rather than as a material infrastructure' (Starosielski, 2015, p. 229), this dissertation contributes significantly to ethnographic understanding of the diverse media of fibre. As I outlined in an earlier section of this dissertation ('*Research statement*', Chapter 3 – *Methods*), ethnographic engagements with the specific media of fibre are scant, with Starosielski (2011, 2012, 2015) being the notable

exception. Amongst such works, this dissertation contributes a unique range of temporalities and vantage points (Star, 1999) by engaging with 'the fibre project' at a diversity of nodes, including a number of points along the backhaul, middle mile, and last mile. The timing of the study makes further contributions: as one of my informants characterised it, this was a study that took place at a moment in which the islands were 'in the unusual position of being on the cusp of…going from one of the worst-served broadband markets in the country to one of the best'[114]. While in an earlier section I noted the methodological and conceptual difficulties entailed by this constant state of movement ('*Reflections*', Chapter 3 – *Methods*), the result is a unique account of fibre as both labile *and* operational infrastructure.

In vignettes such as '*This very lack*' and '*Digital settlers*' (Chapter 6 – *Mobilities*), I explored the ways in which 'the fibre project' is challenging shibboleths of place, and more generally, how spaces and places are altered in both the terms of their physicality and meaning by the emergence of 'the fibre project' (Massey, 1999). Through such vignettes, and in their theoretical development in the later *Discussion*, this dissertation contributes significantly to broader ethnographic understanding of fibre's capacities, both real and imagined, to alter the relational politics of place (Harvey, 1990; Massey, 1994). In addition, my describing *ambivalence* and *dissent* as a facet of situated encounter ('*This very lack*', Chapter 6 – *Mobilities*; Chapter 7 – *Discussion*) adds to scholarship concerning technological rejectionism in the face of perceived spatial encroachment (e.g. Parks, 2009; Starosielski, 2015). At the broadest level, this research may be said to contribute to contemporary discussion as to the labile ontological character of islands as 'laboratories' and sites of creative remixing through infrastructural interconnection (Barker, 2005; Massey, 2005; Bjarnason, 2010).

Community and alternative networks

[114] BL. Interview, Daajing Giids, 2020.

This dissertation makes further contributions to the literature of community and alternative networks (Mignone and Henley, 2009; Salemink and Bosworth, 2014; McMahon, 2014; Ramillo, 2018; Gerli, 2019; Ali, 2021), firstly by offering an unusual depth of encounter within, and theoretically informed rendering of, alternative network provision. Informed by my engagements as a complete member researcher (Adler and Adler, 1987), it contributes a rich ethnographic account of the 'brokerage' of rural broadband and, in offering a strengths-based account of Indigenous-led rural broadband development, it further advances the 'first mile' framework (McMahon, 2011, 2014), while adding to conversations around expanded conceptions of digital sovereignty and self-determination (Whiteduck et al., 2012; Duarte, 2017; Winter and Boudreau, 2018).

Moreover, whereas much of the literature of community broadband development has tended toward a heralding of the 'do-it-yourself' spirit (Ramillo, 2018, p. 5; Ashmore et al 2017; Oghia, 2017), and has had a strong material emphasis, stressing the importance of 'keep[ing] the Internet in local hands' (Ramillo, 2018, p. 5), in this dissertation I have shown that the question of local ownership, as with questions of locality more generally, are more open-ended. In so doing, it complicates more firmly materialist accounts (McMahon 2011, 2014; Mignone and Henley, 2009) and sits alongside scholarship such as Burrell (2016), who notes that it is often the case that 'the academic rationale about the rewards of learning and control holds little weight with the people who lived through it…Even though each struggle and setback was a chance to acquire new expertise, those involved in the project are now ready to give up their hard-won skills in exchange for normalcy. If we had the chance to do it again, they say, we wouldn't do it this way…Rather than delight in learning about tower construction, the expertise is a reminder that they *had* to do it themselves' (Burrell, 2016, p. 190; emphasis added). Accordingly, this dissertation may be said to prompt questions as to

what might constitute adequate, or indeed *ideal*, participation in the process of rural broadband development.

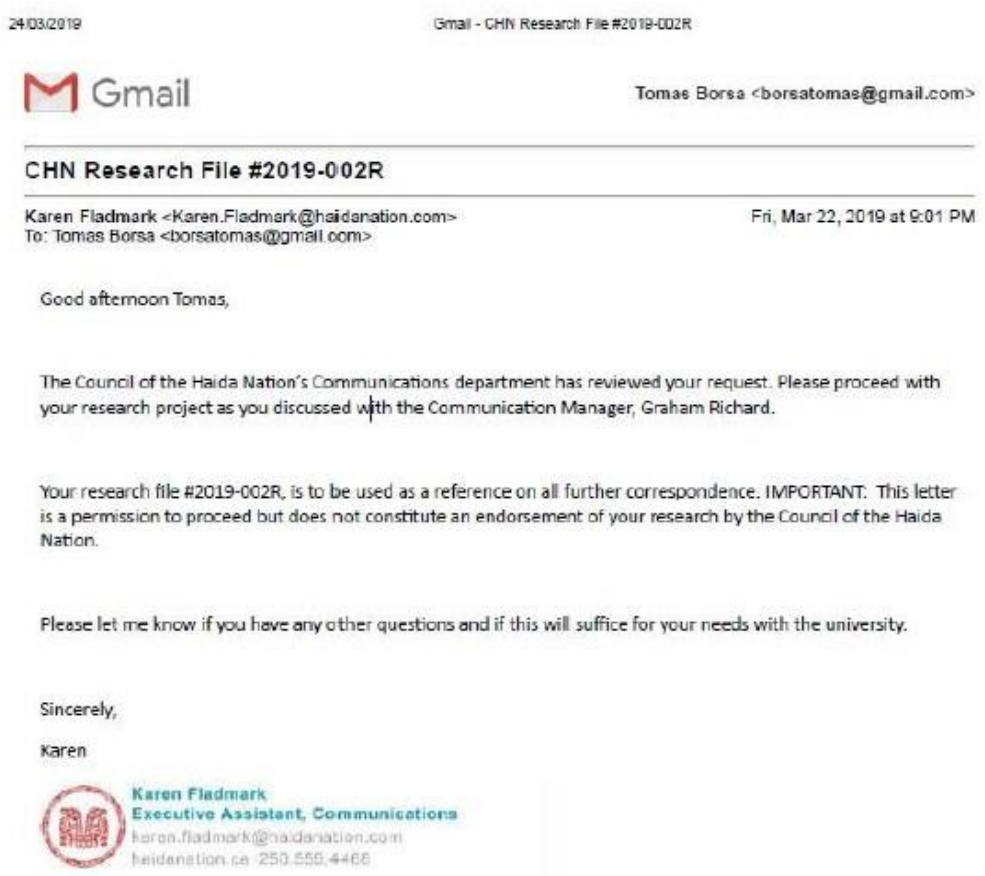
Methodological contributions

In addition to its conceptual and empirical contributions, this dissertation makes a number of further methodological contributions. The first of these pertains to my use of photographic methods. In responding to calls for greater visual ethnographic engagement with fibre infrastructures (Starosielski, 2015, p. 22), throughout this dissertation I have made extensive use of photographic methods, as both social practice (Sontag, 2002) and as a means of engaging poetic evocation (de Certeau, 1984). In doing so, this dissertation not only adds to the visibilities of fibre, but develops a parallel, visual account of its poetics (Larkin, 2013).

This dissertation makes additional methodological contributions by way of its extensive use of local news media within the overall corpus. Among those I have drawn from are local newspapers and journals *Haida Laas*, the *Haida Gwaii Trader*, and the *Haida Gwaii Observer*, and, as I described in an earlier section ('*Putting pen to paper*', Chapter 3 – *Methods*), writing a column for one such newspaper also proved a productive means of engaging in a form of 'public ethnography'. While not all communities have quite so active a local media space, I hope to have highlighted the depth of situated knowledge (Haraway, 1988) that can be tapped into by taking local media seriously *as a source of data*, and out of which can come new insights as to collective understandings of sociotechnical change.

Appendix A

Research Permit approval from the Council of the Haida Nation (CHN)



24/03/2019 Gmail - CHN Research File #2019-002R

Gmail

Tomas Borsa <borsatomas@gmail.com>

CHN Research File #2019-002R

Karen Fladmark <Karen.Fladmark@haidanation.com> Fri, Mar 22, 2019 at 9:01 PM
To: Tomas Borsa <borsatomas@gmail.com>

Good afternoon Tomas,

The Council of the Haida Nation's Communications department has reviewed your request. Please proceed with your research project as you discussed with the Communication Manager, Graham Richard.

Your research file #2019-002R, is to be used as a reference on all further correspondence. IMPORTANT. This letter is a permission to proceed but does not constitute an endorsement of your research by the Council of the Haida Nation.

Please let me know if you have any other questions and if this will suffice for your needs with the university.

Sincerely,

Karen

Karen Fladmark
Executive Assistant, Communications
karen.fladmark@haidanation.com
haidanation.ca 250.559.4466

Appendix B

Recruitment leaflet



Do you live in QC, Skidegate, or Port Clements and use the Internet? Do you *not* use the Internet, but have an opinion on it?

If you answered yes (and there's a good chance you did), then I'd love to speak with you! My name's Tomas and I'll be on-island for the next year conducting research for my PhD. My study is focused on the arrival of high-speed Internet on Haida Gwaii: how it's felt to have impacted upon daily life, what challenges and opportunities it presents, and what effects it may have on life in the future.

I am looking for volunteers aged 14 or over to complete a brief in-person survey (c. 20 minutes), and if you're willing, to take part in a follow-up interview. If you're interested or would like more information, please send me an email at **tomas.borsa@oii.ox.ac.uk**, send me a message through Facebook (Tomas Børsa), or text/call me at **1-306-290-7124**. Haawa for considering it!

Appendix C

Survey measure (excerpt)

1

HG INTERNET SURVEY

Introduction: This survey contains a list of questions related to how you interact with the Internet, as well as asking a few questions regarding your overall attitudes toward the Internet and digital technologies. Completing the survey should take roughly 25 minutes. Your responses will be treated in the strictest confidence, and will be stored under the terms of all relevant data protection laws at all times. Your consent is needed in order to participate. As you work your way through the survey, please place an X in the box which corresponds to your selected answer. If you are happy to proceed, please sign (*or, if completing this electronically, simply add your name along with the words 'I hereby provide consent') below.

NAME:

AGE:

OCCUPATION:

LOCATION:

DATE/TIME:

CONSENT SIGNATURE:

Do you have a health problem or disability which prevents you from doing everyday tasks at home, work, school or university or which limits the kind or amount of work you can do? [If no, proceed to Question 2]

No	0
Yes	1
Refused to answer	-2

[If yes] Does this health problem or disability limit your use of a computer or the Internet?

No	0
Yes	1
Refused to answer	-2

On a scale of 1 to 5, where 5 is totally reliable and accurate and 1 is totally unreliable and inaccurate, how RELIABLE and ACCURATE would you rate the information found in:

	Totally reliable and accurate	Somewhat reliable and accurate	Neutral	Somewhat unreliable and inaccurate	Totally unreliable and inaccurate	Refused to answer	Don't Know
a. Print newspapers & Magazines	5	4	3	2	1	-2	-3
b. Television	5	4	3	2	1	-2	-3
c. Radio	5	4	3	2	1	-2	-3
d. Online news	5	4	3	2	1	-2	-3
e. Social media	5	4	3	2	1	-2	-3
f. Search engine results	5	4	3	2	1	-2	-3

Generally speaking, how interested or not interested would you say you are about things you can DO on the Internet? Would you say you are:

Very Interested	Interested	Not Very Interested	Not at All Interested	Don't Know
4	3	2	1	-3

People have different views toward NEW TECHNOLOGY. Please indicate how much you agree or disagree with each of the following statements:

	Disagree Strongly	Disagree	Neither Agree nor Disagree	Agree	Agree Strongly	Don't Know
a. When new technologies or gadgets are invented, it is a good idea to try them	1	2	3	4	5	-3

c. New technology is making things better for people like me	1	2	3	4	5	-3
d. People should be able to express their opinion anonymously online	1	2	3	4	5	-3
f. The use of computers and the Internet is a threat to personal privacy	1	2	3	4	5	-3
g. I find it difficult to keep up to date with new technology	1	2	3	4	5	-3
i. Artificial Intelligence will bring overall positive benefits for society	1	2	3	4	5	-3
j. Older technologies are often superior to newer ones	1	2	3	4	5	-3
k. Overall, the Internet will improve the quality of life for future generations	1	2	3	4	5	-3

The following statements relate specifically to YOUR Internet Service Provider, as listed in Question 38. Please indicate the degree to which you AGREE or DISAGREE with the following statements:

	Disagree strongly	Disagree	Neither Agree nor Disagree	Agree	Agree strongly	Don't Know
a. I feel that my ISP charges a fair rate for their services	1	2	3	4	5	-3
b. I feel that the speeds offered by my ISP are adequate	1	2	3	4	5	-3
c. I feel that the customer service offered by my ISP is fair and helpful	1	2	3	4	5	-3
e. I would consider switching to an ISP owned and operated by the Council of the Haida Nation, if my monthly costs stayed the same	1	2	3	4	5	-3
f. I would consider switching to an ISP owned and operated by the Council of the Haida Nation, even if my monthly costs rose somewhat	1	2	3	4	5	-3
g. I would consider switching to any other ISP, if my monthly costs stayed the same	1	2	3	4	5	-3
h. I would consider switching to any other ISP, even if my monthly costs rose somewhat	1	2	3	4	5	-3
i. I feel that the quality of my Internet service fluctuates depending on the time of year	1	2	3	4	5	-3
j. I feel that the quality of my Internet service fluctuates depending on the weather	1	2	3	4	5	-3

The following statements relate to the Internet on a broad level, and are especially useful if you are interested in taking part in a FOLLOW-UP INTERVIEW. Please indicate the degree to which you AGREE or DISAGREE with each statement:

	Disagree strongly	Disagree	Neither Agree nor Disagree	Agree	Agree strongly	Don't Know
b. Overall, the Internet is a force for global good	1	2	3	4	5	-3
c. In today's world, community economic development is impossible without access to high-speed Internet	1	2	3	4	5	-3
d. Generally speaking, Indigenous communities have access to the same quality of Internet services as non-Indigenous communities	1	2	3	4	5	-3
e. The Internet can offer unique and exciting possibilities for Indigenous art, culture, and creativity	1	2	3	4	5	-3
f. I am concerned with the amount of racism and intolerance I see on social media	1	2	3	4	5	-3
g. I wish the Internet had never been invented	1	2	3	4	5	-3
h. People do not consider the environmental impacts of using the Internet as much as they should	1	2	3	4	5	-3
i. The Internet should be treated as a public utility, not as a privately-owned entity	1	2	3	4	5	-3
j. All communities should have equal access to high-speed Internet	1	2	3	4	5	-3

Appendix D

Meeting minutes, GwaiiTel Society, 27 July, 2020

GwaiiTel Society

5.3

DRAFT

Our Mandate: To facilitate the availability and delivery of affordable broadband Internet services to residential and commercial customers on Haida Gwaii. Through investment in the installation and operation of broadband network infrastructure, and the aggregation of internet traffic to maximize purchasing power for connectivity to the public Internet.

GwaiiTel Board of Directors Meeting Minutes

Location: Unit 4 – 888 Highway 16, Skidegate - Conference Call
Date: July 27, 2020
Time: 6:15PM
Quorum: 3

Participants:

Chair:	Evan Putterill	Consultants:	Terri Walker, General Manager Brian Lund, Industry Advisor
Directors:	Evan MacLean, Director Tomas Borsa, Director		
Regrets:	Sam Hall, Treasurer		Devin Rawlek, Director

Meeting Start 6:20pm

1. **Call to Order - Approval of Agenda**
   - Motion: To accept the agenda as amended - Evan MacLean
   - Seconded: Tomas Borsa
   - Decision: Approved Unanimously

2. **Delegations**
   - NONE

3. **New Business**
   - 3.1 Tlell POP
     - Motion: Approve payment of invoice 1366 in the amount $901.56 to Richardson Ranch - Evan MacLean
     - Seconded: Tomas Borsa
     - Decision: Approved Unanimously

GwaiiTel Society

ACTION ITEM: Brian Lund/Terri Walker to contact North Coast Regional District regarding exemptions BC Assessment

3.2 Research Project
Discussion on information for dissemination upon completion of Tomas Borsa's research

3.3 AGM Deferral

Motion:	Authorize that an extension request be made for the AGM to be held before March 31, 2021 - Tomas Borsa
Seconded:	Evan MacLean
Decision:	Approved Unanimously

ACTION ITEM: Terri Walker to research time frame and advise Membership

4. **Old Business**

4.1 Pathways to Technology Contribution Agreement
Discussion- Radio upgrade complete

ACTION ITEM: Terri Walker to follow up for final payment using the Equipment invoice

4.2 Gwaii Communications Funding
Discussion - Gwaii Trust had a meeting on July 17th, and we are waiting for response regarding the application

4.3 Contract Renewal Gwaii Communications/Mascon
Discussion - Short Term contract for month to month services will be recommended

4.4 BC Hydro Power Repayments and LOU's

ACTION ITEM: Follow up regarding Meter Reads and updating documents for signature

GwaiiTel Society

4.5 BC Hydro Fibre Cut
Release has been signed and payment should be received in the coming weeks. We are in the process of obtaining vendor information to remit payment to Gwaii Communications/Mascon

4.6 Covid 19
Discussion

ACTION ITEM: Evan MacLean to sign 15 cheques for bill payments in August & September. Terri Walker to prepare a document to indicate the cheques signed and provide copies to the directors

4.7 Brush Clearing Old Massett
Work to be completed in the next week. Evan MacLean has visited the site and will send pictures for our files. Need to review the treeline as the evergreens are almost as high as the dish, may require the dish to be moved higher up the tower to ensure clear sight lines. - Item complete will be removed from future agendas

4.8 Radio Repair Work and Insurance

Update on the completed work and invoices to be processed by Insurance

4.9 PPE Insurance
Discussion

ACTION ITEM: Terri Walker and Brian Lund to provide detail for insurance quote

GwaiiTel Society

5. Recurring Business

5.1 Monthly Activity Report

5.2 Financial Report

Motion:	To receive the Financial and Activity Report as presented - Tomas Borsa
Seconded:	Evan MacLean
Decision:	Approved Unanimously

5.3 Adopt June 29, 2020 Meeting Minutes

Motion:	To adopt the June 29, 2020 meeting minutes as presented Tomas Borsa
Seconded:	Evan MacLean
Decision:	Approved Unanimously

Adjourn 7:45pm

Next Meeting: August 24th ,2020 at 6:15pm

Evan Putterill, Chair

Terri Walker, Recording

Appendix E

HGM Haida interview protocols (excerpt)

HAIDA GWAII MUSEUM AT KAY LLNAGAAY

Haida Oral History Interview Tips

About Semi-structured Oral History Interviews

The type of interview you will be conducting is known as "semi-structured". What that means is that there are certain topics we want to ask about, but the order in which they come or the detail in which they get discussed is largely up to the participant and based on his/her particular knowledge or expertise. This is less "structured" than some other types of interviews. Remember that an *Interview Questionnaire* is just a guide—you may not ask all the questions on it each time, or you may ask them in a different order—it is meant to help you remember what you should be talking about and keep both you and the participant on track and is not meant to be read off like a list. A good interviewer does not rely solely on the prepared questions. You must be prepared to deviate from the outline at any moment and follow up on unexpected information from the participant.

The questions on the *Questionnaire* are designed to be "open-ended". That means instead of asking something that has a short, yes or no answer, like "*Was that event important?*" ask "*Why was that event so important?*" Or, "*You like camping at Windy Bay, don't you*?" Instead, ask "*Can you show me the places where you like to camp?*" The idea is to encourage the participant to talk, and not shape what they say too much. It's usually easiest to start with very broad, general questions and as things progress, ask more specific ones. For example, try starting out asking about the person's background. It can be useful for writing a short biography of the participant's life, and also helpful to inform what things you may want to ask this person about as the interview progresses. You might also sometimes ask questions that seem a little obvious. Try not to take information for granted—a subject that's well-known by people involved with the Haida language or other subject matter may be unknown or not fully understood by most other people.

Try to not interrupt or share your own stories (unless sharing a story can help lead into more conversation). Show you're listening and interested in what they are saying. Jot down notes to yourself also—reminders of dates/places/names to check back on with them, etc.—but your main job as an Interviewer is to really pay attention to what the participant is saying, as well as ensure that it is getting documented properly. As the interview progresses, remain flexible so that you can re-direct the participant if they get off-topic while at the same time enjoy what they have to share, which will be valuable no matter the topic!

At the end of each interview take some time to think about how it went, what you might try to do better next time, if there is anything you forgot to do, etc. and jot down some notes/thoughts in your journal.

*Interviewers/researchers are bound to confidentiality and must sign a confidentiality agreement with the organization they are conducting research for. If it is independent research, this should be laid out in the consent form.

HGM Approaches to Interviews © Haida Gwaii Museum Society 2020

Appendix F

Sample interview script

General questions

- When did you first hear about ‘the fibre project’?
- Is ‘the fibre project’ money well-spent?
- What do you think the economic consequences of ‘the fibre project’ might be?
- Have you experienced any economic benefits (e.g. as a business owner)?
- Some have suggested that the promise of full-fibre connectivity could help attract new residents. What are your thoughts?
- How important is it to you that the network be owned and/or operated by the islands’ communities? (ask to elaborate)
- Word associations: what does [mobility, community, connectedness, etc] mean to you? How do you think ‘the fibre project’ might impact on that, if at all?
- Do you think there are any potential downsides to ‘the fibre project’?
- Has your experience of connectivity changed since the start of the project? If so, how? If not, can you elaborate?

Questions for non-users

- When was the last time you made use of the Internet?
- Why did you decide to stop using the Internet?
- What strategies do you take to avoid use of the Internet?

Questions for GwaiiTel membership

- When did you first get involved with GwaiiTel?
- What motivated you to get involved?
- How would you describe the mandate of GwaiiTel? Have those goals been met?
- Will there still be a need for GwaiiTel in the future?
- What challenges have needed to be overcome in securing fibre to the home?
- What is at stake in securing full-fibre on Haida Gwaii?

Appendix G

Codebook

Academic researchers Acceptance into community Act of kindness AlcaTel All Islands P.A. Allyship Amateurish Ambivalence Anecdote/vignette Anime Athlii Gwaii Attraction to HG Authoritativeness Auto-confrontation	Bandwidth Basketball BC Hydro Bebo 'Being present' Bell Ben Davidson Biology/forestry Boundary-making Bricolage 'Broken thing' Business failure 'By any means necessary'	Cable Cowboys Carol Kulesha CBC Cell service CFB Massett CHN CityWest Cloud computing Coast Mountain College Coastal First Nations Coming out Community Health Community spirit/ethics Consolidation Conspiracy Cost of installation Cost of living 'Cost prohibitive' **COVID** 'Crabs in a bucket' Credit Union CRTC Culture Cultural appropriation Cultural loss Customer service Cybersecurity	Daajing Giids Dana Moraes Dangers of Internet Data cap Death/dying Deadzones Demographics De-skilling Desperation Dial-up Internet Digital archive Digital economy Digital detox Digital divides Digital government **Digital literacy** Dilemma Disconnected by choice Disappointment Discord 'Diving in' DIY 'Drowned out' Drugs	Ecology/environment **Economic boom/decline** **Economics/finance** Economies of scale Ecotechnology Edge of the Knife **Education/learning** Elders Emerging theory End-user Enthusiasm 'Essence of place' Evan Putterill Expectations of Internet Experts
Family/friends Farming Fear **Fibre** Fishing Federal government First Nations partnership Fishing Lodge	Gender Gentrification/displacement Geography Gig economy GitHub 'Glamorization of struggle' Golden Spruce Governance Government buildings	HaiCo Haida art Haida diaspora **Haida futurism** Haida Gwaii as anomaly **Haida Gwaii as disconnected (e.g. Gwaii Haanas)** Haida Gwaii as global/connected	'I would feel stuck' Importance of Internet to future Improving connectivity (present) INAC Indian Act Individual usage/behaviour	Jack Littrell Jealousy Jim Pazarena Jobs Joe Lavoie

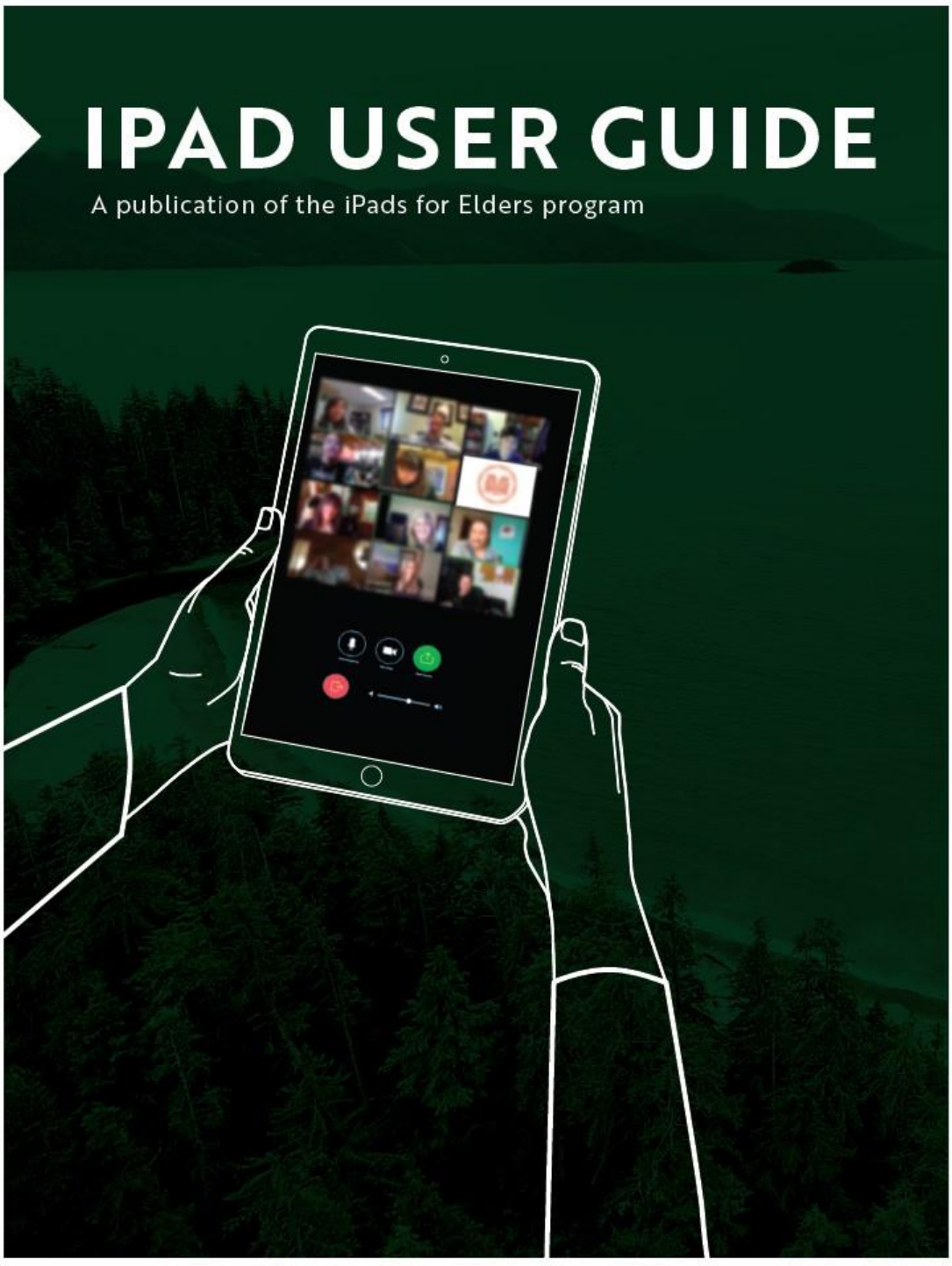
‘For where we are’ **Future imaginary** ‘Future-proof’	Grants/subsidies Great Bear Telecom Initiative Grey market Guilt GwaiiComm GwaiiComm/GwaiiTel confusion **GwaiiTel** GwaiiTel mandate Gwaii Trust	Haida Gwaii Institute HGRS Haida Laas Haida/non-Haida relations Haida Wild Hardware ‘Healthy to leave’ Hecate Strait Hereditary leaders **History of Internet on HG** Home/homing Homogenization House of Assembly **Housing** Human error Humour	Infrastructural violence **Infrastructure** **Inter-community relations** Internalized non-reliance **Internet mnemonic** Internet of Things Intro/lit-review **iPads for Elders** Isolation Isuma	
K	LAN Party Land claims Land/Place Lack of service Leaving Haida Gwaii LEO Satellite Local ownership Locals Location Loss (culture, control, etc.) ‘Love/hate technology’	Mage Networks Magic cards ‘Make Shit Happen’ Marijuana Market competition Mark Hollowa Mascon/Telus Masset/Old Massett Market efficiencies **Media consumption** Memory Mental Health Methods MHTV Microsoft Miles Richardson Minimum standards/benchmarks Misty Isles Society	Nature Nerdy Network-building Network outage Network technician perspective Network vulnerability New arrivals Newspapers Nisga’a **Non-use** North/south divides Nostalgia ‘Not black/white’	OC-12 Obfuscation Obsolescence/redundancy Omegle OMVC On-island Internet inequality On/off-island relations **Online learning** Optimism Other rural community Over-stimulation

		Municipal government Mushroom hunting Myaamia		
'Past point of caring' Pan-Indigeneity Paul Daniell Paul Hawse People power/capacity Personal income Pessimism Peter Lantin Phishing Photography Platformization Podcast Point of Presence Poisson Consulting Politics of technology Politeness/reputation Port Clements Positionality Positives of connectivity Potlatch Powerful anecdote 'Preaching about benefits' Precarity Pre-departure perspective Prioritization of Internet Property values	Quality of life Queen Charlotte	Racism Radio Radio-link RCMP 'Readiness to change' 'Real Internet' Regret Relationship-building Relative deprivation Relax Road Remote working Repatriation Resilience/Resourcefulness Resource extraction Revenue sharing Richard Byron Romanticism Rose Harbour Rumour Rural techno-optimism	Safety Sandspit SBC Scarcity Scepticism School closures Science fiction SD50 Self-confidence Self-determination/sovereignty Self-reliance Self-representation **Settlers/new arrivals** **Settler imaginary** Silicon Valley Skidegate Social change Social comparison Social media Social work Software/software developers **Sovereignty** Speed vs cost STEM careers Stereotype Strathcona Regional District Streaming Structural exclusion Support/buy local 'Such magic'	Taan **Tactics** **Techno-ambivalence** **Techno-optimism** **Techno-scepticism/rejection** Technical expertise Ted Squires Television Telus Telus/GwaiiTel collaboration Telus Hub Temporal deferral 'The Big City' 'The Charlottes' Tlell Tl'l Yahda Tofino Tourism **Traditional knowledge** Transcendence Transportation Two-to-fivers

Prospective buyer Protest Proxy use **Public imaginaries of Haida Gwaii** Public sphere				
UBC Ubiquitous connectivity University Unemployment Urban vs rural Internet Urgency of connectivity	Vancouver Video-chat Videogames Vignette Virus/hacking Volunteering/activism Voting 'VR vs. AR'	Watchmen Weather event/disaster Weirdos/outcasts 'What's the point' 'Whatever it takes' Whistler Windy Bay Workplace	**Xaayda Kil** **Xaad kil**	Yahguudang Yoga Youth
Zoom				

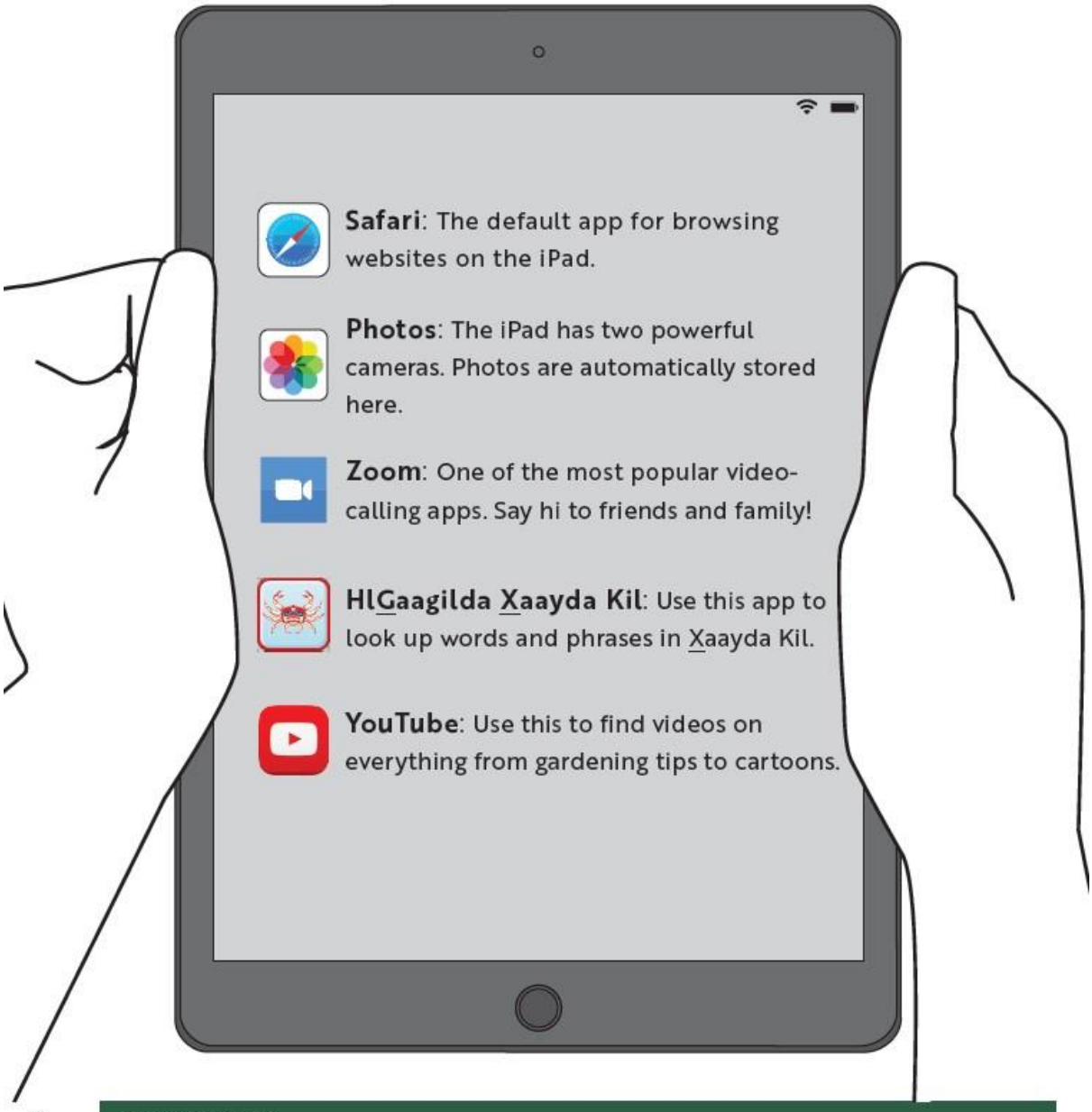
Appendix H

iPads for Elders booklet (excerpt)



COMMONLY USED APPS

Each app on the iPad has a different function and is represented by a different app icon. To open an app, simply tap on the icon. Try exploring some of these apps to get started.



ABOUT

The iPads for Elders program is an initiative of the Council of the Haida Nation, Haida Gwaii Museum and School District 50. The program is funded by the Gwaii Trust Society with additional support from Mascon, Vancouver Island Regional Library and Literacy Haida Gwaii, and is facilitated at the local level by community liaisons in each of the Islands' Village and municipal councils.

By providing access to devices, technical support, and learning resources, the iPads for Elders program aims to support Haida Gwaii's Elders to confidently explore the Internet, realize their capacities for learning, and ensure that social inclusion and connectedness are maintained for all Islanders.

The iPads for Elders program is especially grateful for the assistance and advice provided by the Elders and staff of HlGaagilda Xaayda Kil Naay *Skidegate Haida Immersion Program*, Hiit'agan.iina Kuuyas Naay *Skidegate Youth Centre*, and Island-wide Emergency Operations Centres, each of whom provided feedback and helped to shape this user guide.

Haawa, Haw'aa, and thank you!

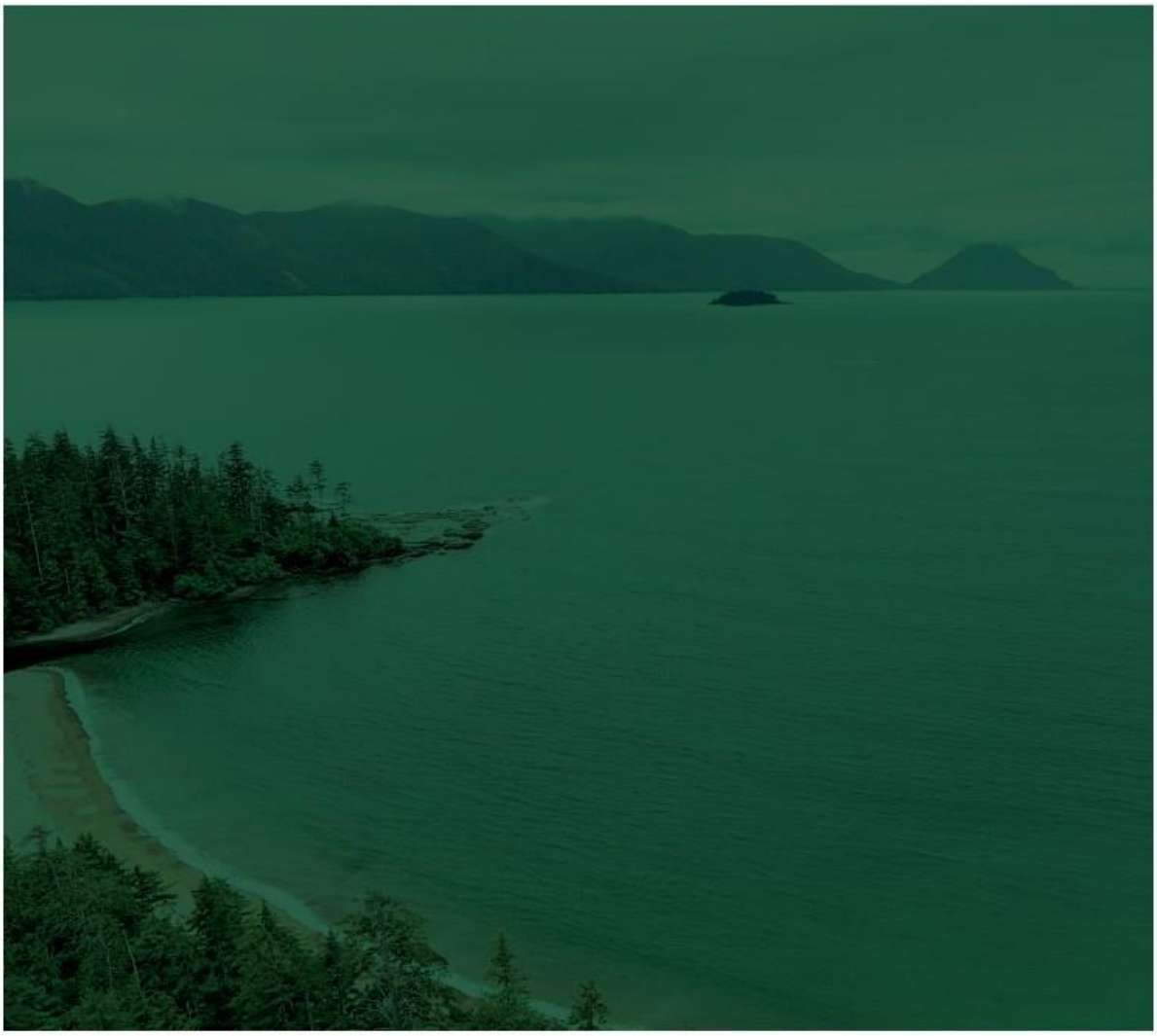
CONTACTS

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ipadsforelders@haidagwaiimuseum.ca

Training Support: **BENG FAVREAU**
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General Program Inquiries:
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execdirector@haidagwaiimuseum.ca

User Guide developed by **Tomas Borsa**.
Graphic design and illustrations by **Jen Bailey**.
Printing by **Haida Gwaii Designs and Signs**.



Haawa Haw'aa *Thank you* to:

HAIDA NATION
HAIDA GWAII MUSEUM AT KAY LLNAGAAY
Gwaii Trust Society
School District 50
Mascan
Skidegate Band Council
Village of Masset
Old Massett Village Council
NORTH COAST
Skidegate Youth Centre

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Appendix I

Letter from IIjuu Xiilaay *Isabel Brillon* re: affordability

June 15, 2021

To the committee of the Canada Healthy Communities Initiative:

I am a 78-year-old Haida woman and have lived on Haida Gwaii for nearly my entire life. Through this letter, I hope to provide you with some insights into the challenges that Elders like myself face with respect to Internet connectivity, and of the positive impacts that could come about through your support of the iPads for Elders program.

For the past 8 years I have been attending the Skidegate Haida Immersion Program (SHIP), where I am an avid learner of the language. At SHIP we invite anybody that's interested to come on in and learn about us, talk to us, and begin their journey of learning the language. We try to be as welcoming as possible, and to bring others on this journey with us. Every Wednesday, a group of young people from different communities on island come and help cook a lunch for us. When university students visit, we play a game called Diigway, a Haida version of Bingo. We love to do that.

For myself and many others, the COVID crisis has been an emotionally difficult time. We're a family at SHIP, and normally, we would be able to comfort and support each other. But for much of the past year and a half we have not been able to see each other. For a time, classes were cancelled, and then in October 2020 we were thankfully able to move online, though not all of the Elders have the skills or devices to allow them to.

The impact of COVID on our community has been very hard, and made worse by the fact that time is not always on our side. Though the language is growing stronger, our Elders are also passing on, and their knowledge is going with them. Given this, I am so thankful for the iPads for Elders program for providing us with the devices, the skills, and the confidence to learn and grow our knowledge of the ins-and-outs of staying in touch and working through the Internet.

In the midst of all this, staying connected through the Internet has been critical. It's going to take some getting used to but it's all we have right now, and we must not let this setback stop us from doing our work. But not all of us are able to participate equally. Particularly for our older Elders in their 80s or 90s, things like video-calls, Facebook messages, and voice-notes are unfamiliar or even intimidating. They want to learn, and they are more than capable of learning, but they do not have any way to participate in SHIP's work, as they do not have access to the necessary devices and in some cases do not have a home Internet connection at all.

Even for those of us who do have a home Internet connection, the monthly costs can really pile up. For all that it offers us in terms of our culture, our language, our way of life, Haida Gwaii can at times be a very expensive place to live. The cost of basic goods like gas or groceries is much higher than most other parts of the country, and for those of us who live off a fixed income, every little bit of money we put out needs to be accounted for.

Knowing that there are others who are unable to participate in our daily work and who lack the means to make use of the Internet breaks my heart. As you weigh up the iPads for Elders program's request for assistance, I would ask that you take these facts into consideration. I can assure you that this kindness would not soon be forgotten, and that it would serve our community in a good way.

Haawa,

Iljuu Xiilaay *Isabel Brillon*

Appendix J

Letters of support re: affordability

COUNCIL OF THE HAIDA NATION

September 30, 2020

Attn: Telus/Mascon

To whom it may concern:

On behalf of the Council of the Haida Nation, we write to express our ardent support for the iPads for Elders program, and to ask that you consider the program's request for assistance.

Haida Gwaii, like every community around the world, has been forced to adapt to the uncertainties of the COVID-19 pandemic. In a historic measure enacted to reduce the impacts of COVID-19 in our communities, Haida and municipal leadership declared a State of Emergency (SOE) in March. The SOE reflects our commitment to ensuring that residents of Haida Gwaii remain safe at all costs, and that the unique challenges introduced by our isolation and lack of healthcare facilities be mitigated and managed. Among other measures, this has included restrictions on travel to and from the islands.

For many citizens of Haida Gwaii, the Internet has been an important tool for navigating this 'new normal,' particularly given the above-mentioned restrictions on travel to and from the Islands. Through our website, the CHN has been able to provide a centralized COVID-19 bulletins, webinars, and weekly updates to ensure that citizens have all they need to make informed and responsible choices.

Unfortunately, not all Island citizens are equally equipped to make the most of these resources, and concerns have been raised that Island residents aged 60 and up have been particularly hard hit as a result of gaps in access to Internet-enabled devices (e.g. iPads), a lack of digital literacy and computer skills, and strained finances. As a result, many individuals who would stand to benefit the most are unable to access basic services (e.g. banking or healthcare appointments), to remain connected with friends and family, or receive up-to-date information on local restrictions.

The iPads for Elders program is finding ways of providing them with the skills, confidence, and technical support to ensure that residents are not forced to choose between broadband and other daily essentials.

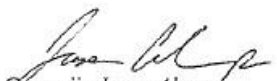
We have been heartened by the many creative solutions that have been devised at the local level to minimize the disruption caused by the pandemic: Village Council and municipalities have found ways of streaming community events, public meetings, and coordinating fundraisers. And yet, there is a clear and pressing need to ensure that our Elders do not simply slip through the cracks.

PO BOX 98, VILLAGE OF QUEEN CHARLOTTE, HAIDA GWAII · V0T 1S0 · PH: 250-559-4468
PO BOX 589 MASSETT, HAIDA GWAII · V0T 1M0 · PH: 250-626-5252

For this reason, we ask that you consider partnering with the iPads for Elders program to provide subsidized broadband to a select number of our most cherished Island residents.

As a self-described 'social capitalism' company, we have every confidence that Telus understands the level of community support that stands to be engendered through such a partnership. Please do not hesitate to reach out to discuss this matter further.

Haawa *thank you,*



Gaagwiis *Jason Alsop*
President of the Haida Nation

Haida Gwaii Mentor Apprentice Program

HAIDA GWAII MUSEUM AT KAY LLNAGAAY

Severn Cullis-Suzuki
severncullissuzuki@gmail.com
Haida Gwaii Mentor Apprentice Program
Haida Gwaii Museum
PO Box 1523
Skidegate, BC
V0T 1S1

September 13, 2020

To Whom it May Concern.

I am writing in support for broadband monthly support for the elders of our community here on Haida Gwaii.

My name is Severn Cullis-Suzuki, and I am the Chair of the Haida Gwaii Mentor Apprentice Program Committee. We are a group of community members in both Old Massett and Skidegate who have been working on the revitalization and continuation of the Haida Language.

Normal intergenerational transmission of the Haida Language has been broken by 100 years of residential schools, but today we still have a handful of first-language fluent speakers of Haida. There are less than 20 of them, and they are all in the eldest generation. Time is of the essence. Our program partners language learners with these last speakers, so that they may apprentice with them, and, following the methods established by Leanne Hinton and Nancy Steele with Californian Native languages (2002), transmit the language at this critical time. This is done in a naturalistic way, with apprentices spending time with mentor elders, doing activities while using the target language. These mentor-apprentice teams try to spend 20+ hours per week together doing this work.

COVID-19 has thrown a wrench in all of our worlds. But it has definitely made this time sensitive work even more challenging. Our teams responded - apprentices have set up Facetime and Zoom on elders' cellphones, and they have continued with their Haida lessons as best as they can. We have been amazed by the ability of our elders to adapt, and the resilience of the teams to continue on, under the circumstances.

Continuing to do language work together through the internet has been very positive for everyone - the apprentices and especially the elders, who are the ones most isolated by this pandemic. Everyone wants to keep elders "safe," but a side effect of this is loneliness. Continuing to work through the internet has been one of the bright lights during all this, and truly feels like a strategy for survival. During the pandemic, one of our precious Haida language speaking elders passed away. He was isolated in the hospital, with no visitors allowed. It was truly terrible to know that he was languishing there, without his community to engage with him. When he left us, one of his family members told me it was because of his isolation.

Haida Gwaii Mentor Apprentice Program



HAIDA GWAII
MUSEUM AT
KAY
LLNAGAAY



COVID-19 is stretching everyone. Challenges abound. Elders have had to adapt to using technology. Money is tight, as many of us cannot work in our normal way. I am writing in support for providing internet services for elders so that they can continue to be the valued and important members of Haida society as they always have been. It would be a huge boost for them, and an important indication of the valuation of our elders. When our elders are able to share their knowledge, they are providing us an essential service.

I hope you can support our important cause.

Yours truly,

Severn Cullis-Suzuki
Kihlgula Gaay.ya
Chair, Haida Gwaii Mentor Apprentice Program

Hlɢaagilda
X̲aayda Kil Naay

S.H.I.P.
(Skidegate Haida Immersion Program)
http://www.skidegate.ca/ship.html

149-B Front Street
PO Box 1235
Skidegate, B.C. V0T 1S1
tel: (250) 559-9073
fax:(250) 559-7880
Email: ship@haidagwaii.net

Attn: Telus/Mascon
To whom it may concern:
We write to express our utmost support for the iPads for Elders program's request for assistance from Telus/Mascon, and to lend context to the potential benefits that such an arrangement could bring to the work of the Skidegate Haida Immersion Program (SHIP).

SHIP was founded in 1998 with the express purpose of preserving and revitalizing the Skidegate Haida language, and to have it once again become the language spoken in the households of Skidegate and in Haida families living off island. To date, we have produced hundreds of instructional recordings and educational materials, and we are often asked to participate in community events, to contribute toward academic research on Haida traditions and names, or to establish altogether new terms where the existing lexicon falls short. As these outputs and collaborations have grown in scope, so too has our profile, both locally and abroad.

While we are able to attract a handful of new language learners each year, SHIP continues to be led by a small but dedicated group of Elders fluent in the Skidegate Haida language. The average age of our Elders is 80 years of age, and together they represent roughly 50% of fluent speakers. In normal circumstances, the Elders attend SHIP five days a week, ten months of the year. Of course, these are not normal circumstances. Recognizing the heightened risk that COVID posed to our valued Elders, in early March we were forced to close our doors for the remainder of the academic year. Naturally, this was not an easy decision to make, and the loss of our regular daily programming has proven highly disruptive and unsettling to many of our Elders.

Thankfully, on September 14th we were able to resume our daily sessions, albeit in a highly-modified format. While this is a positive step toward re-establishing some semblance of normality in SHIP's daily work, our Elders are now walking a largely unknown path, in which Internet-enabled video conferencing is being used to record, preserve, and revitalize the Skidegate Haida language.
All of our Elders are doing their best to adapt, to learn, and to embrace this 'new normal' for as long as is necessary. Unfortunately, the cost of a monthly home broadband connection remains a significant barrier to full participation, as many of our Elders have limited incomes. Compounding this, a lack of digital literacy and/or self-confidence in their existing computer abilities can significantly limit their willingness to seek out new technologies and integrate them into their daily lives. As such, some of our Elders have neither a smartphone nor a home Internet connection and thus remain entirely 'offline', as it were.

Through the iPads for Elders program, and with Telus/Mascon's support, it is our hope that our Elders will be provided access to the tools they need to not only participate in our programming, but to maintain their bonds with friends, family, and the broader community.

Haawa,

Kevin and Denver
Program Managers

Appendix K

Advertisement for GwaiiTel board opening

GwaiiTel Society

Our Mandate: To facilitate the availability and delivery of affordable broadband Internet services to residential and commercial customers on Haida Gwaii. Through investment in the installation and operation of broadband network infrastructure, and the aggregation of internet traffic to maximize purchasing power for connectivity to the public Internet.

Are you a community minded individual interested in helping us maintain and continue to build Haida Gwaii's Internet infrastructure?

GwaiiTel needs one more Director to complete its Board. We are hoping to fill this vacancy as soon as possible.

We are looking for you to help us steer this volunteer run, non-profit society.

Internet access is important to the health of our communities and we need strong individuals to assist GwaiiTel in continuing to improve access to high speed Internet on Haida Gwaii.

If you are interested in serving as a Director for GwaiiTel, please contact Terri Walker at terri.walker@gwaiitel.com or call 250-559-7756 for an application package.

Previous governance experience and a good knowledge of technology and/or telecommunications is an asset.

Closing Date November December20, 2019

GwaiiTel Society Website gwaiitel.ca Email terri.walker@gwaiitel.ca

PO Box 796, Queen Charlotte, BC, Canada V0T1S0 Unit 4 – 888 Highway 16, Skidegate, BC

Appendix L

Letter of comment (2016)

BRITISH COLUMBIA

July 29, 2016 Ref: 104776

His Worship Greg Martin
Mayor of Village of Queen Charlotte
PO Box 580, 903A Oceanview Drive
Queen Charlotte BC V0T 1S0

Dear Mayor Martin:

Thank you for your letter of July 7, 2016, regarding connectivity on Haida Gwaii. Premier Clark has asked me to respond on her behalf. I appreciate your comments about the status of high-speed Internet services and the concept of an undersea cable to improve reliability.

We understand the importance of reliable telecommunications services to facilitate the Province's goals related to health, education, security, emergency preparedness, first responders, public service delivery and other quality of life and social benefits. It is also important to help support the growth of commercial enterprise, large and small.

The goal of the Northern Connectivity Initiative is to expand and improve reliability of Internet services to northern British Columbia, which includes Haida Gwaii. A submarine fibre would provide a new route for data transfer thus improving the reliability of telecommunications in the region. As the initiative is in the conceptual stage, there is still a significant level of due diligence required, including the establishment of the envisioned consortium of private, federal and provincial funding. Please contact Mr. Howard Randell, Executive Director of Network BC at (250) 415-6867, to further discuss opportunities to enhance connectivity on Haida Gwaii.

Thank you for advocating on behalf of your community and Haida Gwaii on the importance of reliable connectivity for your residents and businesses.

Sincerely,

Amrik Virk
Minister

.../2

Ministry of Technology, Innovation and Citizens' Services

Office of the Minister

Mailing Address:
PO Box 9068 Stn Prov Govt
Victoria BC V8W 9E2

Phone: 250 952-7623
Fax: 250 952-7628

Location:
Room 346
Parliament Buildings
Victoria BC V8V 1X4

www.gov.bc.ca/citz

pc: Honourable Christy Clark, Premier
Province of British Columbia

John Jacobson, Deputy Minister
Ministry of Technology, Innovation and Citizens' Services

Bette-Jo Hughes
Associate Deputy Minister and Government Chief Information Officer
Office of the Chief Information Officer
Ministry of Technology, Innovation and Citizens' Services

Susan Stanford
Executive Lead responsible for Network BC
Office of the Chief Information Officer
Ministry of Technology, Innovation and Citizens' Services

Carol Kulesha, Chair
GwaiiTel Society, PO Box 652, Queen Charlotte, BC V0T 1S0

Appendix M

Employment contract

HAIDA GWAII MUSEUM AT KAY LLNAGAAY

EMPLOYMENT CONTRACT _ TOMAS BORSA

Date: August 5, 2020

Confidential

Name: Haida Gwaii Museum
Address: Box 1373 Skidegate, Haida Gwaii, V0T 1S1

Re: Offer of Employment

Dear Tomas,

Further to our recent discussions we are pleased to present you with an offer of short-term employment with the Haida Gwaii Museum in the capacity of Internet Connectivity & Accessibility Program Coordinator (ICAP). This position will be based on Haida Gwaii. This position will commence on August 5, 2020 and end on September 30, 2020. The end date may be amended by mutual agreement depending on the operational needs of the business. In this role you will report directly to Museum ED Nika Collison and/or to any other person(s) designated by the Employer.

Entire Agreement

This Agreement constitutes the entire agreement between you and the Museum. It supersedes all prior communications, understandings, and agreements whether verbal or written between the parties with respect to the subject-matter contained in this agreement. No amendment, variation, representations or communication shall affect this Agreement or the Employee's employment with the Museum unless it is made in writing, signed by the parties, and states expressly that it is intended to modify this Agreement.

Background

The Haida Gwaii Museum, through a general Memorandum of Understanding with the Secretariat of the Haida Nation (SHN), is engaged in a coordinated response to the COVID-19 pandemic through the CHN's Incident Command. Incident Command created the Community and Economic Support (CES) unit to carry out activities to respond to individuals, families, and small businesses on Haida Gwaii during and following the COVID-19 pandemic. Internet connectivity and accessibility for Elders was identified early on.

CES has been working with community liaisons on this program since early May 2020. You will receive all pertinent background documents for your files from the Museum ED.

Duties

You agree to perform the duties and responsibilities as assigned in Appendix A. The Museum may modify these duties and responsibilities in accordance with its business requirements, and such modifications will not constitute a breach of the terms of this Agreement.

Compensation

Your hourly rate will be $30 up to 120 hours total, and subject to all statutory withholdings.

Probation

There is no probation period associated with this employment offer.

Workspace

Due to the COVID-19 pandemic, you will provide your own workspace that meets WorkSafe BC standards. Should you wish to work from the Museum at times, access is by appointment only, with written permission from the Museum ED.

Confidentiality

You shall treat as confidential, any and all information relating to the affairs of the Museum and through extension the Council of the Haida Nation/Secretariat of the Haida Nation, to which you become privy as a result of their employment.

Governing Law

This Agreement and all matters arising hereunder shall be governed by and construed in accordance with the laws of the Haida Nation.

Starting Dates

If accepted, this agreement will commence and is effective on August 5, 2020.

Acknowledgments

You acknowledge that:

1. you have had sufficient time to review this Agreement thoroughly and to obtain independent advice corning the interpretation of this Agreement as needed, and
2. you understand the terms of this Agreement and your obligations.

Sincerely,

Nika Collison
Executive Director

Please sign below and return to me as confirmation of your acceptance of this position as outlined in the above agreement.

Tomas Borsa

August 6th, 2020

Tomas Borsa | Date

APPENDIX A

ICAP Scope of Work

The Internet Connectivity & Accessibility Program Coordinator (ICAP) will implement ongoing initiatives related to promoting connectivity and accessibility to the Haida Gwaii community, specifically:

Activity	Details
Coordination of the iPads for Elders Program	Design, delivery and full implementation of the iPads for Elders program. Activities to include drafting and finalizing agreements with program partners; program delivery; networking on potential opportunities for program expansion; creation of iPad use and internet safety instruction pamphlets for Elders; and, creation of a plan for continued technical support and administration of lending program.
Coordination of other internet connectivity and accessibility activities as needed	Pathfinding assistance for individuals and businesses without internet or access to computers who need to navigate social and economic support programs/opportunities related to challenges posed by the COVID-19 pandemic.
Technical support to other CEDS initiatives	Technical support to other initiatives of the Community Economic Development Support Unit as needed and interested, i.e.: webinar on internet safety.

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