Multifamily Housing Parking Optimization Study

An evaluation of parking requirements for multifamily housing in Longmont, Colorado

by Geoffrey Weathers

Multifamily Housing Parking Optimization Study

An evaluation of parking requirements for multifamily housing developments in Longmont, Colorado

Prepared for the City of Longmont, Colorado

Ben Ortiz and Phil Greenwald

May 13, 2021

by Geoffrey Weathers | Candidate, Master in Urban & Regional Planning

Master of Urban and Regional Planning
COLLEGE OF ARCHITECTURE AND PLANNING
UNIVERSITY OF COLORADO DENVER

Capstone Project submitted in partial satisfaction of requirements for the degree of
Master of Urban and Regional Planning, College of Architecture and Planning, University of Colorado Denver

Acknowledgements

A special thank you to all who have supported and guided me throughout this project, especially:

The planning staff at City of Longmont: Ben Ortiz, Phil Greenwald, Erin Fosdick, Jade Krueger

My expert advisor: Drew Willsey

My faculty champions: Ken Schroeppel and Manish Shirgaokar

And above all my beloved, tolerant family members: Kat, Gigi, Veda

Geoffrey Weathers is a professional urban planner and an Urban and Regional Planning Master's Degree candidate who believes that overcoming automobile dominance is key to creating vibrant, joyful places and realizing a humane, sustainable world.

Table of Contents

Table of Exhibits

Executive Summary

Problem Statement

The City of Longmont seeks to determine whether and where its minimum parking requirements for multifamily housing might be reduced or eliminated to achieve an optimal parking supply that mitigates the environmental, economic, and social degradation caused by parking facilities and supports the City's prevailing planning goals to achieve a safe, healthy, and resilient community with a robust multi-modal transportation system.

Dilemma

Minimum parking standards contribute to the inefficient use of land, higher housing costs, unsightly and unlivable urban landscapes, as well as numerous forms of environmental damage resulting from toxic construction materials, increased automobile use, and impervious surfaces. Yet, cities are resistant to eliminating their parking requirements because they are wary of the repercussions of under-provision of parking and cannot afford to transfer the burden of parking decisions to the individual planners conducting development review.

Grandview Meadows Apartments, Longmont, CO (Google Earth, 2021)

Longmont's Planning Goals

The 2016 Envision Longmont Multimodal and Comprehensive Plan conveys the City's vision for sustainability and resilience through promoting objectives such as:

- ◊ compact growth
- ◊ expanded housing optionsh
- ◊ accessible and affordable transportation options for all
- ◊ transit-supportive and-oriented development that emphasizes bicycle and pedestrian connectivity
- ◊ beautification of the public realm
- ◊ a complete, balanced and connected transportation system
- ◊ a safer environment for active transportation
- ◊ promotion of less polluting alternatives to single occupancy vehicles
- ◊ decreased vehicle miles traveled
- ◊ a more balanced mode split

Executive Summary

- ◊ increased transit ridership
- ◊ affordable accessible housing for all ages, abilities, and income levels
- ◊ decreased housing cost burden
- ◊ protection and conservation of natural resources and the environment
- ◊ attraction and incentivization of business development
- ◊ encouragement of mixed-use development...

Parking minimums compromise the realization of all these laudable ambitions.

Background Research

The following are takeaways from the literature review, case-studies, and planning documents researched for this study:

1. Parking reform can be prudent and effective for achieving optimal parking supply.
2. Minimum parking requirements are often based on erroneous premises and faulty, distorted data that subordinate community needs and ambitions to an insatiable appetite for parking.
3. Effective parking studies account for contextual factors such as geography, demographics, land use, transportation options, income levels, shifting transportation modalities, and policy choices.
4. Alternative parking management models involve prioritizing non-automobile modes of transportation and charging automobile owners directly for the storage of private vehicles.
5. Cities tend to underestimate the costs of parking and the role of minimum requirements in wasting valuable public resources.
6. If location and circumstances are properly factored, parking reform can be effective in a variety of settings for aligning parking policy with a community's greater objectives.
7. The City of Longmont could advance many of its planning objectives by reducing or eliminating minimum parking requirements for multifamily dwellings.

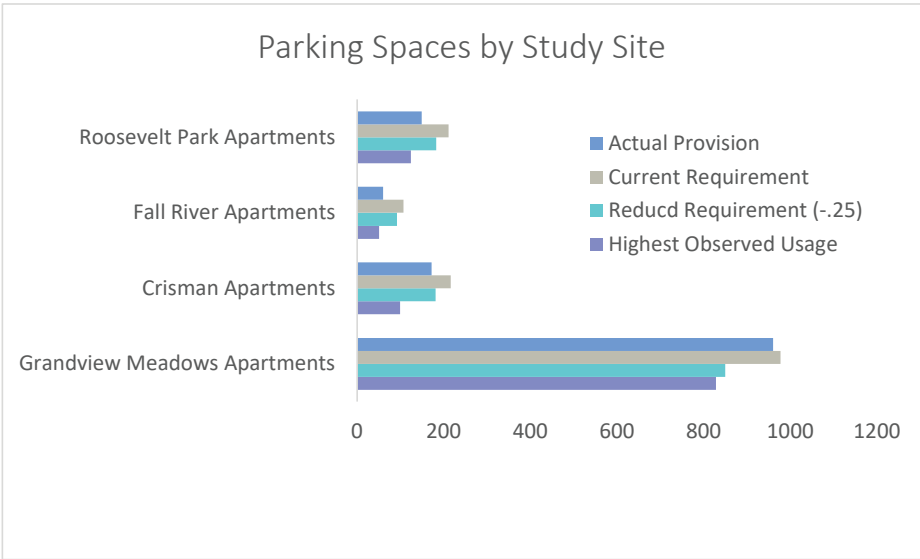
Methodology

The study includes a Parking Sites Survey, a Peer-Cities Analysis, and a Multifamily Housing Parking Optimization Framework. The Parking Sites Survey investigates the conditions, context, supply, and usage of parking at four multifamily developments designated by the City of Longmont, namely Grandview Meadows Apartments, Roosevelt Park Apartments, Crisman Apartments, and Fall River Apartments. The Peer-Cities Analysis explores the ordinances of several Colorado and other North American cities for potential model parking management techniques for Longmont to consider. The Multifamily Housing Parking Policy Framework specifies several recommendations for approaching reformation of the parking requirements for multifamily housing in Longmont to achieve the optimal parking provision.

Findings

The Parking Sites Survey found that the multifamily sites included in the study were in different respects "over parked,"

each providing more parking than is optimal. The Peer-Cities Analysis uncovered many replicable parking codes with provisions to optimize parking rates and supply requirements at multifamily residential dwellings.



RECOMMENDATIONS

Recommendation 1: Adopt a proactive parking demand paradigm.

Justification 1: The study found that the current parking usage and requirement rates are incompatible with the City's vision and goals.

Justification 2: The study found that some cities explicitly include parking supply reduction among the purposes for their parking policy.

Conventional Predict and Provide Method	**Proposed Parking Tolerance Method**
Step 1: Use utilization estimates to predict future "demand" for free parking.	Step 1: Envision and plan desired community.
Step 2: Provide ample parking to satisfy potential demand in the worst-case scenario.	Step 2: Determine how much parking this vision for the community can tolerate.
Step 3: Plan community around constraints presented by parking.	Step 3: Using mitigation techniques available, allow only the amount of parking strictly necessary to best achieve the community

Justification 3: The study found the conventional predict and provide method for determining parking requirements should be supplanted by a new model based on achieving greater community goals.

Justification 4: The study found evidence of a significant amount of land and money wasted on unnecessary parking in Longmont.

Recommendation 2: Minimize parking requirements.

Justification 1: The study found no evidence that the current minimum requirements are warranted.

Justification 2: The study found evidence of unused parking at every site it evaluated.

Justification 3: The study found parking usage rates at income-restricted housing to be lower than parking requirements.

Justification 4: The study found that sites located close to transit and essential amenities used less parking.

Justification 5: The study found that lowering minimum parking requirements does not restrict the provision of parking.

Justification 6: The study showed declining future parking rates.

Recommendation 3: Bolster minimized parking requirements with comprehensive parking demand mitigation measures, including incentives, safety nets, alternatives, and redlines.

Justification 1: The study found that cities can offer incentives to reduce parking provision.

Justification 2: The study found that cities can provide safety nets for developments that offer parking reductions.

Justification 3: The study found that offering alternatives to satisfying parking requirements may be an effective strategy for reducing parking supply.

Justification 4: The study found that drawing redline restrictions may be necessary to decrease parking supply.

CONCLUSION

The Longmont Multifamily Housing Parking Optimization Study supports the reduction of Longmont's minimum parking requirements at multifamily housing to optimize its parking supply and achieve its greater planning goals. These objectives can be best accomplished through the implementation of a comprehensive parking minimization policy, incorporating a clear statement of the policy's intentions to minimize parking supply in subordination of Longmont's greater planning goals, an across-the-board reduction of minimum requirements at multifamily dwellings, and a host of demand mitigation measures, including incentives, safety nets, alternatives, and redlines.

Parking Optimization Heuristic

Longmont Multifamily Housing Parking Optimization Study

Evalution of optimal parking requirements for selected multifamily housing developments in Longmont, Colorado

by Geoffrey Weathers | Candidate, Masters in Urban and Regional Planning

to Table

Chapter 1 / Introduction

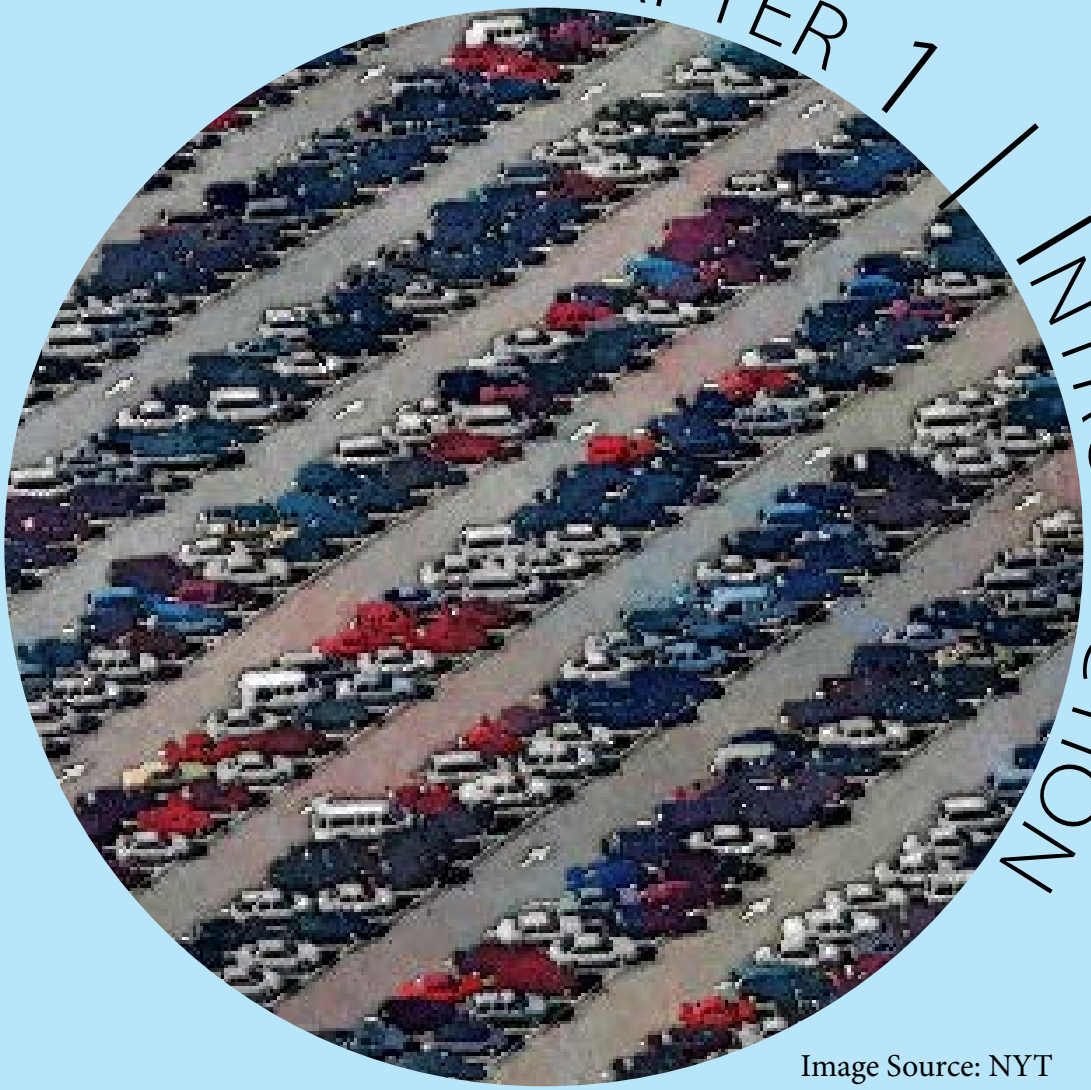


Image Source: NYT

Problem Statement

The City of Longmont has requested a parking study of local multifamily residential dwellings.

The stated purpose of the study being to determine whether and where parking minimum requirements for this type of development might be reduced or eliminated to achieve an optimal parking supply that is better aligned with the City's prevailing planning goals.

This question would seem to invoke others, such as what is an optimal parking supply, what can be achieved by reducing requirements, how can a city accomplish parking reforms, and under what circumstances are reforms most efficacious?

Longmont's desire to reevaluate its parking policy at multifamily dwellings is not surprising. Parking spaces have no inherent value. They are a necessary evil required to store automobiles, and should be reduced to the minimum quantity practicable. In fact, in recent years, many parking, planning, and environmental experts have sounded the alarm that minimum parking standards are contributing to the inefficient use of land, higher housing costs, unsightly and unlivable urban landscapes, as well as numerous forms of environmental damage resulting from toxic construction materials, increased automobile use, and impervious surfaces (Shoup, 2017; Shoup, 2018; Willson, 2013; Litman, 2006). Not only is Longmont's planning staff well aware of how minimum parking requirements exacerbate the problems caused by parking, but it also recognizes that abundant parking provisions conflict with and undermine many of its goals and policies designed to ensure that Longmont is a safe, healthy, and adaptable community with a robust multimodal transportation system.

Although few city officials would advocate for supplying too much parking, local governments are often trepidatious about altering their minimum parking requirements. After all, as they see it, under-provision of parking could be a costly problem to fix, both financially and politically. Moreover, leaving such a consequential decision in the invisible hands of the free market is just too great a leap for many planners whose jobs and reputations are on the line. Cities reasonably fear that having no standard could transfer the burden of the parking decisions to the individual planners conducting development review—an unacceptably cumbersome and costly outcome. Hence the dilemma over whether the City can pursue reform of its parking code for multifamily housing.

Parking Code

Currently, Longmont requires that new residential developments and redevelopments include a minimum number of off-street parking spaces. The **City of Longmont's** Land Development Code (LDC) establishes specific **parking requirements** for all residential land use types (City of Longmont, 2021). In the case of multifamily dwellings, the number of bedrooms within each unit determines the parking requirement.

Efficiencies and one-bedroom units require 1.75 spaces per unit; two bedrooms, 2 spaces per unit; three bedrooms, 2.25 spaces per unit; and four and more bedrooms, 3 spaces per unit.

According to the ordinance, these requirements can only be satisfied by surface or garage parking spaces included on-site and as part of the price of the sale or rent of the unit (also referred to as being "bundled parking"). It states that parking minimums may also be fulfilled by adjacent on-street parking on local, collector, or internal streets fronting on a lot containing multifamily dwellings.

The City's stated purpose for these requirements is to protect the public health, safety, and general welfare by:

1) Avoiding and mitigating traffic congestion

2) Providing safe and convenient interaction between vehicles and pedestrians

3) Providing necessary access for service and emergency vehicles

4) Providing methods to help reduce stormwater runoff and the heat island effect of large, paved parking areas

5) Providing flexible methods of responding to the transportation, access, and parking demands of various land uses in different areas of the city through changes in markets, technology, and demographics.

No doubt, many parking experts would argue that minimum parking requirements in fact contradict these principles and only aggravate the issues they intend to address. The degree to which parking minimum requirements help achieve these objectives notwithstanding, however, they seem out-of-sync with the City of Longmont's current planning goals outlined in Envision Longmont.

Envision Longmont

The **2016 Envision Longmont Multimodal and Comprehensive Plan** conveys the City's vision for sustainability and resilience through promoting objectives such as:

- ◊ compact growth
- ◊ expanded housing options; accessible and affordable transportation options for all
- ◊ transit-supportive and-oriented development that emphasizes bicycle and car connectivity
- ◊ beautification of the public realm
- ◊ a complete, balanced and connected transportation system
- ◊ a safer environment for active transportation
- ◊ promotion of less polluting alternatives to single occupancy vehicles
- ◊ decreased vehicle miles traveled
- ◊ a more balanced mode split
- ◊ increased transit ridership
- ◊ affordable accessible housing for all ages, abilities, income levels
- ◊ decreased housing cost burden; protection and conservation of natural resources and the environment
- ◊ attraction and incentivization of business development
- ◊ encouragement of mixed use development...

Parking minimums compromise the realization of all these laudable ambitions. Ostensibly, this fact is not lost on the City staff since the plan even explicitly calls for parking demand management for better use of land, and infill development where there is currently surface parking. Moreover, Longmont has already all but eliminated parking minimums for all land uses other than residential and has replaced them with parking maximums (City of Longmont, 2021).

Optimization

Altering minimum parking standards for multifamily residential dwellings is, however, fundamentally riskier than doing so for other uses. Every car in a city presumably needs a "home" storage space, even if it rarely gets used. A person need not drive to every place they travel, such as work, restaurants, or the grocery store. They may walk, bicycle, take transit, or use some form of carsharing. When one person goes by personal automobile to these places, others may travel by alternative modes or go at a different time, and nearby curb parking might suffice to meet parking needs. This is not the case for residences because cars "live with" their owners, so at residences every car needs a space—and all at once since relatively few people take their cars out overnight. For multifamily residences, curb parking is likely insufficient to accommodate occupancy. In short, if people own a personal automobile, they park at home. So, can a city responsibly reduce or eliminate minimum parking requirements for multifamily residences?

"Parking reform will necessitate moving from the esoteric pseudoscience of predict and provide to an informed consideration of parking policy in service of a community's greater land use and transportation goals."

Since their inception in Columbus, Ohio in 1923, the objective of minimum parking requirements at multifamily residential dwellings has been to predict the demand for parking and provide enough of it to meet or exceed this demand (Shoup, 2017; Willson, 2013; Litman, 2006). As we shall see, this methodology nearly always yields the same results, ample parking supply at the cost of all other objectives. To earnestly pose the question whether minimum requirements can be changed is to suggest a paradigm shift, a new approach to thinking about parking provision in our cities. Parking reform will necessitate moving from the esoteric pseudoscience of predict and provide to an informed consideration of parking policy in service of a community's greater land use and transportation goals (Shoup, 2017; Willson, 2013). The aim of this study, as detailed in this report, is to support the City of Longmont in pursuing sound parking reform that will allow it to achieve better alignment between its parking policies for multifamily residences and its greater planning objectives.

In the subsequent Chapter, the report will include a comprehensive discussion of background research related to parking reform, including academic literature, case studies, and related planning documents. That will be followed by an explanation of the report's methodology. The second part of the report will cover the parking study per se, including the study's findings and recommendations.

Chapter 2 | Background Research

Image Source: Motley Fool

Introduction

The background research portion of this report is intended to provide the most current and influential thinking about reforming minimum parking requirements for multifamily housing as well as to inform the methodology and approach to this study. The discussion will address research materials in three categories: academic literature, case-studies, and planning documents. Note that some of the sources apply to and maybe reviewed in more than one of these sections.

Parking Guru Profile: Shoupdogg

Image Source: Shoupdogg

"Donald Curran Shoup (born August 24, 1938) is a distinguished research professor of urban planning at UCLA, and a Georgist economist. His 2005 book The High Cost of Free Parking identifies the negative repercussions of off-street parking requirements and relies heavily on 'Georgist' insights about optimal land use and rent distribution. In 2015, the American Planning Association awarded Shoup the "National Planning Excellence Award for a Planning Pioneer." (Wikipedia)

Literature Review

This section reviews several sources from the academic literature addressing minimum parking requirements at multifamily housing, and parking reform measures aimed at resolving the problems created by these parking regulations. The goal of the research was both to inform the methodology for conducting this parking study and to gain an appreciation of parking reform measures including their repercussions to instruct the study's recommendations. This section is structured in terms of questions about how and why to implement parking reform, commentary from the literature, and takeaways that will inform this study and final report.

Question 1

Is reducing minimum parking standards likely to impact the provision of parking at multifamily developments?

Commentary 1

Donald Shoup and others explain that lowering or eliminating minimum requirements does not amount to a prohibition on parking but rather would leave it up to property developers to decide how much would be needed to make the project marketable (Shoup, 2018; Willson, 2013; Litman 2006). As to whether developers are likely to seize the opportunity to provide less parking, Shoup points to the fact that, where it is allowed, many developers already opt to pay in lieu of fees rather than meet the minimum parking requirements (Shoup, 2018). This suggests that, by removing the cost of the fee, the practice of providing less parking would increase if requirements were removed. In their study of residential parking reforms undertaken in London in the 2000s, Fei Li and Zhan Guo found that removing minimum parking requirements and imposing parking maximums had a dramatic effect on parking supply (2014). The study showed that parking provisions dropped an average of 0.76 spaces per dwelling unit or by 49% post-reform and by even greater margins in suburban contexts (Li & Guo, 2014). Gabbe et al . investigated the impacts of reforms implemented in Seattle, Washington in 2012 that reduced or eliminated parking minimums in transit-rich sections of the city (2020). They found that parking requirements consistently drive supply with the study area showing a 40% post-reform reduction in parking provision, saving an estimated floor area value equal to 18,000 spaces and $537 million (Gabbe, 2020). The study shows, nevertheless, that developers continued to provide parking in 70% of developments where parking requirements were eliminated, particularly in areas of high demand (Gabbe, 2020).

Takeaways 1

Though not predictive of how parking reform might affect supply in Longmont, these studies corroborate the efficacy of using reduction and elimination of parking minimums to mitigate oversupply of parking as well as the tendency of developers to respond to market incentives for parking provision. Parking reform measures can be both prudent and effective strategies for achieving optimal parking supply.

Literature Review

Question 2

How do cities formulate their minimum parking requirements and are their methods sound? After all, if parking requirements are justified, perhaps they should be left alone.

Commentary 2

Shoup and others say that devising a parking standard usually comes down to a three-step process: (1) define the land use, such as multifamily housing; (2) choose a basis for the requirement, such as per unit; and (3) specify spaces required per that unit basis (Shoup, 2017; Willson, 2013; Litman, 2006). According to Shoup the two most popular methods by which cities complete this process are to follow the examples of other cities or consult with national parking data compendia.

Shoup is highly critical of cities that create their parking codes by copying other cities because he says they often do so without understanding how they were established in the first place (2017). Although Shoup recognizes that this method is usually pursued innocently due to lack of training and resources, he says the result is almost always an uneducated overestimation of need (2017). Todd Litman, on the other hand, suggests that the study of comparable sites can be an accurate method of assessing parking demand if sufficient attention is paid to influencing factors such as geography, demographics, and management techniques (2006).

The other major source used in composing parking standards is published national compendia of parking utilization data, particularly the Institute of Transportation Engineers' Parking Generation (Willson, 2013; Willson and Roberts, 2011; Shoup, 2017; Shoup, 2018; Litman, 2006). Such compendia are meant to serve as parking policy guides by providing different forms of national parking data broken down by land use and differentiated by various contexts. The literature suggests that national compendia should be used cautiously. Litman objects to the widespread use of the 85th percentile demand curve in these sources, since it results in 85 out of 100 parking lots providing too much parking rather than a small number possibly providing too little (Litman, 2006). He also calls into question the small sample sizes and lack of geographic, demographic, and economic context in this data which makes them susceptible to being misapplied to unanalogous situations by unsuspecting practitioners (Litman, 2006). Shoup criticizes ITE for inflating generation rates by focusing its studies on peak demand in suburban sites with free parking and no access to transit (2017). He also raises technical objections to their studies, pointing out that their samples often fail to demonstrate a relationship between the proposed basis and the rate (e.g., erroneously suggesting a correlation between parking utilization and square footage of buildings), are usually too small to be statistically significant, and fail to account for important contextual factors (Shoup, 2017). Willson adds that some compendia sources such as ITE use out-of-date studies conducted as far back as the 1960s, which raises concerns about their level of accuracy in current circumstances (Willson, 2013). Yet, while acknowledging that when used uncritically these sources build in assumptions that parking is free and generously supplied and that transit is nonexistent, Willson argues that they can still be useful sources of parking data if analyzed carefully (Willson, 2013).

Literature Review

Several sources also suggest that minimum parking requirements are founded on the false pretense that they are responding to parking demand. In fact, what is often referred to as demand is no more than occupancy or utilization rates (Shoup, 2017; Willson, 2013; Litman, 2006). Litman calls the practice of establishing parking requirements the "predict and provide" model of parking policy because it purports to predict demand and provide more than enough parking to fulfill it (2006, 3). He goes on to say "…demand actually refers to the quantity of goods a consumer would purchase at a given price. Most parking surveys [what I've called compendia] are performed where parking is free, which is equivalent to asking how much food a grocery store could give away" (Litman, 2006, 16). Shoup has a similar criticism and suggests that what such parking studies really measure is "the quantity of parking demanded at a zero price at the time of peak demand" (Shoup, 2017, 36).

Litman: "…demand actually refers to the quantity of goods a consumer would purchase at a given price. Most parking surveys are performed where parking is free, which is equivalent to asking how much food a grocery store could give away"

Allowing utilization rates to dictate parking minimums also ignores induced demand; the fact that more parking actually leads to more cars (Shoup, 2018). Shoup says that parking utilization behaves more like a gas than a liquid in the sense that it expands to fill up what space is available to it (Shoup, 2018). Parking demand is not absolute; existing demand levels reflect past practices such as excessive parking supply and lack of parking pricing as well as automobile-oriented transportation services and land use patterns that make driving more practical than other modes of travel (Willson and Roberts, 2011). Requirements lead to excessive supply and become a self-fulfilling prophecy where free storage leads to car ownership and car ownership "demands" more parking (Shoup, 2018). Willson and Roberts point out, however, that although it is often misused, utilization data can be useful in creating effective parking policy if proper attention is paid to contextual considerations (2011).

Takeaways 2

The literature unanimously concludes that most minimum parking requirements are founded on erroneous premises and faulty, distorted data. Parking utilization data, including that from national compendia, and other comparative studies can be valuable in the formulation of parking policy if they are applied judiciously with attention to context, sample size, and basis. Special care should be taken when considering "parking demand," since it is not a static figure but can only be understood in terms of price, including nonmonetary factors such as convenience.

Literature Review

Question 3

Are there better methods than predict and provide for determining the optimal amount of parking provision for multifamily dwellings?

Commentary 3

Although Shoup does provide recommendations for ways to improve the data included in the national compendia that planners tend to rely on to create policy, he does not directly address best practices for studying parking (Shoup, 2017). Instead, he cautions against the futility of trying to understand the demand for parking so long as it is widely provided free and in abundant quantities (Shoup, 2017). He regards such studies as self-fulfilling prophecies that only perpetuate the practice of requiring minimum parking and the problems associated with it (Shoup, 2017; Shoup, 2018). Willson and Roberts, on the other hand, encourage the use of localized data sources and a contextualized synthesis of field counts, surveys, and national compendia parking utilization rates to inform parking policy (Willson and Roberts, 2011; Willson, 2013). This synthesized utilization rate should not be treated as a mandate for parking but rather should be adjusted in terms of relevant information about demographics, land use, transportation options, pricing, regulations, and management techniques to understand how to create the requirements that best suit community objectives (Willson, 2013). Similarly, Litman advocates for parking studies that attempt to understand the factors that can improve efficiency to reduce supply as desired, including geography, density, land use, transit access, carsharing, walkability, demographics, income, tenure, pricing, parking and mobility management, design hour, and contingency planning (Litman, 2006).

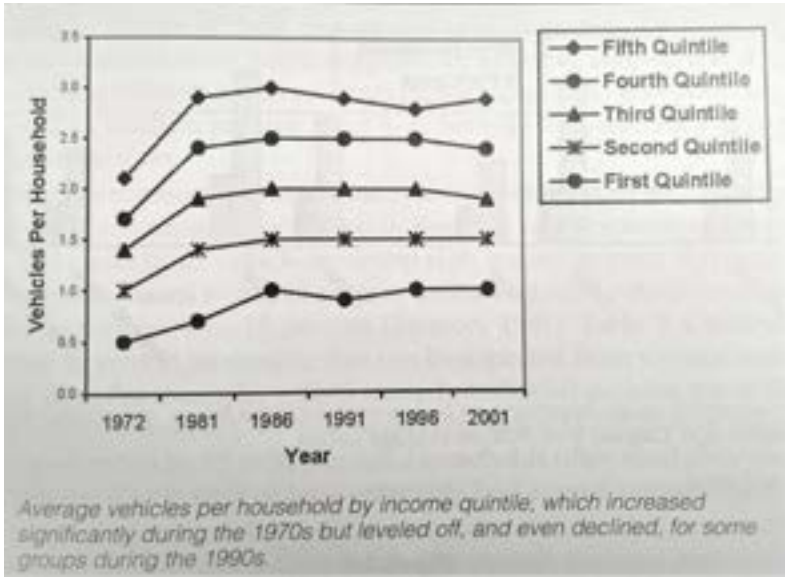
"Willson cautions that utilization rates should not be treated as a mandate for parking but rather should be adjusted in terms of relevant information about demographics, land use, transportation options, pricing, regulations, and management techniques to understand how to create the requirements that best suit community objectives."

The literature points to two factors that are often underappreciated when formulating minimum parking requirements, the influence of income and emergence of new modalities. As demonstrated by *Exhibit 1*, Litman says that income has a dramatic impact on car ownership with the lowest income households owning only about a quarter as many cars as those in the highest income class (2006). In a recent study of the Front Range region in Colorado, Fox Tuttle Transportation Group and Shopworks Architecture found that affordable housing facilities provide about 50% more parking than gets used due to the tendency for low-income housing to be located in urban areas and the high cost of car ownership

Literature Review

(2021). The cause of the overprovision is the absence of an industry standard for parking reduction at affordable housing sites (Fox Tuttle and Shopworks Architecture, 2021). In fact, according to Willson, due to several factors including cost of automobile ownership, changes in land use, and technological advances, personal vehicle ownership and therefore residential parking utilization are likely to trend downward in the future (2013). Increasingly, people have been and will continue opt to substitute transit, walking, biking, carshare, and telecommunications for personal car ownership (2013). When creating minimum parking requirements, cities should take income levels and transportation trends into consideration.

Exhibit 1: Vehicles per Household by Income Class (Litman, 2006, p 37)



Average vehicles per household by income quintile, which increased significantly during the 1970s but leveled off, and even declined, for some groups during the 1990s.

Takeaways 3

Although predicting parking demand is a futile exercise, parking studies can shed light on ways parking policy can be adjusted to meet a community's goals. Effective parking studies should attempt to triangulate data from multiple sources and must attend to contextual factors such as geography, demographics, land use, transportation options, and policy. Income levels and shifting transportation modalities must be factored into the formulation of minimum parking requirements.

Question 4

What are effective alternatives to imposing minimum parking requirements?

Commentary 4

Shoup advocates for a three-step market approach to regulating parking supply: (1) eliminate (or lower to the extent politically possible) minimum requirements, (2) charge a market-based rate for on-street parking, and (3) return the proceeds from the parking fees to neighborhoods to be used on community improvement projects to incentivize keeping fees high (Shoup, 2017; Shoup 2018). Shoup also supports policies such as unbundling the cost of parking from rents, products, and services so that car owners pay directly for their own parking and allowing in lieu of fee options for developers in communities that do not eliminate requirements, but he does not endorse parking maximums since they interfere with the market (Shoup, 2017; Shoup, 2018). Litman favors

Literature Review

using a host of parking management strategies designed to increase efficiency and reduce demand, including shared parking, regulated parking, improved standards, maximums, shuttle services, smart growth, walkability, increased capacity, mobility management, pricing, incentives, unbundled parking, taxing, bike facilities, marketing and information, enforcement, community organizing, overflow plans, and improved facility design (Litman, 2006). In another study, Petter Christiansen et al. suggests that reducing convenience by using shared, remote facilities might deter unnecessary car ownership (2016). Michael Manville finds that unbundling parking costs greatly reduces parking demand, even when controlling for self-selection of housing options by residents who already own fewer cars (2017). In a case study of New York City residential parking, Zhan Guo finds that parking supply predicts car ownership more than do other demographic and income factors (2012). In his study of Melbourne, however, Chris De Gruyter et al. found that transit access by itself had only a negligible impact on reducing car ownership rates and suggests that further measures like unbundling parking might be necessary to make a more significant impact (2020).

"The Fox Tuttle and Shopworks Architecture report estimates the cost of parking facilities per space as $9,000 for surface, $35,000 for above ground , $22,000 for partial below grade, $33,000 for single level below grade, and $50,000 for underground."

Takeaways 4

The literature strongly supports the notion that there are many effective alternatives to the predict and provide model of parking management. Such methods include increasing the quality and accessibility of non-private automobile modes of transportation, decreasing the availability and convenience of parking, and charging automobile owners directly for the storage of their private vehicles.

Question 5

What are the various ways of understanding the costs of parking facilities?

Commentary 5

Shoup breaks down the costs into internal and external costs. Internal costs include land opportunity, financing, (possibly) taxes, operations and maintenance expenses, and the type of structure built (2017). He finds that even conservative estimates of cost can run as high as $22,500 a space for structured parking (Shoup, 2017). Moreover, this figure nearly doubles when the external costs associated with the pollution and congestion these parking structures generate are taken into account (Shoup, 2017). Willson considers the cost of parking facilities in

Literature Review

terms of transportation trade-offs and points out that in many situations it would be more cost effective for cities to make developers subsidize non-automobile forms of transportation than to require parking (2013). According to Litman, each space of off-street parking uses about 300-400 square feet, including driveways and access lanes (2006). For suburban locations each off-street surface parking space will cost more than $8,000 over 20 years, and every urban 3-level structured parking spot will cost more than $30,000 (Litman, 2006). The Fox Tuttle and Shopworks Architecture report estimates the cost of parking facilities per space as $9,000 for surface, $35,000 for above ground , $22,000 for partial below grade, $33,000 for single level below grade, and $50,000 for underground (2021). Parking facility costs also include opportunity costs, which are the productive uses the community foregoes when it devotes land to parking (Litman, 2006). For example, the Fox Tuttle and Shopworks Architecture study found that the cost of the unused parking at 19 sites over 6 years equated to the cost of one 40-unit affordable housing building (2021). Parking facilities account for roughly 10 percent of building development costs which can stifle development, cut affordable housing construction, and encourage sprawl (Litman, 20006).

Takeaways 5

Cities often underappreciate the costs of parking, including direct, external, opportunity, and social costs. In general, the money and land used for parking could be put to more productive use. By inflating parking provisions beyond what is strictly needed, parking minimum requirements mandate the waste of these valuable resources.

Case Studies

This section examines two case studies of cities in the United States that have recently enacted significant parking reforms to gain insight into methods for studying parking at multifamily dwellingsin Longmont as well as ideas of how the City might go about reforming its policies.

Buffalo, New York

Image Source: Reddit

Daniel Baldwin Hess' article, "Repealing Minimum Parking Requirements in Buffalo: New Directions for Land Use and Development," examines the first ever in the U.S. city wide removal of minimum parking requirements in Buffalo, New York (2017). In 2017, when the requirements were eliminated, Buffalo was a city of prolonged decline, ranking sixth poorest in the nation with a population of approximately 250k inhabitants or about half of what it was in 1950.

"The new Green Code eliminated all obligation to provide parking in one sentence: 'there are no provisions that establish a minimum number of off-street parking spaces for development.'"

According to a 2014 study, the city had 250 surface and structured parking facilities taking up about a third of the land in the downtown area but having an average occupancy rate of only about 63% or between 33%-87% depending on the location. Due to the glut of parking, parking prices were deflated to between $30 and $135 monthly and $5 and $15 daily.

Under the old ordinance adopted in 1953, residential uses were required to provide 1 space per dwelling unit plus 1 space for every 2 additional residents or visitors (not sure how they accommodated party crashers). Public housing required only 1 space per two units. All residential parking had to be located within 500ft of the premises if not on the same lot. For other uses, parking was mandated per various basis, such as square feet, beds, seats, or (bowling) alleys, and had to be on the lot or within 1000ft of it.

The new Green Code was adopted in 2016 and implemented in 2017 and was designed to encourage walkable, mixed-use neighborhoods organized around sustainability principles. It

Case Studies

eliminated all obligation to provide parking in one sentence: "there are no provisions that establish a minimum number of off-street parking spaces for development" (Hess, 2017, 451). It allows developers to build with or without parking for any land use and to replace existing parking with other uses, provided they comply with the design standards set out by the City.

The removal of parking requirements was popular with residents and business leaders alike who all recognized that the possibility of creating parking congestion was insignificant compared to the potential economic and benefits parking reform might offer. Hess discusses methods the City might use to manage future parking demand growth, such as charging for on-street parking and promoting mode-shift away from private automobile usage.

Hess recognizes that the auto-centric design of the city and lack of funding disadvantages transit use but is hopeful that the city has the right structure for walking and biking and predicts the new Green Code will accelerate transit-oriented development. He acknowledges that Buffalo's poor economy and ample parking supply made it possible to support radical parking reform by giving it nothing to lose.

Seattle, Washington

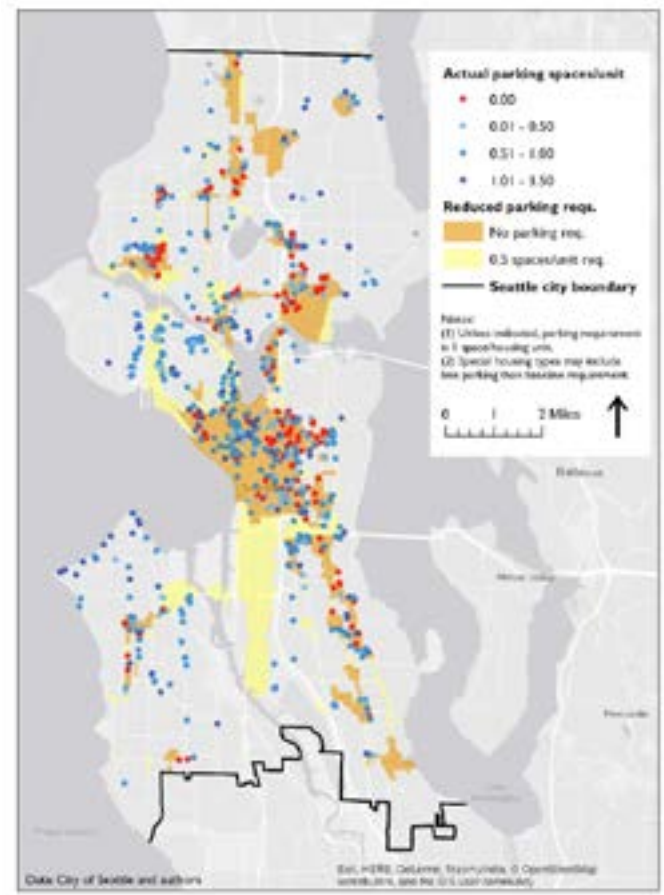


Image Source: Transfers Magazine

In "Parking policy: The Effects of Residential Minimum Parking Requirements in Seattle" (2020), C.J. Gabbe et al. studied the

Case Studies

impact that parking code reform had on provision of parking at multifamily dwellings in Seattle, Washington from 2012-2017. Seattle is a large and growing city of 668,000 inhabitants with a metropolitan area population of nearly 3.7 million. In support of its planning goals to focus growth in high density areas with good transit options, Seattle first relaxed parking requirements for multifamily dwellings in these growth areas in 2006, and then in 2012 eliminated them for all uses in these areas and reduced them by 50% near frequently served transit stops.

Using entitlement data from 868 multifamily developments comprised of 60,361 housing units, which includes nearly all multifamily development from this period, the study compared the actual amount of parking provided by the developer to the amount required under the old parking policy as well as that required by the 2006 and 2012 reforms. The study clearly demonstrated the impact of the reforms.

First, it found that parking supply is closely tied to minimum parking requirements, with requirements being the most reliable predictor of provision. Thirty-four percent of developments adhered exactly to the code. This was especially true for those that required 1 space per unit, but also held for 30% of projects for which the parking requirement was zero. Second, it showed that parking reforms have a significant impact on development patterns. On average, the areas in which requirements had been eliminated or reduced supplied 0.57 spaces per unit compared to the city average of 0.68 spaces per unit. In the reformed areas, 20% of new residential developments provided no parking and 88% had less than 1 space per unit. In total, the study estimates a 40% decrease in the supply from what would have previously been required, including nearly 18,000 fewer spaces and a direct cost savings of about $537 million. Finally, the study suggests that developers respond to market forces for parking provision when parking requirements are reduced or eliminated. Where only 0.5 spaces were required, more than 3/4 of developments provided a slightly greater amount, and 70% of the developments for which none was required opted to provide some parking. Greater provision of parking was also correlated to areas that saw stricter enforcement of on-street parking regulations.

The study reports that Seattle's parking reforms have been largely popular and have been met with little community opposition. Community support is attributed to public and stakeholder support of housing affordability, amenable elected officials, general approval of the City's growth strategy, growing interest in a transit-oriented lifestyle, and the success of the City's on-street parking management programs. The authors point to the fact that Seattle has incrementally implemented greater reductions of parking minimums since 2006, with yet another being deployed after the study period in 2018, as evidence of the overall success of these reforms.

Case Study Takeaways

Dramatic parking reform can be successful in aligning parking policy with a community's greater objectives in

Case Studies

disparate contexts and for distinctive reasons. The approach taken should be tailored to circumstances of the location and temperament of the community. The inevitability of opposition to parking reform is a myth and can be overcome through education and engagement.

Comprehensive Plan

This section will discuss the ways in which reforming minimum parking requirements might impact the goals and strategies addressed by the City of Longmont's Envision Longmont Multimodal and Comprehensive Plan (City of Longmont, 2016). Drawing on the language used in the plan, I will aim to connect the community's greater ambitions to the tactic of reforming parking minimum requirements at multifamily dwellings.

A reduction of parking minimums for multifamily residential dwellings might support many of the goals and strategies included in Longmont's Envision Longmont Multimodal and Comprehensive Plan. The plan makes specific mention of parking in two places. First, it explicitly calls for infill and redevelopment of existing surface parking lots (p 27). Second, it endorses the use of parking management techniques, including unbundling parking spaces from multifamily dwelling units to support better land use (p 42). In fact, however, parking reform impacts many goals within all six of the guiding principles Longmont outlines to pursue its vision of a sustainable, resilient Longmont.

Mandating parking contributes to inefficient land use which negatively impacts the City's development objectives such as the promotion of compact growth, infill, redevelopment, adaptive reuse, higher density, mixed-uses, destination accessibility, preservation of open space and agriculture, vibrant places, development of neighborhood and community parks and natural areas, increasing density and housing diversity, and transit-supportive and -oriented development.

Minimum parking requirements also privilege private automobile travel at the expense of other modes, harming Longmont's goals to expand local and regional transit service, reduce reliance on single-occupant motor vehicle trips, promote safety, mobility, accessibility, and convenience for all modes.

Requiring parking directly and indirectly increases pollution created by parking lots and automobile travel which interferes with Longmont's ambitions to protect the environment, promote healthy, active lifestyles, mitigate the noise created by transportation facilities, promote the beautification of the city's public and private realm, and protect and conserve Longmont's natural resources and environment, especially water.

As shown in *Exhibit 2,* several strategies the City is using to pursue these goals might be supported by reforming parking minimum standards.

Exhbit 2: Envision Longmont Applicable Strategies Table (City of Longmont, 2016)

Strategy-1.10	Review the City's Building Codes with an eye toward potential barriers to infill and redevelopment and/or higher density development. Consider adopting local amendments, where feasible, to provide additional flexibility while still meeting health and safety requirements.
Strategy-1.1	Align zoning with the Future Land Use Plan to ensure desired development patterns and densities can be readily achieved; update zoning districts (or develop new zoning districts) and design standards for centers and corridors and other land use categories as necessary to address desired mix of uses; height, massing, and scale; housing types; transitions to existing neighborhoods; and pedestrian, bicycle, and transit accessibility, and other considerations outlined in the goals and policies contained in this Plan.
Strategy-1.2	Update development review processes to make it possible for certain types of development (i.e., increased heights and/or densities in centers and corridors, and expanded support for mixed-use development and affordable housing options) to be approved administratively by staff.

Comprehensive Plan

Strategy-2.21	Support the reduction or maintenance of current vehicle congestion on streets through the encouragement of non-SOV modes of travel and Transportation Demand Management (TDM) programs, with roadway widening used as a last resort.
Strategy-3.6	Review and modify as appropriate City regulations, policies, and processes that hinder the creation or development of affordable housing or limit housing options.
Strategy-5.3	Update regulations to encourage the use of sustainable and resilient site design and development practices in new development and redevelopment.

Reduction of parking requirements might be a part of Strategy 1.10 since it constitutes a building regulation that results in a costly barrier to infill-redevelopment and/or higher density development. Strategy 5.3 might include parking requirement reform in its updates to site design and building practices targeted to promote more sustainable and resilient development and redevelopment. Parking policy reform would likely be a part of Strategy 3.6 which seeks to remove regulations that reduce housing options and housing affordability. Decreasing parking minimums could be a part of Transportation Demand Management (TDM) programs that help relieve roadway congestion as part of Strategy 2.21. Strategy 1.2 concerning revising the review processes to support mixed-use and affordable housing development could include parking variances. Almost certainly, parking reform could be a part of Strategy 1.1 which seeks to align the zoning code with the Future Land Use Plan to better achieve the goals included in the Envision Longmont Multimodal and Comprehensive Plan.

Comprehensive Plan Takeaways

By reducing or eliminating minimum parking requirements for multifamily dwellings, the City of Longmont could advance many of the goals and strategies defined in the Envision Longmont Multimodal and Comprehensive Plan.

Comprehensive Plan Takeaways

Research Takeaways Recap

1. Parking reform measures can be both prudent and effective strategies for achieving optimal parking supply.

2. Minimum parking requirements are often based on erroneous premises and faulty, distorted data. Parking utilization data should be applied judiciously with attention to context, sample size, and basis. “Parking demand,” is not a static figure but must be understood in terms of price.

3. Effective parking studies cannot predict demand but can inform parking policy if they properly account for contextual factors such as geography, demographics, land use, transportation options, and policy. Income levels and shifting transportation modalities must be factored in to the formulation of minimum parking requirements.

4. Effective alternatives to the predict and provide model of parking management include increasing the quality and accessibility of non-private automobile modes of transportation, decreasing the availability and convenience of parking, and charging automobile owners directly for the storage of their private vehicles.

5. Cities tend to underestimate the costs of parking and the role of minimum parking requirements in wasting valuable public resources.

6. If location and circumstances are properly factored, parking reform can be effective in a variety of settings for aligning parking policy with a community’s greater objectives. Opposition to parking reform is not inevitable and can be overcome through education and engagement.

7. The City of Longmont could advance many of its planning objectives by reducing or eliminating minimum parking requirements for multifamily dwellings.

Chapter 3 | Methodology

Image Source: Dreamstime

Introduction

The central objective of this parking study is to establish whether Longmont can reduce or eliminate its minimum parking requirements for multifamily residential dwellings to optimize its parking supply. The background research for the study has demonstrated that the thinking behind minimum requirements has been to predict demand for parking and provide sufficient quantities to meet or exceed demand. However, the dubious practice of forecasting parking demand is fraught with confounding factors such as supply driven demand, a tendency to conflate it with more general access and mobility needs, and "free" bundled parking (Shoup, 2017; Shoup, 2018; Litman, 2006; Willson, 2013). To be clear, predicting demand turns out not to be just difficult; it is an irredeemable sham. As Shoup says: "Planners cannot predict parking demand any better than the Wizard of Oz could give Scarecrow brains or send Dorothy back to Kansas" [emphasis added] (2017, 88). Moreover, the focus on keeping up with demand establishes a self-perpetuating system of ever-increasing supply (Shoup, 2017; Shoup, 2018; Willison and Roberts; 2011). Since the City of Longmont's request for a parking study implies an interest in moving beyond such a system, this report will omit the customary prediction of parking demand for multifamily dwellings in Longmont.

"Shoup says: "Planners cannot predict parking demand any better than the Wizard of Oz could give Scarecrow brains or send Dorothy back to Kansas.'

Rather, the goal of this study is to empower Longmont to create a parking policy that will serve its greater planning ambitions, which may involve altering its current parking minimums. To this end, the report aims to provide Longmont with a clear understanding of the factors that influence parking usage as well as the options for tailoring and fine-tuning parking codes and parking management strategies to suit its needs. Although the product of the study does not include a prediction of parking demand at multifamily residential developments in Longmont, it does aim to provide an understanding of local utilization patterns in order to determining how context and conditions impact parking rates and what parking management policies might need to be implemented to control usage were parking reforms to be adopted. The study includes three parts: a Parking Sites Survey, a Peer-Cities Analysis, and a Multifamily Housing Parking Optimization Framework.

Parking Survey

The Parking Sites Survey investigates the conditions, context, supply, and usage of parking at four multifamily dwellings in Longmont. The City of Longmont designated four sites for data collection: Grandview Meadows Apartments, Roosevelt Park Apartments, Crisman Apartments, and Fall River Apartments.

The report profiles each of these sites in terms of factors related to its unique context and conditions. The study also includes manual field counts of parking occupancy for each of the selected study sites. For each site, the number of parked cars was counted on three occasions at a peak parking hour for residential-uses, between 8:45PM and 9:45PM on Wednesdays and Thursdays in Janurary and March during the COVID pandemic. The only site that was not manually counted was Roosevelt Park Apartments because the management company would not consent to a parking count at a peak hour. Coincidentally, the property manager revealed that all off-street parking at the site is leased for a fee and that the rate of parking utilization and fee rates at Roosevelt Park could be shared with the study.

The study compares the numbers from these field counts with parking utilization data obtained from three national sources: the Institute of Transportation Engineers (ITE)'s Parking Generation 5th Edition, the Urban Land Institute (ULI)'s Shared Parking 3rd Edition, and U.S. Census Bureau's Tenure by Vehicle Available from American Community Survey 2019 5-Year Estimates. The study uses the juxtaposition of these sources of parking utilization data to inform discussion of anticipated and actual parking rates. Together the considerations of conditions, context, and parking utilization rates will provide an understanding of the factors that impact parking demand and give insight into the best policies for optimizing Longmont's parking requirements.

The first national data source the study draws from is the Institute of Transportation Engineers (ITE)'s Parking Generation 5th Edition. The specific parameters considered by the study are for low- and mid-rise suburban contexts with no available rail transit by dwelling unit as well as per bedroom. The study also uses data in the same context for affordable housing with income limits and senior housing where applicable. The second natural source used is the Urban Land Institute (ULI)'s Shared Parking 3rd Edition. ULI provides parking ratio recommendations to developers based on their own data. This report uses ULI's 85% of peak, Base Parking Ratios. The third source of national parking data in the report is the U.S. Census Bureau's Tenure by Vehicle Available from American Community Survey 2019 5-Year Estimates. The most complete data with the lowest margins of error was for that broken down by zip code area. The report uses the survey as an estimate of car ownership and therefore residential parking utilization at rental properties in the zip code areas of the sites included in the study.

Peer-Cities Analysis

The Peer-Cities Analysis explores the ordinances of several Colorado and other North American cities for potential model parking management techniques for Longmont to emulate. The study applies the data collected about Longmont's parking utilization including context and conditions to identify the policy ideas that will be most relevant to Longmont. The data selected for the analysis was chosen not because the city's bare demographic or geographic resemblance to Longmont but for their apparent applicability to its circumstances. The study intentionally disregards aspects of ordinances and parking policies deemed irrelevant to Longmont's particular context. The purpose of this analysis is to inform the City of Longmont's parking policies by elucidating model codes, parking management options, and best practices to replicate, as well as by rooting out pitfalls and mistakes to be avoided. By understanding the range of options for parking reform and parking management, the City of Longmont will be better equipped to determine how to reduce or eliminate its minimum parking requirements for multifamily residential dwellings in support of its other planning goals.

Plan Framework

The Multifamily Housing Parking Policy Framework lays out several proposals for approaching reformation of the parking requirements for multifamily housing in Longmont to achieve the optimal parking provision. This step of the study draws on the information acquired in the first two steps to develop a parking policy plan framework for multifamily housing in Longmont. The evaluation includes the opportunity costs of the parking supplied at the study sites as well as data-supported recommendations for solutions that better align Longmont's multifamily dwelling parking policies with its greater planning goals.

Chapter 4 | Parking Survey

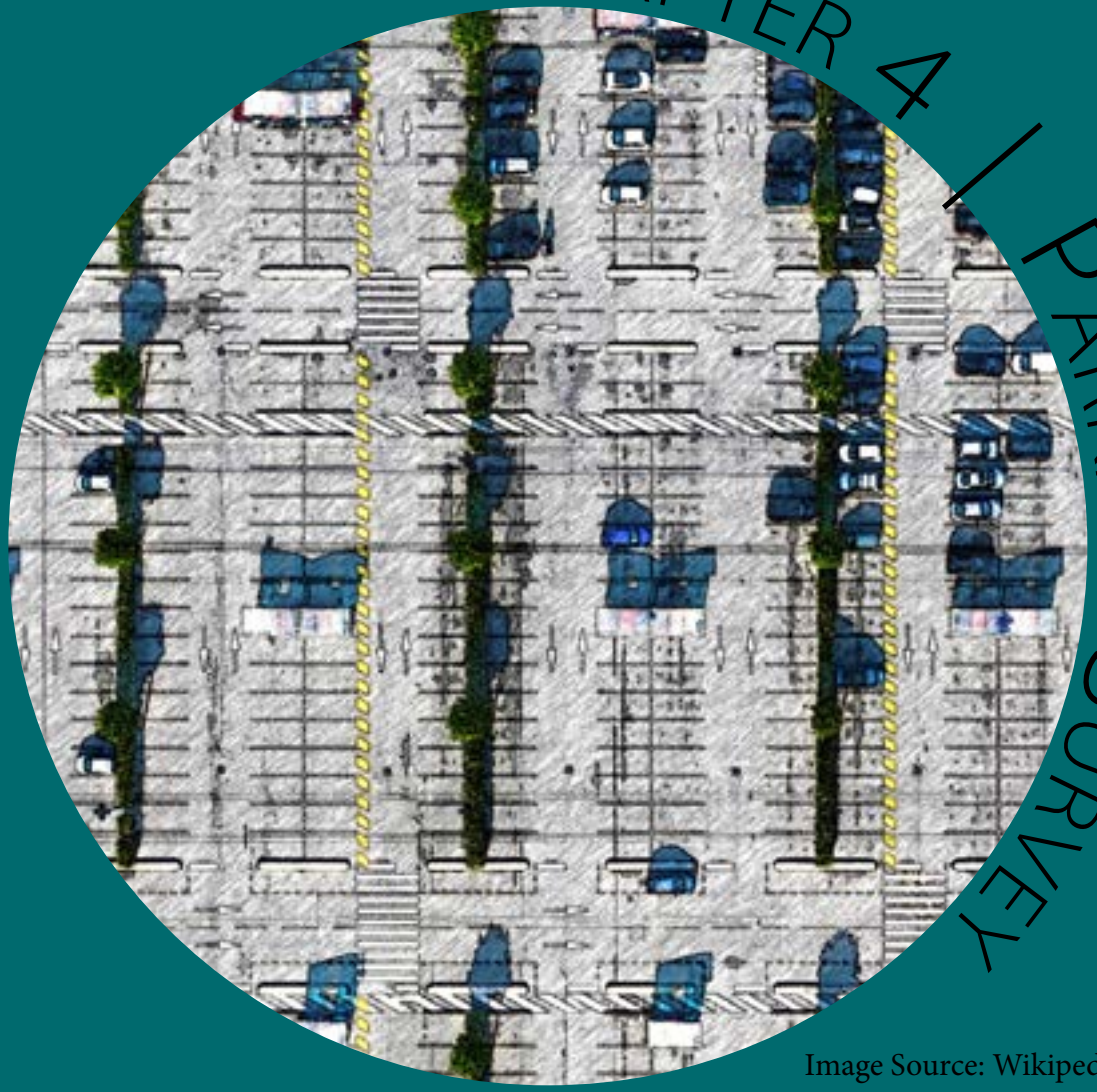


Image Source: Wikipedia

Surveys Overview

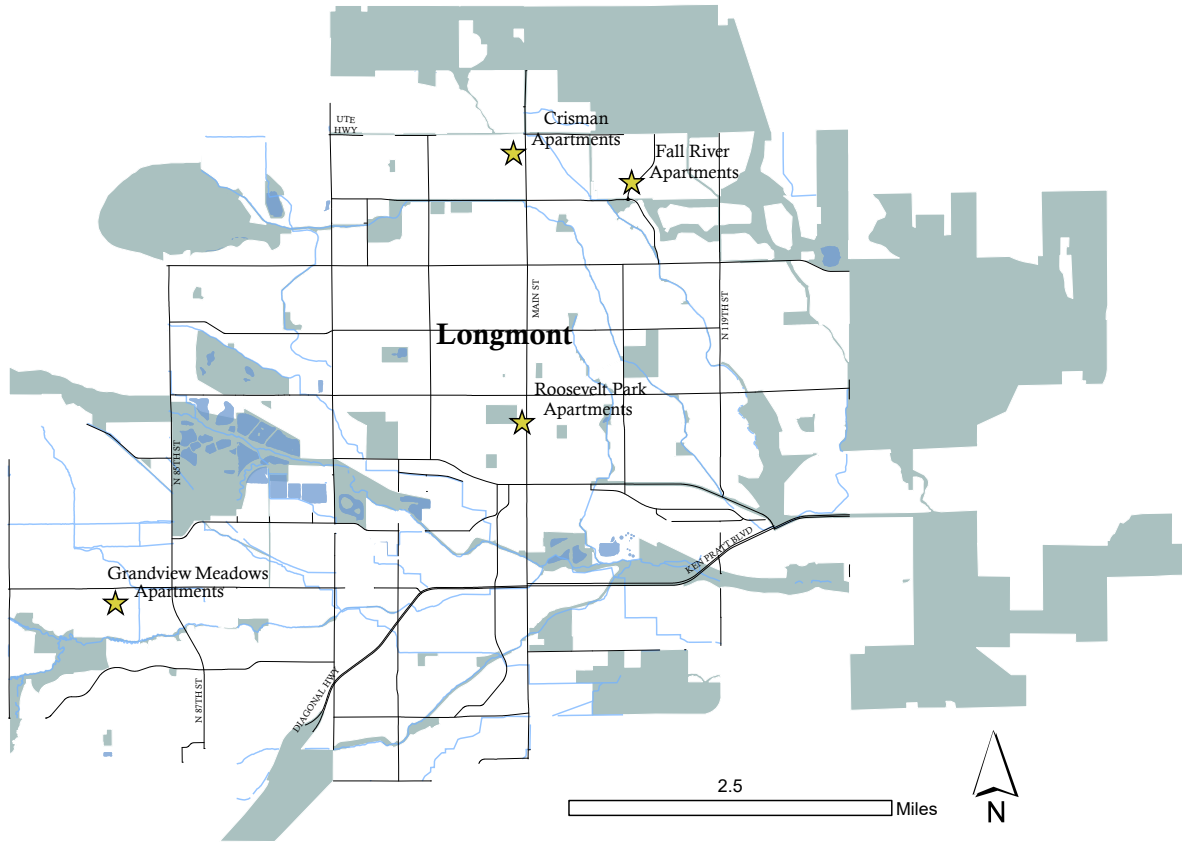


Exhibit 3: Survey Sites Locator Map

The City of Longmont has selected the four multifamily housing sites designated in *Exhibit 3* for the Longmont Multifamily Dwelling Parking Study: Crisman Apartments, Roosevelt Apartments, Grandview Meadows Apartments, and Fall River Apartments. This section of the report will include a three-part individual evaluation of each site. The Site Profile will elucidate its unique conditions and context. The Parking Evaluation will examine the data collected regarding its parking provisions and rates of utilization. The Discussion will consider the possible implications of this section's findings for addressing the City of Longmont's parking requirements inquiry. Finally, the section will conclude by summarizing and

Surveys Overview

comparing the principal takeaways from each site.

Together the considerations of characteristics and parking data for each site will provide an understanding of the factors that impact parking demand and give insight into the best policies for optimizing Longmont's parking ordinances.

Crisman Apartments

Site Profile

Image Source: Google Earth

The Crisman Apartments are located near the intersection of Ute Highway and Main Street in north-central Longmont.

As shown in *Exhibit 4*, Crisman comprises 3 buildings nestled among rows of off-street parking and includes a landscaped park area and playground on site. As detailed in Table 1, the development is three stories in height and has 48 one-bedroom and 66 two-bedroom units, totaling 114 in all (PARIKH, 2016). Half of these units are income restricted at or below 50% of Boulder County's area median income (AMI), which is currently $51,800 for a household of three people (PARIKH, 2016; Department of Community Investment, 2021).

The remainder of the units rent at the market rate. The community manager for the development reported 99.2% occupancy over the course of the study period. There are 32 bike parking spaces at 16 uncovered, inverted U-shaped racks. No transit passes are included with rent and no carshare is on-site at Crisman.

Exhibit 4: Site Conditions at Crisman Apartments

Crisman Apartments	
Street Address	750 Crisman Drive
Stories	3
Units	114
Bedrooms	180
Unit Mix	48-1BRs and 66-2BRs
Housing Type	Affordable
Affordable Units	50%
AMI	≤50%
Occupancy Rate	99.20%
Bike Parking Spaces	32
Walk/Transit/Bike Score	67/40/58
Transit Passes Included	No
On-Site Car Share	No

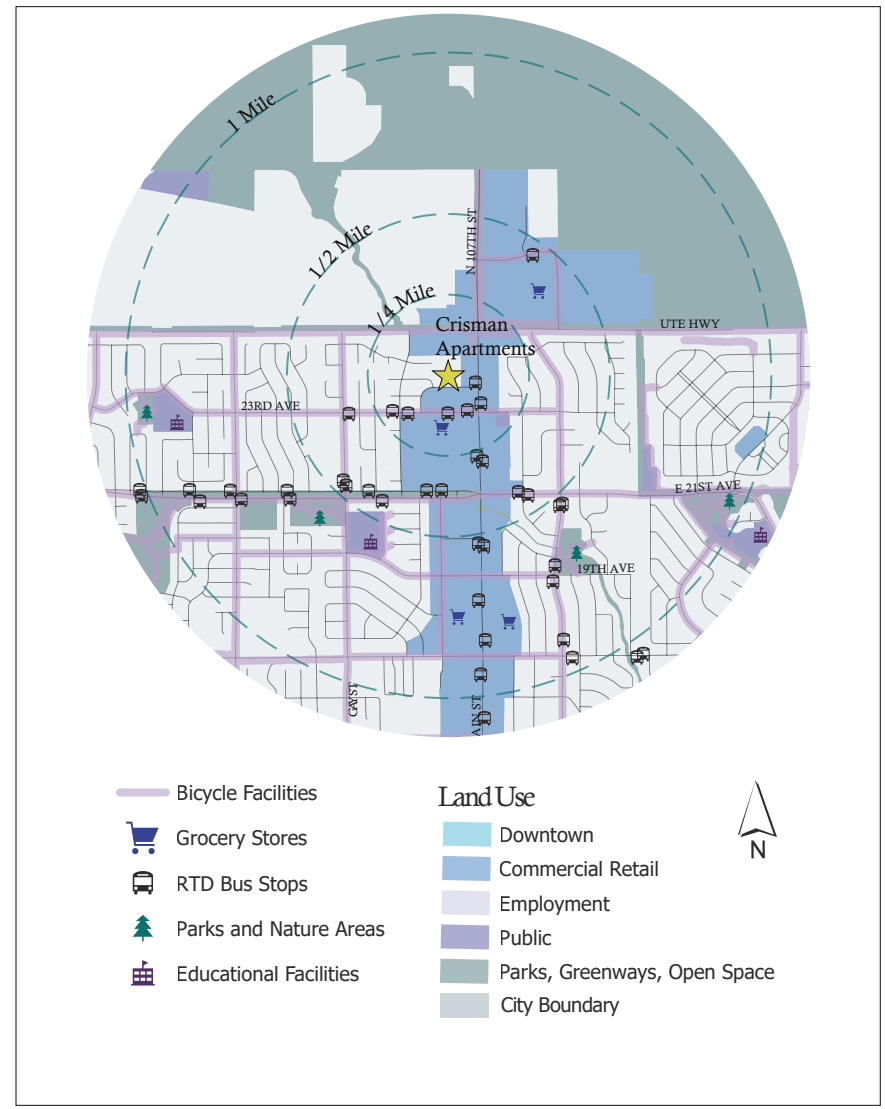
Exhibit 5 shows that the Crisman Apartments are positioned on the cusp of a residential neighborhood to the west and a commercial retail corridor along Main Street to the east. As a result, many amenities and transit options are located within

Crisman Apartments

a reasonable walking and biking distance from Crisman. Four parks and three schools are located between roughly a half a mile and a mile from Crisman. In addition to having four grocery stores in the vicinity, two of which are well within the half mile range, Crisman has bike routes and transit stops within a quarter mile.

Despite its seemingly above average mobility and accessibility advantages, Crisman receives only a middling Walk/Transit/Bike score, the website calling it only "somewhat walkable" with "some transit" and "some bike infrastructure" (2021).

Exhibit 5: Context Map for Crisman Apartments



Crisman Apartments

Parking Evaluation

Exhibit 6: Parking Provision Table for Crisman Apartments

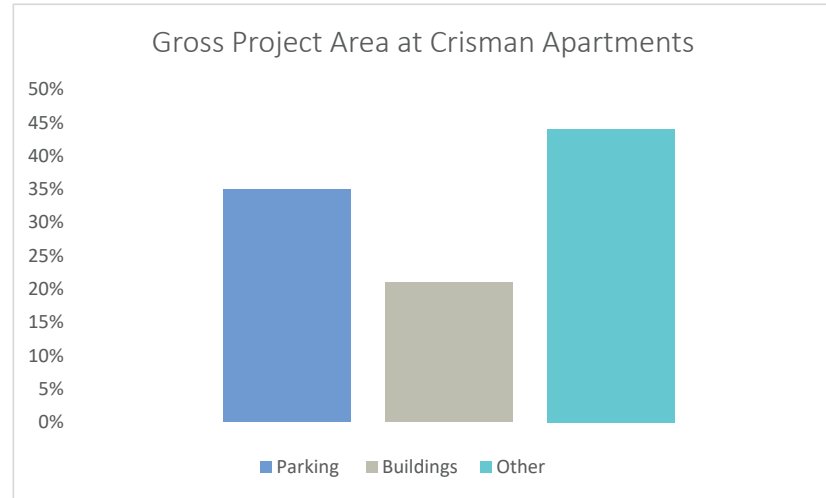
Crisman Apartments	
Street Address	750 Crisman Drive
Stories	3
Units	114
Bedrooms	180
Unit Mix	48-1BRs and 66-2BRs
Housing Type	Affordable
Affordable Units	50%
AMI	≤50%
Occupancy Rate	99.20%
Bike Parking Spaces	32
Walk/Transit/Bike Score	67/40/58
Transit Passes Included	No
On-Site Car Share	No

As detailed in *Exhibit 6*, Crisman Apartments provides 172 surface parking spaces to residents. Parking is included in the price of rent and pooled in the sense that any resident may park anywhere in the lot, spaces being unallocated. In addition, a small amount of on-street parking is available immediately to the south of the development. Although the on-street spaces do not have meters or require permits, few residents seem to use them.

At the time Crisman was built, the City of Longmont required it to provide a minimum of 1.75 parking spaces for each one-bedroom unit and 2 spaces for each two-bedroom unit for all market rate units. Affordable units were required to furnish only 1 space per unit. Despite the fact that this requirement adds up to only 165 spaces, the developer chose to provide 172 (PARIKH, 2016).

Exhibit 7 shows that parking at the Crisman site takes up 35% of the gross project area—about 1.7 times the gross building

Exhibit 7: Gross Project Area Used for Parking at Crisman Apartments



Crisman Apartments

area (PARIKH, 2016).

As shown in *Exhibit 8*, of the three conducted at Crisman Apartments, Field Count 1 saw the highest rate observed during the study finding only 99 occupied spaces, just 58% of the total spaces provided. On the other hand, Field Count 3 saw the lowest utilization, finding only 86 spaces in use or just 50% of those supplied. To corroborate the parking numbers observed in the field, the study consulted several secondary sources of data including ITE's Parking Generation, ULI's Shared Parking, and the Census Bureau's ACS figures on automobile ownership rates. Although the intention had been to validate the field counts, the numbers at Crisman only demonstrated how erroneous parking utilization rate predictions can be.

Exhibit 8: Field Counts at Crisman Apartments

Crisman Apartments	
Spaces Provided	172
Field Count 1	
Date	1/28/2021
Time	8:45 PM
Spaces Occupied	99
% Occupied	58%
Field Count 2	
Date	3/4/2021
Time	8:45 PM
Spaces Occupied	93
% Occupied	54%
Field Count 3	
Date	3/10/2021
Time	9:30 PM
Spaces Occupied	86
% Occupied	50%

As shown in *Exhibit 6*, the amount of parking provided at Crisman is equivalent to 0.96 spaces per bedroom or 1.5 per unit. These numbers are relatively close to the utilization numbers estimated by the secondary sources in *Exhibit 9* (US Census, 2019; ITE, 2019; Smith, 2020). Even when adjusted for income restricted affordable housing, the ITE do not accurately predict the rates of usage found in the field counts. The highest parking usage rate per bedroom at Crisman was 0.55 per bedroom which is only about two-thirds of the lowest estimates provided by any secondary source, including ITE's income restricted rate of 0.82 per bedroom (ITE, 2019). In the case of Crisman, the difference is about 49 parking spaces.

Exhibit 9: Utilization Estimates for Crisman Apartments

Crisman Apartments	
ITE per Unit	1.47
ITE per Bedroom	0.87
ITE Income Limits per Unit	1.33
ITE Income Limits per Bedroom	0.82
ITE per Senior Income Limits per Unit	n/a
ACS Projected Ratio per Unit	1.37
ACS Projected Ratio per Bedroom	0.87
ULI per Unit	1.33
ULI per Bedroom	0.84
Highest Observed Usage per Unit	0.87
Highest Observed Usage per Bedroom	0.55
Highest Observed % Usage	58%

Crisman Apartments

Discussion

Crisman Apartments sees much lower rates of parking than expected: lower than the City of Longmont's minimum requirements; lower than the amount of parking provided by its developer; lower than the rates predicted by national parking data sources; and lower than Census surveys might suggest. In fact, it is widely known that affordable housing sees lower rates of car ownership and parking, and parking experts often advise adjusting requirement downward for affordable developments. (ITE, 2019; Litman, 2006; Willson, 2013). In keeping with the Crisman numbers, however, a recent study conducted by Fox Tuttle and Shopworks Architecture suggests that the numbers may be much lower than these adjustments account for. It found that 50% of parking at affordable housing in the Denver metropolitan region goes unused (Fox, 2021). Thus, the fact that half of the apartments at Crisman are income-restricted to equal to or less than 50% of AMI is a factor in its low parking rates. If the City had imposed Longmont's affordable housing parking requirements (i.e., 1 space per unit) for the entire development, the rate of unused parking would drop to about 13% (Code, 2021). Nevertheless, it is significant that half of the apartments at Crisman rent at a market rate, and yet this does not seem to impact the amount of parking being used. As the Fox Tuttle report points out, expense of autos is only a portion of the story of why affordable housing sees lower rates of parking; the other part is that affordable housing is often located in areas with better access to amenities including transit (2021). It seems probable that Crisman's proximity to essential amenities like grocery stores, schools, and non-automobile modes of transportation is a key factor in keeping its parking usage well below expectations.

Exhibit 10: Parking Rate Comparison for Crisman Apartments

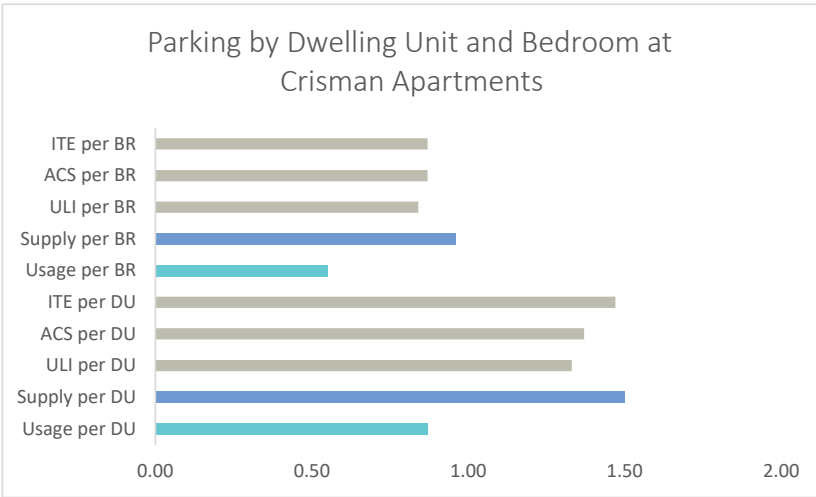
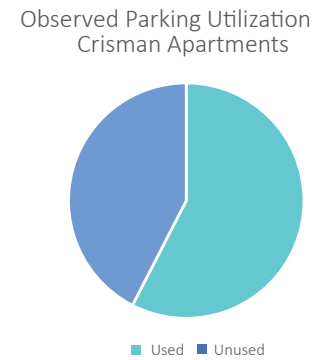


Exhibit 11: Parking Utilization at Crisman Apartments



Roosevelt Park Apartments

Site Profile

Image Source: Google Earth

The Roosevelt Park Apartments are located on the corner of Main Street in Longmont's downtown Central Business District (CBD). It is a mixed-use development with an urban feel. The building has three residential levels over ground floor commercial retail, directly abuts the public right of way, and the parking for the entire development is contained in an interior structured parking facility, hidden to view from the

Exhibit 12: Site Conditions at Roosevelt Apartments

Roosevelt Apartments	
Street Address	600 Longs Peak Avenue
Stories	4
Units	115
Bedrooms	153
Unit Mix	12 studios, 65 1-BRs, and 38 2-BRs
Housing Type	Market
Affordable Units	0%
AMI	n/a
Occupancy Rate	95.65%
Bike Parking Spaces	14
Walk/Transit/Bike Score	92/42/63
Transit Passes Included	No
On-Site Car Share	No

Roosevelt Park Apartments

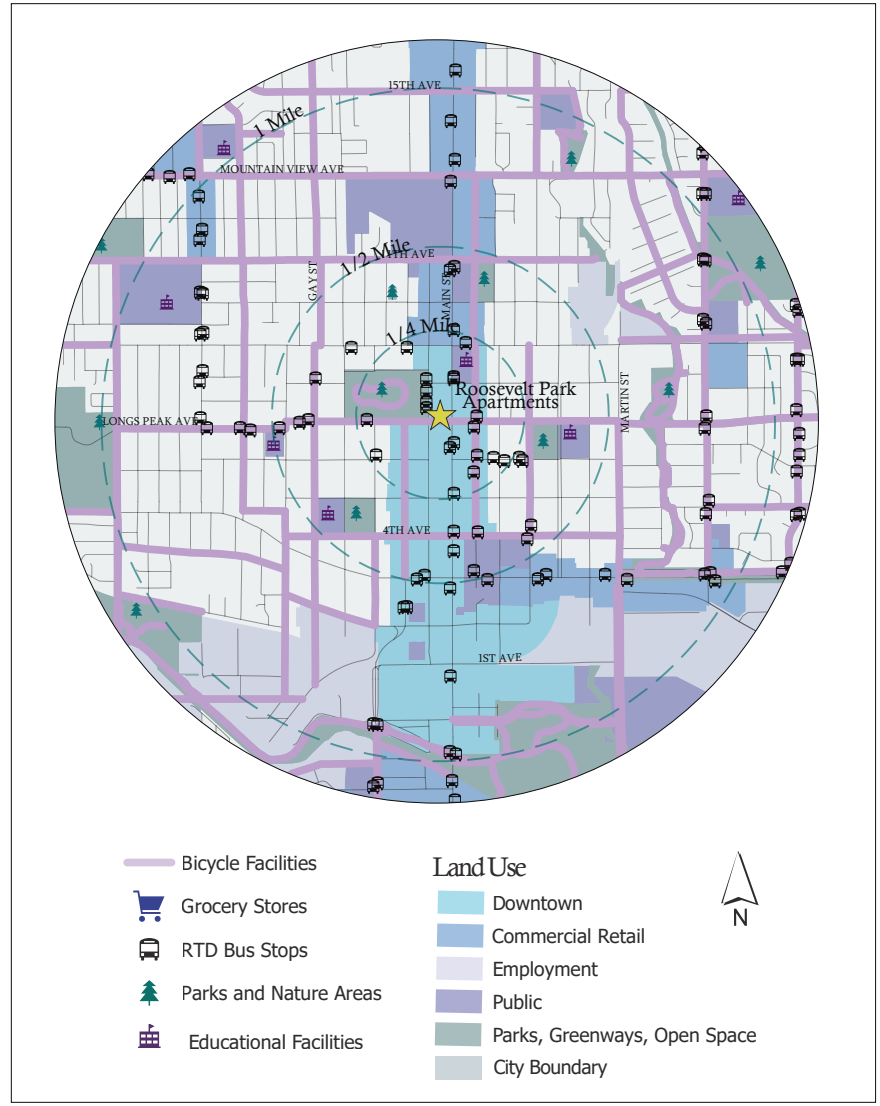
street.

As shown in *Exhibit 12* there are 115 residential units in the building, including 12 studios, 65 one-bedrooms, and 38 two-bedrooms (Shears, 2010). All the units rent at a market rate and the property manager reports 95.65% occupancy during the study period.

No transit passes are offered with rent and no carshare is available on-site, though the building has 14 open-air, inverted U-racks for bikes (Shears, 2010).

Although its Bike and Transit Scores are average, Roosevelt Park receives a glowing "Walker's Paradise" from Walkscore.com, possibly due to its proximity to downtown amenities, and urban streetscape (2021). As shown in *Exhibit 13*, Roosevelt Park also has six parks and four schools in its vicinity and is near several areas of concentrated employment. Its access to transit and bicycle routes is also good, especially compared to other areas of Longmont.

Exhibit 13: Context Map for Roosevelt Park Apartments



Roosevelt Park Apartments

Parking Evaluation

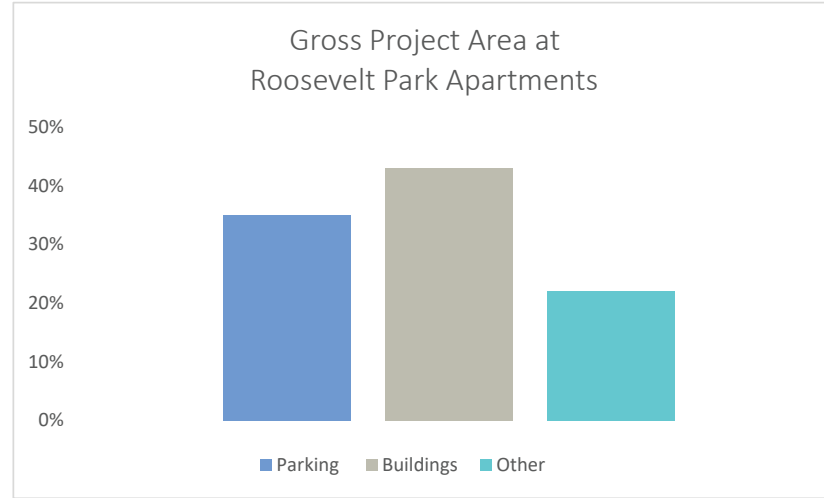
Exhibit 14: Parking Provision for Roosevelt Park Apartments

Roosevelt Apartments	
Circulation	Reserved
Price per Space	$25 uncovered $50 covered
Required Ratios	1.5/unit + 10% reduction (-7 for employees)
Parking Spaces Provided	149 (83 covered)
Parking Spaces per Bedroom	0.97
Parking Spaces per Unit	1.29
On-Street Utilization	Substantial
Parking Percent of Gross Project Area	35%

Exhibit 14 reflects the singularity of the parking arrangement at Roosevelt Park Apartments among the sites in this study. Namely, the off-street parking it provides for its residents is 100% structured, reserved, and unbundled. In other words, the parking is all located in a central above-ground garage facility, each space is assigned to a designated lessee, and all parking spaces must be purchased at a cost in addition to rent. Furthermore, the City of Longmont parking standards were simplified to a flat rate of 1.5 spaces per dwelling unit and then further reduced by 10% to define its minimum parking requirement for the project.

The property manager at Roosevelt Park maintains that the cost of the off-street parking causes some residents to park on the street because it is free and unregulated by the City. Since the cost to park in the structured facility is only $25-50 per

Exhibit 15: Gross Project Area Used for Parking at Roosevelt Park Apartments



Roosevelt Park Apartments

month per space, there must be other contributing factors to this phenomenon.

As shown in *Exhibit 15*, although over a third of the gross area of the Roosevelt Park development is parking, the ratio of parking (26,925 sf) to building area (33,368 sf) is only about .81 due to the lack of setbacks and the multi-storied garage. The parking structure is also shared between several uses, including commercial, residential, and public parking.

Exhibit 16: Field Counts at Roosevelt Park Apartments

Roosevelt Park Apartments	
Spaces Provided	149
~~**Field Count 1**~~	Lease Rate
Date	2/26/2021
Time	
Spaces Occupied	124
% Occupied	83%
Field Count 2	n/a
Date	
Time	
Spaces Occupied	
% Occupied	
Field Count 3	n/a
Date	
Time	
Spaces Occupied	
% Occupied	

Because Roosevelt Park charges its residents for parking, the property manager had a record of the exact utilization rates and there was no need to conduct field counts at the site. Roosevelt reported that it had a steady parking space leasing rate of about 83% or 124 of the 149 spaces available to tenants.

The secondary source parking estimates for Roosevelt Park align closely to the lease rates provided by the property manager. The ITE and ULI numbers are only about 0.05 spaces per bedroom higher than the actual occupancy rate. Without the reductions afforded by the City, under the current parking ordinance the development would have been required to provide about 60 additional parking spaces (Longmont, 2021).

Exhibit 17: Utilization Estimates for Roosevelt Park Apartments

Crisman Apartments	
ITE per Unit	1.47
ITE per Bedroom	0.87
ITE Income Limits per Unit	1.33
ITE Income Limits per Bedroom	0.82
ITE per Senior Income Limits per Unit	n/a
ACS Projected Ratio per Unit	1.37
ACS Projected Ratio per Bedroom	0.87
ULI per Unit	1.33
ULI per Bedroom	0.84
Highest Observed Usage per Unit	0.87
Highest Observed Usage per Bedroom	0.55
Highest Observed % Usage	58%

Roosevelt Park Apartments

Discussion

The parking utilization rates at Roosevelt Park Apartments are surprising and instructive in two ways. First, the utilization rate might be expected to be lower than it is. After all, Roosevelt Park has a downtown location, pedestrian-friendly urban street scape, and good access to transit and amenities. Walk Score even called it a "walker's paradise" (2021). Furthermore, Roosevelt Park charges a fee for parking, albeit a nominal one. By virtue of its walkability and unbundled parking, Roosevelt Park's utilization rates should be the lowest of the study sites and much lower than the ULI and ITE predictions. Shoup and others often claim that free parking and a lack of non-auto access drive high parking rates (2018). So why are Roosevelt Park's utilization rates as high as they are?

Exhibit 18: Parking Rate Comparison for Roosevelt Park Apartments

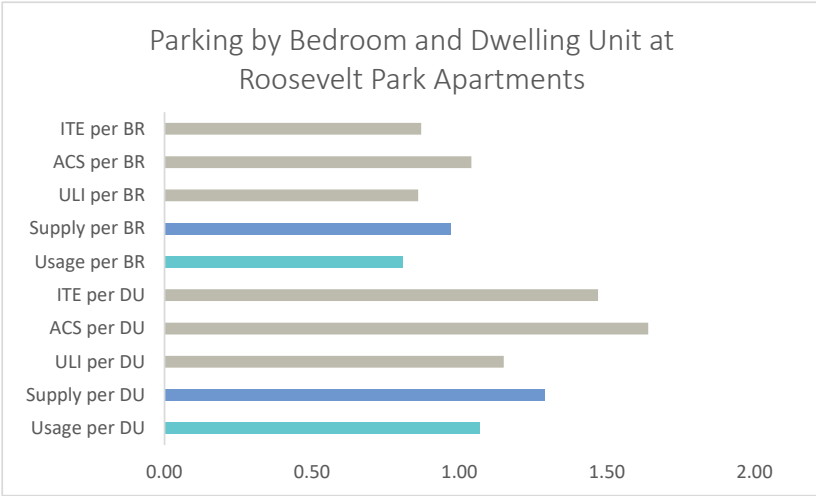
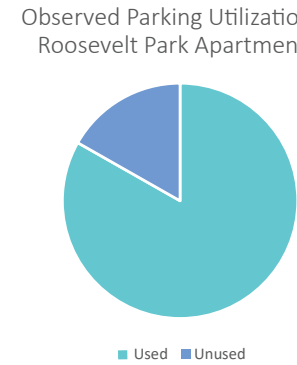


Exhibit 19: Parking Utilization at Roosevelt Park Apartments



As it says on their website, Roosevelt Park offers luxury apartments, and its relatively wealthier clientele likely have greater access to private automobiles than those living in more affordable housing (2021). Litman finds that the number of vehicles per household correlates closely to income (2006).

In addition to income considerations, one sort of essential amenity is conspicuously absent from its context map in *Exhibit 13*, and that is grocery stores. It would be difficult to live without an automobile if there were not grocery stores nearby, particularly if there were no access to a rapid transit system or carshare either.

The second revelation from the examination of Roosevelt Park is that it demonstrates the exorbitance of Longmont's parking requirements. If the current parking code had been followed at Roosevelt Park, it would provide 211 spaces, 62 more than it does presently, and 87 more than are currently in use (Code, 2021; Shears, 2010). At an estimated 300 square feet and $35k per space, that's a cost of 26k square feet or 34% of

Roosevelt Park Apartments

the total lot coverage and more that $3 million. Compare that to the 7.5k square feet and $385k worth of parking area that never gets used at the current 83% rate of occupancy.

Grandview Meadows Apartments

Image Source: Google Earth

Site Profile

The Grandview Meadows Apartments is a vast 32-acre development located in the southwestern quadrant of Longmont. It consists of 30 buildings, 508 units, and 858 bedrooms in total with a mix of 194 one-bedroom, 278 two-bedroom, and 36 three-bedroom dwellings (Rocky, 1999; Rocky 2001; Owen, 2005; Owen, 2013).

Grandview offers solely market rate apartments and according to its property manager maintained an occupancy rate of 95% throughout the study period.

Each building at Grandview Apartments has 2 uncovered, inverted-U bike racks but does not include transit passes in the price of rent and offers no on-site carshare facilities (Rocky, 1999).

Although there are schools and green spaces nearby,

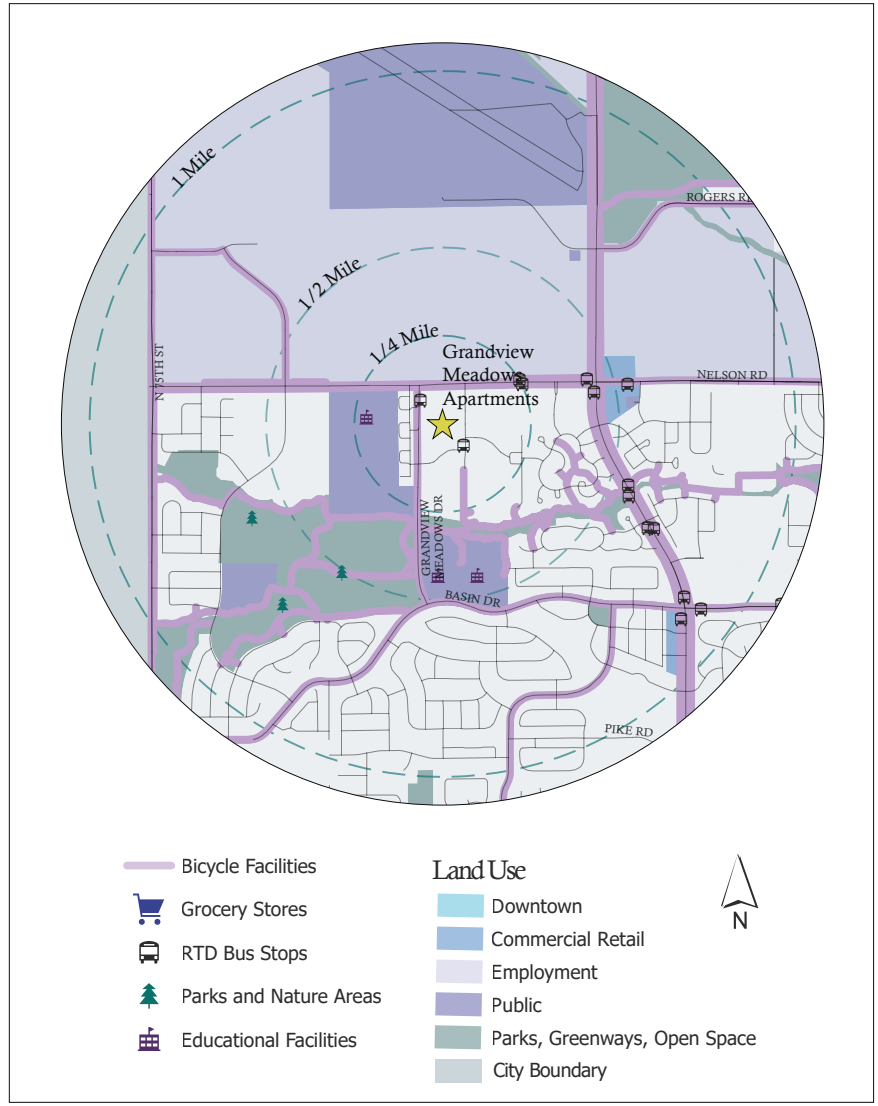
Exhibit 20: Site Conditions at Grandview Meadows Apartments

Grandview Meadows Apartments	
Street Address	620 Grandview Meadows Drive
Stories	2
Units	508
Bedrooms	846
Unit Mix	194-1BRs, 278-2BRs, and 36-3BRs
Housing Type	Market
Affordable Units	0%
AMI	n/a
Occupancy Rate	95%
Bike Parking Spaces	120
Walk/Transit/Bike Score	23/25/53
Transit Passes Included	No
On-Site Car Share	No

Grandview Meadows Apartments

Grandview offers limited walking, biking, and transit mobility as reflected by the Walk/Transit/Bike Scores in *Exhibit 20* and the context map in *Exhibit 21* (2021). Some major employers and a small amount of commercial retail are also located in the vicinity, though no grocery stores can be found in the area. By-and-large, Grandview is an automobile-dependent suburban subdivision, a fact borne out by its extensive parking provisions.

Exhibit 21: Context Map for Grandview Meadows Apartments



Grandview Meadows Apartments

Parking Evaluation

Exhibit 22: Parking Provision Table for Grandview Meadows Apartments

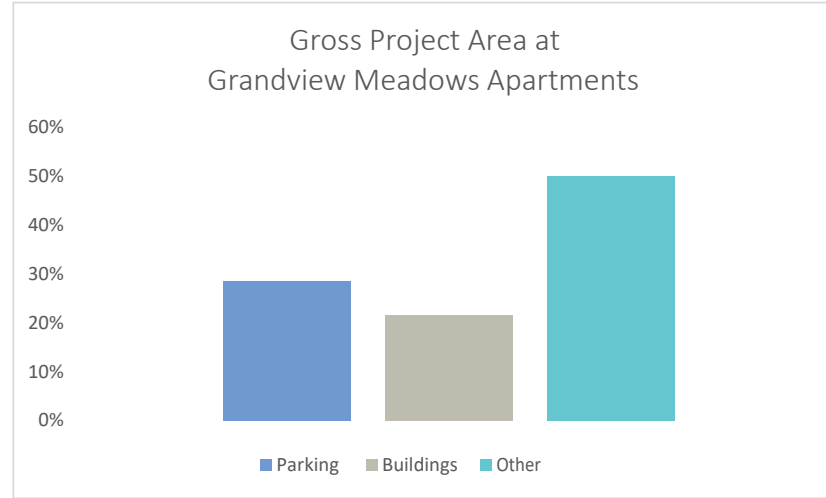
Grandview Meadows Apartments	
Circulation	Pooled
Price per Space	$60/month for garage spaces
Required Ratios	1.75/1BR, 2.00/2BR, 2.75/3BR
Parking Spaces Provided	960 (208 garage)
Parking Spaces per Bedroom	1.1
Parking Spaces per Unit	1.9
On-Street Utilization	Substantial
Parking Percent of Gross Project Area	29%

Grandview Meadows provides its residents with 752 spaces worth of surface parking included with their rent. In addition, tenants can opt to pay $60 per month for a one of the 208 garage spaces on the property.

In addition to the off-street parking at Grandview, there is also substantial use of the on-street parking found along both Redman Drive and Peck Drive.

According to the site plans, Longmont's parking code at the time of construction equivalent to the current code and would have required Grandview to provide 1.75 spaces per one-bedroom, 2 spaces per two-bedroom, and 2.25 spaces per three-bedroom units for a total of 977 spaces (Rocky, 1999; Rocky 2001; Owen, 2005; Owen, 2013). Despite this fact, the site plans report that the total required parking was only 928

Exhibit 23: Gross Project Area Used for Parking at Grandview Meadows Apartments



Grandview Meadows Apartments

spaces and the actual total provision at the development was 960 spaces (Rocky, 1999; Rocky 2001; Owen, 2005; Owen, 2013). Though these discrepancies are perhaps negligible, the reason for them remains unclear.

As shown by *Exhibit 23*, the Grandview development devotes 132% more land devoted to storing cars than to housing

Exhibit 24: Field Counts at Grandview Meadows Apartments

Grandview Meadows Apartments	
Spaces Provided	958
Field Count 1	
Date	1/27/2021
Time	9:00 PM
Spaces Occupied	828
% Occupied	86%
Field Count 2	
Date	3/3/2021
Time	9:00 PM
Spaces Occupied	783
% Occupied	82%
Field Count 3	
Date	3/10/2021
Time	9:00 PM
Spaces Occupied	800
% Occupied	84%

people, with 9.1 acres of parking compared to 6.85 acres for apartment buildings (Rocky, 1999; Rocky 2001; Owen, 2005; Owen, 2013).

As the data in *Exhibit 24* demonstrates, the abundant parking provided by Grandview sees high rates of usage. The property manager at Grandview reported that 190 of the 208 garages were continuously leased for the duration of the project. When these numbers are combined with the field counts of the surface lots, the study reveals peak parking rates at Grandview of around 86% of capacity.

Exhibit 25: Utilization Estimates for Grandview Meadows Apartments

Grandview Meadows Apartments	
ITE per Unit	1.52
ITE per Bedroom	0.86
ITE Income Limits per Unit	n/a
ITE Income Limits per Bedroom	n/a
ITE per Senior Income Limits per Unit	n/a
ACS Projected ratio per unit	1.39
ACS Projected ratio per bedroom	0.84
ULI per Unit	1.55
ULI per Bedroom	0.93
Highest Observed Usage per Unit	1.63
Highest Observed Usage per Bedroom	0.97
Highest Observed % Usage	86%

A comparison of the data in Table 10 and Table 11 reveals that both parking supply and usage exceed expectations at Grandview Meadows. As shown in Table 12 and Figure 13, Grandview provides and uses more parking than recommended by any of the numbers offered by secondary sources of parking data. It is the only development in the study to do so.

Grandview Meadows Apartments

Discussion

Grandview Meadows Apartments has extremely high rates of parking supply and utilization. Some people might find that high rates of parking usage justify ample parking provision, arguing that a 15% utilization buffer is reasonable. The field counts suggest, however, that 132 of the parking spaces provided at Grandview are never occupied. It is also worth noting that the number of unoccupied spaces would have been slightly great if the development would have complied with the ordinance and supplied the 977 parking spaces it requires. Moreover, even if the City had reduced its rate across the board by 0.25 spaces per unit, Grandview would still have provided 22 more parking spaces than the field counts suggest ever get used.

Exhibit 26: Parking Rate Comparison for Grandview Meadows Apartments

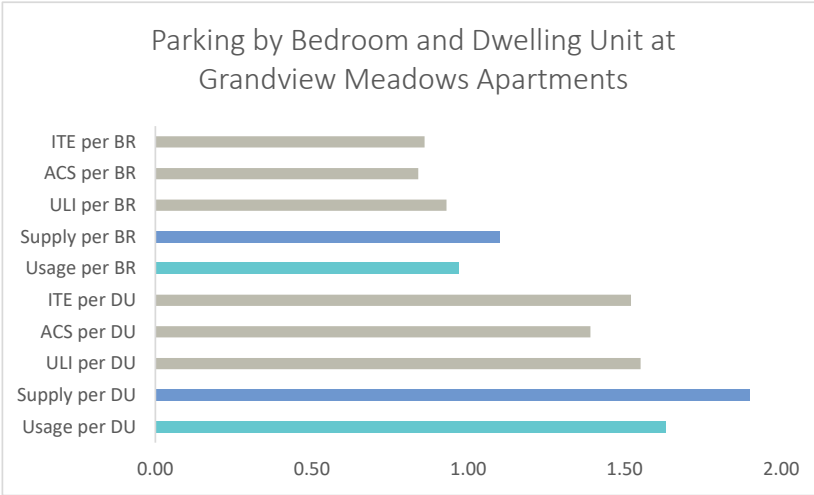
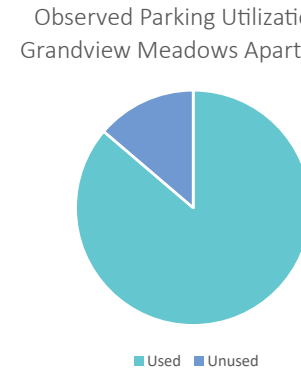


Exhibit 27: Parking Utilization at Grandview Meadows Apartments



In spite of the fact that Grandview Meadows provides more parking than actually gets used, it still sees the highest rates of parking utilization per unit and per bedroom than any other study site, as previously mentioned higher rates than any source in the study predicted. Some may argue that the development's relative isolation and dearth of alternative modes of transportation make high rates of parking inevitable. Granted that its transportation and land use problems require solutions, the best explanation of why rates of usage at Grandview are so high is probably oversupply itself. Providing greater amount of free storage incites residents to own a greater number of automobiles. Why then should the City of Longmont's current code need to require even more parking than the excessive amount now provided at Grandview Meadows?

Fall River Apartments

Site Profile

Image Source: Google Earth

The Fall River Apartments is a senior, affordable housing development located in the northeast quadrant of Longmont. As detailed in *Exhibit 28*, Fall River consists of a single building, housing 60 units with 68 total bedrooms. All of the units are age and income restricted to 62-and-over and 50% of AMI and below (Workshop8, n. d.). According to a representative from the Longmont Housing Authority (LHA) that manages the property, it is 100% occupied. Fall River provides 7 uncovered, inverted-U bike racks to its tenants, but no carshare is available on site and no bus passes are included in

Exhibit 28: Site Conditions at Fall River Apartments

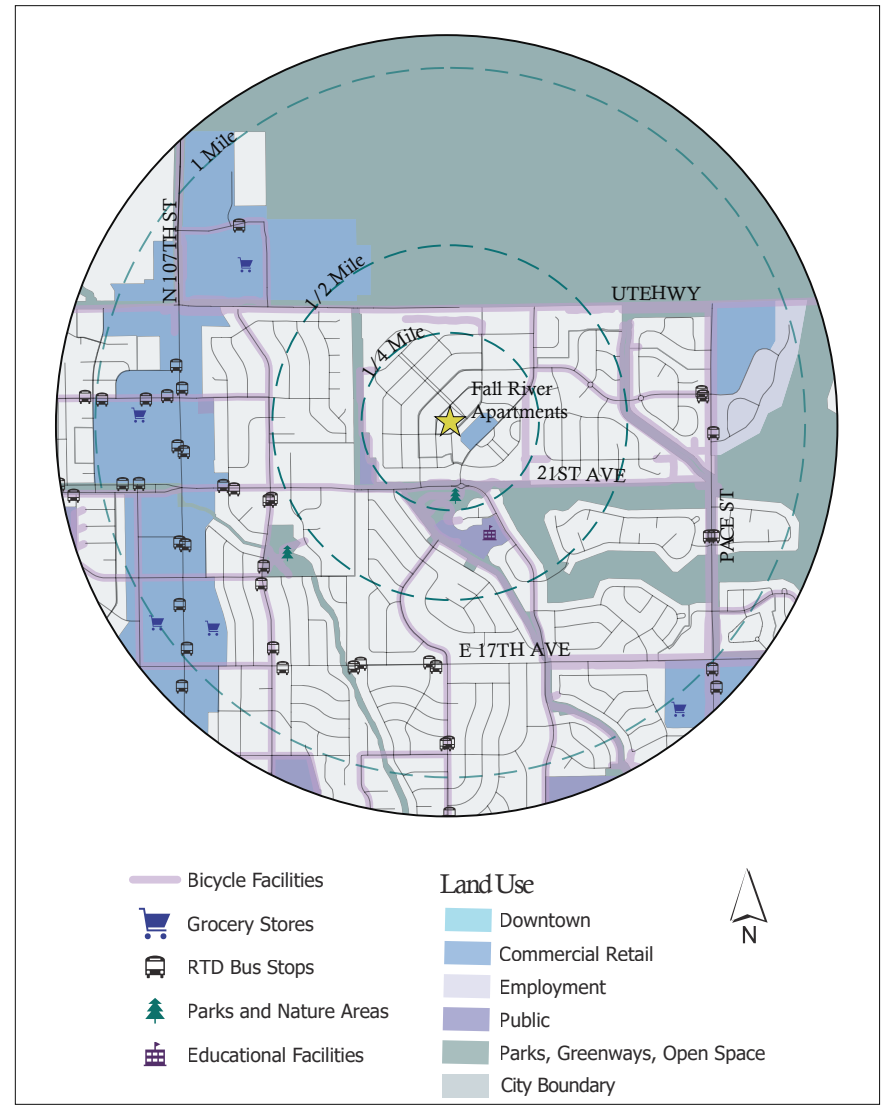
Fall River Apartments	
Street Address	321 Homestead Parkway
Stories	4
Units	60
Bedrooms	68
Unit Mix	52-1BRs and 8-2BRs
Housing Type	Senior Affordable
Affordable Units	100%
AMI	≤50%
Occupancy Rate	100.00%
Bike Parking Spaces	14
Walk/Transit/Bike Score	11/31/72
Transit Passes Included	No
On-Site Car Share	No

Fall River Apartments

the rent (Workshop8, n. d.). Fall River has the lowest walk and transit scores but the highest bike score of the four sites in this study: Walk Score referring to it as being "car dependent" with "some transit" but also saying that "biking is convenient for most trips [emphasis added]" (Walk Score, 2021).

According to the Context Map in *Exhibit 29*, there are few amenities and no transit in short walking distance from Fall River. However, commercial retail including several grocery stores, a school, and some parks and green space are all within a mile vicinity of the development.

Exhibit 29: Context Map for Fall River Apartments



Fall River Apartments

Parking Evaluation

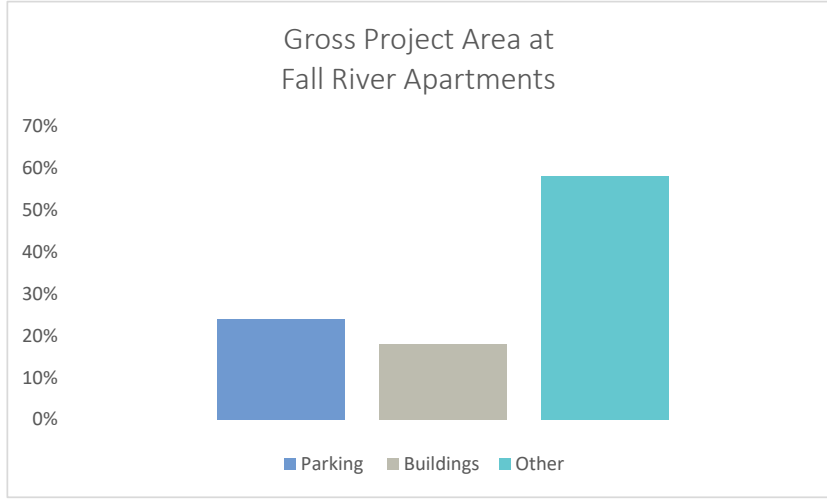
Exhibit 30: Parking Provision Table for Fall River Apartments

Fall River Apartments	
Circulation	Pooled
Price per Space	$0
Required Ratios	Affordable: 1/Unit
Parking Spaces Provided	60
Parking Spaces per Bedroom	0.88
Parking Spaces per Unit	1.0
On-Street Utilization	None
Parking Percent of Gross Project Area	24%

As shown in *Exhibits 32 and 33*, Fall River enjoys the lowest parking requirement and supply of the four developments in the study. The City's minimum parking requirement for affordable housing is 1 space per unit; 60 parking spaces is exactly the amount the developer built and that Fall River provides its residents. Parking is included in the rent and is pooled, though each unit is guaranteed one spot in the lot. There is also no evidence that residents avail themselves of the ample on-street parking around the building either.

Although the parking lot takes up about 6% more space than the building at Fall River, this is in part due to the building's tall stature and small footprint. The sidewalks and landscaped areas of the development account for almost 60% of the gross project area (Workshop8, n. d.). The field counts at Fall River suggest that peak utilization rates are between 80%-

Exhibit 31: Gross Project Area Used for Parking at Fall River Apartments



Fall River Apartments

85% of capacity or 48 to 51 occupied spaces. Figure 16 shows the utilization estimates for Fall River Apartments. The ITE estimates for mid-rise, market rate, suburban multifamily housing without access to rail transit are far too high, but the senior, income restricted category prediction is far too low (ITE, 2019). The ACS data for the zip code area is the farthest from the observed rates. It showed the highest rate of car ownership and multiple car ownership of the study areas, which may be related to the area's poor walkability rating (US Census, 2019). The ULI numbers for senior housing predicted the observed rate exactly (Smith, 2020). The City's prediction of 1 space per unit was also fairly accurate.

Fall River Apartments

Discussion

Although the development's parking footprint is relatively small (just 60 spaces) and the City's minimum parking requirement for affordable housing turned out to be fairly accurate in this case, the field observations still suggest

Exhibit 32: Field Counts at Fall River Apartments

Fall River Apartments	
Spaces Provided	60
Field Count 1	
Date	1/28/2021
Time	9:00 PM
Spaces Occupied	51
% Occupied	85%
Field Count 2	
Date	3/4/2021
Time	9:00 PM
Spaces Occupied	48
% Occupied	80%
Field Count 3	
Date	3/10/2021
Time	9:45 PM
Spaces Occupied	51
% Occupied	85%

Exhibit 33: Utilization Estimates for Fall River Apartments

Fall River Apartments	
ITE per Unit	1.47
ITE per Bedroom	0.87
ITE Income Limits per Unit	n/a
ITE Income Limits per Bedroom	n/a
ITE per Senior Income Limits per Unit	0.44
ACS Projected ratio per unit	1.96
ACS Projected ratio per bedroom	1.74
ULI per Unit	0.85
ULI per Bedroom	0.75
Highest Observed Usage per Unit	0.85
Highest Observed Usage per Bedroom	0.75
Highest Observed % Usage	85%

Fall River Apartments

that 15% of the parking for Fall River Apartments goes unused. Furthermore, other than the reduced minimum parking requirement, no parking mitigation techniques are currently employed at Fall River. If anything, Fall River shows how little parking is needed for certain populations, all things being equal. Were the City to provide more mobility options or other parking management tactics to this development, they might be able to further reduce the already low minimum currently in place.

Exhibit 35: Parking Utilization at Fall River Apartments

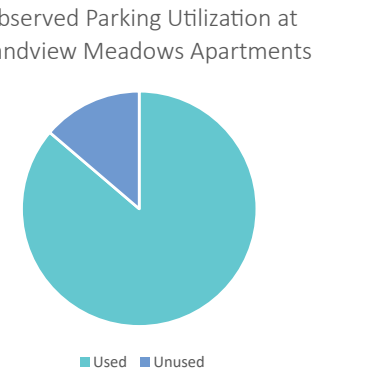
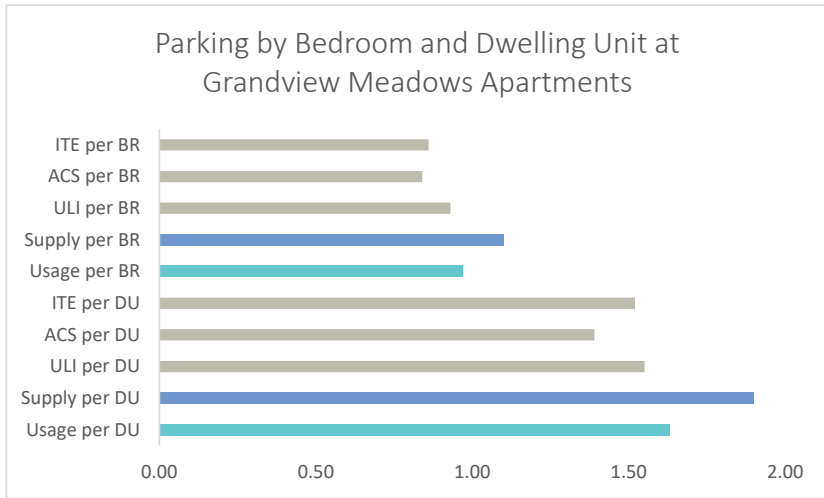


Exhibit 34: Parking Rate Comparison for Fall River Apartments



Conclusion

In summary, the Parking Sites Survey has found that multifamily family residential dwellings in Longmont are in different respects "over parked," each providing more parking than is optimal. Crisman Apartments has vast amounts of unused parking, while at Grandview Meadows Apartments overuse of parking is likely being induced by abundant supply. Roosevelt Park Apartments and Fall River Apartments, on the other hand, have comparatively lower rates of supply and usage but seem to underachieve at mitigating rates of demand.

The next section of the Longmont Multifamily Dwelling Parking Study is the Peer Cities Analysis and will consider methods other cities have undertaken to reduce parking requirements at multifamily housing development.

Chapter 5 | Peer-Cities Analysis

Image Source: Kai

Introduction

As part of the Longmont Multifamily Dwelling Parking Study, the City of Longmont requested an exploration of exemplary parking codes measures that other municipalities have implemented to reduce minimum parking requirements at multifamily housing. The study has discovered that the parking codes of many cities in Colorado and North America include provisions to mitigate parking rates and optimize supply requirements at multifamily residential dwellings. Although the cities chosen by the study may be demographically and geographically dissimilar to Longmont, the aspects of their codes detailed in the analysis were specifically selected for apparent applicability to its circumstances. In other words, the study sought out provisions that seemed instructive and disregarded measures that seem inappropriate for Longmont, such as those intended for larger cities like San Francisco's SF Park on-street performance pricing program (see Shoup, 2017).

Some of the parking optimization tactics contained in the model codes are already included in Longmont's parking requirements.

In particular, Longmont's code already: (1) includes a reduction of minimum requirements for affordable housing to 1 space per unit, (2) allows for shared parking arrangements, and (3) permits on-street parking to count toward satisfaction of minimum requirements (Code, 2021).

Because the specific applications may differ in notable ways, the study found reason to retain examples of similar measures taken by other cities. Other methods the study took note of for minimizing requirements are either absent or explicitly precluded by Longmont's current code. Presently, for instance, Longmont's code prohibits unbundled and remote parking and does not impose maximum parking limits for multifamily housing developments (Code, 2021).

Apart from specific regulations and requirements, an additional aspect of City ordinances that might be of interest to this study is the purpose for parking codes. Currently, Longmont's stated purpose for its parking regulations includes language that might be interpreted as supporting minimizing parking supply including, providing "safe and convenient interaction between vehicles and pedestrians," "methods to help reduce stormwater runoff and the heat island effect of large paved parking areas," and "flexible methods of responding to the transportation, access, and parking demands of various land uses in different areas of the city through changes in markets, technology, and demographics" (Code, 2021). By contrast, some cities are more explicit about their intentions to optimize parking provision.

For example, Lakewood, Colorado's ordinance states: "The purpose of the parking and loading standards in this Article is to: A. Provide for pedestrian connections and safety. B. Prevent the establishment of excessive amounts of off-street parking. C. Reduce the need for parking by promoting the use of transit, bicycles, and other alternative forms of transportation" (Lakewood, 2016).

Longmont may want to consider adopting similar language to their purpose statement, in addition to updating its rules and regulations.

Findings

Exhibit 36: Table of Selected Parking Demand Mitigation Measures Adopted by North American Cities

	Colorado					Other North American Cities										
Parking Optimization Measure	**Lakewood**	**Boulder**	**Leadville**	**Lafayette**	**Longmont**	**SD**	**Buffalo**	**Seattle**	**SF**	**NYC**	**Madison**	**Santa Monica**	**Palo Alto**	**Toronto**	**Portland**	**Pasadena**	**South Bend**
Long-Term Bicycle Parking	O	O					O	O			O				O		O
Carshare Provision								O	O	O	O						
In Lieu of Fee				O				O						O		O	
Land Banking		O				O					O		O				
Reduced Minimums	O		O				O	O			O				O		O
Imposed Maximums	O	O						O		O	O				O		
Parking Management Plan							O		O						O		
Residential Parking Permits														O	O		
Shared Parking	O				O	O		O			O				O		
Demographic Specific Standards		O			O	O		O		O					O		
Enhanced Mobility Standards	O	O				O		O			O				O		
Transferable Parking Rights															O		
Unbundled Parking		O							O			O			O		
Remote Parking	O																
On-Street Toward Minimums	O	O			O												

The following list defines the applicable parking mitigation measures discovered by the study and indicates the location and application of these measures in the cities in which they are employed:

1. *Long-Term Bicycle Parking* // These cities support bicycle use by requiring secure, indoor or covered bicycle parking at multifamily residential dwellings.

- ◊ Lakewood requires 1 bicycle parking space per 2 units in developments with more than 10 residential units (2016).
- ◊ Boulder requires 2 bicycle spaces per unit for all residential dwellings without a private garage, 75% of which must be long-term (2021).

Findings

- Buffalo requires 1 bicycle space per 5 dwelling units; 90% must be long-term.
- South Bend requires 1 bicycle space per 10 residential dwelling units.
- Madison requires 1 per unit up to 2-bedrooms, 0.5 spaces per additional bedroom, as well as 1 additional space per 10 units, 90% of which must be long-term. Four bicycle spaces may also be substituted for 1 required automobile space (2021).
- Seattle requires 1 bicycle space per multifamily dwelling unit.
- Portland requires that residential housing with 5 or more units on a site provide 2 automobile parking spaces per unit, except for elderly and disabled housing which requires only 2 spaces per 8-10 units depending on its location. Five spaces of non-required bicycle parking may substitute for 1 motor vehicle space up to 25% of required parking. Existing parking may also be converted to take advantage of this provision and existing required parking spaces may be converted to bicycle parking to accommodate required bicycle parking minimums. The amount of parking spaces required is reduced by the amount needed to accommodate the minimum bicycle parking required (2020).

2. *Carshare Provision* // These cities either require or incentivize provision of carshare programs that provide short-term car rentals operated by a private company or not-for-profit organization.

- New York allows carshare to locate in off-street, public parking garages or in parking facilities accessory to residential, commercial, or other uses (NYC, 2011).
- San Francisco requires developers to provide carshare parking spaces based on the total number of residential units in new and converted buildings in several districts (NYC, 2011).
- Madison allows for a reduction in requirements if carshare is available for use by residents on or within reasonable proximity of the site (2021).
- Seattle grants a reduction of the minimum parking requirement by the lesser of three required parking spaces for each carsharing space or 15 percent of the total number of required spaces for developments requiring 20 spaces or more (2021)

3. *In Lieu of Fee* // These cities offer developers the choice to opt out of constructing required parking by paying a cost-effective fee to the government, which can be used to support city programs and policies to reduce the need for private motor vehicle ownership.

Findings

- Lafayette accepts in lieu of fees for off-street parking in the downtown area in order to accommodate future parking demand (2021).
- Pasadena allows developers in Old Pasadena to pay a fee to the City instead of providing required parking (NYC, 2011).
- Toronto permits developers to pay a fee of half the cost of land and construction to build the parking spaces instead of providing the required parking (NYC, 2011).
- Seattle allows developers to pay a fee in lieu of providing parking which the City may use for structured parking or to help vehicle trips in the area (NYC, 2011).

4. *Land Banking* // These cities seek to mitigate the risk of decreased parking supply by requiring or incentivizing developers to set aside unpaved open space (often in the form of parks or playgrounds) that could later be turned into parking if necessary.

- Boulder allows deferral of up to 20% of required parking in residential areas with enhanced mobility and mixed-use areas (2021).
- Palo Alto allows developers to landscape up to 50% of the area required to meet parking minimums which then may remain open space if the parking is not needed (NYC, 2011).
- San Diego allows reduction of parking minimums only if the developer sets aside land in case the omitted parking spaces will be needed in the future (NYC, 2011).
- Madison allows deferral of all or a portion of the required parking "until such parking is needed" (2021).

5. *Reduced Minimums* // These cities have reduced minimum parking requirements for all multifamily housing to address the over-supply of parking, which itself might induce demand.

- Lakewood has reduced parking minimums to 0.75 spaces per unit for multifamily residential dwellings (2016).
- Leadville has reduced its multifamily parking requirements to 1 per dwelling unit (2020).
- South Bend has eliminated minimum parking requirements for all uses (2021).

Findings

- Buffalo has eliminated minimum parking requirements for all uses (2016).
- Madison has reduced parking minimum requirements to 1 space per unit for multifamily dwellings (2021).
- Seattle has reduced parking minimums city wide to 1 space per multifamily residential unit and 1 per 2 efficiency units (2021).
- Portland has reduced household living parking requirements citywide to 1 per 2 units, except in areas where they have been eliminated or in what are essentially transit-oriented development zones that require 1.35 spaces per unit (2020).

6. *Imposed Maximums* // These cities cap the number of parking spaces that may be offered on a site.

- Lakewood has established unit based maximums of 3 spaces in residential suburban contexts, 2 spaces in urban contexts, and 1.5 spaces in transit context for multifamily residential dwellings (2016).
- Boulder has instituted parking maximums of 1 space per dwelling unit for some multifamily dwellings in high intensity residential and mixed-use zone areas (2021).
- New York established, in 1984, maximums for the amount of parking that could be provided. (NYC, 2012).
- Madison limits parking provision to 2.5 spaces per unit for multifamily dwellings (2021).
- Seattle limits parking provision for major institutions to 135% of the minimum parking requirement (2021).
- Portland restricts the number of parking spaces provided for facilities that are more than 25% surface lots to that required by the minimum, except in areas not well served by transit where it allows up to 125% of the minimum (2020).

7. *Parking Management Plan* // These cities require developers to submit a detailed plan for mitigating parking demand for a project.

- Portland requires developers to submit reports detailing specific parking plans (NYC, 2011).
- San Francisco requires new developments in the downtown core to have an approved parking plan (NYC, 2011).
- Buffalo requires that all new buildings over 5,000 square feet and large renovations involving a change of use to submit

Findings

Transportation Demand Management plans which must include strategies to "reduce single-occupancy vehicle trips, reduce vehicle miles travelled by site users, and promote transportation alternatives such as walking, cycling, ridesharing, and transit" (2016).

8. *Residential Parking Permits* // These cities seek to address the evasion of off-street parking fees by requiring a permit to park on the street in designated areas.

- ◊ Portland requires parking permits to be purchased by business owners and residents of non-metered areas (NYC, 2011).
- ◊ Toronto employs fee-based permit parking in some parts of the city where off-street parking is not readily available (NYC, 2011).

9. *Shared Parking* // These cities allow, encourage, or require the sharing of parking facilities by more than one site or use.

- ◊ Lakewood provides opportunities for shared parking at multifamily residential dwellings by reducing requirements during specific daily time periods when demand is known to be lower (e.g., residential parking requirement is reduced by 40% from 6AM to 6PM) on weekdays (2016).
- ◊ Portland allows shared provision of required parking between uses so long as the parking demand of each use occurs at different peak times (2020).
- ◊ San Diego allows shared parking if uses are located within 600 feet of each other (NYC, 2011).
- ◊ Seattle allows shared parking between residential and other specified uses to satisfy parking requirements by up to 30-50% provided that the reduction does not exceed the minimum required parking for the non-residential use (2021).
- ◊ Madison allows for a reduction in parking minimum requirements when the hours of peak use among multiple uses are complementary (2021).

10. *Demographic Specific Standards* // These cities have reduced parking requirements for housing serving populations that consistently demonstrate lower rates of automobile ownership, such as low-income housing or seniors.

- ◊ Boulder allows up to 70% reduction of parking requirements for government sponsored housing for the elderly.

Findings

- New York has reduced parking requirements for publicly assisted housing and non-profit housing for the elderly (NYC, 2011).
- San Diego has reduced parking requirements for multiple family dwellings in low-income areas according to a set of complex walkability and transit access indexes (2021; NYC, 2011).
- Seattle has eliminated minimum parking requirements for all residential dwelling units restricted to 80% of the area median income or below.
- Portland reduces the minimum parking requirement to zero if the applicant demonstrates compliance with affordable housing requirements (2020).

11. *Enhanced Mobility Standards* // These cities have reduced parking requirements for developments that offer residents reliable access to amenities and transit without relying on an automobile.

- Lakewood limits the number of parking spaces that multifamily residential dwellings can provide in urban areas to 2 per unit and in transit areas to 1.5 per unit (2016).
- Boulder allows reductions of up to 25% of required parking in areas with enhanced mobility and mixed-use areas (2021).
- San Diego reduces residential parking requirements by 0.25 spaces per unit if located within a transit area (NYC, 2011).
- Madison permits parking requirement reduction of up to 50% within 600 feet of a high-frequency transit corridor (2021).
- Seattle has eliminated minimum parking requirements in areas of the city where residents do not rely on automobiles for transportation (2021).
- Portland reduces parking requirements to between 0.33 and 0 spaces per unit for sites located 1500 feet or less from a transit station or 500 feet or less from a street with at least 20-minute peak hour service based on the number of units in the development. Also, sites with up to 20 parking spaces may substitute up to 10 % of required parking for a transit supportive plaza where at least one street lot borders a transit street (2020).

12. *Transferable Parking Rights* // These cities give a developer the option to transfer unused parking allowances to other developments.

◊ Portland allows developers to transfer unused required parking spaces between developments (NYC, 2011).

13. *Unbundled Parking* // These cities permit or require housing providers to exclude the cost of parking from the cost of housing, thereby allowing residents to pay only for the vehicle storage they use.

◊ Boulder requires unbundled parking in certain high intensity residential and mixed-use zone areas (2021).

◊ San Francisco mandates new and conversion developments with 10 or more residential units to separate the cost of parking from that of housing (NYC, 2011).

◊ Santa Monica requires the unbundling of parking at all new multifamily residential dwellings of 4-units or more and conversions to residential dwellings of 10 units or more within a certain zone of the city (2021).

◊ Portland allows for unbundle parking for all uses (2020).

14. *Remote Parking* // These cities seek to enhance the livability of a housing development and reduce the convenience of automobile ownership by allowing or requiring that some portion of the parking supply be located off-site.

◊ Lakewood allows parking requirements to be met off-site at a distance of up to 600 feet from a multifamily development (2016).

15. *On-Street Toward Minimums* // These cities allow adjacent on-street parking to be counted toward satisfaction of minimum parking requirements in order to reduce the footprint of parking facilities.

◊ Lakewood allows on-street parking available along the street adjacent to a multifamily dwelling to count toward the minimum number of parking spaces required (2016).

◊ Boulder permits satisfaction of up to 25% of off-street parking requirements by adjacent on-street facilities (2021).

Chapter 6 | Plan Framework

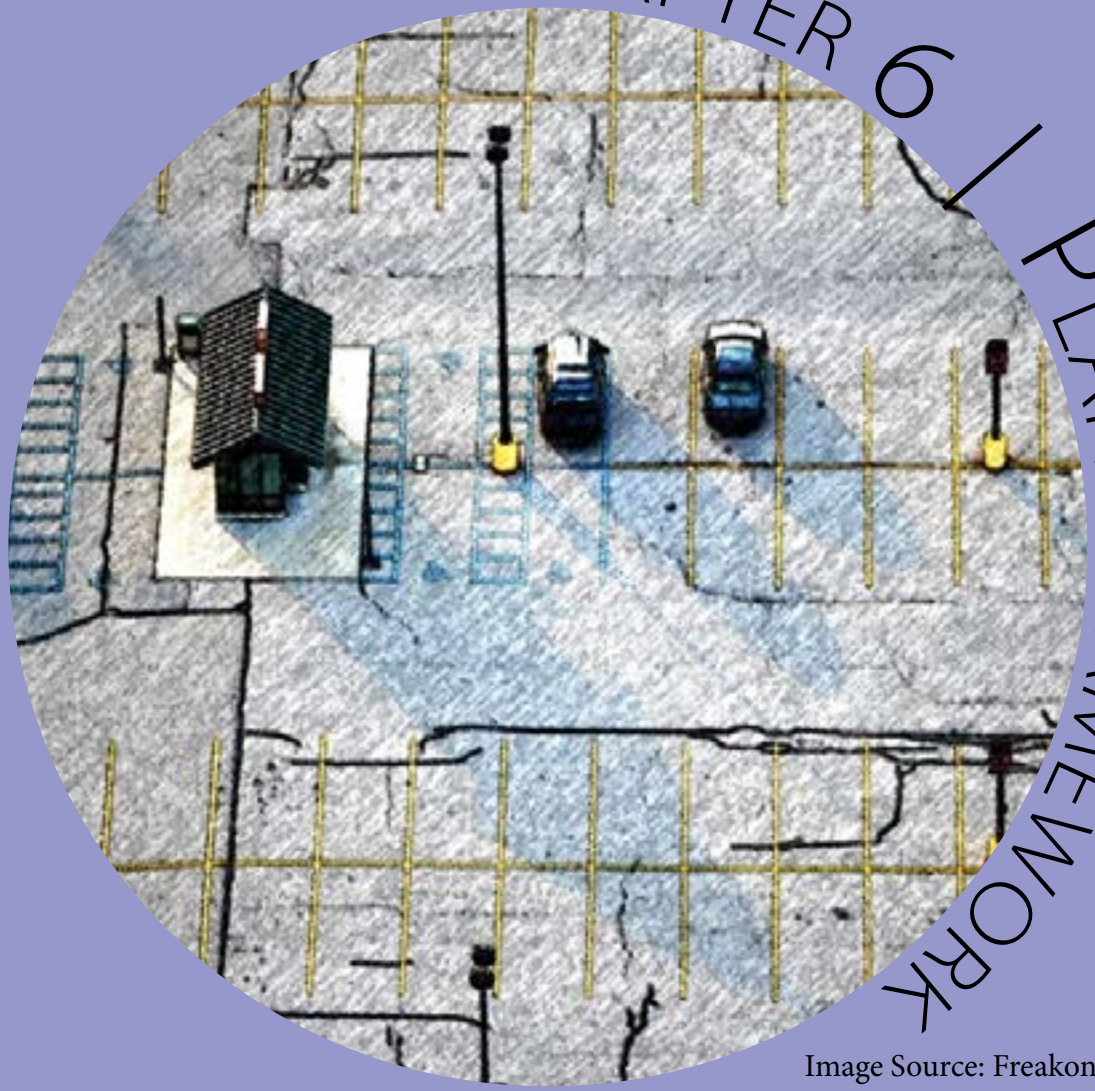


Image Source: Freakonomics

Recommendation 1

Bases for the Recommendations

Based on the findings of this report, the following recommendations are provided in response to the central question regarding whether the City of Longmont can reduce or eliminate its parking requirements for the optimization of parking supply to mitigate the environmental, economic, and social degradation caused by parking facilities and to support a safe, healthy, and resilient community with a robust multi-modal transportation system.

Parking Policy Recommendations

The report conclusions support the following actions concerning parking requirements for multifamily housing in Longmont:

Recommendation 1: Adopt a proactive parking demand paradigm.

Justification 1: The study found that the current parking usage and requirement rates are incompatible with the City's vision and goals.

As addressed in this report's introduction and background research, abundant parking is incompatible with the housing, land use, sustainability, and transportation objectives described in the Envision Longmont Multimodal and Comprehensive Plan. To achieve its ambitions, the City must be proactive about reducing current parking requirements as well as existing levels of parking demand.

Justification 2: The study found that some cities explicitly include parking supply reduction among the purposes for their parking policy.

The Peer Cities Analysis in this report found that the City of Lakewood, Colorado clearly proclaims that the purpose for its parking policy is to prevent excessive amounts of parking and reduce the need for parking. Effective policy follows from clear intentions and Longmont would benefit from updating its parking ordinance to include a similar statement of purpose.

Justification 3: The study found the conventional predict and provide method for determining parking requirements should be supplanted by a new model based on achieving greater community goals.

The background research and site surveys conducted by the study demonstrate that the conventional predict and provide model of formulating parking requirements put the parking-cart before the planning-horse. The optimal parking provision should be understood as the one that best serves the greater vision for the community, instead of engaging in a futile effort to predict adequate provisions for free parking and subordinating the rest of the community's needs and ambitions to its parking "demand. The parking supply should be restricted to the amount that can be endured given the great priorities and plans of the community.

Justification 4: The study found evidence of a significant amount of land and money wasted on unnecessary parking in Longmont.

As shown in *Exhibits 37* and *38* the opportunity cost of the

Recommendation 1

Exhibit 37: Land Area Used for Parking at Study Sites

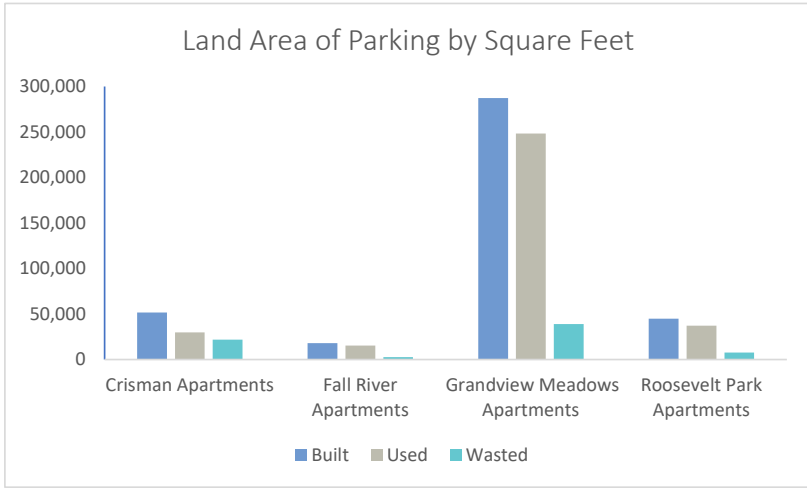
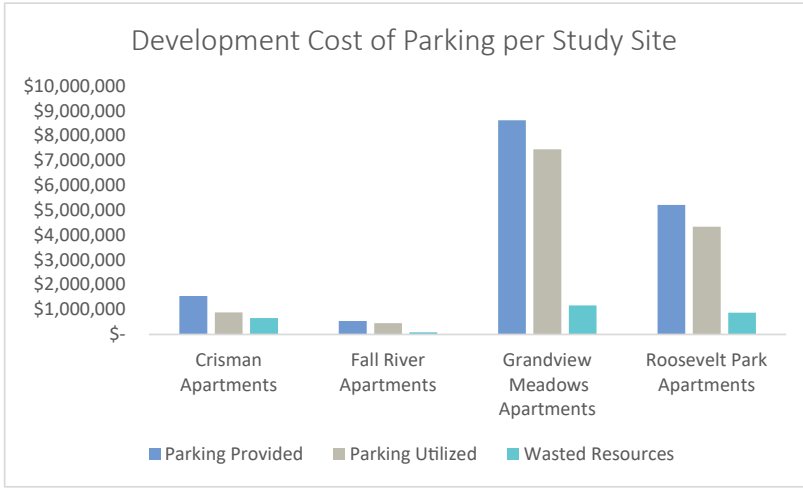


Exhibit 38: Development Cost of Parking at Study Sites



land and money wasted on unused parking is substantial. Combined, the four study sites under consideration wasted more than 70,000 square feet of land and $3 million on empty parking spaces, resources which could have been used to provide more parks and greenspace, better amenities, or more dwelling units to residents of Longmont. Moreover, reduced parking supply is essential to creating the vibrant, verdant, healthful, multimodal urban form contemplated in Envision Longmont.

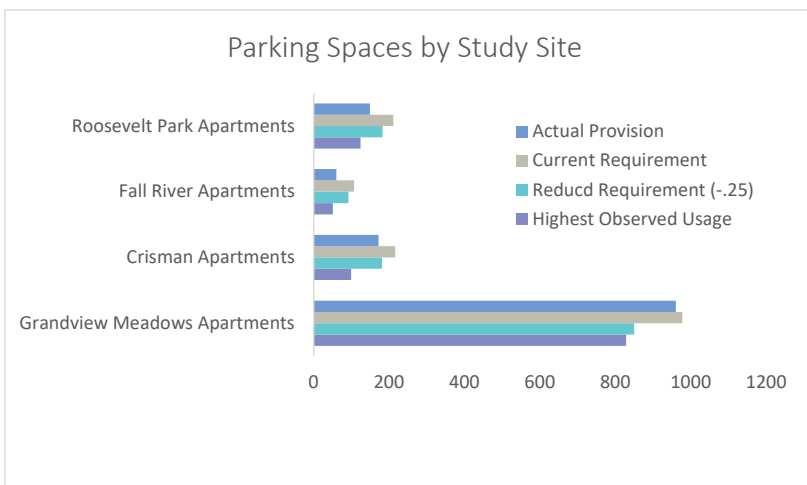
Recommendation 2

Recommendation 2: Minimize parking requirements.

Justification 1: The study found no evidence that the current minimum requirements are warranted.

Exhibit 39 demonstrates that none of the sites included in the study has utilization rates high enough to merit the current parking requirement in Longmont. Even as the site with the highest rate of usage (1.1 space per bedroom), Grandview Meadows would not come close to fully occupying the spaces of a parking facility that complied with the current requirement. In fact, if this minimum requirement was lowered by 0.25 spaces per unit without taking any further steps toward parking mitigation, neither Grandview Meadows nor any other study site would reach parking capacity.

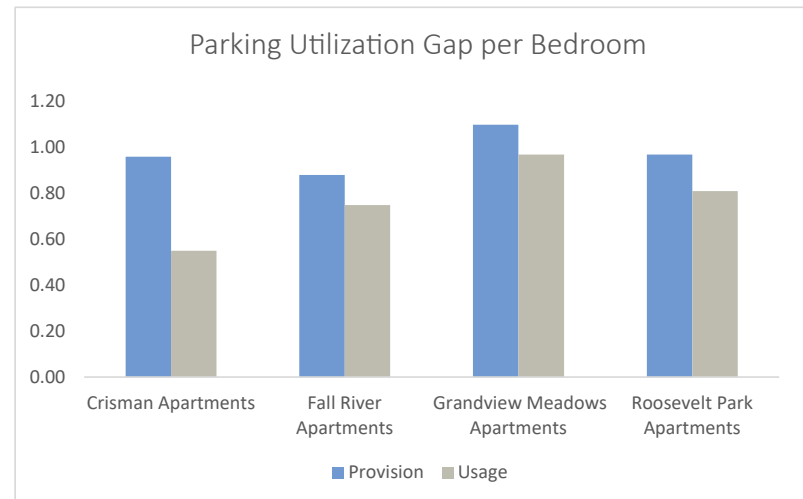
Exhibit 39: Parking Requirements vs Utilization at Study Sites



Justification 2: The study found evidence of unused parking at every site it evaluated.

As shown in *Exhibit 40* the rate of parking occupancy is lower that the rate of usage at each site. Empty parking spaces at the peak period of usage are wasted space and money that could be put to better use.

Exhibit 40: Gap between Provision and Usage at Study Sites

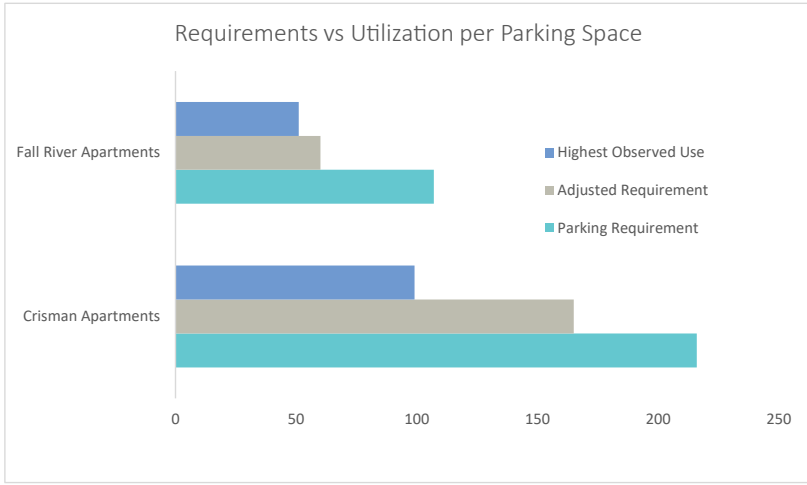


Justification 3: The study found parking usage rates at income-restricted housing to be lower than parking requirements.

Exhibit 41 shows that current parking requirement reductions at affordable developments in the study may be effective but are insufficient to eliminate parking

Recommendation 2

Exhibit 41: Reduced Parking Requirements vs Usage at Affordable Housing Sites



oversupply.

Justification 4: The study found that sites located close to transit and essential amenities used less parking.

Due to their superior access to transit and other amenities Crisman Apartments and Roosevelt Apartments use less parking than they would be forced to provide under the current minimum requirements (despite the fact that Crisman was afforded a requirement reduction due to its affordable units). This finding suggests that parking minimums should be reduced in areas that provide greater access and mobility.

Justification 5: The study found that lowering minimum parking requirements does not restrict the provision of parking.

The developers at two of the four subject sites, Crisman and Grandview Meadows, provided more parking than required by the City at the time of their construction (note: this is at the reduced rates cited in these developments respective site plans). If anything, this shows that reducing minimum parking requirements would be a necessary but insufficient measure to optimizing parking supply.

Justification 6: The study showed declining future parking rates.

According to several sources cited in the study, future expectations for parking usage are trending downward across the United States due to various demographic and technological changes (Litman, 2006; Willson, 2013; Smith, 2020). If Longmont currently requires too much parking, it is anticipated to need even less in the future.

Recommendation 3

Recommendation 3: Bolster minimized parking requirements with comprehensive parking demand mitigation measures, including incentives, safety nets, alternatives, and redlines.

Justification 1: The study found that cities can offer incentives to reduce parking provision.

The Peer Cities Analysis revealed several different ways that cities can incentivize the provision of less parking. By reducing requirements for affordable housing and housing near transit, the City encourages both less parking and more strategic development.

Some cities also offer reduced parking requirements in exchange for provision of long-term bicycle parking or on-site carshare facilities. Provision of transit passes might be another bargaining chip.

Some cities even allow developers to pay fees instead of building parking, the proceeds of which can be used to improve mobility options for residents.

Incentives might also be directed toward residents in the form of unbundled parking and land banking. One of the best ways to achieve reduced parking rates is to charge a market rate for parking. Cities may require or at least allow unbundled parking to reduce parking requirements. Unbundling parking is also more equitable since it keeps those without cars from paying for the storage of people with cars. Land banking can also work as an incentive for residents because it forces them to choose between their parking space and more parking, which may make them think twice about owning a second automobile.

Finally, cities might offer developers the option of transferring requirements among developments to reduce parking for certain areas or development types. Transferable parking might also be helpful if the City were to implement parking maximum restrictions.

Justification 2: The study found that cities can provide safety nets for developments that offer parking reductions.

Cities and developers may hedge the bet of providing less parking by setting aside land that could be used for parking if usage rates end up being higher than expected.

Another form of safety net might be to allow inclusion of adjacent on-street parking to be counted toward satisfaction of minimum parking requirements.

Finally, allowing developers to offer remote (i.e., off-site parking) could also be a way to safeguard decreased parking provisions.

Justification 3: The study found that offering alternatives to satisfying parking requirements may be an effective strategy for reducing parking supply.

Many cities in the Peer Cities Analysis have policies that maximize flexibility in fulfilling parking requirements. This may be an effective way to achieve parking reductions without mandating them.

Justification 4: The study found that drawing redline

Recommendation 3

restrictions may be necessary to decrease parking supply.

Several cities in the Peer Cities Analysis go beyond lowering parking minimum requirements and also impose parking maximum limits on developers. Such measures may be necessary to effectively reduce parking provisions.

Chapter 7 | Conclusion

Image Source: Pinterest

Findings

The Longmont Multifamily Housing Parking Optimization Study has found evidence to suggest that the City of Longmont both can and should reduce its parking minimum requirements at multifamily housing to optimize its parking supply and achieve its greater planning goals. Furthermore, the study concludes that these objectives can be best accomplished through the implementation of a comprehensive parking minimization policy. Such a program would incorporate a clear statement of the policy's intentions to minimize parking supply in subordination of Longmont's greater planning goals, an across-the-board reduction of minimum requirements at multifamily dwellings, and a host of demand mitigation measures, including incentives, safety nets, alternatives, and redlines.

Shortcomings & Merits

Although this report strives to be comprehensive and complete, the City of Longmont's central question as to whether it can reduce its parking requirements for multifamily housing could be answered more definitively by further research. For example, it is outside the scope of the study to substantiate its assertions of the negative impacts of parking on communities. Additional information about these impacts would make the study more robust. Also, finer grained data with more specificity about amenities and transportation options would improve the analysis of site contexts. Furthermore, the Peer Cities Analysis requires a more thorough investigation to truly understand the efficacy and impacts of the parking policies employed by other cities. Most importantly, a complete study would need to address matters of equity and public engagement in parking policy.

Nevertheless, the study has succeeded in compiling a considerable amount of valuable information and analysis about parking at multifamily residential dwellings in one document and can serve as a resource to City of Longmont staff.

Bibliography

Christiansen, P., Engebretsen, Ø., Fearnley, N., & Usterud Hanssen, J. (2017). "Parking Facilities and the Built Environment: Impacts on Travel Behaviour." Transportation Research Part A: Policy and Practice, 95, 198–206. https://doi.org/10.1016/j.tra.2016.10.025

City of Boulder, Colorado (2021). "Chapter 9-9-6: Parking Standards." Boulder Municipal Code. https://library.municode.com/co/boulder/codes/municipal_code?nodeId=TIT9LAUSCO_CH9DEST_9-9-6PAST

City of Buffalo, New York (2016). Buffalo Green Code: Unified Development Ordinance. https://www.buffalony.gov/DocumentCenter/View/1785/Buffalo-Green-Code---Unified-Development-Ordinance-PDF?bidId=

City of Lafayette, Colorado (2021). "Section 26-20: Off-Street Parking Requirements." Lafayette, Colorado Code of Ordinances. https://library.municode.com/co/lafayette/codes/code_of_ordinances?nodeId=COOR_CH26DEZO_S26-20OREPARE

City of Lakewood, Colorado (2016). "Article 8: Parking and Loading Standards." Lakewood Zoning Ordinance. https://www.lakewood.org/files/assets/public/planning/development-assistance/pdfs/zoning-ordinance/article-8-parking-and-loading-standards.pdf

City of Leadville, Colorado (2020). "Chapter 17.76 – Off-Street Parking and Loading Requirements." Leadville Colorado Code of Ordinances. https://library.municode.com/co/leadville/codes/code_of_ordinances?nodeId=TIT17ZO_CH17.76OREPALORE

City of Longmont (2016). Envision Longmont Multimodal and Comprehensive Plan. https://www.longmontcolorado.gov/home/showpublisheddocument/15099/636080740290800000

City of Longmont, Colorado (2021). "Chapter 15.05.080 Off-Street Parking, Stacking, and Loading." Code of Ordinances. https://library.municode.com/co/longmont/codes/code_of_ordinances?nodeId=PTIICOOR_TIT15LADECO_CH15.05DEST_15.05.080OREPASTLO

City of Madison, Wisconsin (2021). "Chapter 28: Zoning Code Ordinance." Code of Ordinances. https://library.municode.com/wi/madison/codes/code_of_ordinances?nodeId=COORMAWIVOIICH20--31_CH28ZOCOOR_SUBCHAPTER_28IGERE_28.141PALOST

City of Portland, Oregon (2020). "33.266 Parking, Loading, and Transportation and Parking Demand Management." City Code. https://www.portland.gov/sites/default/files/code/33.266-parking-and-loading.pdf

City of San Diego, California (2021). "Article 2: General Development Regulations Division 5: Parking Regulations." San Diego Municipal Code https://docs.sandiego.gov/municode/MuniCodeChapter14/Ch14Art02Division05.pdf

City of Santa Monica, California (2021). "Chapter 9.28: Parking, Loading, and Circulation." Santa Monica Municipal Code. http://www.qcode.us/codes/santamonica/view.php?topic=9-3-9_28-9_28_110

Return to Table of Contents

Bibliography

City of Seattle, Washington (2021). "Chapter 23.54 – Quantity and Design Standards for Access, Off-Street Parking, and Solid Waste Storage." Seattle Washington Municipal Code. https://library.municode.com/wa/seattle/codes/municipal_code?nodeId=TIT23LAUSCO_SUBTITLE_IIILAUSRE_CH23.54QUDESTACOREPASOWAST_23.54.015REPAMAPALI

City of South Bend, Indiana (2021). "Article 21-07: Access & Parking." Zoning Ordinance. http://docs.southbendin.gov/WebLink/0/edoc/328494/21-07%20Access%20and%20Parking.pdf

De Gruyter, C., Truong, L. T., & Taylor, E. J. (2020). "Can High Quality Public Transport Support Reduced Car Parking Requirements for New Residential Apartments?" Journal of Transport Geography, 82, 102627. https://doi.org/10.1016/j.jtrangeo.2019.102627

Department of Community Investment (2021). "Income and Assets Limits." City of Longmont, Colorado.https://www.longmontcolorado.gov/departments/departments-e-m/housing-and-community-investment/housing-programs/income-and-asset-limits

Fox Tuttle and Shopworks Architecture (2021). Parking and Affordable Housing 2020/2021 Report. https://www.apacolorado.org/sites/default/files/sites/all/themes/apa_colorado/images/editor/2021%20Parking%20Study%20SW%20and%20FT%20Final.pdf

Gabbe, C. J., Pierce, G., & Clowers, G. (2020). "Parking policy: The Effects of Residential Minimum Parking Requirements in Seattle." Land Use Policy, 91, 104053. https://doi.org/10.1016/j.landusepol.2019.104053

Google Earth Pro (2021). Longmont, Colorado.

Guo, Z., & Ren, S. (2013). "From Minimum to Maximum: Impact of the London Parking Reform on Residential Parking Supply from 2004 to 2010." Urban Studies, 50(6), 1183–1200. https://doi.org/10.1177/0042098012460735

Hess, D. B. (2017). "Repealing Minimum Parking Requirements in Buffalo: New Directions for Land Use and Development." Journal of Urbanism: International Research on Placemaking and Urban Sustainability, 10(4), 442–467. https://doi.org/10.1080/17549175.2017.1310743

Institute of Transportation Engineers (ITE). (2019). Parking Generation Manual (5th ed.) Washington DC.

Li, F., & Guo, Z. (2014). "Do Parking Standards Matter? Evaluating the London Parking Reform with a Matched-Pair Approach." Transportation Research Part A: Policy and Practice, 67, 352–365. https://doi.org/10.1016/j.tra.2014.08.001

Litman, T. (2006). Parking Management Best Practices. American Planning Association.

Manville, M. (2016). Bundled parking and vehicle ownership: Evidence from the American Housing Survey. Journal of Transport and Land Use, 10(1). https://doi.org/10.5198/jtlu.2016.730

Bibliography

NYC Department of City Planning, Transportation Division (2011). Parking Best Practices: A Review of Zoning Regulations and Policies in Select US and International Cities. https://www1.nyc.gov/assets/planning/download/pdf/plans/transportation/parking_best_practices.pdf

Owen Consulting Group Inc. (2005). "Grandview Meadows – Filing 3 Final Development Plan."

Owen Consulting Group Inc. (2013). "Grandview Meadows Filing 3 – Replat "A" Final Development Plan."

PARIKH Stevens Architects (2016). "Crisman Apartments Final PUD Development Plan"

Rocky Mountain Consultants Inc. (1999). "Final Development Plan for Grandview Meadows, Filing No. One."

Rocky Mountain Consultants Inc. (2001). "Final Development Plan for Grandview Meadows, Filing No. Two."

Roosevelt Park Apartments (2021). Roscoe Properties Inc. https://www.liveatrooseveltpark.com/

Rowe, D., McCourt, R. S., Morse, S., & Haas, P. (2013). "Do Land Use, Transit, and Walk Access Affect Residential Parking Demand?" Institute of Transportation Engineers. ITE Journal, 83(2), 24–28.

Shears-Adkins-Rockmore Architects (2010). "Roosevelt Park Apartment Site Plan (Sixth and Final Submittal"

Shoup, D. (2017). The High Cost of Free Parking. Routledge: London and New York.

Shoup, D. (Ed.). (2018). Parking and the City. Routledge: London and New York.

Smith, Mary S. (2020). Shared Parking (3rd ed.). Washington, DC: Urban Land Institute, ICSC, and National Parking Association.

United States Census Bureau (2019). "Tenure by Vehicles Available." American Community Survey 5-Year Estimates. https://data.census.gov/cedsci/table?q=transportation&g=0500000US08013_1400000US08013013302,08013013306_8600000US80501,80503,80504&tid=ACSDT5Y2019.B25044&hidePreview=trued

Walk Score (2021). "750 Crisman Drive Longmont, Colorado, 80501." https://www.walkscore.com/score/750-crisman-dr-longmont-co-80501

Walk Score (2021). "600 Longs Peak Ave, Longmont, 80501." https://www.walkscore.com/score/600-longs-peak-ave-longmont-co-80501

Walk Score (2021). "620 Grandview Meadows Drive Longmont, Colorado, 80503." https://www.walkscore.com/score/620-grandview-meadows-dr-longmont-co-80503

Walk Score (2021). "321 Homestead Parkway Longmont, Colorado, 80504."

Return to Table of Contents

Bibliography

https://www.walkscore.com/score/321-homestead-pkwy-longmont-co-80504

Willson, R., & Roberts, M. (2011). “Parking Demand and Zoning Requirements for Suburban Multifamily Housing.” Transportation Research Record: Journal of the Transportation Research Board, 2245(1), 49–55. https://doi.org/10.3141/2245-06

Willson, R. W. (2013). Parking Reform Made Easy. Island Press.

Workshop8 Architecture, Planning and Design (n. d.). “Fall River Apartments Preliminary and Final PUD Development Plantable?q=transportation&g=0500000US08013_1400000US08013013302,08013013306_8600000US80501,80503,80504&tid=ACSDT5Y2019.B25044&hidePreview=trued

Appendix

Appendix I: Field Count Data by Study Site

Development	Count #1			Count # 2			Count #3		
	Date & Time	Total Parking Utilization	Total Percent Parked	Date & Time	Total Parking Utilization	Total Percent Parked	Date & Time	Total Parking Utilization	Total Percent Parked
Crisman Apartments 750 Crisman Drive	1/28/21 8:45PM	99	58%	3/4/21 9:00PM	93	54%	3/10/21 9:30PM	86	50%
Fall River Apartments 321 Homestead Parkway	1/28/21 9:00PM	51	85%	3/4/21 9:00PM	48	80%	3/10/21 9:45PM	51	85%
Grandview Meadows Apartments 620 Grandview Meadows Drive	1/27/21 9:00PM	828	86%	3/3/21 9:00PM	783	82%	3/10/21 9:00PM	800	84%
Roosevelt Park Apartments 600 Longs Peak Avenue	2/26/2021	124	83%	n/a			n/a		

Return to Table of Contents

Appendix

Appendix II: Site Survey Data by Study Site

Development	ITE 85% per Unit	ITE 85% per Bedroom	ITE 85% Income Limits per Unit	ITE 85% Income Limits per Bedroom	Senior Income Limits per Unit	ACS Projected Ratio per Unit	ACS Projected Ratio per Bedroom	ULI per Unit	ULI per Bedroom	Highest Observed Usage per Unit	Highest Observed Usage per Bedroom	Highest Observed Utilization	Supply per Unit	Supply per Bedroom	Walk/Transit/Bike Score
Crisman Apartments 750 Crisman Drive	1.47	0.87	1.33	0.82	n/a	1.37	0.87	1.33	0.84	0.87	0.55	58%	1.5	0.96	67/40/58
Fall River Apartments 321 Homestead Parkway	1.47	0.87	n/a	n/a	0.44	1.96	1.74	0.85	0.75	0.85	0.75	85%	1	0.88	11/31/72
Grandview Meadows Apartments 620 Grandview Meadows Drive	1.52	0.86	n/a	n/a	n/a	1.39	0.84	1.55	0.93	1.63	0.97	86%	1.9	1.1	23/25/53
Roosevelt Park Apartments 600 Longs Peak Avenue	1.47	0.87	n/a	n/a	n/a	1.64	1.04	1.15	0.86	1.07	0.81	83%	1.29	0.97	92/42/63