## Application to the City of Calgary Council Innovation Fund

**Date:** November 15ᵗʰ, 2022

**Name of Project:** Scoping Calgary's Short Term Rental Economy: Building the Evidence Base to Shape Innovative Regulatory Frameworks in the Digital City

**Sponsor:** Councillor Mian

**Affected Business Unit(s) and/or Departments:** Development, Business & Building Services

**Amount of Funds Requested:** $324,070

**Description of Project**

In Calgary, as is the case around the world, the expansion of the short term rental (STR) economy has produced wide-ranging implications for individuals, communities, and various sectors. Though the City of Calgary (The City) introduced an initial phase of regulations in February 2020 to balance the costs and benefits of STR activity, the disruption produced by the COVID-19 pandemic, coupled with continued market evolution, means that Calgary's STR economy is now different from that which existed when regulations were first designed. As Calgary looks to adopt a second phase of regulations, a sophisticated evidence base is necessary to ensure new approaches and processes both address costs effectively, as well as enable The City to leverage STR activity to achieve broader economic, social, and environmental goals.

This project will advance a research and innovation partnership between The City and academic experts at the University of Calgary, the core objectives of which are two are two-fold:

1. To develop a holistic, evidence-based, and stakeholder-informed understanding of both Calgary's STR market, as well as the challenges and opportunities the market presents in light of The City's goals to foster resiliency and improve quality of life for Calgarians.

2. To translate the results of this research into new and improved planning and regulatory processes that will not only support effective management of STRs but will also leverage the market in innovative ways to create value for the community.

A key output will be an adaptable design, implementation, and evaluation guide for the STR market (including a series of smart practices). This will ensure The City's policy and regulatory mix is viable and sustainable in the long term, but also able to advance strategic priorities.

Some of the questions this project will address are:
1. What does Calgary's STR market look like?
    1.1. How many STRs are there? How has this changed over time?
    1.2. Where are STRs located? Are there spatial trends?
    1.3. Are there peaks and troughs in rental activity? What drives them?
    1.4. What is the nature of STR activity? E.g., How many listings are "commercial"?
2. How does Calgary's STR market intersect with and impact other markets?
    2.1. Are STRs impacting long term rental supply? How do secondary suites factor in to STR market?
    2.2. Are STRs impacting the hotel industry?

3. What impact did COVID-19 have on the STR ecosystem in Calgary?
4. Has the first phase of STR regulations been effective?
   4.1. Have regulations achieved stated policy objectives?
   4.2. What do compliance and enforcement look like in practice?
   4.3. What challenges and opportunities exist in terms of access to data and information?
5. Given these findings, how might existing regulatory frameworks be adjusted?

**Project Benefits: Why is the Project Needed, and Why Now?**

The STR market is both a driver of innovation and economic value, and a potentially disruptive force in overlapping markets (e.g., hotels) and communities concerned about housing pressures, residential character, and safety. As STR markets have grown, local governments—including The City— have stepped into the regulatory fold to manage costs and benefits. However, many have struggled with regulation, with imprecise measures and data and enforcement issues stymieing effectiveness. Additional challenges are determining how to revise approaches as the market changes (including post-pandemic) and how to match regulation to local issues to achieve desired objectives. These challenges will persist until a sophisticated evidence base, tailored to local dynamics, is generated and translated for those operating in policy and planning spaces.

That The City is currently pursuing a second phase of changes to its STR regulations signals that now is a sensible time to invest in obtaining and leveraging this evidence base. In June 2022, Council approved a Notice of Motion directing Administration to revise the fee structure for STRs, update the "Good Host" and "Good Guest" guides, and modernize business license requirements. However, the landscape of the STR market has changed considerably since the development of the 2018 STR scoping review report and the initial phase of regulations that resulted, underscoring the need for a comprehensive review of the market before Administration undertakes further changes. Regulatory reforms must also be informed by an understanding of stakeholder perspectives, including those of STR hosts, housing advocates, the hotel industry, and residents.

This project will provide The City with the evidence base to develop a data-driven, future-oriented, and locally tailored regulatory framework for the STR market, positioning The City in the vanguard of its municipal peers. The improved planning and regulatory processes that result from this project will enable The City to maintain a flexible and transparent approach to managing the STR economy that ensures a fair playing field, addresses stakeholder concerns, and leverages STR activity in an innovative way to improve quality of life for Calgarians. Overall, this project will enable The City to advance Council priorities concerning downtown revitalization, social equity, land use planning, and hospitality and tourism, and aligns with the objectives outlined in the Resilient Calgary, Economic Development, and Smart Cities strategies.

**Urban Alliance Project Partner**
**Academic Experts at the School of Public Policy, University of Calgary** will partner with The City to develop a comprehensive evidence base concerning the STR economy in Calgary that will drive innovation and improved processes in the planning and regulatory space. The academic group will leverage its track record of academic and policy research on the STR market in Canada and internationally, as well as expertise in urban policy and governance, regulation, and policy design, implementation, and evaluation. This partnership will lay a foundation from which Administration

and Council can make strategic and evidence-based decisions regarding Calgary's STR economy. The academic team includes:

- **Dr. Lindsay Tedds, Associate Professor, Department of Economics & Scientific Director, Fiscal and Economic Policy:** Dr. Tedds will direct research, oversee the research team, monitor and evaluate budgets, and serve as primary author.
- **Dr. Gillian Petit, Research Associate:** Dr. Petit has expertise in data management, preparation, analytics, linkages, visualization, and mapping specific to the STR market.
- **Anna Cameron, Research Associate:** Ms. Cameron has expertise in intersectional analysis, urban policy, and comparative analysis specific to the STR policy and regulation.
- **Alexa Atherly, Project Coordinator:** Ms. Atherly has project management expertise, enabling her to coordinate research activities and establish stakeholder connections to support consultation.

**Proposed Timeline**

November 2022
- Submit application to Council Innovation Fund

November-January 2023
- Finalize agreement with The City via the Urban Alliance
- Complete Phase 1 Overview report: Patterns and Use of STRs in Calgary-2017-2021[1]
- Procure STR data from private provider. Data will be used to update the analysis in the Phase 1 Overview report (which Administration will draw on for its Q2022 report).
- Establish protected digital data storage, access, and management

January-June 2023
- Obtain data (e.g., census, business licence, hotel usage data) to be linked to STR data
- Prepare new STR data for analysis; link it to data held by the University of Calgary
- Create initial data visualizations and mapping of STRs in Calgary
- Conduct a comparative analysis of regulatory approaches adopted across Canada
- Conduct a spot analysis of STR listings
- Complete Phase 2 report: Patterns and Use of STRs in Calgary updated for 2021-2022 data (answering questions 1 and 5) & analysis of regulatory approaches

July 2023-December 2023
- Design and conduct stakeholder engagement sessions regarding regulatory options.
- Review Calgary's current regulatory approaches (for STRs and adjacent markets) including a fee review/analysis and compliance with current STR regulations.
- Review competitive issues in Calgary (includes review of the LTR market, hotel industry).
- Using the linked data, begin the analysis required to answer questions 2, 3, and 4

January 2024-June 2024
- Complete Phase 3 report: The Role of STRs within the Broader Policy Environment in Calgary (answering questions 2, 3, and 4)

July 2024-December 2024
- Complete Final Report: Recommendations for Calgary's STR Regulatory Framework: Smart Practices in Design, Implementation, and Evaluation (answering questions 6 and 7)

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[1] We also plan to compare the data for Calgary to the data for Edmonton. Edmonton is an excellent comparator city for understanding changes in patterns and trends in STR activity in the context of the proposed project, especially since regulations in Edmonton were adopted at a different time and have been periodically revised.

- Summary/completion report on project execution and use of funds

| Understanding the short term rental economy in Calgary and the role of regulation | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Q1 2023 | Q2 2023 | Q3 2023 | Q4 2023 | Q1 2024 | Q2 2024 | Q3 2024 | Q4 2024 |
| **Phase 1 overview report** | ▨ | | | | | | | |
| **Data analysis and Phase 2 report** | ▨ | ▨ | | | | | | |
| **Stakeholder engagement** | | | ▨ | ▨ | | | | |
| **Phase 3 report** | | | | | ▨ | ▨ | | |
| **Final report and recommendations** | | | | | | | ▨ | ▨ |

**Proposed Budget**

The two-year project budget is detailed below. The funding request is associated with the costs in the Budget Request column, with several in-kind contributions being provided by the project partners.

| Category | Budget Request |
|---|---|
| Procurement of Proprietary Short Term Rental Data, Monthly, Calgary and Edmonton, To June 2023 | $ 13,500.00 |
| Protected Digital Data Storage, Access, and Management | $ 1,493.28 |
| Data Management, Preparation, Analytics, Linkages, Visualization, Mapping | $ 105,342.62 |
| Project and Research Coordination and Management, Regulatory Review, Fee Review, Literature Review, Intersectional Analysis, Competitive Issues Review, Events Analysis, Fee Analysis, Compliance Analysis, Enforcement Analysis, etc. | $ 141,463.88 |
| Strategic Stakeholders Consultation and Engagement | $ 20,000.00 |
| Sub-Total | $ 281,799.77 |
| Urban Alliance Master Agreement Fee | $ 42,269.97 |
| Total | $ 324,069.74 |

**How does this project meet the criteria of the Council Innovation Fund as set out in the Terms of Reference?**

This application to the Council Innovation Fund (CIF) is to support a startup project grant for The City to engage in a research and innovation partnership on the STR economy with experts at the School of Public Policy, University of Calgary. This partnership creates the foundation for The City to adopt cutting-edge planning and regulatory frameworks and processes that will enable The City to meet its resiliency and innovation goals in the digital age. The core objectives of the partnership are two-fold:

1. To develop a holistic, evidence-based, and stakeholder-informed understanding of both Calgary's STR market, as well as the challenges and opportunities the market presents in light of The City's goals to foster resiliency and improve quality of life for Calgarians.

2. To translate the results of this research into new and improved planning and regulatory processes that will not only support effective management of STR, but also leverage the market in innovative ways to create value for the community.

These objectives are aligned with CIF's definition of innovation and have the potential to change policy and procedures at The City. A key output of the partnership will be an adaptable design, implementation, and evaluation guide for the STR market, which will enable The City to adapt its regulatory framework and processes in order to both align with smart practices, as well as use the STR market to advance strategic priorities. This guide will also ensure The City's policy and regulatory mix is viable and sustainable in the long term. Currently, no such evidence-informed regulatory and governance guide exists in the Canadian context.

This research and innovation partnership will also enable The City to identify new points of alignment with other frameworks, such as the Municipal Development Plan, and Resilient Calgary, Economic Development, and Smart Cities strategies. The evidence base developed through this partnership will position The City to not simply account for STR activity in the context of community-wide planning and growth decisions, but also leverage the STR market in innovative ways to meet emerging needs, create value for the community, and improve quality of life. Examples span several planning and policy areas, including:

- Land Use: Land-use redesignations are often accompanied by concerns from the community regarding the types of housing options that they will enable, including the possibility of the proliferation of STRs and their potential impact on residents and neighbourhood character. Understanding where STRs are, as well as their impacts, benefits, and relationship with secondary suites, housing affordability, and the accommodation industry, will aid evidence-informed decision making to inform land use policy that fosters vibrant communities

- Tourism and Events: Calgary's STR market already plays a vital role in providing accommodation during major events that draw tourists from around the world (e.g., Stampede, the Olympics, Stanley Cup playoffs)—particularly when the existing stock of tourist accommodation is insufficient to meet demand. Knowing what and where short term housing stock exists will help The City better plan for such events, and can also strengthen future bids. With the right policy and regulatory approach, STR market could play an

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important role in activating Tourism Calgary's vision to make Calgary the ultimate host city by closing Calgary's hosting infrastructure deficit, connecting visitors to Calgary's identity, personality, and culture, and ensuring inclusive and accessible accommodation that meets a wide range of needs.

- Flexible Housing: The STR market could be leveraged to fill social service gaps in times of emergency, including instances of natural disaster (e.g., flooding, wild and residential fires, blizzards) in which victims and emergency response personnel require emergency housing; international conflicts, during which Calgary experiences an influx in refugees, and the domestic violence crisis, given insufficient shelter capacity for individuals and families fleeing abuse). Having a detailed picture of the stock of short term housing will aid The City in developing a robust emergency management strategy across a number of scenarios. Further, STRs can be leveraged to offer flexible housing options, including for people travelling from out of town to access medical services that are not available in their community.

Further, this project will enable The City to demonstrate leadership and innovation in the areas of community engagement and planning and regulatory evaluation. Through the partnership, The City will engage proactively with STR hosts and managers, the broader accommodation sector, real-estate professionals, civil society leaders, community stakeholders, and residents. As a result, this project will serve as an example for other jurisdictions of how a municipality can leverage community and stakeholder engagement to co-create with communities an evidentiary basis that can shape flexible, inclusive, and responsive planning and regulatory frameworks. The partnership will also involve the co-creation of an evaluation framework to guide the ongoing assessment and adaptation of Calgary's planning and regulatory approaches, which will enable The City to determine which elements are (and are not) working, as well as how to make modifications as the nature of STR activity changes and as the goals, objectives, and policies of The City evolve.

Overall, this project would place Calgary in the vanguard of Canadian municipalities grappling with how to both manage and leverage the STR market in the digital age.

**Project Administration**

The proposed project will be subject to existing City of Calgary and University of Calgary Urban Alliance Master Terms and Conditions, and an Urban Alliance Project Contract Agreement will need be signed following funding approval. The funds will be administered by Research Accounting, University of Calgary, which ensures that funds are expended and accounted for in accordance with the funding terms.

**Background**

At the 11 December 2017 Combined Meeting of Council, Notice of Motion C2017-1180 was carried. The Notice of Motion directed Administration to provide a scoping report on options for regulating short term rentals by the end of 2018. At the 5 December 2018 meeting of the Standing Policy Committee (SPC) on Community and Protective Services the scoping review report (CPS2018-1328) and its recommendations were considered. The outcome was for Administration to both create a new,

tiered licence category in the Business Licence Bylaw 32M98 for Tourist Accommodations, as well as urge the Government of Alberta to apply the Destination Marketing Fee to STRs.

With regards to the bylaw, at the 11 September 2019 meeting of the SPC on Community and Protective Services the draft revisions (CPS2019-1070) were considered and carried. During the 30 September 2019 Combined Meeting of Council, Council voted to adopt the Proposed Bylaw 31M2019 to amend the Business Licence bylaws.

The amended bylaw came into effect February 1, 2020. Administration built an online submission process to assist those in applying for their licence at their convenience. The online process asks a series of questions to determine the appropriate Licence Type and Tier and allows applicants to pay for the licence and obtain a Licence number. The business licence number must be posted on the STR website, thereby informing potential guests that it is legally registered. Tier 1 licences are issued quickly, whereas Tier 2 licences require a Fire Inspection to be completed prior to issuance. Booking a Fire Inspection is done through 311 and takes place within 7 days past the date the customer is ready for business. Once the Fire Inspection is completed, the Fire Department will inform the Licence Approvals group of the results.

**Current Context**

Since the bylaw came into effect a number of events have occurred that have dramatically impacted the STR market in Calgary.

First, when the COVID-19 pandemic struck, STR activity was severely impacted through abrupt cancellations, declines in reservations, refunds to guests, and various travel and public health regulations. While the sector has deployed various crises management strategies in response, the impacts of the pandemic have resulted in a different sector than existed previously. Some hosts have permanently exited the market, while individuals facing economic strain as a result of the pandemic have entered the market as hosts. Guests are increasingly concerned with cleaning protocols and maintaining social distancing. Platforms have turned attention to ensuring flexibility for guests, complying with various regulations, and addressing neighbourhood concerns (e.g., parties). Professional service providers (e.g., property managers) that serve the STR market have seen increased demand and have expanded the services they offer.

Second, on 1 April 2021 changes to the Government of Alberta *Tourism Levy Act* came into force which included the extension of the tourism levy to short term rentals offered through online marketplaces (e.g., Airbnb).

Third, mounting tensions due to the rapid proliferation of STR activity in Canada have resulted in a growing number of local and provincial governments stepping into the regulatory fold. That said, many have found it challenging to land on the right policy and regulatory mix for managing the STR market, how to revise their approach as the market changes, and how to match the policy and regulatory mix to the specific issues they are facing to achieve the desired objectives.

Finally, governments have increasingly been on the receiving ends of calls to strengthen regulatory efforts, most often from housing advocates, the hotel industry, and residents concerned about neighbourhood safety. The STR market is accused of taking long-term rental accommodations off the market, being given regulatory preference over the hotel industry (resulting in competitiveness

concerns), and negatively impacting neighbourhood quality of life. Yet there is little concrete evidence to support these claims.

Sound and sustainable revisions to The City's current STR regulations will rest on a strong understanding of these dynamics, a point made recently in a presentation related to a two-year review of the existing SRT regulation. Gaining additional knowledge in the following areas will further support effective changes that can also support The City to achieve broader strategic goals:

- the current nature of Calgary's STR market post-COVID, its interaction with large events (e.g., Stampede), and its impacts on related competitive markets[2]
- the impact of the existing regulatory mix on the STR market and its applicability to existing issues
- a detailed understanding of regulatory approaches across Canada and their impacts
- the role digital platforms (e.g., Airbnb) can play in the co-regulation of the STR market
- how to enforce existing or new regulations.

Answering these and other questions can lead to the development of a regulatory design and implementation guide specific to the conditions in Calgary that Administration can use to monitor, evaluate, and update is regulatory mix as the market changes.

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[2] This would include a particular focus on the hotel and related accommodation industry. One of the main STR-related concerns raised by the Hotel Association of Canada, a concern detailed in a presentation in 2017, is that hosts with multiple STR units operate in a significantly less burdensome regulatory arena than the hotel industry. Paying careful attention to STR hosts with multiple units, including ensuring to differentiate between such hosts from STR property managers, will be an important exercise in this work.

**Appendix: Existing STR Research by the Research Team**

In spring of 2019, the research team received donor funding to support preliminary research into short term rentals to understand the main impacts of home sharing and the factors influencing these impacts. This funding was matched with funds internal to the School of Public Policy. This funding (totaling $204,000, all of which has been expended to produce the work detailed below) was used to procure data from AirDNA, data as well as engage in research to understand the STR market, both of which form the foundation upon which this proposed work is built. We detail this foundational work here.

1. **Why Existing Regulatory Frameworks Fail in the Short Term Rental Market: Exploring the role of Regulatory Fractures (Published: https://www.policyschool.ca/wp-content/uploads/2021/10/UP32_Short-Term-Rental-Market_Tedds-et-al.pdf)**

   Over the past decade, home-sharing has evolved from fringe activity to encompass a booming short term rental (STR) market of global scale. This rise has not been without criticism, as Airbnb and other STR platforms have been charged with exacerbating over-tourism, gentrification, and housing issues and engaging in anti-competitive behaviour. On the other hand, the STR market has produced benefits, sparking new activity in local economies and innovation in the travel accommodation sector. In this paper, we explore the nature, evolution, and impact of platform-mediated home-sharing to arrive at a sophisticated conceptualization of the STR market and its complications. We then use this understanding to demonstrate the ways in which existing regulatory approaches—built upon traditional ideas of market composition and dynamics—are inadequate for managing the novel STR market. In particular, we argue that attempts at regulation have been hindered in three ways: first, by a lack of attention to the diversity and complexity of the STR market; second, by a failure to conceive of STR markets as three-sided and involving the active participation of platforms; and third, by a tendency to characterize various forms of market activity as regulatory violations, when the concept of regulatory fractures—instances in which new modes of activity do not map well onto existing frameworks, disrupting regulatory effectiveness—is more apt. Ultimately, we contend that the effective management of the STR market hinges on the ability policymakers to both reconceive of the STR market and the activity that plays out within it, as well as re-imagine and innovate beyond traditional regulatory approaches. We conclude by considering ways in which regulators might begin to do so, including through a discussion of the potential of co-regulatory approaches.

2. **Managing Airbnb: A Cross-Jurisdictional Review of Approaches for Regulating the Shor-term Rental Market (Revise and Resubmit: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4009268)**

   Since 2018, an increasing number of Canadian governments, most of them municipalities, have adopted regulatory frameworks to both mitigate perceived negative impacts of the short term rental (STR) market, as well as reap some of its benefits. However, little academic work to date has sought to take stock of and understand this regulatory push. This article responds to this gap in the research by analyzing in comparative perspective the regulatory approaches adopted in 11 Canadian jurisdictions in response to the rise of platform-mediated home

sharing. We find that aspects of regulation, such as licensing and registration, are increasingly a question, not of "if," but rather "how" and "to what extent," with the most promising approaches being those that reflect sophisticated understandings of the range of activity that plays out in the market and the various actors, including platforms and property managers, involved. For jurisdictions looking to introduce or tweak approaches going forward, there is potential benefit in reframing market regulation as a governance issue, rather than a technical legal problem. From this standpoint, of particular promise are joint governance approaches which involve municipalities and other local jurisdictions implementing distinct rules within the context of an overarching provincial framework.

3. **A Comparative Analysis of Short Term Rental Regulations in Six Alberta Municipalities (Under Revision: [https://mpra.ub.uni-muenchen.de/cgi/users/home?screen=EPrint%3A%3AView&eprintid=112671](https://mpra.ub.uni-muenchen.de/cgi/users/home?screen=EPrint%3A%3AView&eprintid=112671))**

Once limited and relatively unknown, Alberta's short term rental (STR) market has, in the past five years, become a frequent discussion topic in news media and municipal council chambers alike. Facilitated by the arrival of online platforms, such as Airbnb, the now-thriving STR market is viewed as an economic boon by some, but has also stoked longstanding debates about housing access and resident liveability, provoking newer complaints of anti-competitive behaviour, as well as general calls for regulatory intervention. In the context of limited research on Alberta's STR market (and its regulation), this paper presents a comprehensive overview and analysis of regulatory frameworks for STR activity in six Alberta municipalities, alongside an assessment of pertinent provincial measures. The aim of the review is two-fold: (1) to gain an understanding of the nature and extent of regulatory efforts across a range of local contexts that, together, constitute a representative picture of the overall market in the province; and (2) to ascertain the extent to which these approaches are both effective and appropriate, based on what can be discerned about local context, market dynamics, policy objectives, and current and emerging issues. We argue that while some jurisdictions appear to have fared better in implementing generally appropriate and effective measures, all local authorities, in addition to the province, have considerable room to improve their framework. We draw particular attention to ensuring regulations are developed in response to local issues, reflect the actual and projected state of the market, contain clear and measurable objectives aligned with broader community strategies, and invite ways for local authorities to leverage the power, insights, and resources of platforms.

4. **Short Term Rental Data from AirDNA**

We purchased STR data from AirDNA (AirDNA n.d.) for six Alberta Municipalities spanning from June 2017 until June 2021.[3] AirDNA scrapes data on short term rentals listed on Airbnb. The scraped Airbnb data includes information on Airbnb hosts including their city and country of residence and their number of listings anywhere in the world. It also includes information on the listing, including the property type (e.g., apartment), listing type (e.g.,

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[3] The terms of the agreement with AirDNA are such that AirDNA retains intellectual property rights over the raw data transferred. The raw data were provided to the authors for the purpose of statistical and research purposes and cannot be republished or disclosed to a third party without the written consent of AirDNA.

entire apartment or single room in a shared apartment), the number of bedrooms and bathrooms, and the published nightly fee. Finally, AirDNA also provides monthly transaction data for each listing that includes the number of bookings per month, the number of days available in a month, the occupancy rate, and the monthly revenue. Unlike the host and property data, the transaction data has had to be estimated by AirDNA from 2015 onwards as Airbnb does not provide information on bookings, although they did previously. AirDNA uses machine learning algorithms based on an enormous historical dataset to perform the estimations.

The data provided by AirDNA is raw data that **must** be reviewed and properly prepared for analysis, especially since the focus is specifically on STRs and not tourist accommodations writ large.

There are several reasons for this. First, some listings on Airbnb are posted by traditional tourist accommodations such as hotels, motels, lodges, inns, and hostels. While these may be listed on Airbnb, they are not what we consider as STRs, which are accommodations that are in or on a property that could otherwise be used for residential purposes. Excluding listings for traditional tourist accommodations is a three-step labour intensive process. In the first step, we exclude any Airbnb listing where the host self-selects a hotel room as its "listing type".[4] In the second step, we manually check each host to determine if they are a traditional tourist accommodation. If the host was determined to be a hotel, motel, lodge, or hostel, we exclude those hosts' listings.[5,6]

In the third step, we exclude all listings which are listed by an "online agency" to exclude traditional tourist accommodations. As part of the data cleaning process, we manually check all Airbnb listings which were active listings at a set point in time and re-classify their property type and listing type using a standardized classification system.[7] Individual listings can only be verified if they remained an active Airbnb listing[8] at the time the listing is manually verified. If the property is not active when the verification process takes place, its property and listing type could not be re-classified.

Another feature of the AirDNA data that may cause some error is that Airbnb listings may appear to be more numerous than actual STR properties. Some hosts have multiple Airbnb listings for the same physical property. For example, a host may have one Airbnb listing for an entire single detached house, plus separate Airbnb listings for separate rooms in the same house. In such a case, there can be no overlap between a booking of the entire house listing and a booking of a room listing. In addition, an STR operator may also list multiple rooms in

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[4] There are four listing types a host can choose from when listing their property on Airbnb as coded in the AirDNA data are as follows: entire home/apartment, private room, shared room, and hotel room.

[5] Note that for Canmore, we have not removed listings by "resort" complexes (e.g., Windtower Lodge, Blackstone Lodge, etc.) as it is possible that these resorts are listing units individually owned on behalf of the individual owner as part of a rental agreement.

[6] To see how we categorized host types, see the Data section of the Appendix.

[7] To see our standardization process and definitions, see the Data section of the Appendix.

[8] Active listings are defined as a listing that were either available for rent in the month or were booked as a rental in the month.

the same house. In both of these examples, there is only one physical STR property. This means that the number of STR listings may exceed the number of residential dwelling units that are used as STRs. There is no information available on the specific address of a property listing. All that is known about the property is a small geographic circle within which the property is located. Precisely where in the circle the property is varies by random small amounts for each listing. Manual verification of duplicate properties is only potentially possible for current listings.

We have only just completed this data cleaning work on the procured data, which means that the data is only just now ready for analysis. This work will have to be repeated for any additional AirDNA data that is acquired; however, because of the knowledge we have built engaging in this work to date, it will be a smoother process moving forward.