

# SHORTER ROADS GO A LONG WAY

Road efficiency and growth management in  
Fort Saskatchewan

Prepared for the City of Fort Saskatchewan

June 2018



**SMARTER STREETS**

## **Shorter Roads Go a Long Way: Fort Saskatchewan**

Road efficiency and growth management.

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June 11, 2018

Smarter Streets, Halifax, Nova Scotia

Authors: Paul Dec and Tristan Cleveland.



**SMARTER STREETS**

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# EXECUTIVE SUMMARY

Between 1991 and 2015, Fort Saskatchewan doubled its population to 25,500 people, and the city continues to grow at a rate of 4.7% per year. Its population is projected to double again by the 2040's. Such enormous growth means opportunity, but also responsibility. Once road networks for new development are established, they rarely change over centuries, and so lines drawn on maps today may impact the city's residents for generations.

Smarter Streets has analyzed the efficiency of development patterns of small cities across Canada, and in 2017, Fort Saskatchewan engaged the team to assess the city's development patterns. Our analysis focuses on the efficiency of the road network in communities, measured in terms of road length per resident. Areas with low road length per resident tend to both cost less and generate higher taxes. Many residents in these neighbourhoods spend less time travelling to work and get there by walking or transit, generating lower transportation costs and traffic. Combined, we term these outcomes, "network efficiency."

Most neighbourhoods in Fort Saskatchewan achieve the first benefit of network efficiency: low costs for road infrastructure per taxpayer. We find that, unlike in other cities we have analyzed, most low-density residential communities generate tax revenues higher than the cost of servicing and maintaining roads. We also find that between 2001 and 2016, the areas of the city that had the greatest reductions in road length per resident were those that saw the greatest increase in property tax revenue per square meter.

In most neighbourhoods, however, these savings are achieved at the expense of the other benefits of network efficiency. Long blocks with few intersections mean that there is relatively little road to maintain per resident, but it also means that walking to local businesses or nearby bus stops is more difficult. There are also almost no businesses in residential neighbourhoods, which makes it

hard for people to switch to lower-cost forms of transportation like walking or transit.

We find that apartment building properties in Fort Saskatchewan generate between four to seven times more property tax income per square meter of land than surrounding neighbourhoods, while requiring little road infrastructure. Their residents also appear to disproportionately take transit often, suggesting they create less traffic congestion than the average resident. Building more apartment buildings will, therefore, generate significant resources for the city while costing little.

To create more efficient neighbourhoods throughout the city, we recommend three strategies: encourage infill development in the downtown, allow businesses in residential neighbourhoods, and establish minimum efficiency requirements for new development. In the downtown, we find the addition of 800 residents and 1,600 jobs would allow the area to reach a minimum threshold where a substantial proportion of people would choose to walk for many trips.

Typically such an influx of residents and jobs will push up assessments in the downtown, and could generate 1.7 times more tax revenue per square meter than the city's average. Such revenue would make it possible to reinvest in streetscaping, which could help the downtown attract further growth.

For new greenfield developments, we recommend establishing compact, mixed-use main streets that transit may serve efficiently. By connecting these main streets to the downtown with high-frequency bus routes, all communities in between can benefit from better transit access.

Fort Saskatchewan is well-positioned to create neighbourhoods that produce high property tax revenue at relatively little cost in infrastructure. This report helps identify the scale of that opportunity and the guidelines that would allow the city to achieve this goal.





# FOREWORD

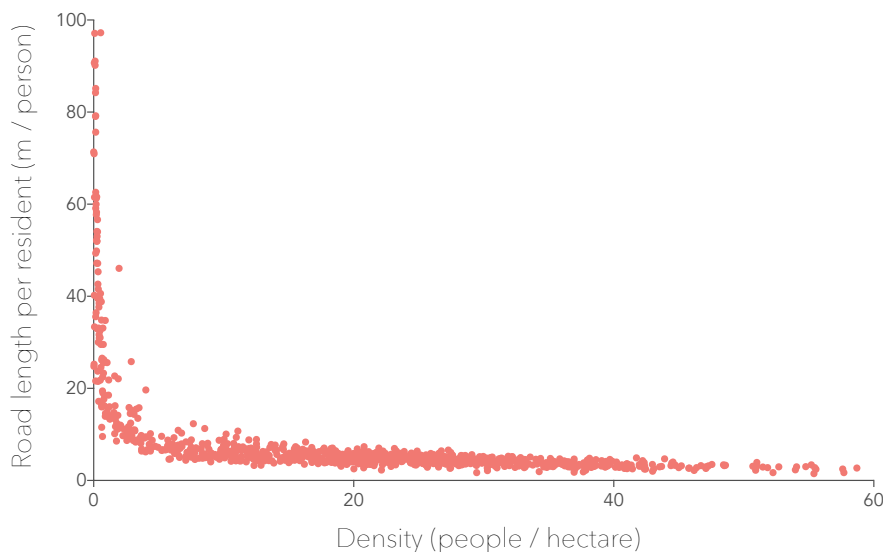
Density lowers costs for government, but its impact is not uniform. Based on previous research on cities across Canada we have determined that as density drops, the average length of road per resident rises super-linearly: the lower density gets, the faster road length per person rises. Many government costs – such as road maintenance, school busing, garbage pickup, emergency services, and snow clearing – depend directly on the length of road. As a result, cost efficiency can vary substantially between different neighbourhoods of a city.

Figure 1 shows the relationship between density and road length per person for nine Canadian cities, with each dot representing a neighbourhood (census tract). We find areas with higher road length per person have both

higher road-maintenance costs and lower average tax assessment values. They also tend to have a lower proportion of people who walk or take transit.

In October 2017, Fort Saskatchewan commissioned Smarter Streets to investigate the city's current road efficiency in terms of insights we have gathered from analyzing municipalities across the country. The topic is particularly salient for Fort Saskatchewan because the town has been growing at a tremendous rate, having doubled in 24 years. A 2015 growth study, *Where do we Grow from Here?*, projects that population will double again by 2044, and triple by 2066, growing from 24,149 souls to over 70,000.

The nonlinear connection between density  
and road length per person



**Figure 1:** Road efficiency vs. density for the census tracts of nine Canadian cities. As density approaches zero, the length of road per person rises at an increasing rate, suggesting that the lowest density areas impose disproportionately high maintenance and servicing costs.

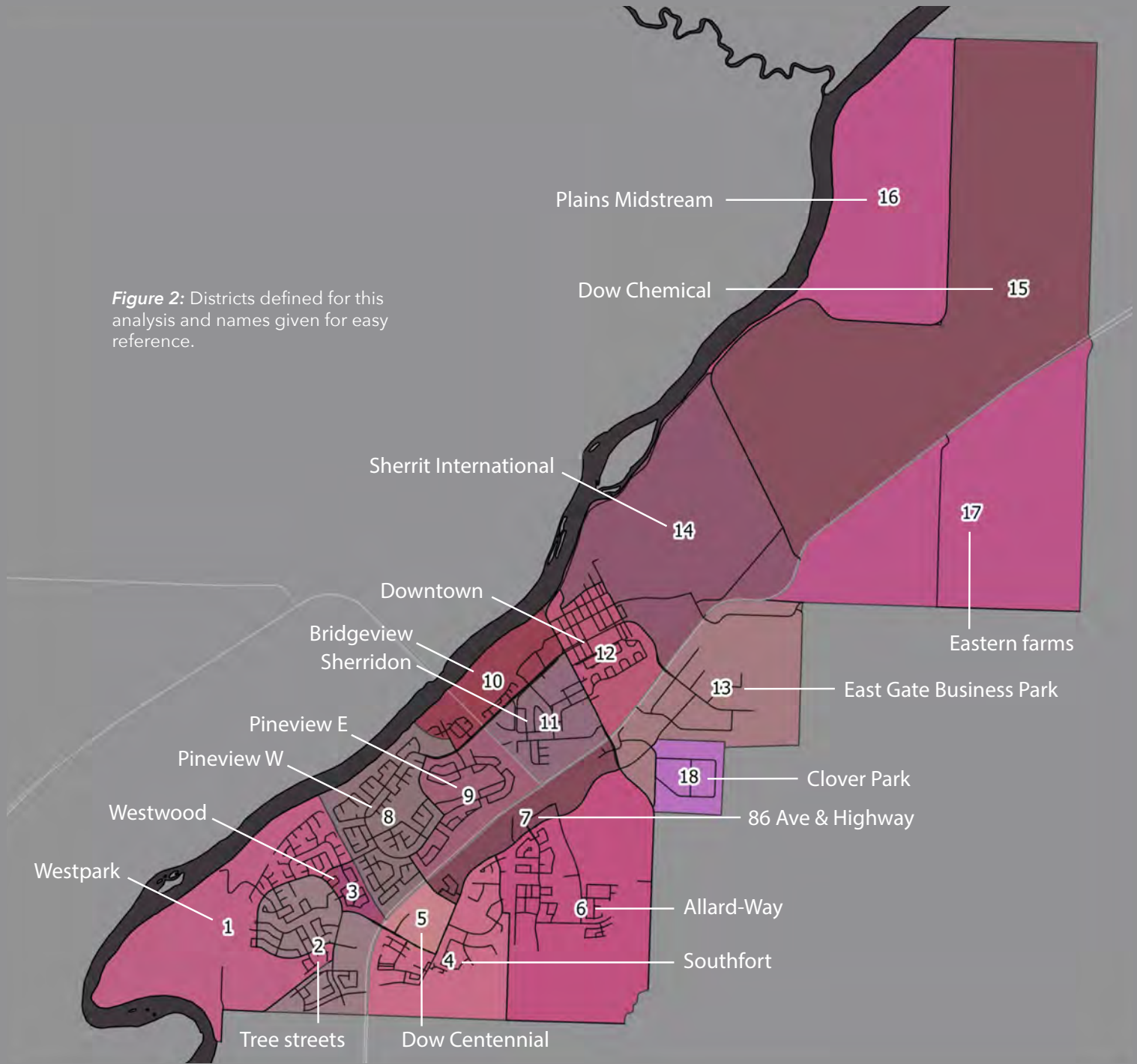


Designing an all-new street network presents a one-time opportunity to create an efficient and productive urban fabric. It is also an enormous responsibility, because once established, road networks change little over centuries. Downtown Calgary is slightly misaligned with the rest of the city's grid because in 1883, an engineer miscalculated true north. While buildings come and go, the street network remains in roughly the same shape.

Road layout decisions made today could impact Fort Saskatchewan for centuries. It is therefore critical to get them right. To this end, we draw on our research on other cities to identify goals and strategies that could help accomplish efficient growth. With so much growth, Fort Saskatchewan has a rare opportunity to aim for the best of what other cities have accomplished.



**Figure 2:** Districts defined for this analysis and names given for easy reference.



## METHODOLOGY

We first sought to split the city into neighbourhoods for analysis. Statistics Canada divides Fort Saskatchewan into three types of geographic unit, none of which correspond effectively with neighbourhoods: census tracts, dissemination areas, and dissemination blocks. The city has only four Census Tracts, which would be too broad to provide useful comparison between neighbourhoods.

The city's 21 dissemination areas correspond more effectively with neighbourhoods, but only in the area north of highway 21. The area south

of the highway, plus most of the city's industrial parks, are in a single dissemination area.

The city has 202 dissemination blocks, which, in turn, are excessively specific. We therefore custom-built 17 geographic units by combining the city's 202 dissemination blocks, as shown in Figure 2. These dissemination block divisions did not allow us to distinguish, however, the residential neighbourhood of Clover Park from the East Gate Business Park, which have markedly different urban forms. We therefore separated these areas manually using property assessment data for each civic address.





**Figure 3:** The length of roads in each district was calculated.

We use these 18 geographic units for the majority of our analysis. However, Statistics Canada does not provide data on transportation mode split and employment by dissemination block, so for these topics, we use dissemination areas.

We calculate the aggregate length of road for each area using Geographic Information System software. Some roads run along the boundary between two areas. For these, we divide their length in half and add them to both.

## DATA SOURCES

We used the Census Canada Road Network Files to calculate road lengths. We screened this road map for errors and inconsistencies using

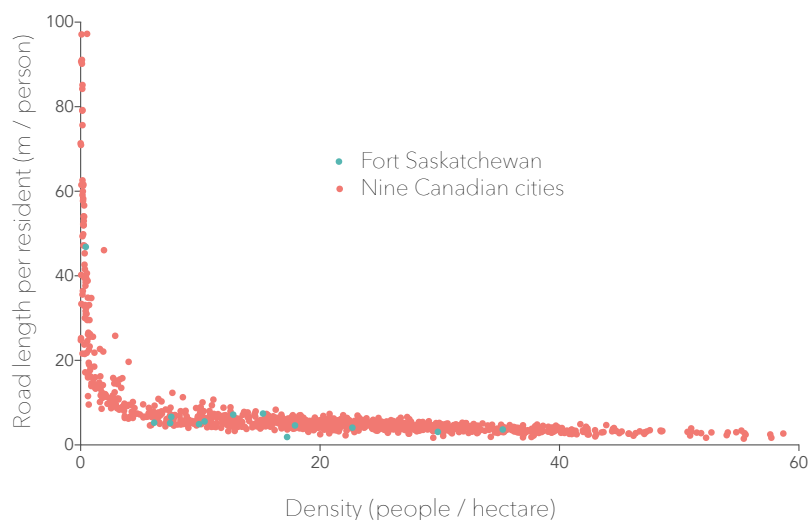
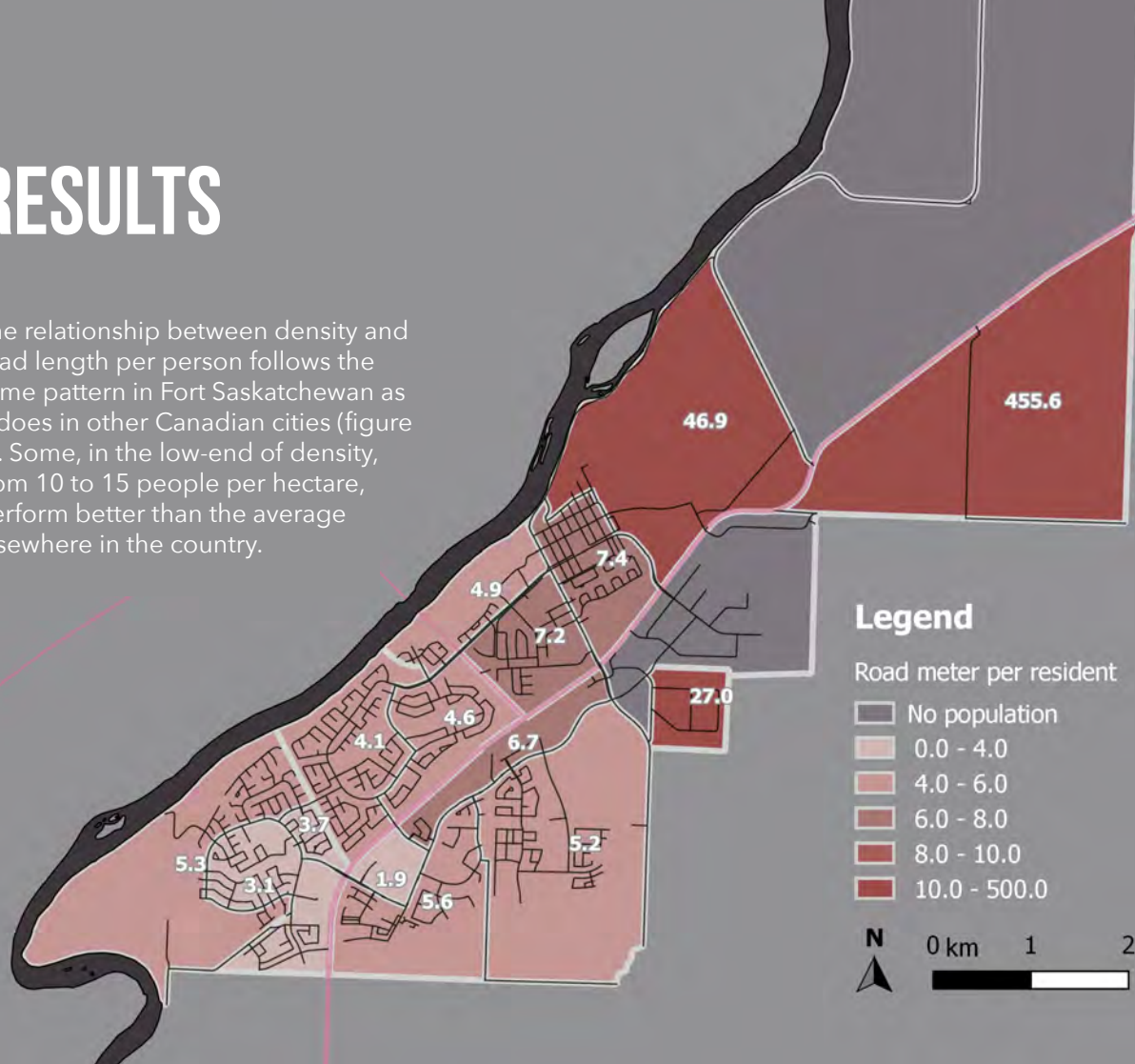
aerial imagery. We also removed private roads and the provincial highways 15 & 21 in order to focus on municipal roads that serve homes and businesses.

Fort Saskatchewan provided data on the cost of road maintenance, the number of annual bus boardings per stop, and the commercial and residential assessment value of each civic address. We accessed data from Statistics Canada on the number of jobs, homes, and residents in each area, as well as the number of people who walk, bike, drive, and take transit to work.

The Canadian Census 2016 and the above mentioned data provided by the City are the only data sources used throughout this study.

# RESULTS

The relationship between density and road length per person follows the same pattern in Fort Saskatchewan as it does in other Canadian cities (figure 5). Some, in the low-end of density, from 10 to 15 people per hectare, perform better than the average elsewhere in the country.

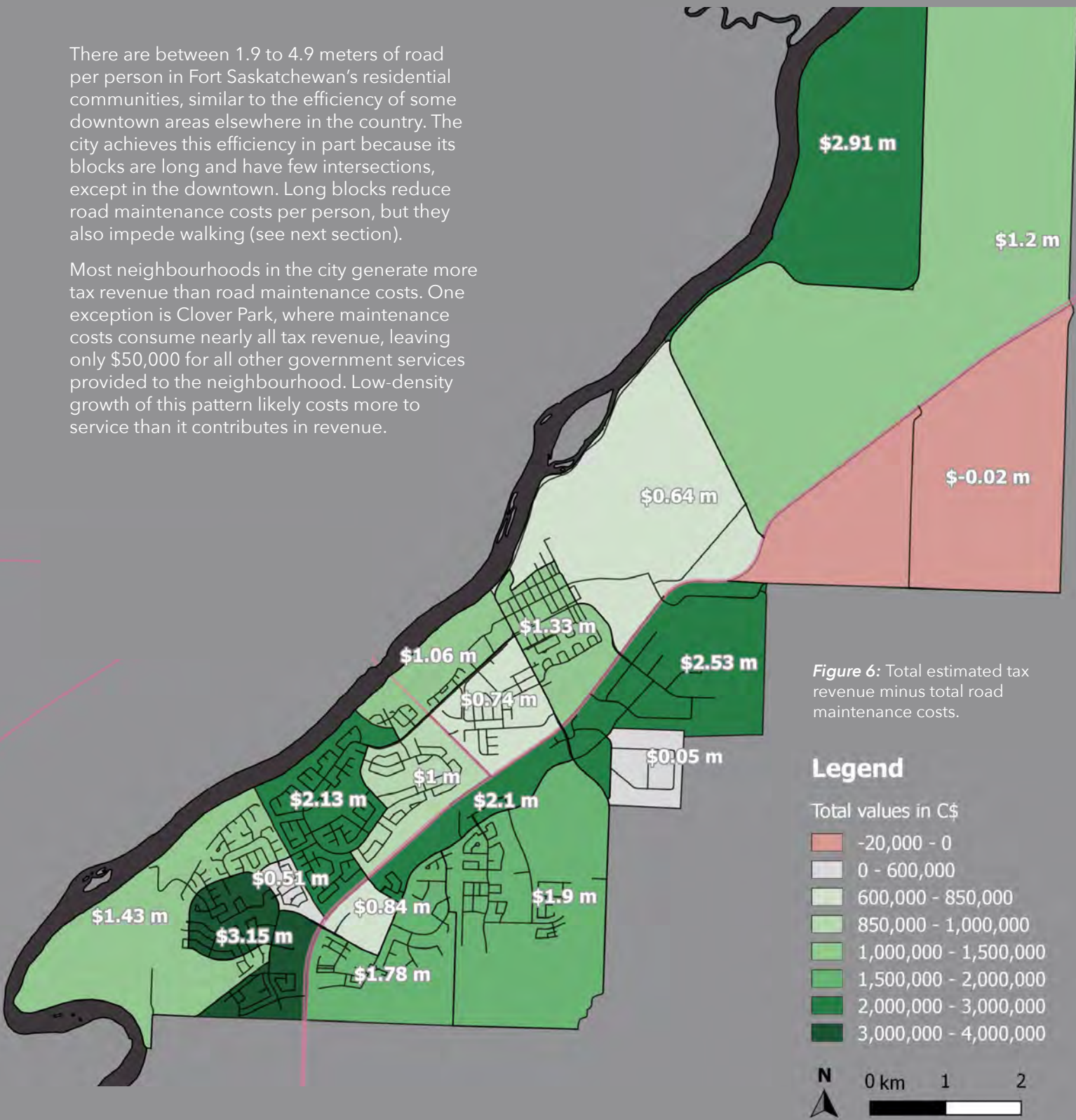


**Figure 5:** The relationship between density and road length per resident for Fort Saskatchewan, overlain with the results for nine other cities across Canada. Dots represent census tracts or, in the case of Fort Saskatchewan, geographical units customized for the purpose of this study.

# TOTAL TAX REVENUE MINUS ROAD MAINTENANCE COST

There are between 1.9 to 4.9 meters of road per person in Fort Saskatchewan’s residential communities, similar to the efficiency of some downtown areas elsewhere in the country. The city achieves this efficiency in part because its blocks are long and have few intersections, except in the downtown. Long blocks reduce road maintenance costs per person, but they also impede walking (see next section).

Most neighbourhoods in the city generate more tax revenue than road maintenance costs. One exception is Clover Park, where maintenance costs consume nearly all tax revenue, leaving only \$50,000 for all other government services provided to the neighbourhood. Low-density growth of this pattern likely costs more to service than it contributes in revenue.





# TRANSPORTATION EFFICIENCY

Many neighbourhoods in Fort Saskatchewan feature cul-de-sacs, long blocks, and few intersections. As a result, pedestrians may need to take long, indirect routes to reach destinations.

It is therefore likely difficult for many residents to reach bus stops on foot. Annual bus boardings per resident range between 0.5 and 3.7 in residential areas. To compare that number to what the city can aim for as it grows, Windsor Ontario, population 218,000, has 29 transit trips per resident per year.

## Legend

Annual boardings per resident

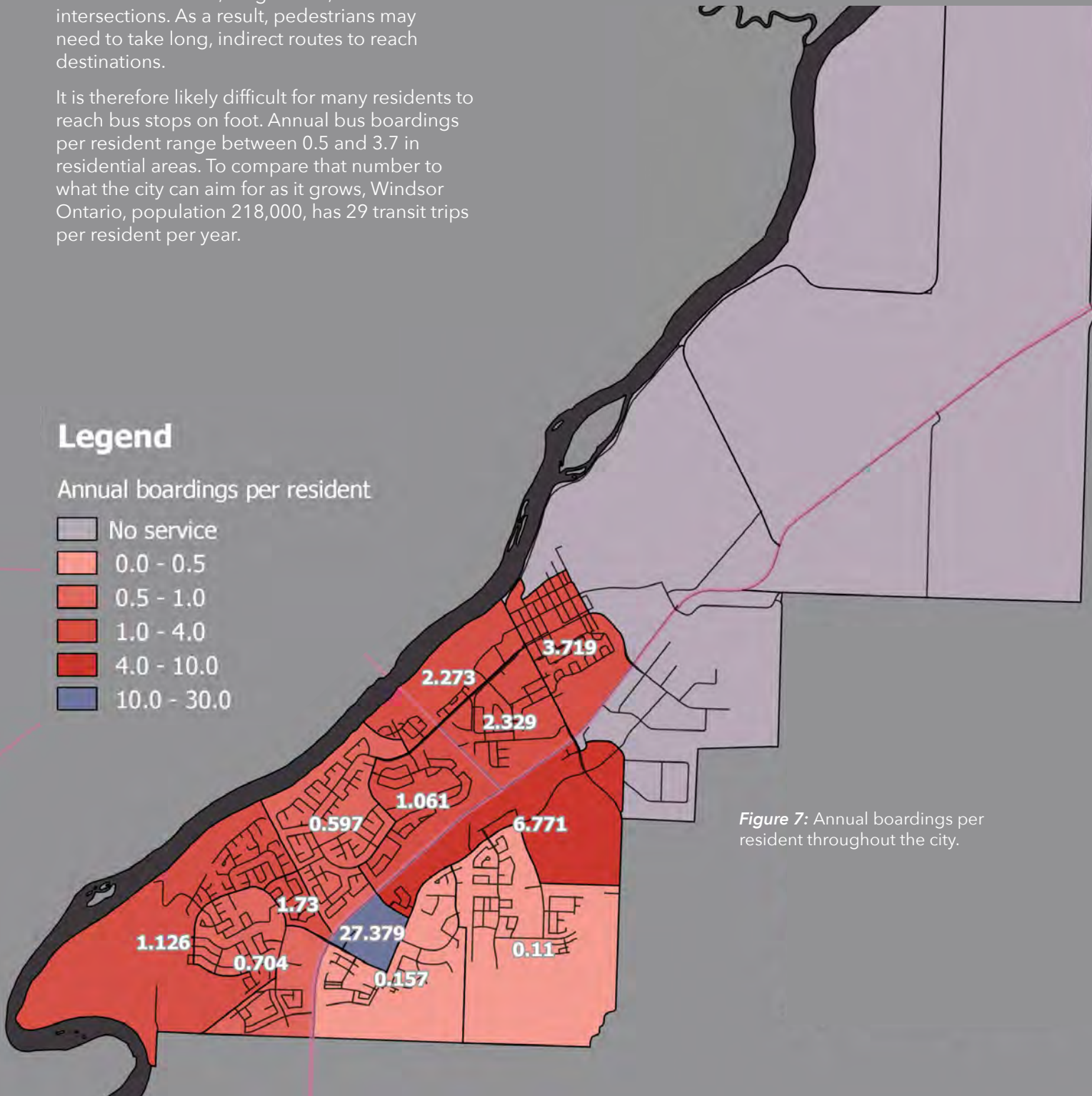
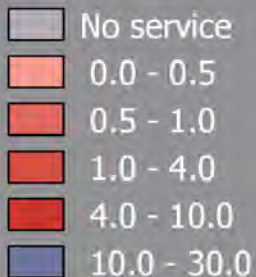


Figure 7: Annual boardings per resident throughout the city.

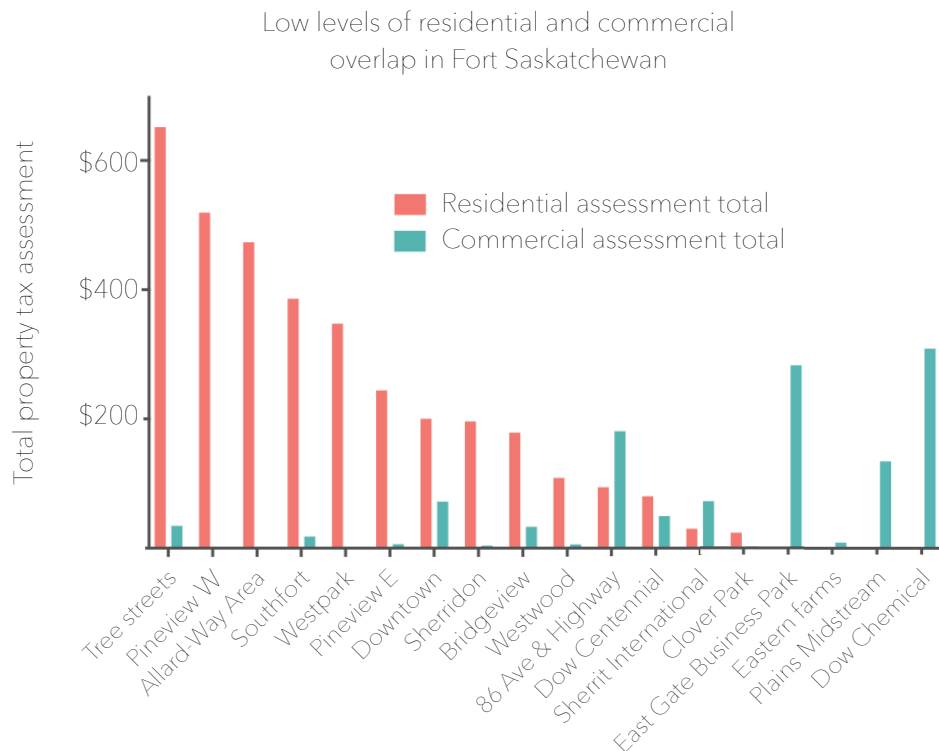
## LAND-USE MIX

All purely residential areas of Fort Saskatchewan that are on the transit network have similar levels of transit ridership. The locations where ridership is higher, such as the downtown, feature commercial destinations as well as homes. Other high-ridership areas, such as the 86 Ave. & Highway, feature employment. Research has shown that areas with both homes and employment tend to have higher transit ridership.<sup>1</sup>

A comparison of residential and commercial tax assessments reveals that there is almost no overlap between residential and non-residential land uses. This lack of mixed-use development represents a barrier to growing Fort Saskatchewan's transit ridership. There are a total of only 11 mixed-use properties in the municipality.

The city's newest neighbourhoods have very few businesses. As a result, the commercial share of total tax assessments dropped from roughly 65% to 42% since 2002, according to the *'Where do we Grow from Here?'* report.

At present, the greatest concentration of transit boardings is at the Dow Centennial Centre. This area contains the transit terminal as well as both residential and commercial land uses. The underused land around this building represents a major opportunity for increasing ridership.



**Figure 8:** There is little overlap between residential and commercial property assessments in Fort Saskatchewan. The areas of Fort Saskatchewan with the highest transit ridership have a mix of employment and homes. Creating more mixed-use areas could support greater transit use, as well as more walking and biking.

# BENCHMARKS FROM OTHER CITIES

As Fort Saskatchewan adds tens of thousands of new residents in the coming decades, its downtown has the potential to become a prosperous, thriving place. To evaluate that potential, it will be helpful to compare the downtown to successful community cores in other cities. We draw on three examples: Summerside, PEI (population 15,000); Charlottetown, PEI (population 36,000); and Halifax (population 320,000).

## NETWORK EFFICIENCY

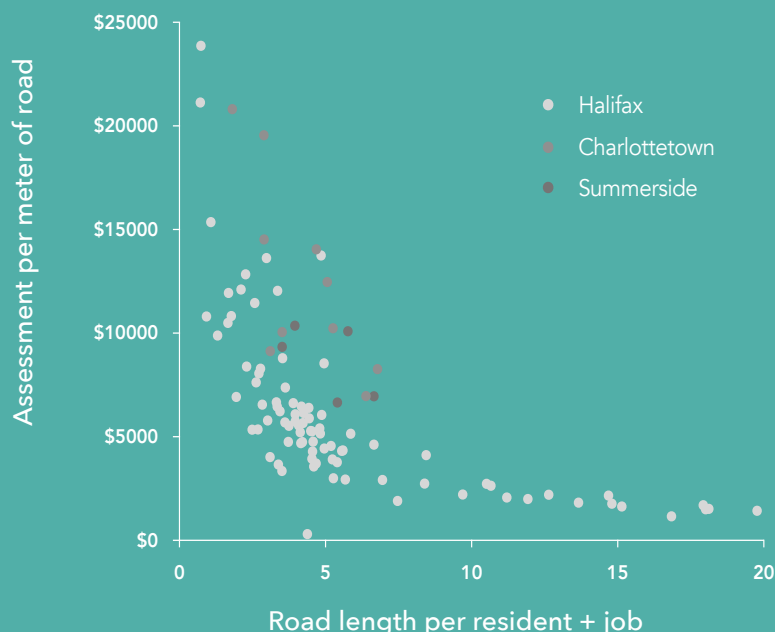
In our analysis of other cities, we find that certain patterns of growth simultaneously reduce infrastructure and transportation costs while increasing tax revenue. We call this combination “network efficiency.” To achieve optimal outcomes, we find it is necessary to create compact communities with both jobs and residents on a well-connected grid so people can easily walk to destinations. We will outline the evidence for the various aspects of network efficiency before assessing the potential of Fort Saskatchewan’s downtown to follow this model.

## RESIDENTS & JOBS

We calculate both the number of residents and jobs for this analysis. The density of both residents and jobs (called “intensity”) better predicts transportation mode share than residential density alone, because jobs indirectly indicate the number of local destinations people can access. Calculating jobs also offers a more complete picture of the users of streets and the number of residential and commercial taxpayers.

## COST EFFICIENCY AND REVENUE GENERATION

We find that the greater the number of both homes and jobs mixed together on the same streets, the greater the taxable assessment per square meter. Areas with many homes and jobs have a limited supply of land, pushing up property values. The convenience of having many destinations near home also likely increases value. Higher property taxes, and more tax payers, in turn mean each meter of road generates higher tax revenue (see figure 9). As the cost of maintaining roads per resident and business goes down, the revenue per meter of road goes up, creating significant efficiencies for government.



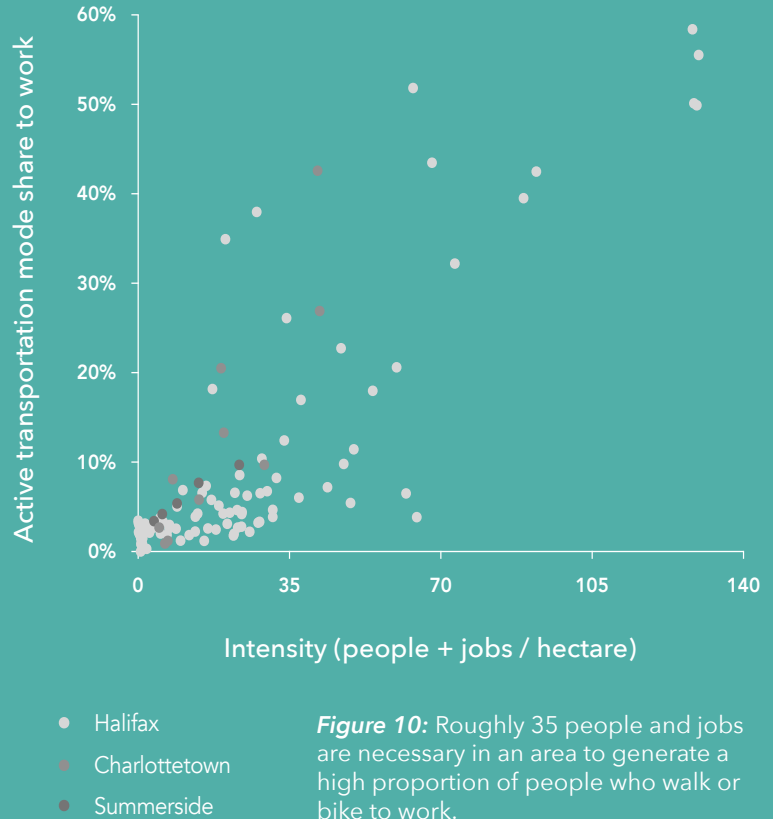
**Figure 9:** In Halifax, Charlottetown, and Summerside, the more costs of roads are shared with more residents and businesses, the more tax revenue those roads generate per meter.



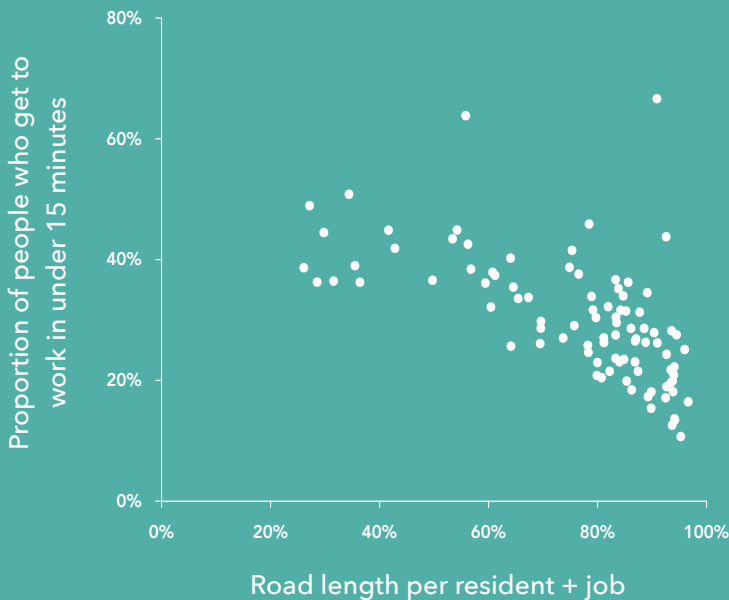
## LOW-COST TRANSPORTATION

The same factors that create financial efficiencies also support lower-cost modes of transportation. When many jobs are available within close distance of homes, a substantial proportion of people walk or bike to work.<sup>2</sup> We find that there needs to be a compact mix of roughly 35 people and jobs per hectare before a substantial proportion of residents will choose to use their feet for transportation, figure 10.

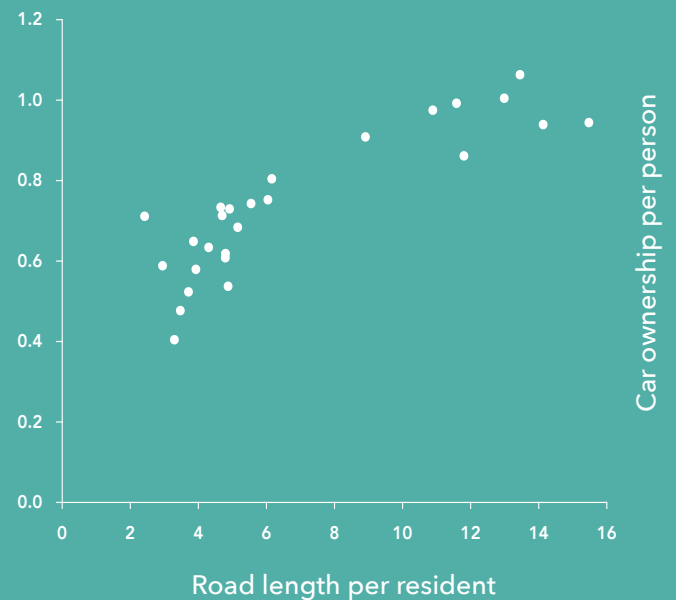
Neighbourhoods where fewer people drive to work generate less congestion, both because their residents are less reliant on cars, and because they tend to arrive at work faster, figure 11. Less driving per person creates less infrastructure wear and tear and requires less road capacity and parking. Such mixed-use neighbourhoods also allow households to save on car ownership, gas, and maintenance, figure 12. And the community benefits from less traffic noise and pollution. Walking and biking, in this way, create fewer costs for the individual, government, and the community.



**Figure 10:** Roughly 35 people and jobs are necessary in an area to generate a high proportion of people who walk or bike to work.



**Figure 11:** In Halifax, the greater the concentration of homes and jobs, the more people get to work in under 15 minutes.



**Figure 12:** In Halifax, areas that have a high road-costs per person also have higher rates of car ownership.

## ACTIVE TRANSPORTATION, REVENUE AND LOCAL ECONOMIC GROWTH

The proportion of people who walk or bike to work is itself strongly correlated with a higher average value of land per square meter (figure 13). There are likely two reasons for this relationship. First, land sells for more when many people and businesses want to occupy the same scarce land. Second, people will pay more for homes that have many destinations within convenient walking distance of home.<sup>3</sup> Since walking and biking cost less than driving, research shows people who live in such neighbourhoods tend to save money overall, despite paying more for their homes and generating greater government revenue.<sup>4</sup>

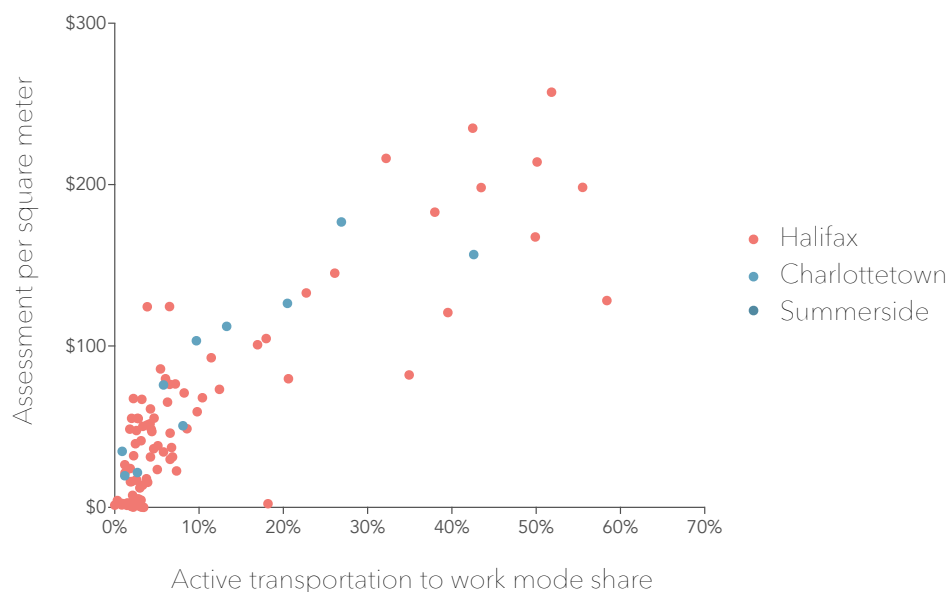
People who walk and bike to local businesses also tend to be loyal customers, spending more overtime than people who arrive by other modes.<sup>5</sup> Active transportation both costs less for individuals and can help support local business growth.

## REINVESTMENT IN HIGH-REVENUE STREETS

Throughout Canada, downtowns are highly lucrative, often generating over 10 or 20% of their city's total tax revenue, despite constituting only a small fraction of their city's land area.<sup>6</sup> They are this lucrative because, as shown in figure 9, streets with many homes and businesses generate much higher total tax revenue, while also costing less to service per taxpayer.

Attracting new development to such streets will make them yet more lucrative. One way to attract development is to reinvest part of the downtown's revenue back into the its streets. Benches, flower boxes, parks, and other streetscaping interventions all help attract growth.<sup>7</sup>

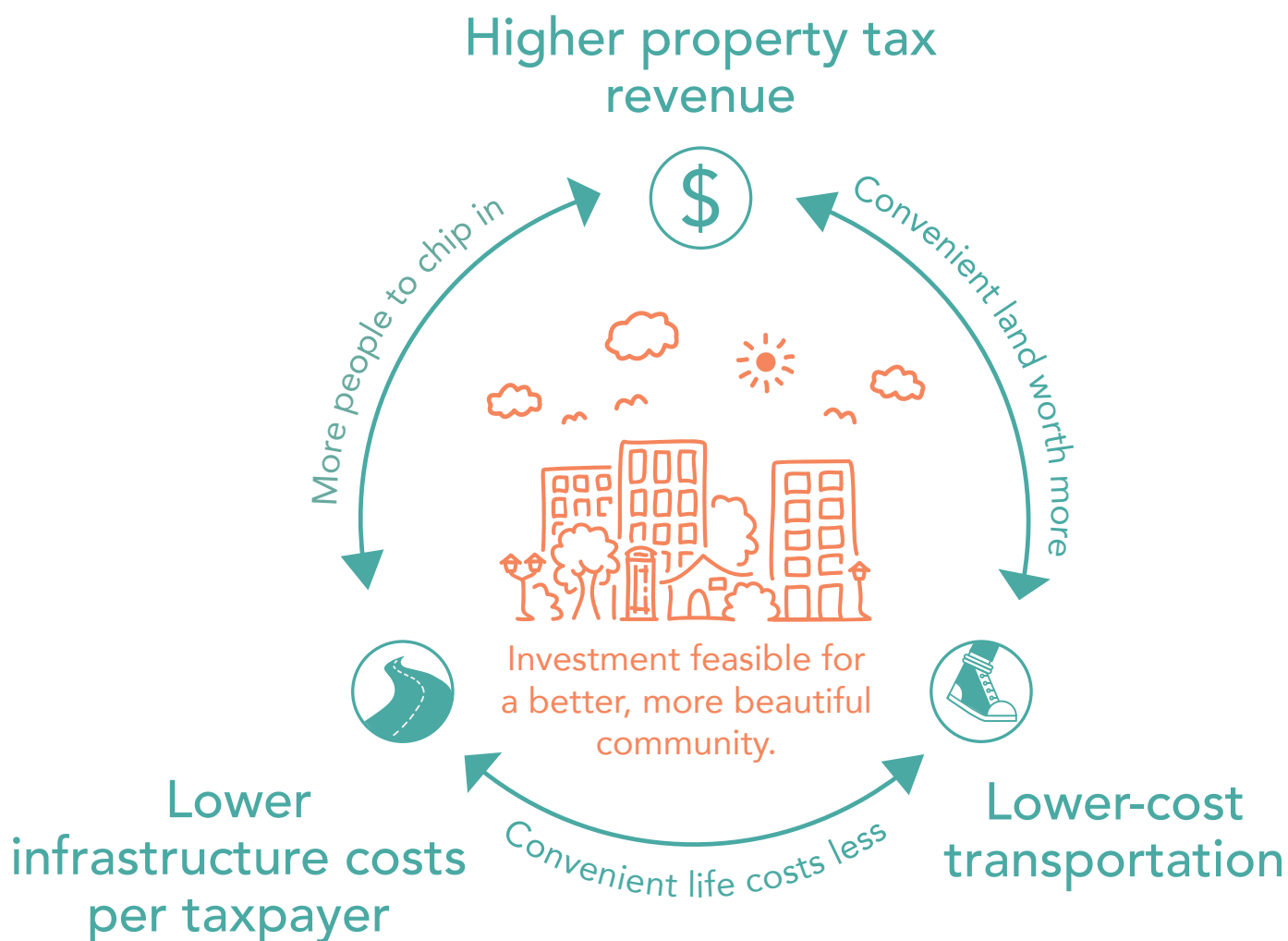
A downtown with high network efficiency can make the city wealthier in the short term. By consistently reinvesting part of that wealth back into the downtown, its success can be self-accelerating. The goal of compact development need not only be to reduce costs per taxpayer, but to make greater investments in streets cost-effective.



# NETWORK EFFICIENCY: 3 ELEMENTS

The potential economic efficiencies of compact development are generated by three elements: low infrastructure costs per taxpayer, high property tax assessments per meter of road, and low-cost transportation, summarized in figure 14. Currently, Fort Saskatchewan's purely residential neighbourhoods are relatively low cost in terms

of infrastructure per taxpayer. Without local jobs, however, these neighbourhoods have limited potential to reduce transportation costs for residents, or to generate sufficient commercial revenue to reduce the tax burden residents must carry.



**Figure 14:** A diagram of network efficiency, a model for how growth can support greater revenues for lower infrastructure costs while also making life more convenient and lower cost for residents. This model of growth informs our recommendations for Fort Saskatchewan.



# POTENTIAL EFFICIENCY DOWNTOWN

Downtown Fort Saskatchewan has a tight grid that could potentially support all three elements of Network Efficiency. Since its streets have many intersections, it would be viable for a large proportion of residents to walk to destinations, if they have sufficient places to walk to. With more commercial and residential development on these streets, there is potential to generate disproportionately high tax revenue on relatively little infrastructure.

While Fort Saskatchewan's downtown has this potential, it currently falls short on a number of metrics. It has the second most road length per resident in the city, 7.4 meters, while in other cities, downtowns tend to have the lowest road length per person. The downtown also performs poorly in terms of the number of both residents and jobs on its streets.

Despite having a large proportion of both homes and businesses, the cost of downtown's infrastructure per taxpayer is currently no more efficient than neighbourhoods with few or no jobs at all. The

reason is that a grid with small blocks, as is found in the downtown, is composed of a comparatively large amount of road. To make this grid cost effective, it must be filled with homes and businesses, and currently, the downtown has too few. While Charlottetown's downtown has 42 people and jobs per hectare, Fort Saskatchewan's has 16. And while Charlottetown's has 2 jobs per person, Fort Saskatchewan's has only half a job per person.

The property value per square meter of Fort Saskatchewan's downtown is equal to the average of the entire city. The assessment per square meter of downtown Charlottetown and Summerside, in contrast, is roughly 1.7 and 1.8 times higher than their communities' total average, respectively. If land in Fort Saskatchewan's downtown were valued at 1.7 times that of the city overall, it would translate to \$4,900 of property tax assessment per meter of road, as compared to \$2,700 today. While the cost of its infrastructure would change little, the revenue it could generate could expand substantially.

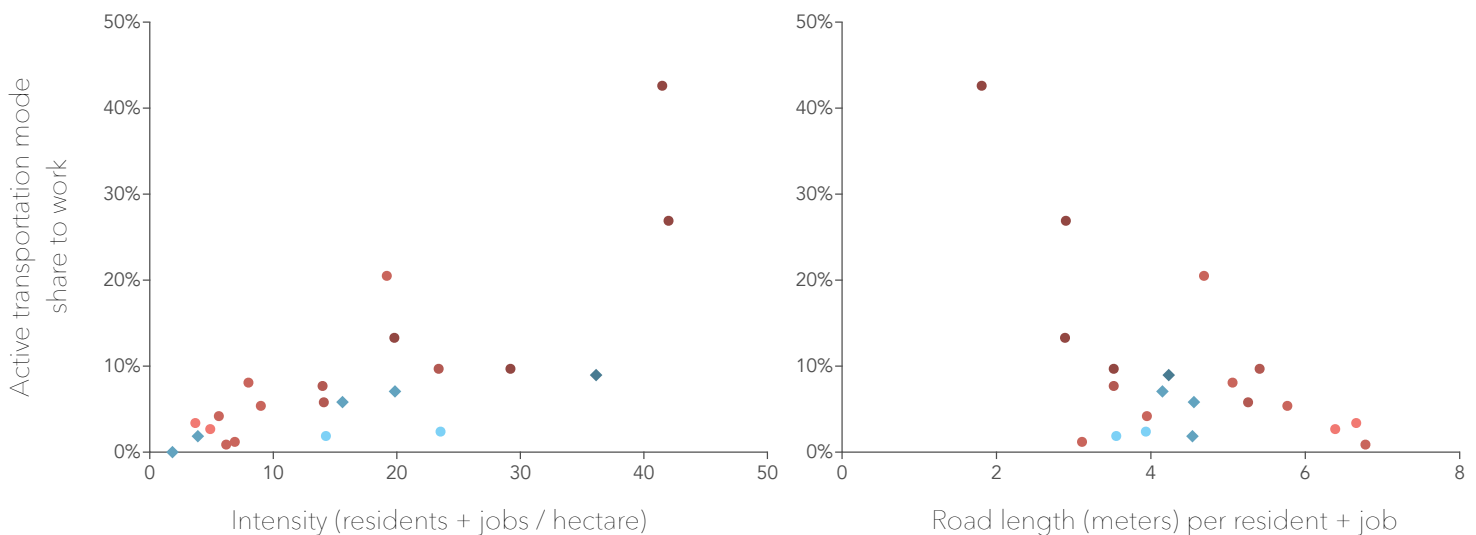


## LOW-COST TRANSPORTATION

Currently, the proportion of people who walk or bike to work in the core is 6%. Given the downtown's tight grid, this number could potentially rise to 30% or higher if the community reaches the threshold of 35 residents and jobs per hectare. To reach that goal, it would be necessary to add 2,400 people and jobs to the area's current 3,400, or an increase of 70%. Considering that the city is projected to grow by as much as 44,000 people in the coming decades, this growth should be possible. At this level of intensity,

the downtown would reach a road efficiency of 2.7 meters per resident and job, a number consistent with efficient downtowns we measure elsewhere.

To support a high proportion of trips on foot, the downtown's job density would need to reach 15 jobs per hectare. To do so, 1,600 jobs would be necessary, meaning two jobs for every new resident. Mixed-use developments should therefore constitute a major component of growth in the core, with businesses and offices in their bottom floors.



**Figure 15:** The areas with the highest proportion of people who walk to work have both a high concentration of homes and jobs. Development that is sufficiently compact to support walking also tends to have relatively low road maintenance costs per resident and job (right).

Fort Saskatchewan

- < 1 job per hectare
- ◆ < 5 jobs per hectare
- ◆ < 30 jobs per hectare

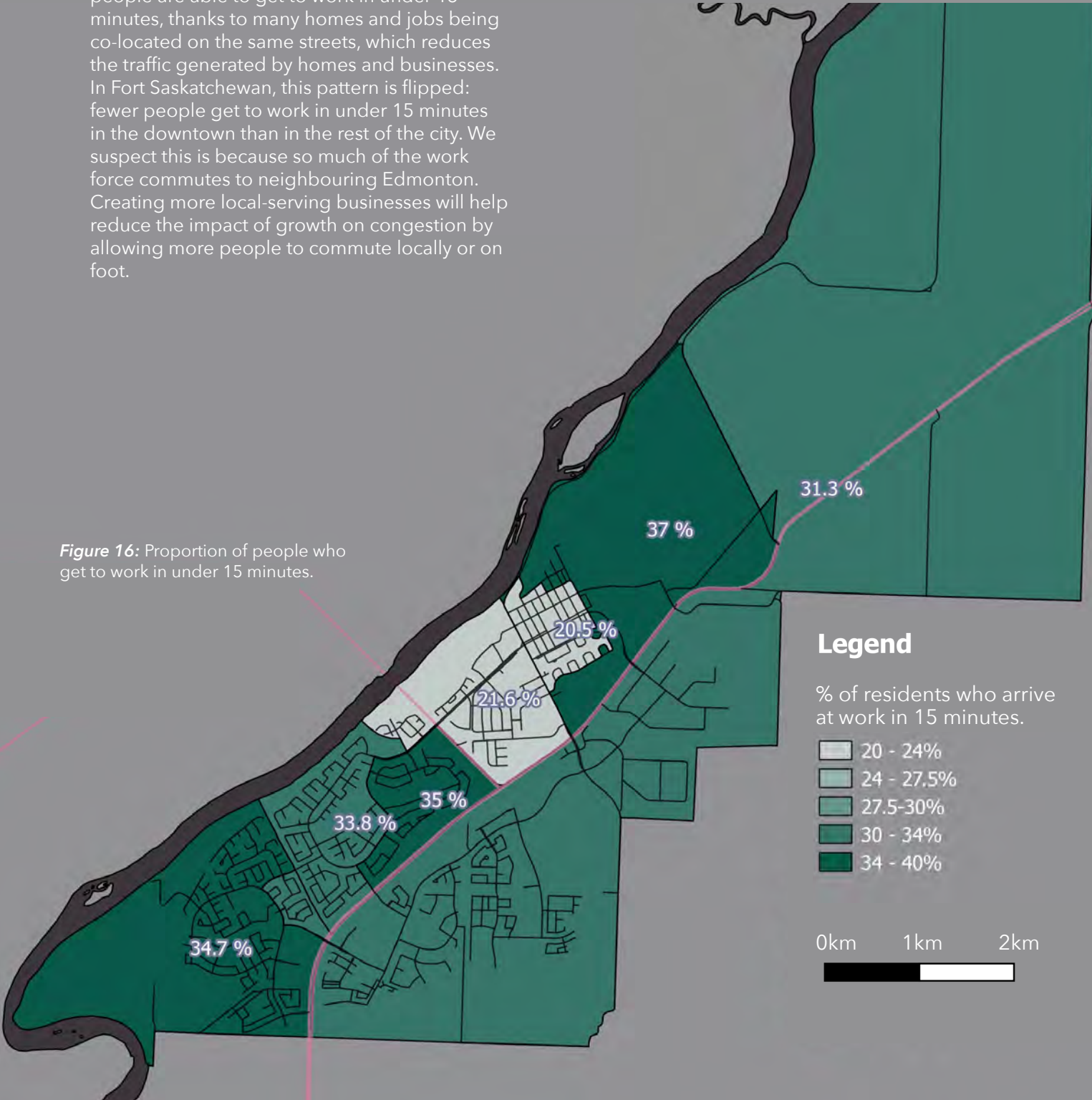
Charlottetown and Summerside, PEI

- < 1 job per hectare
- < 5 jobs per hectare
- < 10 jobs per hectare
- < 30 jobs per hectare

# COMMUTE DURATIONS

In other downtowns, a large proportion of people are able to get to work in under 15 minutes, thanks to many homes and jobs being co-located on the same streets, which reduces the traffic generated by homes and businesses. In Fort Saskatchewan, this pattern is flipped: fewer people get to work in under 15 minutes in the downtown than in the rest of the city. We suspect this is because so much of the work force commutes to neighbouring Edmonton. Creating more local-serving businesses will help reduce the impact of growth on congestion by allowing more people to commute locally or on foot.

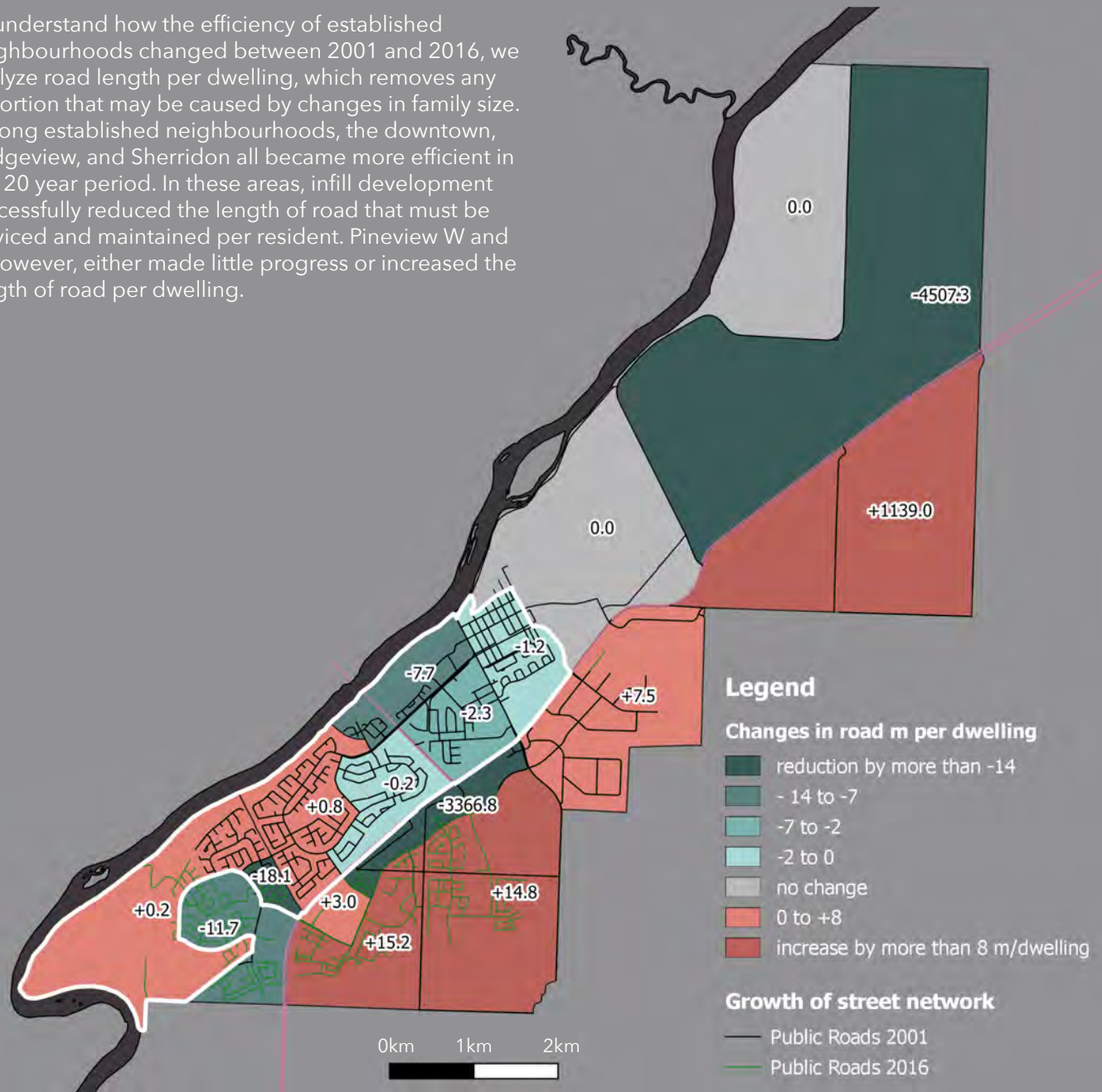
**Figure 16:** Proportion of people who get to work in under 15 minutes.





# CHANGE IN ROAD LENGTH COSTS PER DWELLING

To understand how the efficiency of established neighbourhoods changed between 2001 and 2016, we analyze road length per dwelling, which removes any distortion that may be caused by changes in family size. Among established neighbourhoods, the downtown, Bridgeview, and Sherridon all became more efficient in this 20 year period. In these areas, infill development successfully reduced the length of road that must be serviced and maintained per resident. Pineview W and E, however, either made little progress or increased the length of road per dwelling.



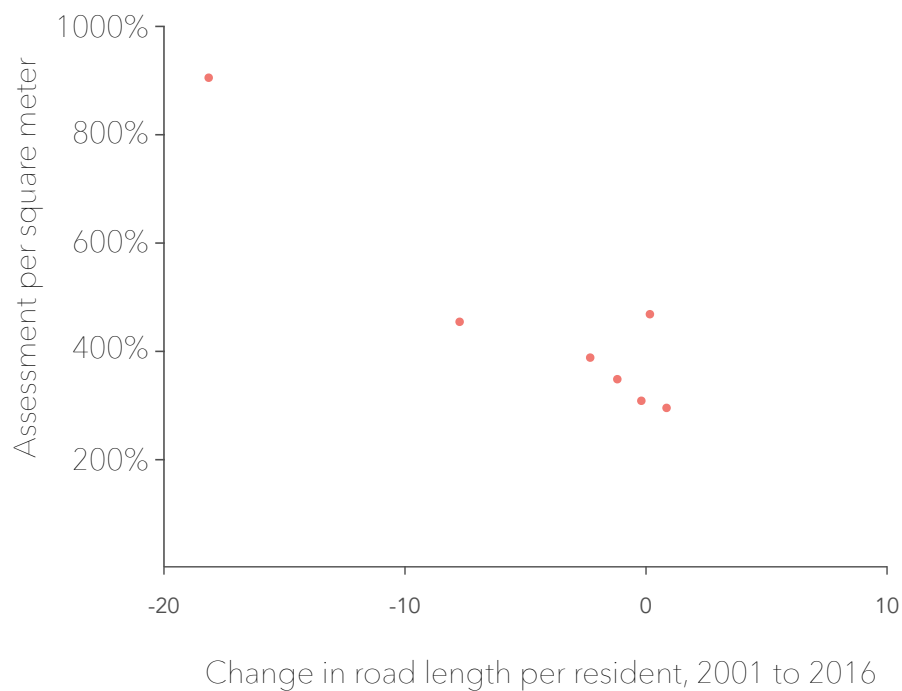
**Figure 18:** Change in length of road per dwelling from 2001 to 2016. Some residential neighbourhoods lost efficiency while the area around the downtown made progress.



## CHANGES IN COSTS VS ASSESSMENTS

To analyze the relationship between road length per dwelling and the tax assessment of homes, we focus on established residential neighbourhoods, outlined with a white border of figure 18. Outside that border, a number of areas in Fort Saskatchewan have transitioned from having few or no roads and houses to hosting full communities (those identified with green roads in Figure 18). Westwood, for example, made enormous gains in efficiency primarily because houses started to appear on its streets only after 2001.

For established neighbourhoods, tax revenue per square meter of land increased the most in areas where the length of road per dwelling went down. Increasing the number of homes on streets both increased revenues and decreased costs.



**Figure 19:** Impact of change in road length per dwelling on total land assessments per district. Those areas that became less costly per resident also greatly increased their tax revenue output.

# ROAD LENGTH PER RESIDENT VS ROAD LENGTH PER DWELLING

Both “road length per resident” and “road length per dwelling” can be useful measures of efficiency, but for different purposes. The first directly measures the number of people on streets, and so provides a greater insight on the supply of customers for local business and transit. Road length per dwelling, meanwhile, is a better guide for understanding the relationship between costs and tax revenues for a residential street, since properties are taxed based on the number and value of houses, not people.

Older and newer neighbourhoods in Fort Saskatchewan feature distinct patterns for the two measures. While the road length per resident for newly-built areas such as Allard-Way (5.2),

Southfort (5.6), and Westpark (5.3) have a lower road length per resident than older areas like the Downtown (7.4) and Sherridon (7.2), they have roughly the same efficiency in terms of road length per dwelling. Family sizes appear to be much larger in newer neighbourhoods, which makes their road length per resident lower than older neighbourhoods. Areas with larger family sizes currently lack jobs, meaning they have less impact than they could for supporting the local economy and increasing active transportation.



**Figure 17:** Larger families in some residential neighbourhoods mean they perform better as measured by road length per resident rather than road length per dwelling.

# APARTMENT BUILDINGS

Properties containing apartment buildings are assessed four-to-seven times higher per square foot than the average for the areas in which they are located, figure 20. These buildings also cost relatively little to service, since they contain many homes fronting a small stretch of road. Allowing more apartment buildings is therefore an excellent strategy for improving the financial position of the city.

Bus boardings in the city occur disproportionately within walking distance of apartments, figure 21. This map strongly suggests that the location of these high-density buildings on transit corridors encourages transit use, as should be expected. Apartment buildings in Fort Saskatchewan

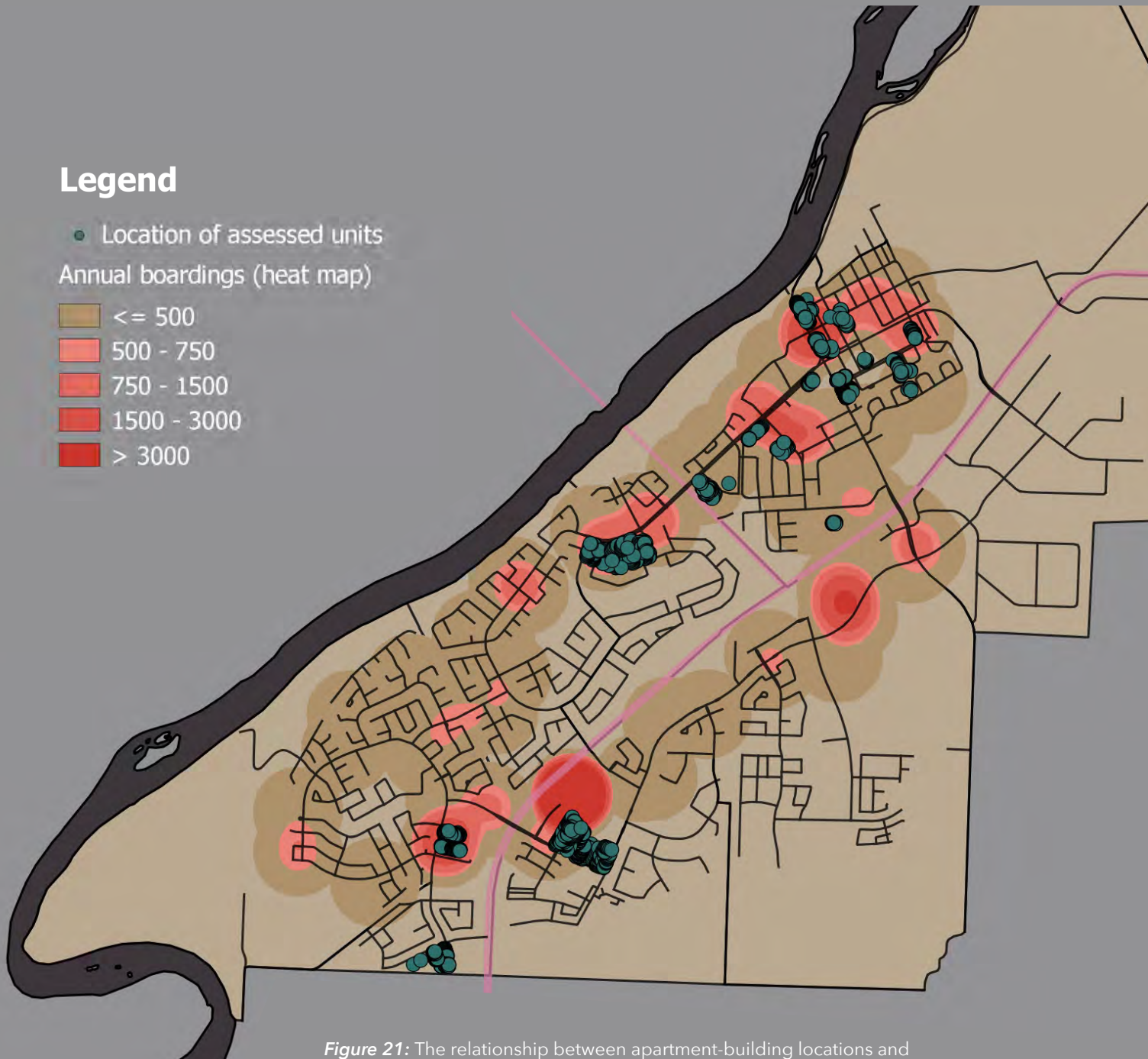
produce greater tax revenue at lower servicing cost, and if they increase transit ridership, they will also produce less traffic per resident.

Apartment buildings that have commercial space on their first floor offer all these cost-efficiencies, but would also generate significantly more tax revenue. They would further provide residents with convenient access to services near home, reducing their impact on congestion. Currently, there are only 11 such mixed-use buildings in all of Fort Saskatchewan. Mixed-use apartment buildings would contribute significantly to the efficiency of the city.

| Apartment building          | Assessment per square foot of land on property | Average assessment per square foot of the district | Difference |
|-----------------------------|------------------------------------------------|----------------------------------------------------|------------|
| Pioneer Apartments          | 139.39                                         | 20.62                                              | 676%       |
| Fort Plaza Apartments       | 135.69                                         | 20.62                                              | 658%       |
| South Rim Apartments        | 120.56                                         | 20.62                                              | 585%       |
| Glenridge Apartments        | 94.96                                          | 16.43                                              | 578%       |
| Bell Apartments             | 94.26                                          | 16.43                                              | 574%       |
| Valleyview Court Apartments | 113.54                                         | 20.62                                              | 551%       |
| Parkview Court Apartments   | 113.44                                         | 20.62                                              | 550%       |
| Fort Lion's Haven           | 81.97                                          | 16.43                                              | 499%       |
| Wedgewood Apartments        | 101.41                                         | 20.62                                              | 492%       |
| Riverdrive Apartments       | 98.20                                          | 20.62                                              | 476%       |

**Figure 20:** Average property assessment per square foot for properties containing apartment buildings as compared to the average for the districts in which they are located.

# TRANSIT BOARDINGS & APARTMENT LOCATIONS



*Figure 21:* The relationship between apartment-building locations and annual transit boardings per resident.



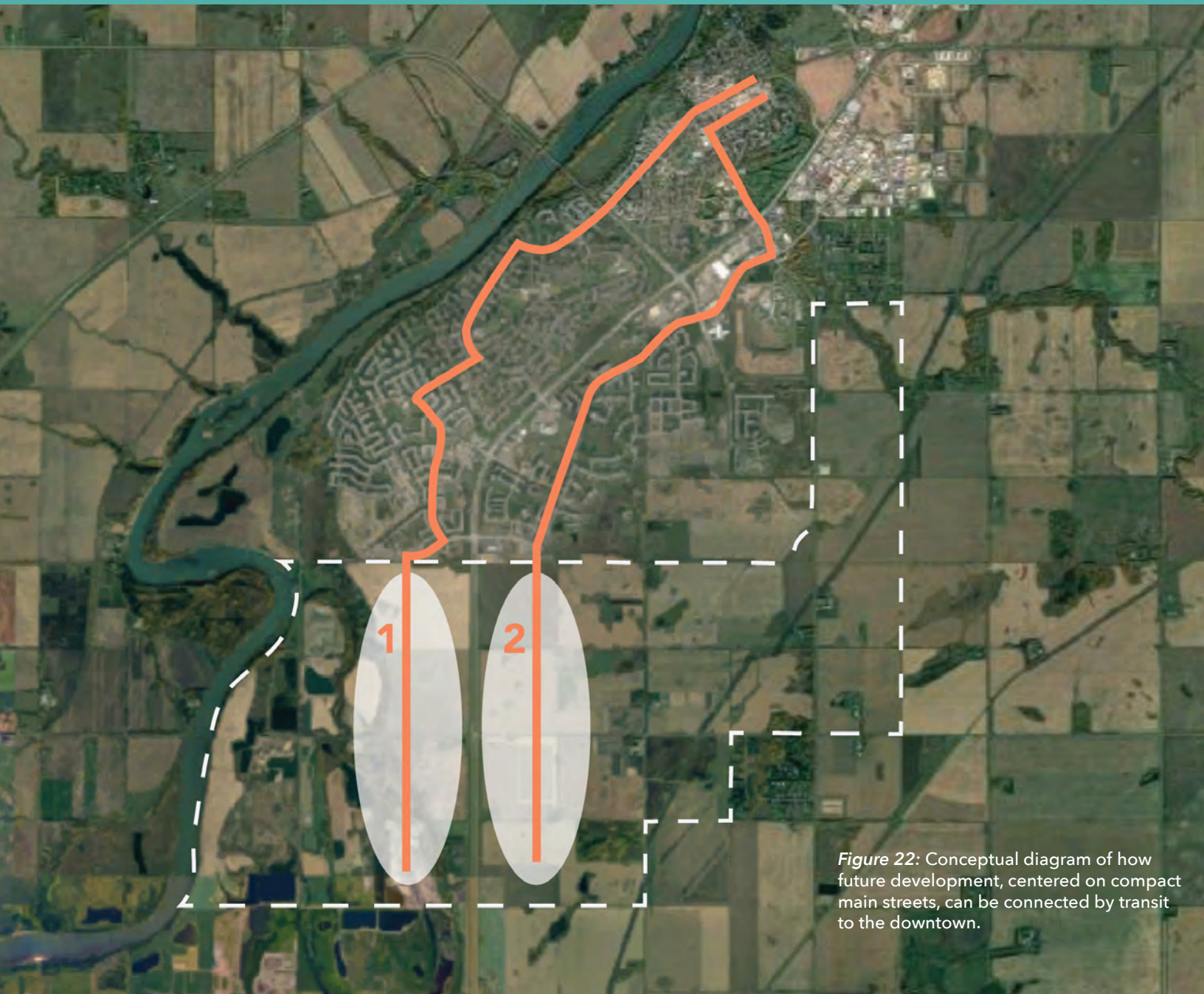
# IMPLICATIONS: FUTURE GROWTH & INFILL

## SOUTHWEST AREA

The *Where do we Growth from Here?* report recommends annexing the area Southwest of the city. While this location is on the opposite end of the city from the downtown, strategically-planned development there could support both the success of the downtown and the effectiveness of transit through the whole city.

Transit lines are most efficient when they have highly compact residential and commercial destinations

on either end, offering transit riders reason to travel in both directions.<sup>8</sup> If new developments in the southwest area are designed to feature a central spine of higher-density, mixed-use development, it would mean a single transit line could serve many homes, businesses, and other destinations without needing to divert from a single street. The existing road layout of Fort Saskatchewan would allow transit there to connect to the centre of the existing downtown relatively directly through residential areas, on both sides of Highway 21 (labelled 1 and 2 on figure 22).



*Figure 22: Conceptual diagram of how future development, centered on compact main streets, can be connected by transit to the downtown.*





The greater the number of homes and businesses centered on these transit lines in the downtown and in these new developments, the more financially feasible it would be to run high-frequency transit between them. As a result, all the residential communities in between could enjoy the benefit of that transit access at little or no extra cost.

As this report makes clear, building new developments on a model of network efficiency will make them more financially lucrative for the community. Aligning this growth model with effective transit would mean these developments could be used as a tool to spur development in the downtown, supporting its network efficiency as well. By making high-frequency transit to the downtown more feasible, this growth pattern could support infill development in the old city core. Improved transit would expand the customer base that could easily access businesses in the downtown, and the number of destinations that new residents downtown could conveniently access.

These transit lines would similarly support the establishment of businesses in the residential communities along their length, where zoning allows. Transit could, in this way, support the goal of increasing the job density of residential areas, improving people's access to local retail and bolstering the proportion of trips made on foot.

## DOW CENTENNIAL CENTRE

The Dow Centennial Centre hosts the city's primary transit terminal and is currently the only place outside the downtown with a significant proportion of both homes and businesses. The population in the area remains relatively low, however. The Centre is surrounded by underused land, and so represents an enormous, cost-effective opportunity to create commercial and residential development on existing streets. The area is an excellent location to increase network efficiency.

# RECOMMENDATIONS

If planned effectively, population growth in Fort Saskatchewan in the coming decades can generate significantly greater tax revenue while reducing infrastructure and transportation costs per person. These benefits of network efficiency occur where a tight, walkable set of streets includes a concentration of both homes and jobs. The disproportionately high revenues such neighbourhoods can generate can be used to either reduce the tax burden for residents or to invest in better community amenities.

Fort Saskatchewan has two main opportunities to create areas with high network efficiency: infill growth in the downtown and new developments. By adding more residents and destinations in the downtown, it will

become feasible for the community to invest in streetscaping projects there, which could further encourage development in the core. If new developments are designed to feature a high degree of network efficiency, it will minimize the traffic impacts of new growth while maximizing their tax revenue impact.

In both new and infill development, higher-density urban form and commercial destinations should be located on streets that are either already served by transit or that can be served efficiently. Generally, transit can best serve streets that pass through the centre of communities, directly connecting hubs of commercial activity and high-density homes.

## RECOMMENDED DEVELOPMENT GOALS

### Downtown development targets

- Minimum 800 new people.
- Minimum 1,600 more jobs.
- 35 residents and jobs per hectare and 2.7 meters per resident and job.
- Property assessments per square meter at least 1.7 times higher than the city's average.

### Downtown policies

- Re-invest part of new development income into streetscaping to support businesses and attract a local customer base.
- Require high-density development in the downtown to offer ground-floor commercial space.

### Existing Residential Neighbourhoods

- Identify potential locations to add new local-serving retail businesses to help reduce the road length per resident and job to below 3.5 meters.
- Encourage higher-density, mixed-use development at major transit stops to increase ridership and decrease traffic congestion.

### Apartment buildings

- Encourage high-density apartment buildings on transit corridors.
- Only allow high-density development within walking distance of transit corridors.



## New Main Streets and Residential Communities

- Set a target of 3.5 meters per resident and job for all new residential neighbourhoods. Set a target of 2.7 meters for areas immediately around main streets.
- Set a minimum intensity of 35 residents and jobs per hectare to support a high proportion of jobs on foot. Set a target of 50 or higher for strategic locations where the city seeks to create new thriving and lucrative commercial hubs.
- Require high-density development on new main streets to offer ground-floor commercial space.
- Concentrate businesses and higher-density residential development on a through-road at the centre of new developments, so that transit may serve the greatest number of users without needing to divert onto side streets.
- Seek to locate single-family-home neighbourhoods within walking distance of local commercial main streets.
- If Fort Saskatchewan annexes the southwest area, it should consider establishing two compact, mixed-use main streets, aligned on a north-south axis, on either side of the highway so that transit lines could easily connect these hubs and the downtown.



Photo credit: Kurt Bauschardt



# CONCLUSION

Compact development can reduce costs while increasing tax revenue from new development for Fort Saskatchewan. When a greater number of homes and businesses collocate on a given length of road, the cost that must be born by each taxpayer to cover that infrastructure is lower. By placing more destinations within easy reach of more homes, the value of both residential and commercial land also increases, generating greater tax revenue. When more destinations are close to home, it takes less time to reach them, reducing the time and costs between economic transactions for individuals and government. When destinations are so close that a large proportion of people can walk, the impact of transportation on pollution, noise, and infrastructure wear and tear is significantly reduced. At a certain critical mass

of jobs and residents within close proximity, it becomes financially feasible to invest in higher-order amenities for streets, such as art, landscaping, and cultural features, to give visitors and potential residents new reasons to come to Fort Saskatchewan.

Any of these benefits alone may well be sufficient to justify an effort to achieve greater network efficiency. Together, compact development represents a strategy to translate growth into prosperity. A strategy focused on network efficiency will ensure new development new development expands the financial resources of Fort Saskatchewan, rather than increasing the tax burden on residents.



Factory at night in Fort Saskatchewan. Photo credit: Jeff Wallace.

# KEY FINDINGS SUMMARIZED

- Most streets in the city generate more tax revenue than costs, with the exception of Clover Park, contributes only slightly more than it costs. Any other costs this community generates beyond road maintenance will be a net loss to the city.
- Fort Saskatchewan's long blocks means there is relatively little road to maintain per person, but they also make it difficult for people to walk or bike to destinations. The downtown is one area with a tight street grid and great potential to support active travel.
- Few neighbourhoods have both homes and businesses. As a result, few residents can walk or bike to work. Transit ridership is highest in those areas that do have both residents and jobs.
- Areas with a high proportion of jobs and residents per meter of road have three benefits: low infrastructure costs per person, low transportation costs, and high tax revenues. We call this combination network efficiency.
- To benefit from network efficiency, we calculate that 2,400 new jobs and residents are needed in Fort Saskatchewan's downtown.
- There are between 0.5 and 3.7 yearly bus boardings per person in Fort Saskatchewan's residential areas. For comparison, Windsor Ontario (population 218,000) has 29 transit trips per person per year.
- Between 2001 and 2016, tax assessments increased the most in areas where the length of road per dwelling decreased the most. Adding more homes to streets both increases revenues and reduces road-infrastructure costs per taxpayer.
- Properties with apartment buildings generate 4-to-7 times more tax revenue per square foot of land than the average for their surrounding areas.
- Apart from the Dow Centre transit stops, the city's highest concentration of bus boardings occur near apartments. These high-density developments both produce greater revenue and likely generate less traffic per person.
- The city could best take advantage of new development in the Southwest region by building two north-south mixed-use main streets. Transit lines could connect these new cores through existing residential streets to offer high-quality transit throughout the city at low cost.
- To increase revenue, reduce infrastructure costs, and switch to efficient transportation, Fort Saskatchewan should set growth targets for new mixed-use development. The city should also seek to increase the number of jobs and population downtown, and add jobs in residential areas.

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