DLCD

Parking Management

Jump Start Guide

Acknowledgements

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Project Management Team
Jay Higgins, Gresham
Eunice Kim, Salem
Christina Robertson-Gardiner, Oregon City
Derek Severson, Ashland
Rachel Zakem, ODOT

Project Manager
Evan Manvel, DLCD

Outreach Participants
Sophie Adams and Jennifer Wehr, Albany
Marlee Boxer, Troutdale
Matt Brinkley and Harry Weiss, Medford
Ryan Kersey, Oregon City
Tobias Marx, Bend
Dustin Nilsen, Hood River
Maya O'Neal, Corvallis
Jeff Petry, Eugene
Molly Rabinovitz, Beaverton
Heather Richards, McMinnville
Derek Severson, Ashland
Josh Smith, Prineville
Nick Snead, Madras

Note: All efforts were made to ensure the data in this guide are correct as of October 2024. However, parking management details change frequently, and users of this guide should reach out to individual cities if interested in accurate current data.

Consultant/Lead Author
Brian Davis, Studio Davis Planning

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1 Introduction

Introduction to the Guide

How a community chooses to manage parking is one of the most important factors influencing its livability, economic success, and overall sense of place. Parking is a very significant land use, often making up about 20% of all land in a city, and even more in downtowns. Adding parking can be very expensive, particularly in the form of parking garages, which cost $30,000 to $100,000 per stall. Smartly managing parking can free up land for housing, boost visitors to businesses, and help people get where they want to go.

With this in mind, the DLCD offers the Parking Management Jump Start Guide. The Guide covers the gamut of parking management strategies communities are using today, from tried-and-true strategies that have long been employed throughout Oregon, to the newest and most innovative strategies.

To compile this guide, the consultant conducted an industry-wide survey of current best practices, interviewed management and planning staff throughout Oregon, and built on years of experience conducting parking studies throughout Oregon. The goal is to provide relevant, actionable information for Oregon's communities, inclusive of all sizes and geographic contexts.

While the Guide was first envisioned for a primary audience of city staff, during our outreach we consistently heard a desire for a resource that could be used in outreach or for educational purposes. We have tried to describe strategies in straightforward and accessible language that can be readily understood by the parking public, yet with sufficient detail to be a valuable resource for city staff. Because few issues in planning stoke passions as much as parking, we emphasize that outreach, education, and buy-in are crucial to the success of a parking plan, and have worked to deliver a Guide that will support those processes.

Guide Organization and The Parking Management Journey

There is a need to manage parking in many communities, and often—though certainly not always—the management strategies employed follow a general pattern related to the age, size, and built environment of these communities We call this "the parking management journey," and reference the progression in various ways throughout the Guide.

The Guide is organized roughly to mimic the steps a community takes along that journey, starting with simple, low-cost interventions like signage and wayfinding designed to guide people to underused parking areas; continuing with a discussion of more powerful tools like time limits, permit programs, and metering; and concluding with an exploration of Parking Benefit Districts, a management strategy that is increasingly being deployed in the busiest

neighborhoods of the state and nation. Finally, we offer chapters on parking enforcement and technology in parking management, and the myriad ways they can be employed to support the management measures previously discussed.

What this Guide Doesn't Cover

In many communities, a wide array of non-automotive travel choices are available. Strategies to shift automotive trips to other modes—commonly called transportation demand management (TDM)—are typically key pieces of the parking management plans in these areas.

This Guide does not cover TDM, and none of the strategies offered herein rely upon the presence of transit, bicycling facilities, etc. to be effective. While modal shift is sometimes an ancillary benefit of parking management where alternatives to driving exist, the strategies herein are focused on management of the parking system itself. For resources and guidance related to TDM, see the Victoria Transport Policy Institutes Online TDM Encyclopedia at https://vtpi.org/tdm/, or the US Department of Transportation's TDM website at https://ops.fhwa.dot.gov/plan4ops/trans_demand.htm

Indeed, during the outreach process, several partners argued a lack of non-driving options was a key limiting factor. Where non-driving options don't exist, functionally the goal of parking management is to increase, not decrease, the overall number of vehicles parking in a district. This is done through a combination of activating underused parking spaces and increasing the turnover within busier spaces, allowing a district to grow and thrive economically without endlessly adding new, unnecessary supply of parking.

We hope this Guide helps Oregon's communities remain among the most beautiful, livable, and successful places in the nation by providing a comprehensive and context-sensitive set of strategies to address one of planning's most complex and nuanced problems: managing parking.

The Parking Management Journey

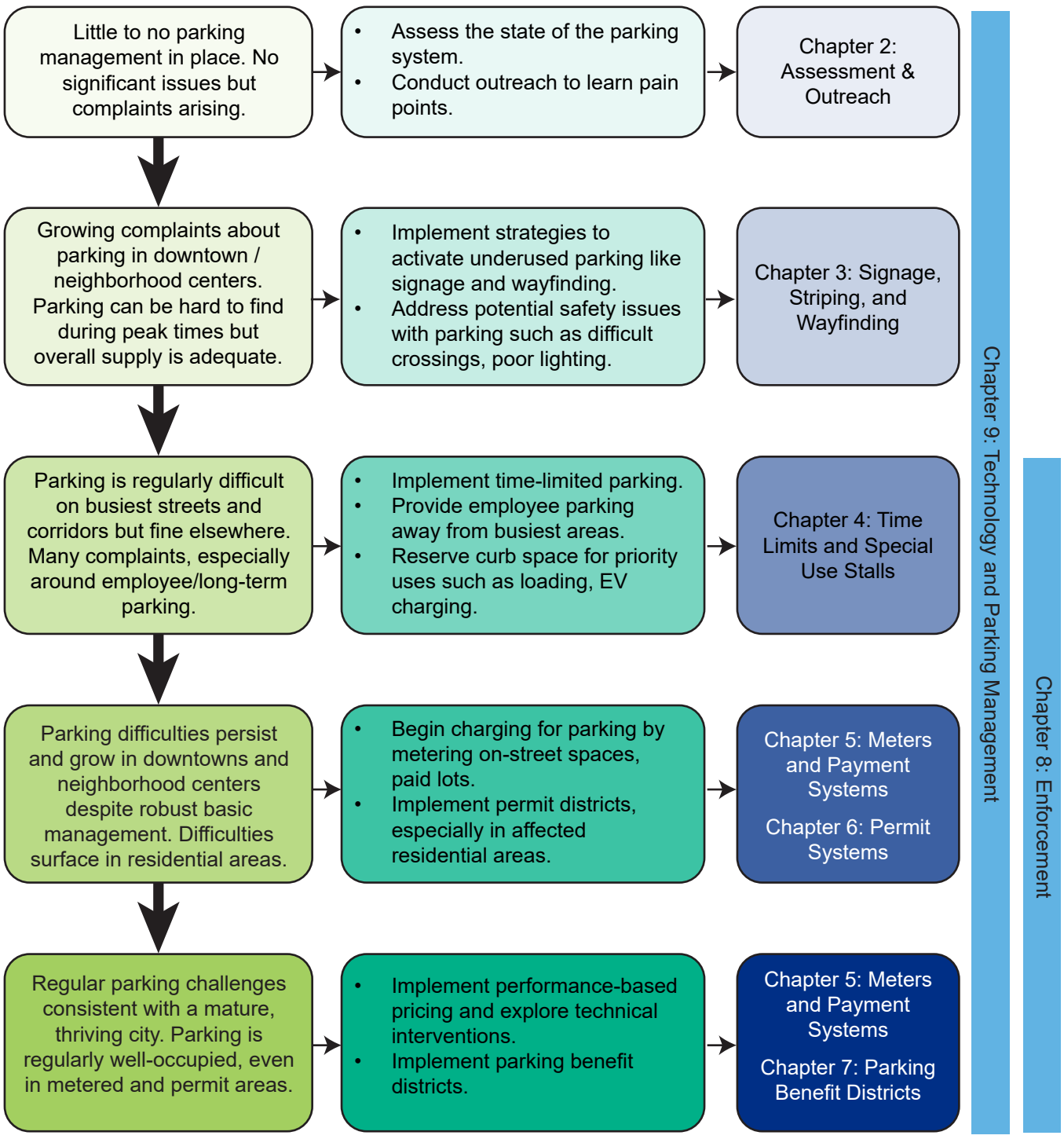


Table 2: Costs to implement various strategies covered in the Parking Management Jump Start Guide

Strategy	Costs	Notes
Outreach and Assessment		
Parking space inventory	Experienced surveyors can typically inventory 10-20+ blockfaces/hour depending on block size. If contracting out, assume $5-10 per blockface or facility, with additional costs for maps etc.	
Occupancy data collection	For occupancy data only, experienced surveyors can count 40-50+ blockfaces (or small lots) per hour. For turnover data, they can count 20 to 25. If contracting out: Occupancy data only: $1 to $2 per hour per blockface or lot Occupancy and turnover data: $4 to $5 per hour per blockface or 10-vehicle lot	
Outreach	For city staff to conduct outreach, costs are limited to staff time, obtaining a location, and materials. If contracting out, $500-$3000+/ event depending upon materials	
Signage, Striping, and Wayfinding		
Striping	New striping: $20 to $40/stall Restriping: $20 to $30/stall	If using contractors, there is typically a minimum project cost of $500 to $1,000. Paint tends to be on lower end of that range and thermoplastic at the higher. However, thermoplastic tends to last longer before needing reapplication (3 to 5 years vs. 2 to 3 years for paint).

Logo/branding for parking program	$5,000 - $10,000 to develop a logo, branding standards, and sign designs, depending on complexity	
Parking lot signage	Basic identifying signage: $300-$750 per sign including post and installation (depending upon size; larger signs are recommended) Custom signage: $5,000 to $15,000 or more	2021 RFP for artwork for Grants Pass' Duck Lot stated a budget of $15,000.
Wayfinding signage	$500 to $5,000+ per sign, depending on size and materials. Additional costs for sign design and program design.	Albany budgeted $150,000 for a complete wayfinding program for the Central Albany Revitalization Area based on a 2017 RFP. Hillsboro's notable 2017 Wayfinding Project was funded with $500,000 from Gain Share along with a $75,000 grant from Washington County Visitors Association. A 2022 plan for wayfinding in Medford projected a $250,000 cost to implement a complete wayfinding program.
Standard regulatory signage (e.g. time limits, special use stalls).	$50-$300 for sign only $250-$500 per sign including post and installation $1,000/blockface is a common rule of thumb.	Cities without in-house sign shops typically procure sign fabrication and installation via an RFP process.

Metering		
Metering program	Upfront implementation cost: $500-$1000/stall. Includes elements such as paystations, applications, and enforcement equipment. Annual costs of equipment: $150-$200/stall Annual gross meter revenues: $2,000-$2,500 per stall per $1 charged for one hour.	Costs cited do not include staff time/administrative costs or costs of enforcement. Numbers cited are based in part on Newport, Oregon's 2024 to implementation of a metering program for 339 stalls in the Bayfront District. There are a number of elements of a metering program (e.g., enforcement, equipment) that cities can either bid out or handle in-house. How a city structures its metering program impacts cost and revenue. See the Parking Data Tool available on the TGM parking website for additional guidance.
Permits		
Permits	Most of the costs of a permit program are limited to staff time for administration and maintenance of the program. However, a city setting up its first permit program will sometimes need to invest in a back end system to track permits and integrate this into enforcement. Once established, permit programs can be revenue-neutral or positive. For example, in June, 2024 Portland's Eliot neighborhood established a permit district that is designed to be revenue-neutral, with an $80 permit cost. 30% of revenues will go to administration and 70% will go to enforcement.	Permit programs are sometimes bid out as part of a larger package when being established, due to the need for a backend/tracking system (See Case Studies in Chapters 8 & 9).

Benefit Districts		
Benefit Districts	The cost of implementing a benefit district is akin to individual costs of implementing updating permit programs and or meter systems, plus the cost of staff time (which is often significant with benefit districts). However, benefit districts are by definition revenue-positive (and are therefore infeasible in situations where there isn't enough demand to generate revenue).	
Enforcement		
Enforcement personnel	Costs of $30 to $60+ per hour, inclusive of benefits, and equipment costs	Portland paid $26-$36/hour to recent new hires, plus benefits.
License Plate Recognition	Basic LPR cameras cost $1,000 to $3,000 or more. Advanced LPR systems cost about $50,000 to $65,000 to integrate onto existing vehicles.	
Contracted enforcement	Private companies tend to charge a set fee per month (about $10,000 for a recent contract in Ashland), as well as reimbursed labor costs (often tied to the local living wage; the cost in Ashland is $24.19) and other expenses.	

2 Outreach and Assessment

Introduction

This chapter presents an overview of best practices concerning two areas of parking management: (1) data collection, analysis, and overall assessment of how a parking system is functioning; and (2) conducting outreach, to learn about how people perceive parking issues and to win support for management initiatives.

Typically, the first steps in creating or updating a parking management plan involve an assessment of the system. From an analytical perspective, this includes two tasks:

- First, identifying a study area and conducting an inventory of the parking system, counting stalls available on-street and in lots, and classifying how they are managed.

- Second, collecting data on how many vehicles are parked at certain times of day (occupancy), and in some cases, how long vehicles are staying in stalls (turnover).

There's a second, just as important, way of assessing the system: *Ask the people who rely on the system.*

A parking plan doesn't only need to address observed issues, but also the issues as people perceive them. While the perceptions can deviate from observations, they provide critical context which complement the analytical pieces to provide a multi-faceted understanding of a parking system: how it's functioning and how people experience it, most notably where people are most frustrated by it.

It is critical to align these processes as planning efforts move forward. That is to say, initial outreach efforts should begin in tandem with initial analytical efforts, and the two processes should complement each other throughout the study. This will help ensure the study area is appropriate, provide context and insight regarding observed issues (and non-issues), and perhaps most importantly, help win support and buy-in at multiple levels to implement improvements.

In practice, this typically takes the form of "leading with engagement." The outreach and analysis procedures described herein are offered with that philosophy in mind.

Outreach

Over the last several years, the planning profession has gradually evolved from the top-down model of the past to a more engagement-first model. As few issues in transportation stir interest and passion among the general public as parking, the public should be engaged early and often.

As described above, ideally the analytical and engagement processes are aligned to complement and inform one another. Sometimes, parking-related engagement can be part of greater engagement or planning effort. However, even in these cases it is probably beneficial to conduct some engagement specific to parking. Oregon also has specific engagement requirements for some land use and transportation decisions in metro areas, including centering the voices of underserved populations. More information can be found on the Climate-Friendly and Equitable Communities web page.

While it is crucial to involve key interested parties (e.g., business owners, community leaders, elected officials, advisory board members) in outreach efforts from the get-go, it is also beneficial to engage the "parking public" during the outreach process. One example of a slender, well-aligned process used in Newberg and Yachats is as follows:

- First, conduct initial outreach to interested parties at the beginning of the study, in tandem with selection of the study area and the inventory of on and off-street parking. The goal is to solicit an initial set of observations to help inform data collection needs.

- Then, conduct a follow-up engagement after parking data are collected and analyzed, but critically, before any interventions are identified or recommended. The goal of this step is to explain the findings of the study and allow interested parties and/or the public to shape the strategies ultimately employed.

- Third, present the full results and recommendations of the study to interested parties and/or the public in draft form. This presents an opportunity to illustrate how the engagement process shaped the overall recommendations at a time when there is still opportunity to meaningfully impact the plan, winning a final level of trust and buy-in.

- Finally, adopt a final product with adjustments based on community input.

Of course, as parking challenges and management initiatives grow, it may be necessary to have additional points of advisory group and/or public contact. Particularly in situations where paid parking is involved, it is often necessary to conduct more robust outreach. In many cases, a city forms a permanent advisory committee to administer the pricing of resources and the distribution of the associated revenue. These often evolve from advisory committees formed at the outset of parking studies and represent an effective way to maintain support and ensure well-administered metering programs and/or permit districts.

Identifying and Phrasing Key Questions

To maximize the productivity of engagement, carefully frame the conversation. Identify a list of the key questions and topics of input for interested parties and the public. Ideally these will be high-minded questions that center the sense of place rather than the parking system, while still teasing out specific and important details regarding how people experience the parking system.

Most often, open-ended questions will solicit more thoughtful responses than simple yes/no questions and invite people to contribute productively to the conversation rather than to merely complain. Some examples of questions to ask, along with how and how not to phrase them, are shown in Table 1.

Table 1: Some examples of phrasing outreach questions to be open-ended and high minded, thinking about the role of parking within the city rather than as an end itself

Don't ask…	Instead ask…
Is parking hard to find, in your experience?	Where or when is parking hard to find, in your experience?
What do you think about parking generally, and what should we do about it?	What is your view of the role the parking system plays in supporting the downtown/ neighborhood?
Does it make sense to charge for parking here?	How much would you be willing to pay to find a parking space right in front of your destination?
Are you supportive of one measure versus another?	What are your suggestions for addressing parking challenges?

Later in the engagement process, it is common (perhaps unsurprisingly) to encounter situations where parking problems observed in the field are not as acute as described. In these cases, it is typically unfruitful to try to convince people their observations are overstated. The perceptions can provide context for the observations, and by asking open-ended questions about the timing and nature of issues, one can gain valuable insights about how a system is functioning.

Collecting Data

Oregon's Transportation and Growth Management program, a joint effort of DLCD and ODOT, has previously published two documents that describe the evolving best practices in data collection and analysis: *Parking Management Made Easy: A Guide to Taming the Downtown Parking Beast* (2001), and *Parking Made Easy: A Guide to Managing Parking in Your Community* (2013). The methodologies described therein remain common practice and are typically used in some form for parking studies throughout the state and are updated here to reflect the current state of the practice.

Case Study:

Identifying Problem Areas through Outreach and Analysis, Yachats

Like many coastal cities, Yachats, “the gem of the Oregon Coast,” can get overwhelmed by parking demand during the summer and on nice weekends. In 2022-23, using a Transportation and Growth Management grant, a project management team of city staff, state staff, and a planning consultant worked to study the challenges and provide recommendations.

First, the team identified a list of key questions, intending to center the sense of place and the economic success of Yachats. The team identified and interviewed key interested parties on a one-to-one basis at the outset of the project. The interviews informed the data collection process in a number of ways, including the selection of representative times and dates for data collection, and identification of the most problematic locations (in this case, the parking lots of the post office and the major grocery market downtown).

Following data collection, the team held a public workshop to present initial results; interested parties from the initial effort were specifically invited. Interestingly, data showed that, while there was often significant parking congestion on-street along and beside Highway 101, the observations did not show significant congestion within the supposedly problematic lots. But, through analysis and follow-up engagement, it became clear people were correct in identifying these resources as handling much of the spillover parking from overburdened street spaces, even if these resources did not typically cross the “functionally full” threshold. These observations also helped reveal how the city’s guests were circulating through Yachats searching for parking, leading to recommendations regarding signage and wayfinding intended to shift this demand from the private lots to underused street parking.

Figure 1: Previous parking publications from Oregon's Transportation and Growth Management program

Selecting a Study Area

As with many planning efforts, the first step in evaluating a parking system is to define the study area. In many cases, an appropriate geographic area is apparent from the get-go, such as pre-defined plan areas, commercial areas, neighborhood districts, residential areas adjacent to downtowns, geographically constrained areas, etc. However, it is often impractical to study all parking spaces within a given study area, so often a subset is selected for analysis. This can include either public parking (i.e., public lots and/or garages and street parking) or a mix of public and private parking facilities.

To the extent possible, when selecting a study area, keep the following factors in mind:

- Select the study area in tandem with initial outreach efforts. The early efforts should seek to identify problematic times and locations, which can inform study area selection.

- Include most or all street parking and public lots known to be problematic, but also include some nearby outlying areas or locations thought to be less busy. This is useful in understanding the geographic extent of problems, the drivers of demand, and opportunities to activate underused resources.

- The study area should include any areas where special events are known to contribute to congestion, even if these areas are not typically problematic.

- If there's zero interest in changing parking management in an area, consider focusing on collecting data in places where changes may be accepted.

Data collection initiatives, particularly where turnover data are needed, can be expensive and/or time consuming, so it's important to right-size the study area. The new information gleaned from surveying additional resources must be carefully weighed against the expense or staff time necessary to serve them in selecting a study area and data collection plan, with the ultimate goal of developing a robust understanding of the system with as little extraneous information as possible.

Inventorying Parking Resources

Once a study area is defined, the next step is to catalog the street parking and parking lots within the study area. Conducting this parking inventory is relatively simple in practice, if somewhat tedious in certain situations.

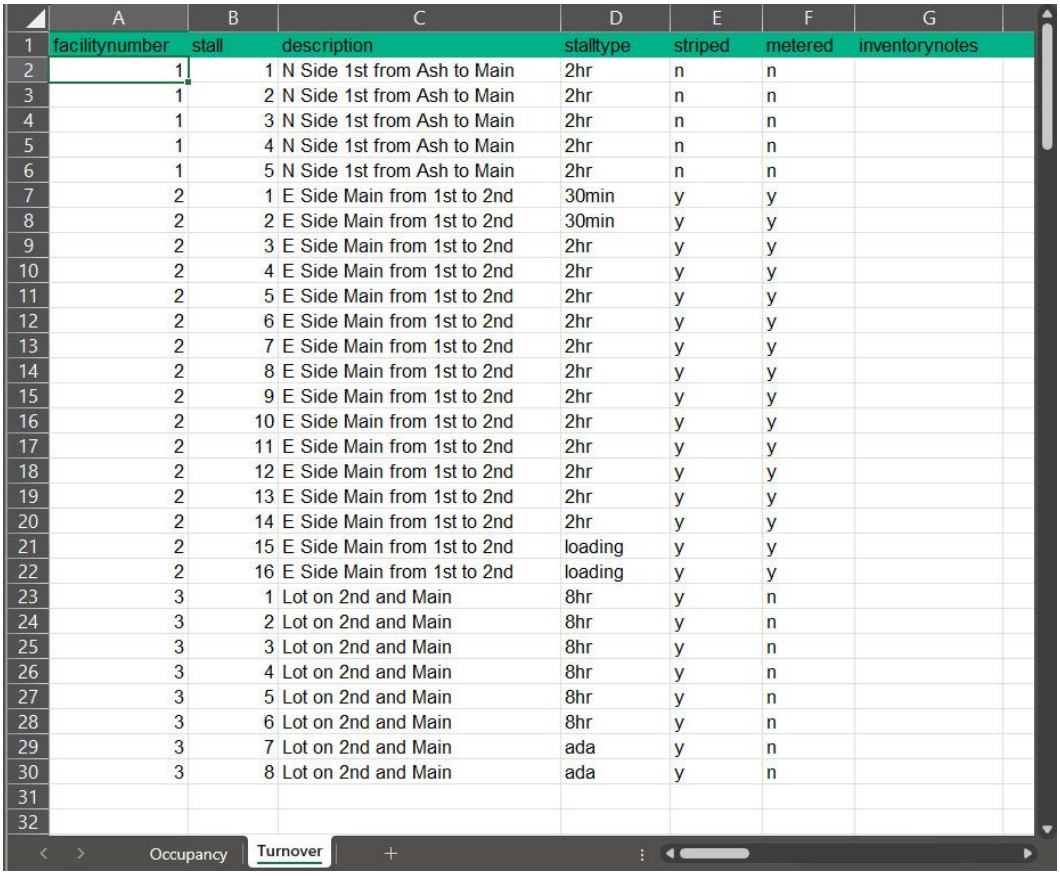
Typically, a parking inventory is conducted by walking through the area, with data collectors counting parking stalls, and noting various aspects of their management such as time or use limits. In the past, people used paper-based systems. Now, it's most often done using a tablet and spreadsheet application, expediting analysis and mapping of resources. In this case, each row of the spreadsheet represents a blockface or parking lot.

To aid in this process, a sample data collection tool has been developed as part of the creation of this Guide. It can be found online at the Oregon Transportation and Growth Management parking web page: https://www.oregon.gov/lcd/tgm/pages/parking.aspx. Figures 2 and 3 show example inventories featured in this tool.

When inventorying resources, it is important to decide upon a resolution for the data collection, i.e., whether parking must be tracked on a stall-by-stall basis (Figure 2) or whether whole blockfaces and parking lots (or subsections thereof) can be tracked together (Figure 3). Which resolution is needed is usually determined by the level of demand data to be collected, with turnover data requiring a stall-by stall inventory whereas occupancy data can be tracked by the blockface or lot. This is described in more detail in the following section.

Of course, some blockfaces and most parking lots will feature more than one type of stall. In these cases, cities must decide if it's important to track occupancies of different management types separately (thus taking more time) or if they can be counted together. When stall types can be counted together, the blockface can be kept to one row, with counts of the stall types input as columns. If they need to be tracked separately, each stall type to be tracked should be input into the spreadsheet as a row type. An example is shown in Figure 3.

For instance, a blockface or parking lot may include mostly regular stalls and a small number of special stalls (e.g., time-limited stalls, accessible stalls, etc.). To decide whether to track these stalls separately or together, consider what additional information can be learned by tracking them separately, weighed against the additional time needed to do so. For example, if there is a need to explicitly understand how the special stalls vary relative to the main stall type, track them separately. The example shown from the sample data collection tool in Figure 3 shows how to handle both eventualities.



	A	B	C	D	E	F	G
1	facilitynumber	stall	description	stalltype	striped	metered	inventorynotes
2	1	1	N Side 1st from Ash to Main	2hr	n	n	
3	1	2	N Side 1st from Ash to Main	2hr	n	n	
4	1	3	N Side 1st from Ash to Main	2hr	n	n	
5	1	4	N Side 1st from Ash to Main	2hr	n	n	
6	1	5	N Side 1st from Ash to Main	2hr	n	n	
7	2	1	E Side Main from 1st to 2nd	30min	y	y	
8	2	2	E Side Main from 1st to 2nd	30min	y	y	
9	2	3	E Side Main from 1st to 2nd	2hr	y	y	
10	2	4	E Side Main from 1st to 2nd	2hr	y	y	
11	2	5	E Side Main from 1st to 2nd	2hr	y	y	
12	2	6	E Side Main from 1st to 2nd	2hr	y	y	
13	2	7	E Side Main from 1st to 2nd	2hr	y	y	
14	2	8	E Side Main from 1st to 2nd	2hr	y	y	
15	2	9	E Side Main from 1st to 2nd	2hr	y	y	
16	2	10	E Side Main from 1st to 2nd	2hr	y	y	
17	2	11	E Side Main from 1st to 2nd	2hr	y	y	
18	2	12	E Side Main from 1st to 2nd	2hr	y	y	
19	2	13	E Side Main from 1st to 2nd	2hr	y	y	
20	2	14	E Side Main from 1st to 2nd	2hr	y	y	
21	2	15	E Side Main from 1st to 2nd	loading	y	y	
22	2	16	E Side Main from 1st to 2nd	loading	y	y	
23	3	1	Lot on 2nd and Main	8hr	y	n	
24	3	2	Lot on 2nd and Main	8hr	y	n	
25	3	3	Lot on 2nd and Main	8hr	y	n	
26	3	4	Lot on 2nd and Main	8hr	y	n	
27	3	5	Lot on 2nd and Main	8hr	y	n	
28	3	6	Lot on 2nd and Main	8hr	y	n	
29	3	7	Lot on 2nd and Main	ada	y	n	
30	3	8	Lot on 2nd and Main	ada	y	n	
31							
32							

Occupancy | Turnover

Figure 2: Sample parking inventory if each stall must be tracked individually

Counting and Estimating Stalls

For well-striped parking lots, counting stalls and tracking management type is a relatively straightforward exercise. For streets and parking lots with no striping, it is necessary to estimate capacity. For parking lots, a common rule of thumb is that each stall requires 300 to 350 square feet, including drive aisles, so a reasonable estimate can be obtained by measuring the size and dividing by 325. For unstriped on-street stalls, a common rule of thumb is to assume a length of 20-24 feet per stall (which includes maneuvering space). In practice, it is often easiest to estimate the number of unstriped on-street stalls by pacing them in the field (e.g., an enterprising parking surveyor might know exactly 6 of their full strides constitutes one parking stall), accounting for driveways, hydrants, and other factors.

	A	B	C	D	E	F	G	H
1	facilitynumber	description	untimedstalls	2hrstalls	1hrstalls	adastalls	totalstalls	inventorynotes
2	1	N side 3rd from Ash to Main	0	8	0	0	8	
3	2	S side 3rd from Ash to Main	0	9		0	9	
4	3	E side Ash from 3rd to 4th	0	7	0	1	8	
5	4	W side Ash 3rd to 4th	0	5	0	0	5	
6	5	N side 4th from Ash to Main	0	8	0	0	8	
7	6	S side 4th from Ash to Main	0	8	0	1	9	
8	7	E side Main from 3rd to 4th 2hr	0	5	0	0	5	
9	8	E side Main from 3rd to 4th 1hr	0	0	4	0	4	
10	9	W side Main from 3rd to 4th 2hr	0	2	0	0	2	
11	10	W side Main from 3rd to 4th 1hr	0	0	7	0	7	
12	11	3rd & Main parking lot untimed	24	0	0	0	24	
13	12	3rd & Main parking lot 2hr	0	15	0	0	15	
14	13	3rd & Main parking lot ADA	0	0	0	6	6	
15								
16								
17								
18								
19								
20								
21								
22								
23								

Chart1 | Occupancy | Turnover

Figure 3: Sample parking inventory when stalls can be tracked together as a blockface or parking lot. Note that stall types on a given block face or within a given parking lot can be tracked separately as needed by adding additional rows. This is shown above for the east and west sides of Main Street between 3rd and 4th Avenues, where 1-hour and 2-hour parking are tracked separately, and the 3rd & Main parking lot, where untimed, 2-hour, and ADA parking are tracked separately.

Occupancy vs. Turnover

There are two basic levels of utilization data: occupancy and turnover. Occupancy data represent simple counts of the number of parked vehicles on a given blockface or within a given lot at a specific time. Turnover counts entail uniquely identifying parked vehicles so that the length of time they are parked can be estimated. The latter reveals significantly more information about how a parking system is functioning, but also requires significantly more time and expense to conduct.

The intensity of the needed data tends to scale with the intensity of the parking problems and management initiatives already in place. For example, in an area where there are no time limits for parked vehicles, it's probably gratuitous to collect turnover data. However, as parking congestion increases and management methods aimed at increasing turnover are implemented, it becomes more essential to have the detailed understanding of use that turnover data provide. Communities taking their first steps in parking management likely will need only occupancy data. However, a data collection plan should be developed to be responsive to both real issues (as they are known) and perceived issues as identified in the outreach process.

Table 2 provides information about the two methodologies and when to employ each.

Table 2: Metrics provided by occupancy vs turnover data collection, and when to implement each

Occupancy data provides…	Turnover data provides…
Counts of parked vehicles, counts of empty stalls, percentage of stalls occupied, stall-hours occupied	Counts of parked vehicles, counts of empty stalls, percentage of stalls occupied, stall-hours occupied, stay length estimates, unique vehicles observed, overstays/time limit violations
Collect if…	**Collect if…**
Time limits have not been implemented, or changes to time limits are not under consideration.	Changes to time limits, pricing, or enforcement approaches are under consideration.
Congestion tends to be limited to peak hours or peak days/event days	Congestion occurs regularly
Management initiatives already in place to address issues are relatively modest	A number of management initiatives have already been implemented to address issues
Typically sufficient in most residential contexts. Can be adequate in mixed-use or commercial areas where peak hours are known or turnover is not considered problematic.	Typically only necessary in downtowns, neighborhoods, and similar mixed use contexts

How to Collect Data

There are a number of data collection methodologies currently in use, and technical advances are introducing new possibilities regularly. A number of new methodologies use license-plate recognition (LPR) technology, LIDAR, or drones. These are further discussed in Chapter 9, Technology and Parking Management. However, as of this writing, most Oregon parking data is still collected via one or more surveyors gathering data directly in the field along predetermined routes.

Most often, surveyors will walk routes individually. However, in some conditions these can be done by car, which typically entails two surveyors, with one driving and one counting and recording. In this case, multiple surveyors move faster than individual surveyors but not nearly twice as fast, so this method is more expensive, and typically limited to bad weather or similar circumstances.

Occupancy counts conducted in the field are straightforward, as these require simply counting the number of parked vehicles on each block face or in each parking lot (or, when lots are nearly full, counting the number of empty stalls and subtracting from the total can often be faster). Turnover counts are somewhat more complicated, as they require the surveyor to

note a unique feature about the vehicle, typically a license plate number (or portion thereof). License plate readers can facilitate the collection of this information to some degree, if available. When recording data by hand, a common practice to expedite turnover data collection without losing quality is to only collect the first four digits of the license plate number. This allows surveyors to move much faster, and in practice, multiple vehicles rarely if ever share the first four digits. This also adds a layer of privacy protection to the process, effectively anonymizing vehicles.

Route Planning & Tools

To ensure efficient demand data collection, the route that each surveyor will walk or drive should be planned in advance. The route should be arranged in a way that minimizes the distance walked/driven, avoiding backtracking or other walking/driving without collecting data, and for walking routes in particular, difficult crossings. When collecting turnover data, it is significantly easier to walk/drive in the direction of traffic, as rear license plates are more commonly in place.

The data collection tool should be a table that lists the parking resources along the route in rows, in the order in which they will be visited. Historically, these were printed worksheets that were carried on clipboards, often underneath “rain-proof” plastic sheeting. Today, data are most often collected directly into a spreadsheet app on a tablet computer, typically originating from the inventory table created in the preceding step. A column is provided for each data collection time needed. For turnover counts, a row is provided for each stall and the surveyor records the license plate number (or some portion thereof) in the appropriate cell; for occupancy counts they record the number of parked cars. Automated license plate readers that use cameras to capture license plate numbers and are often mounted in a vehicle are sometimes used for turnover data collection when available. While these eliminate transcription errors, they do not significantly expedite the process. Examples of turnover data and occupancy data from the sample data collection tool are provided in Figures 4 and 5, respectively.

For turnover, a good (if somewhat conservative) rule of thumb is that a surveyor takes approximately two minutes to cover each blockface. This can of course vary significantly with the size of blockfaces and distance between study blocks but tends to provide a good basis for route planning in aggregate. As surveyors will need time between routes to rest, hydrate, etc., an upper limit of about 25 blockfaces per route has become common practice, though experienced surveyors can sometimes handle 30 or more.

For occupancy-only data collection, surveyors can move much faster and are typically more limited by walking or driving time to complete a given route than by the time taken counting. A good estimate of route time can be obtained by finding the walking or driving time of the route within Mapquest, Google Maps or a similar app, and multiplying by 1.25 for walking routes or 1.5 for driving.

	A	B	C	D	E	F	I	J	K	L	M	N
1	facilitynumber	stall	description	stalltype	striped	metered	10am-obs	11am-obs	12pm-obs	1pm-obs	2pm-obs	3pm-obs
2	1	1	N Side 1st from Ash to Main	2hr	n	n		527j	527j	525l	525l	525l
3	1	2	N Side 1st from Ash to Main	2hr	n	n				362e	362e	362e
4	1	3	N Side 1st from Ash to Main	2hr	n	n	362e	362e	nfz3			
5	1	4	N Side 1st from Ash to Main	2hr	n	n	zcb8	zcb8	zcb8	zcb8	zcb8	zcb8
6	1	5	N Side 1st from Ash to Main	2hr	n	n	829m		4002	4002		919m
7	2	1	E Side Main from 1st to 2nd	30min	y	y	herz	3445		279m	267l	
8	2	2	E Side Main from 1st to 2nd	30min	y	y	478m	486k	145e	5726		4128
9	2	3	E Side Main from 1st to 2nd	2hr	y	y	267l	267l	267l	267l	038d	
10	2	4	E Side Main from 1st to 2nd	2hr	y	y	253m	253m	253m	bmm3		
11	2	5	E Side Main from 1st to 2nd	2hr	y	y	678g	678g	kj28	030l		239l
12	2	6	E Side Main from 1st to 2nd	2hr	y	y	wils	wils	wils	wils		704m
13	2	7	E Side Main from 1st to 2nd	2hr	y	y		9x94	9x94	9x94	9x94	9x94
14	2	8	E Side Main from 1st to 2nd	2hr	y	y	782n	814f	814f	yhm6	bmm3	bmm3
15	2	9	E Side Main from 1st to 2nd	2hr	y	y		209m				
16	2	10	E Side Main from 1st to 2nd	2hr	y	y	518m	518m		822f	822f	
17	2	11	E Side Main from 1st to 2nd	2hr	y	y	745h	745h		7fhh	7fhh	
18	2	12	E Side Main from 1st to 2nd	2hr	y	y		190g	1238	306h	306h	306h
19	2	13	E Side Main from 1st to 2nd	2hr	y	y		867f		spin	spin	spin
20	2	14	E Side Main from 1st to 2nd	2hr	y	y				973g	973g	973g
21	2	15	E Side Main from 1st to 2nd	loading	y	y	moor	4395	029h	xgk9	xgk9	
22	2	16	E Side Main from 1st to 2nd	loading	y	y	2972	2972	2972	5081	5081	
23	3	1	Lot on 2nd and Main	8hr	y	n			553n	979f		604h
24	3	2	Lot on 2nd and Main	8hr	y	n			179l	549h		
25	3	3	Lot on 2nd and Main	8hr	y	n	068g	068g	068g	068g	068g	011j
26	3	4	Lot on 2nd and Main	8hr	y	n				335g	785l	583
27	3	5	Lot on 2nd and Main	8hr	y	n			tsq3	632k	632k	
28	3	6	Lot on 2nd and Main	8hr	y	n	327g			498l	498l	498l
29	3	7	Lot on 2nd and Main	ada	y	n			896k			
30	3	8	Lot on 2nd and Main	ada	y	n	076k	076k	076k	1205	453l	
31												
32												

Occupancy | Turnover | +

Figure 4: Example turnover data from the sample data collection tool. For each hourly observation, the first four digits of the license plate number of the car parked in the stall are recorded. If a stall is empty, the cell is left blank.

	A	B	G	K	L	M	N	O	P
1	facilitynumber	description	totalstalls	10am-ct	11am-ct	12pm-ct	1pm-ct	2pm-ct	3pm-ct
2	1	N side 3rd from Ash to Main	8	7	7	8	7	7	6
3	2	S side 3rd from Ash to Main	9	7	5	7	6	8	7
4	3	E side Ash from 3rd to 4th	8	5	2	2	4	6	5
5	4	W side Ash 3rd to 4th	5	2	1	2	3	2	4
6	5	N side 4th from Ash to Main	8	8	7	7	8	8	7
7	6	S side 4th from Ash to Main	9	6	6	6	6	6	5
8	7	E side Main from 3rd to 4th 2hr	5	4	3	3	2	3	5
9	8	E side Main from 3rd to 4th 1hr	4	3	3	4	4	3	4
10	9	W side Main from 3rd to 4th 2hr	2	0	0	0	2	2	1
11	10	W side Main from 3rd to 4th 1hr	7	3	6	4	5	2	5
12	11	3rd & Main parking lot untimed	24	11	15	20	22	22	20
13	12	3rd & Main parking lot 2hr	15	8	8	9	12	9	12
14	13	3rd & Main parking lot ADA	6	2	2	3	6	4	5
15									
16									
17									
18									
19									
20									
21									
22									
23									

Occupancy | Turnover | +

Figure 5: Example occupancy data from the sample data collection tool. For each hourly observation, the number of vehicles parked within the given location is recorded. Different stall types can be tracked separately by assigning each stall type in each location its own row.

When to Collect Data

Like other data collection parameters, the temporal data collection needs tend to scale with the amount of study and management that have previously been conducted.

When collecting data within purely residential areas, it is often necessary to only collect samples during peak use hours. Residential demand is by far the greatest overnight, particularly on weeknights, so this is the most important data point, though other times—midday during a weekday and/or a weekend, for example—are often sampled as a reference point.

For many downtowns and mixed-use areas, the busiest hours can vary based on the mix and the individual peak hours of land uses in the study area. In these cases, it is ideal to collect several data points over the course of typical weekdays and/or weekends so that the system-wide peak hours and the overall demand patterns can be observed. When resources are available, data can be collected hourly (or once every 30 minutes, 2 hours, etc.) to provide a robust understanding of how demand varies over the course of a day in a given area. When resources are more limited, usually the observations from public interviews identify the most critical times to collect data.

For turnover data, it is necessary to collect data on a regular basis, typically hourly, although sometimes shorter intervals are chosen where resources are available and accurately estimating stay times is at a premium.

Understanding the Data

When analyzing parking data, there are a number of things to look for that can inform an understanding of how the system is functioning.

Peak Hours

Peak hours are used to describe the hours or times of the day when occupancy is the highest. The timing of the peak hour and the occupancy level during the peak hour relative to other times of the day reveal important information about drivers of demand.

Observe factors like whether there is just one noticeable peak, or multiple peaks. If there are multiple peaks, is there a significant “valley” between them? These factors can reveal useful information for how a system is functioning, and what land uses are driving demand.

DLCD

Case Study:

Study Area Selection and Analysis, Forest Grove

Forest Grove has a number of known drivers of parking demand, as well as some potential opportunities, throughout its downtown area and beyond. To efficiently address the key questions, the consultant focused on:

- A detailed understanding of parking demand and turnover on the city's busy Main Street, particularly near the intersection with 21st Street. In particular, the city was considering designating 21st Street as a Festival Street, reducing parking. The impacts of this change needed to be well-analyzed.

- The impact upon the downtown parking system from Pacific University, located immediately to the east of downtown.

- Demand patterns resulting from new mixed-use development in the residential areas east of downtown.

- Demand for parking in the lower-density mixed use areas south of downtown, where several public parking lots are located.

To understand the challenges, the consultant collected turnover data within the busy downtown core, and occupancy data outside the core where a less-detailed understanding would suffice. The turnover data collection area was sized such that data could be collected by one surveyor, with a second surveyor collecting occupancy data within lots and on-street parking outside the downtown core. Turnover data within the core and occupancy data for all public lots were collected hourly; occupancy data outside the core were collected four times each study day during suspected peaks.

A map of the study area and data collection plan for Forest Grove is shown in Figure 6. Visualizations of data collected for this study are shown as examples in Figures 7 and 8.

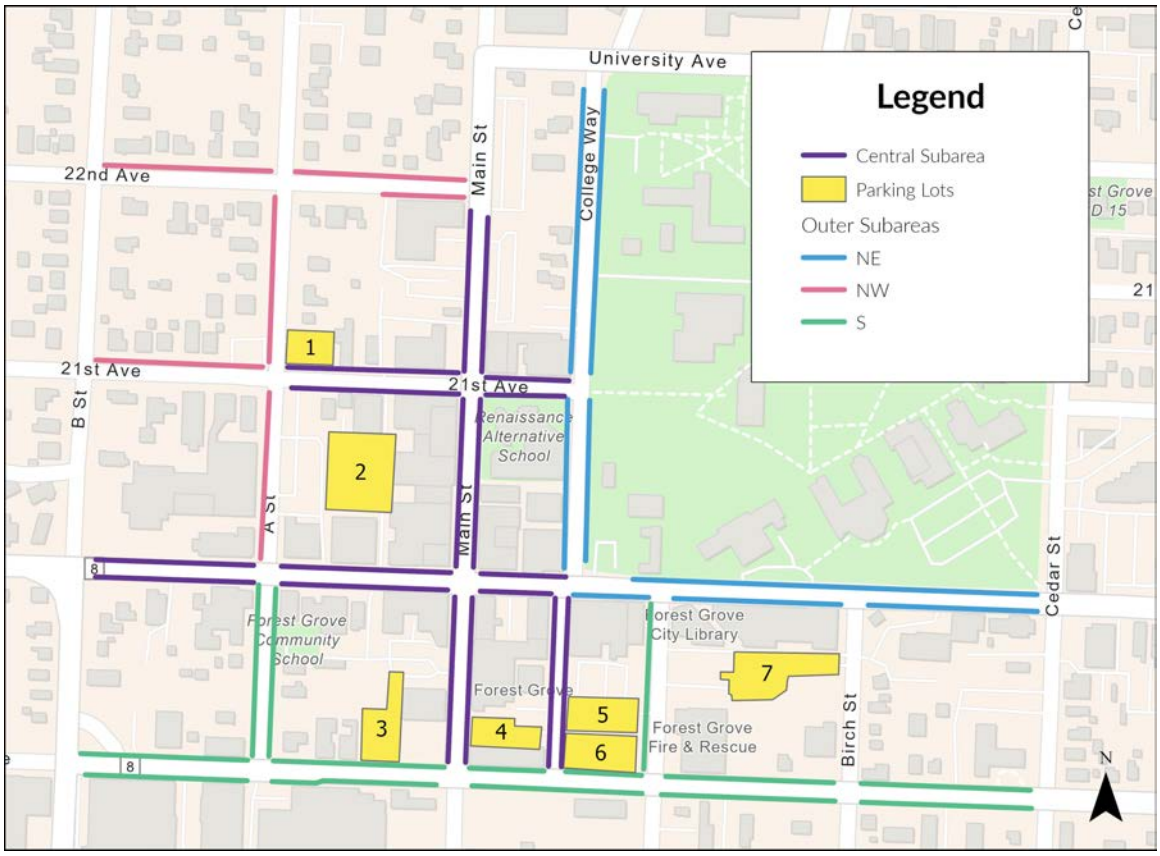


Figure 6: Study area for a parking study in Forest Grove. Hourly turnover data were collected for "Central Blocks;" hourly occupancy data were collected for parking lots; and periodic occupancy data were collected for "Outer Blocks."

Occupancy and the 85% Rule

Parking occupancy for a given location or study area is typically expressed as the percentage of stalls that are occupied.

In most parking management contexts, it is ideal to have one to two parking stalls available per blockface. This corresponds to a target occupancy of about 85%. Research from Donald Shoup and others has shown that problems related to cruising for parking begin when occupancies near or exceed this level. Thus, on-street parking with occupancy levels exceeding 85% often indicates of a need for a change in parking management. Conversely, areas significantly below this percentage are underused, meaning parking spaces may be overmanaged or overpriced (assuming there are enough destinations nearby to reasonably assume parking demand would be higher otherwise).

For many small and mid-sized cities, functionally full areas are limited to the busiest few blockfaces of a downtown, even during peak hours. Thus, occupancy percentages—and how significant parking congestion appears on the surface—can vary greatly depending upon the size of the area one is scrutinizing. A neighborhood or district that has an overall occupancy percentage below 85% may still have blockfaces within it that are consistently above this level and thus in need of better management.

There are certainly exceptions to the 85% rule. Busy residential areas can and do fill to 95%+ overnight, when stay times tend to be long and people are able to cruise a large area looking for a stall. Wayfinding and real-time information can also increase the occupancy rate at which a facility is functionally full, guiding people to open stalls even as they become rarer. This is often seen in bigger garages or at events with attended parking.

As described above, a city might elect to collect occupancy data at known peak times, or at regular intervals (e.g., hourly) across a study day or days. Especially when hourly data are available, it is useful to plot the data on a bar chart or line chart to quickly identify peak periods and visualize how demand varies over the course of a day. Examples from the aforementioned Forest Grove parking study are shown in Figure 7.

Stall-Hours Occupied

Another metric related to occupancy can be obtained via the product of occupancy percentage and the total number of observations. The resulting metric, stall-hours occupied, can reveal important information about the temporal nature of parking issues. While this information is available even when only occupancy data are collected, it is more useful as context for turnover information.

Stay Length

Stay length is the duration of time that a particular vehicle is observed to occupy a particular parking space. In downtowns and mixed-use areas, stay lengths of more than three to four hours likely indicate residential or commuter demand, while shorter stay lengths are likely to indicate demand for retail, restaurant, entertainment, or commercial uses. Since each parking space for which turnover was measured was observed once per hour, stay lengths are recorded as the total number of hours that a particular vehicle was observed.

Note there are some inherent inaccuracies that arise from estimating turnover length with an ideal resolution of minutes while only making one to two observations per hour. The inherent assumption, assuming one observation per hour, is that a vehicle arrives precisely 30 minutes before it is first observed and departs precisely 30 minutes after it is last observed. The difference between this and the actual arrival and departure represent the uncertainty in each observation. While this should be acknowledged, the estimates of stay times quickly improve with a greater number of observations, and so hourly observations are sufficient to gain a clear picture of trends in most cases.

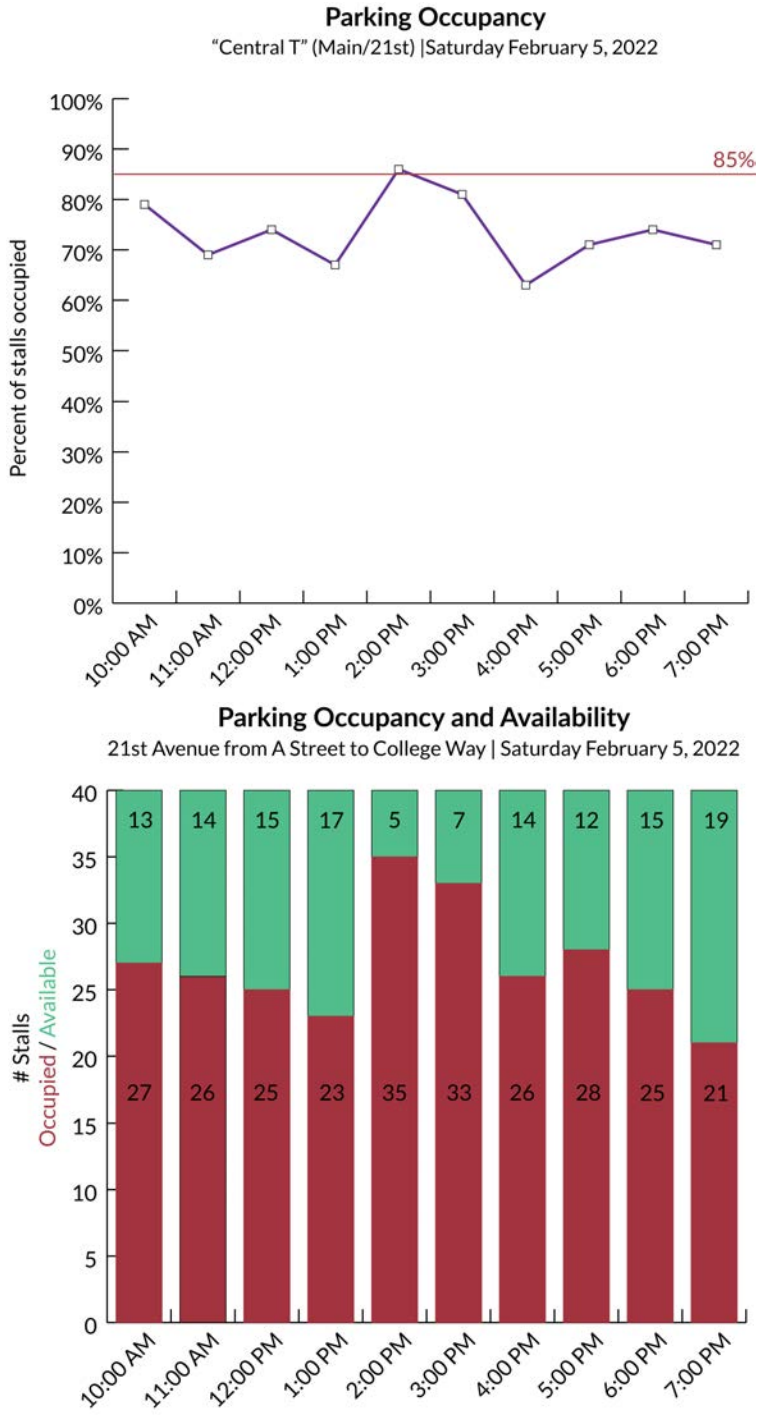


Figure 7: A line graph (top) and bar graph (bottom) showing parking occupancy vs. time of day for two different subareas within Forest Grove. The line graph allows for quick identification of peaks and overall patterns, while the bar graph provides an intuitive representation of occupied versus empty parking stalls.

It can also be helpful to show turnover properties on a map, with factors such as the stay length or percentage of overstays shown on a blockface-by-blockface basis. An example of this from Grants Pass is shown in Figure 8. More information on mapping data is shown below, and the Parking Data Tool is intended to facilitate this process.

Total Vehicles/ Unique Vehicles Observed

When turnover data are collected, one of the most useful metrics is a count of the number of unique vehicles (based on the recorded license plate numbers) observed during a given study period. This metric complements stay length in providing an understanding of the turnover of parking stalls. Along commercial corridors, it is desirable for parking to serve as many unique vehicles as is practical, as it indicates a high turnover of customers. A parking stall serving fewer than three unique vehicles over a 10+ hour study day is likely serving residential demand, employee demand, or a lower demand area, while three or more unique vehicles served is more likely indicative of a parking space serving commercial uses or a mix of uses.

Since data are collected once per hour, the number of unique vehicles observed and reported represents a lower bound for the actual number of unique vehicles served, since vehicles which stay less than an hour can be missed if their stay did not overlap with an observation of their stall.

Violations/Percentage of Overstays

Lastly, when turnover data are collected the number of vehicles staying longer than the posted time limit is useful for evaluating whether management changes are needed to meet demand. Violations/overstays are typically reported as a percentage of all observed stays. A high percentage of overstays (above 10% or so) could indicate that time limits are not adequate to serve demand, or could represent the need for more robust enforcement. As with other turnover metrics, the percentage of overstays reported are affected by the one-hour resolution of data, and thus entail uncertainty, especially for stalls with shorter time limits.

Mapping Data

A key reason to collect data either directly within a spreadsheet or in a format that can be transferred to a spreadsheet is that this information can then readily be mapped within GIS applications.

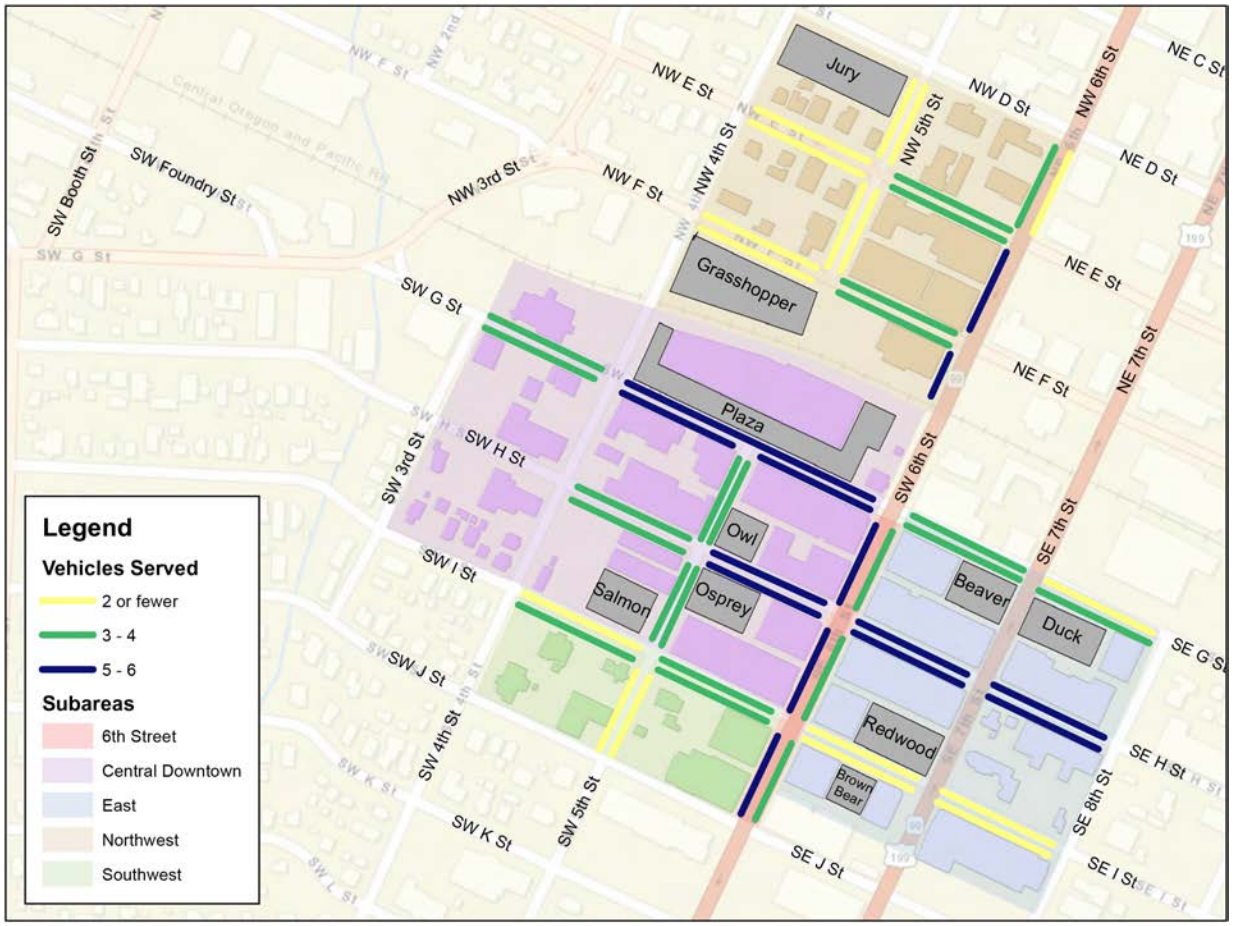


Figure 8: Example map of the number of unique vehicles observed per stall over a 14-hour study period in Grants Pass, illustrating the value of the core parking spaces.

Functionally, this typically entails drawing each block face or parking lot within GIS. Parking lots are typically drawn as polygons, with blockfaces typically drawn as lines. It is often beneficial to use different layers for different facility types (e.g. public vs. private lots), or different subareas within a greater study area, particularly if different data are collected from subarea to subarea. Each layer within the GIS application should correspond to a tab on the data collection spreadsheets. The key factor is to use a text string or numerical value to uniquely identify each facility, both within the GIS and the data collection spreadsheets. This can then allow the data to be imported into GIS and matched with the appropriate location using the 'join' command, layer by layer.

Once data are imported into GIS, they can be analyzed in any number of ways. One of the most common and useful is to produce "heat maps" with blockfaces and lots colored in

proportion to their occupancy rates. Historically, parking was colored with warmer colors as occupancy rates increased, with locations above 85% colored fully red (a generally negative color, indicating problems or pain). Completely unused parking was colored green (a positive, "go" color).

Increasingly, analyses are instead using other color scales to represent occupancy, as high rates of occupancy are not nearly so problematic as heat maps imply. After all, a full stall usually means a customer is present, and the public space is being used, whereas an empty stall means no one is visiting neighboring businesses or using the public parking resource. Business owners and community builders generally want to see nearly full stalls, and a vibrant place. While rates above 85% likely indicate some need for further management, rates just below this are considered ideal. Thus, more neutral color schemes can reveal issues just as quickly in a way that's often more conducive to informed discussion.

An example occupancy map from a recent study in Newberg is shown in Figure 9.

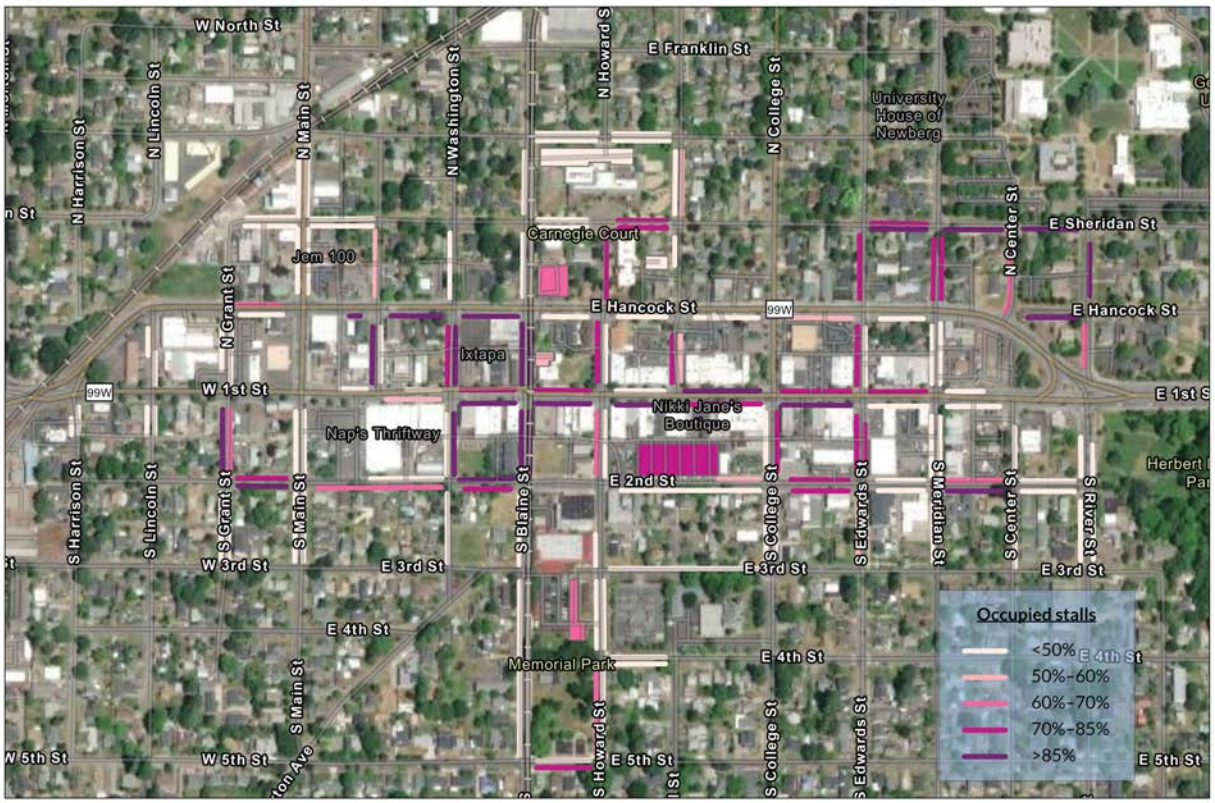


Figure 9: Example occupancy map with value-neutral coloring from Newberg

3

Signage, Striping, and Wayfinding

DLCD

Introduction

Many communities face the challenge of people struggling to find parking, particularly in downtowns. Drivers often cruise to find a spot on the main street or busiest area when nearby lots or street frontage with extra capacity are underused, particularly in cases where those spots are not readily identifiable or visible to visitors.

For communities early in their "parking journey," installing and/or improving signage, striping, and street lighting can represent effective first steps to take to manage nascent parking issues by identifying and activating underused resources. And quite often, cities that have implemented other measures such as time limiting or metering stalls can improve the performance of these management initiatives and the parking system generally by revisiting and improving these elements.

This chapter explores the activation of this underused parking through wayfinding and identifying signage systems.

Identification and Signage Strategies for Public Parking

A crucial early step in managing parking is installing clear, prominent, and consistent signage identifying public parking lots and other key parking resources. This alone can often help address first-stage parking congestion or support other management initiatives already in place.

Often, signage identifying public lots is hard to read, inconsistent from lot to lot, or missing entirely. Making signage easily visible to both drivers and pedestrians, and ensuring consistent, identifiable signage from lot to lot, creates identifiable and welcoming parking. Indeed, in many cases the parking system is the first impression visitors have of a downtown, so making it a positive experience can have economic benefits, particularly in downtowns with high demand from tourists or other visitors.

Naming & Identifying Lots

One way to clearly identify public parking lots, particularly in neighborhoods where multiple public parking lots exist, is to assign each lot a formal name. Often, lots that have not been formally named have been assigned a name colloquially by local users. In these cases the easiest way forward is often to simply adopt and formalize these names. In cases where the lots aren't named or are named inconsistently, cities should develop a naming convention.

Some common naming conventions include:

- Names based on the lot's **location within the neighborhood (**e.g., "Central Lot", "Eastern Lot")
- Names based on the **adjacent street** (e.g., "4th Street Lot", "Main Street Lot")
- Names based on **nearby landmarks** or **public buildings** (e.g., "Library Lot", "City Hall Lot").

Clearly identifying and naming lots in this way accomplishes two things:

- It provides **affirmation** for visitors and others who may not be familiar with the local environs that the parking lot is indeed public and available; and
- Particularly when signed as described below, it provides a **landmark** that helps visitors to navigate and easily locate their vehicle at the end of their stay and can be integrated into cities' broader wayfinding and outreach efforts.

Signage Guidelines and Examples

There are any number of ways to sign public parking lots, ranging from boilerplate parking signage to creative signage that incorporates a city's greater branding elements (see the case study from Grants Pass below). Generally, customizing the signage to some degree—especially to incorporate the lot's name as described above—is preferable to generic signage from both a management and a placemaking perspective.

Whatever the design, using consistent signage improves the parking experience. Particularly when signage is installed on a piecemeal basis, communities may use multiple signage types to identify public parking. This can cause confusion among users and should be corrected via installation of consistent signage when possible.

Parking signage should be prominent and placed so signs are easily visible to both drivers and pedestrians. Keep in mind things such as travel speeds, viewing angles, sign clutter etc. Commonly, a parking lot may be located off of a main roadway, in which case it is useful to install additional wayfinding signage. This is discussed further below.

Some examples of basic signage in use throughout the state are shown in Figure 1.

Figure 1: Some examples of signage identifying parking lots in use throughout the state.

Incorporating Branding

As an emerging best practice, many cities throughout Oregon and beyond are designing signage that incorporates their branding into parking signage. This offers an opportunity to create a more welcoming and user-friendly parking experience, with a minimal additional cost compared to more generic signage.

Local partners consistently stated that the parking system represents the first point of contact with the community for visitors, particularly in downtown contexts. Creating signage that incorporates branding or other elements unique to a city is a great way to put parking in its proper context by highlighting the sense of place, while at the same time having management upside as it leaves no doubt about the nature and name of the parking lot. Grants Pass represents a great example of what these strategies look like in practice.

Striping

Striping parking stalls is another good early intervention that can help improve the utility and efficiency of on-street parking. Many cities with unmanaged or lightly managed parking have unstriped on-street stalls, which often leads to less-than-optimal use of the available street space. This section discusses the considerations around striped parking. The guidance pertains mostly to striping street parking in downtowns and other mixed use commercial areas, with considerations around striping (and restriping) public lots summarized following.

When and Where to Stripe

In most downtown contexts, cities can benefit by striping on-street stalls on the busier block faces. This can prevent the inevitable “bad parking job” that reduces the functional number of stalls on a block face. These instances are particularly likely in areas where there are sharp peaks in demand, as people are more likely to park inefficiently when demand is low, with impacts becoming visible as demand rises. Additionally, on block faces with a large number of driveways, hydrants, etc., it is particularly useful to delineate individual stalls, both to maximize the efficiency of the use of space and to minimize the frequency of illegal parking.

If a city has data on parking utilization as described in the previous chapter, that data can help identify the most important blocks to stripe. Areas where demand regularly approaches or exceeds 85% of capacity should be a priority for striping, as it’s important to use high-demand space as efficiently as possible. However, the loss of parking stalls due to inefficient use begins to be observed at occupancy levels of around 70%. Those block faces also represent good candidates for striping, particularly when adjacent to busier (>85%) block faces.

While in the vast majority of contexts striping increases the efficiency of parking stalls, a notable exception is where parking is heavily utilized on a continuous basis. Here, striping stalls may actually *reduce* efficiency. For example, in the busiest parts of Northwest Portland, where demand is high throughout the day, functional stall sizes were observed to be as low as 18 feet. Other than these edge cases, striping will increase the functional capacity of the system, and the guidance here pertains to those contexts.

DLCD

Case Study:

Creative, Branded Parking Lot Naming and Signage, Grants Pass

Downtown Grants Pass serves as a terrific example of creatively naming and signing lots, incorporating a unique sense of place into its parking management.

In 2015, Grants Pass redesigned its logo and branding with the goal of reflecting the city's reputation as a destination for outdoor adventures. The new branding features a logo with the city's name and an oar, in blue and green (representing the Rogue River and the surrounding wilds) with the tagline "Live Rogue."

Following the roll-out of the new branding, the city redesigned its parking lot signage to incorporate this branding and highlight the city's outdoor bona fides. The city's eight public parking lots were assigned new names inspired by the flora and fauna in the area: Beaver, Brown Bear, Duck, Grasshopper, Osprey, Owl, Redwood, and Salmon. Some lots, like the Owl Lot, were named after art or murals already in place near the lot (Grants Pass has a number of murals throughout downtown). For others, like the Osprey Lot, the city has commissioned public artwork from local artists as funding has become available. As an added bonus, the lots can readily be color coded on maps and visitor facing material, with each lot's name naturally suggesting a color (e.g., pink for the Salmon Lot, brown for the Brown Bear Lot, etc.).

The city's goals are twofold. According to recent requests for proposals for artwork, the program is intended to "improve access and utilization of our downtown parking lots and enhance the tourist experience," while noting the upside for placemaking: "Adding public art created by local artists adds value to our community and helps make Grants Pass a cultural hub of Southern Oregon."

The program seems to be working as intended. In tandem with smartly managing the parking lots in terms of assigning time limits and providing employee parking (discussed in later chapters), the city's signing and branding program has led to healthy utilization patterns where both lots and street parking are consistently busy but not overly crowded, indicating robust turnover and utility.

Example signage and art from Grants Pass are shown in Figure 2.

Figure 2: Parking signage in Grants Pass incorporating the City's branding and elements of public art

Striping Standards

Regulations around parking striping are prescribed by the Manual on Uniform Traffic Control Devices (MUTCD), section 3B.19[1]. Per this section, the striping of stalls must be white, and range from a relatively minimal cross mark delineating each parking stall, to fully outlining each stall with striping. The MUTCD guidance on parking striping is shown in Figure 3.

While more substantial striping provides greater visibility, there is little evidence that striping style impacts the effectiveness of the striping. Thus, most cities in Oregon that feature striped parking tend to use the cross mark (or a similar marking) shown at center in Figure 3, minimizing installation and maintenance costs. However, since the more scant markings can fade to a point of invisibility more quickly, it is necessary to ensure these markings are regularly refreshed and maintained (see "Maintenance" below).

Crosswalk Daylighting and Other Prohibited Stopping

Per MUTCD and the Uniform Vehicle Code (UVC), a "no parking zone" of 20 feet must be maintained in advance of marked and unmarked crosswalks at unsignalized intersections, and 30 feet at signalized intersections. It is also prohibited under Oregon law (ORS 811.550) to park within 20 feet of a crosswalk, or within certain set distances of traffic control devices, hydrants, fire stations, and railroads. A city should ensure these daylighting requirements are followed, as they boost safety for people walking, biking, and driving as they cross the road.

There is an important management-related upside to daylighting (and walkability in general): Since everybody becomes a pedestrian after they park, ensuring safe crossings of main streets and good walking conditions generally serves to increase the utility of parking, reducing the barrier represented by difficult crossings in cases where available stalls are located across a street or streets from one's destination.

Parallel vs. Diagonal Parking

While striping parallel parking can be a straightforward intervention that formalizes and streamlines the usage of existing parking, it may make sense in some cases to install striping for diagonal parking on street segments where there is sufficient width. Indeed, this often arises as a suggestion from interested parties or the public during outreach processes, as it represents a way to add additional stalls to the busiest street segments while often realizing an additional benefit in safety and street environment.

Since converting to diagonal parking could impact safety, traffic flow, and/or capacity, it is typically a more involved effort to implement than simply formalizing existing parallel usage with striping. However, diagonal parking offers expanded capacity and easier access, so cities should give it due consideration where appropriate. Cities should also consider back-in diagonal parking, which can provide safety benefits, particularly now that most cars and trucks are equipped with rear-view cameras making it easier.

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[1] US Federal Highway Administration, *Manual on Uniform Traffic Control Devices,* 11th Edition, December 2023. https://mutcd.fhwa.dot.gov/pdfs/11th_Edition/part3.pdf retrieved March 25, 2024.

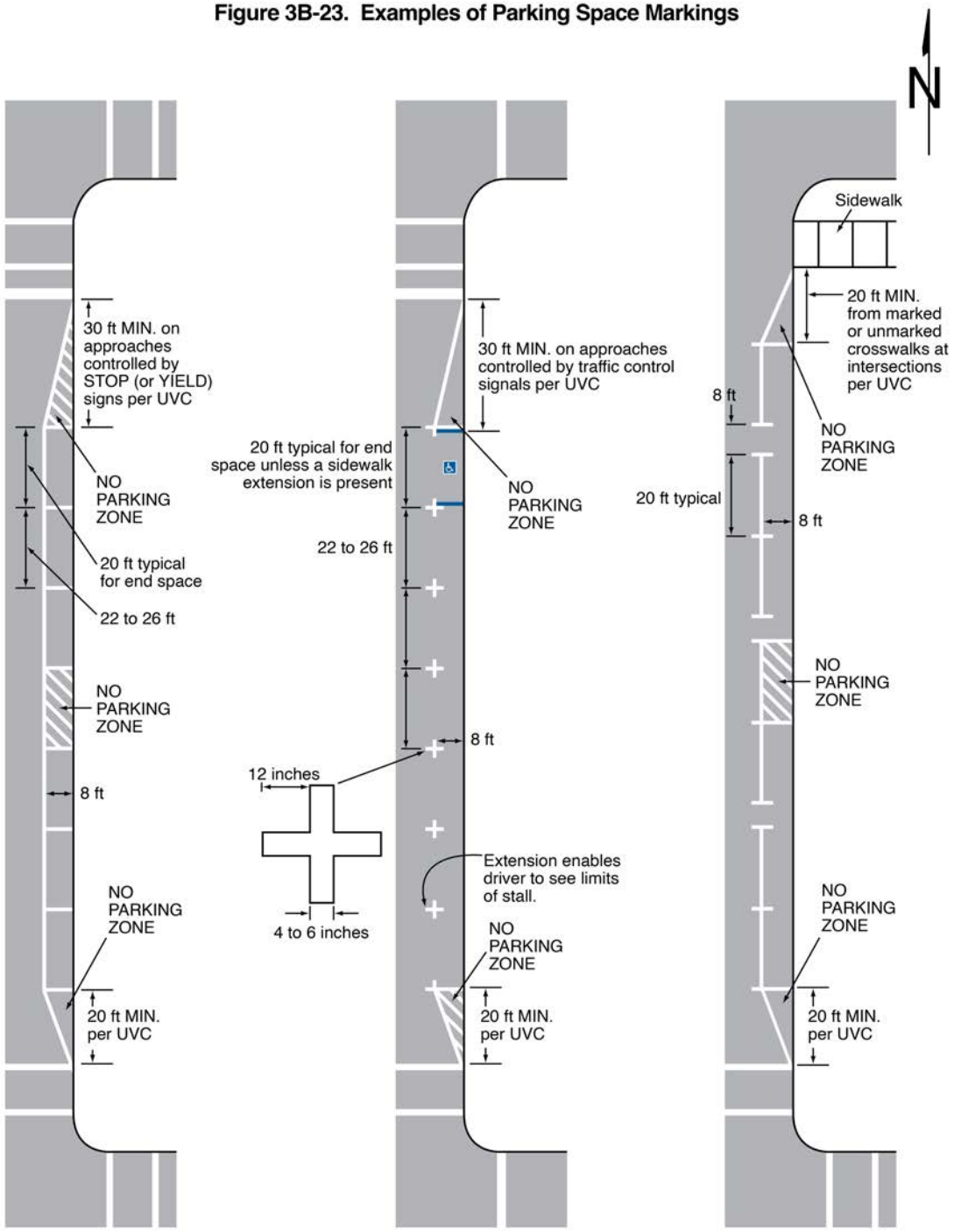

Figure 3: Guidance for parking striping from Manual On Uniform Traffic Control Devices (MUTCD) 11th Edition, 2024

Public Lots

The above guidance focuses primarily on striping strategies and standards for on-street parking, as the lion's share of public parking lots have been striped. In some cases, however, striping may be inefficient or in poor condition. In these cases, refreshing striping or restriping to maximize the number of stalls represents a simple intervention that can improve the utility of the lots.

Maintenance

Maintenance is a key consideration around striping parking. Cities need to incorporate the cost into their maintenance schedule and budget. Typically, parking stalls will need to be restriped every two to three years. High demand parking, or parking in rainy/snowy areas may need to be restriped more frequently. Cities should include striping for public on-street and off-street parking as part of its regular maintenance schedule. Maintaining this striping in adequate condition is important to preserving its effectiveness at maximizing the utility of curb space.

Wayfinding

Especially when combined with signage and parking lot identification, the introduction or improvement of wayfinding signage can be a powerful way to improve the utilization of public parking lots and underused on-street parking.

In many downtown contexts, people looking to park may not be familiar with the area and often aren't aware of the locations of parking lots or lightly used street parking relative to key destinations. Guiding visitors to and from parking assets within downtown via wayfinding represents another low-cost early intervention cities can take to improve the utility of existing parking resources. Well-designed wayfinding works hand-in-hand with naming and lot identification strategies to take the guesswork out of finding suitable parking, which can maximize the utility of existing parking.

While cities can (and should!) have other goals for wayfinding beyond managing parking, this guidance focuses primarily on the parking management elements.

Modes and Considerations

Wayfinding, first and foremost, should be concise, unambiguous, and user friendly. When designing wayfinding efforts, consider the behaviors and needs of various types of visitors and travel modes.

- For **drivers,** a key goal is to allow for access to parking as directly as possible from the main roadways into downtown. Driver-oriented wayfinding should therefore clearly define

Case Study:

Increasing Functional Supply with Striping, Forest Grove

In Forest Grove, the city proposed reconfiguring centrally-located 21st Street as a Festival Street, a street that prioritizes walking and lingering that is intended to regularly host events.

While local businesses and stakeholders broadly supported the plans, people had concerns about parking. The Festival Street plan called for eliminating seven on-street spaces along 21st Street, in the busiest part of the downtown core with high parking demand during most of the day.

However, when the city conducted a parking study, it found that, while the striped segment of Main Street south of 21st had significant parking demand, the much quieter and unstriped block north of 21st had far less demand. Further, vehicles were using this parking in an inefficient way, significantly reducing the functional capacity of the block face. The consultant recommended installing striping along this block, which would result in a total of 19 spaces—a marked increase in utility compared to the small handful of poorly parked vehicles under existing conditions—all within a 2-minute walk from destinations on 21st.

For local merchants and other interested parties, the new striping represented an addition of new parking stalls to help offset the loss of stalls from the Festival Street plan. This was a key consideration in allowing the Festival Street to move forward.

Visualization of a potential design of a Festival Street in Forest Grove. Image MIG Consulting

and direct drivers toward parking lots or desirable areas of on-street parking. Wayfinding signage aimed at drivers should also consider the pedestrian environment, and refrain from pointing drivers toward busy crossings or pedestrian-oriented streets.

- For **pedestrians,** wayfinding should focus on helping people identify and remain oriented to the area where they parked, and additionally should reinforce the walkability of downtown. Often, a key goal for a downtown parking system is to encourage people to park once and walk to several destinations. Wayfinding signs and systems should be designed with this and other goals as needed in mind.

- For **bicyclists and related modes,** wayfinding should help guide users between bike lanes, bike parking, and destinations. In areas with good facilities and otherwise amenable to cycling, encouraging the use of bicycles and transportation demand management (TDM) generally is an effective way to help alleviate pressure on the city's auto parking resources. While TDM is not the focus of this Guide, wayfinding systems provide opportunities for a city to connect its parking management efforts with other TDM goals.

Wayfinding Signage

As with identifying signage, communities largely have the discretion to design wayfinding signage to their needs. Thus, the best practices related to identifying signage described above regarding incorporating branding, etc., apply to wayfinding signage as well. A key goal is to create continuity between signage identifying on-street lots, wayfinding, and other aspects of place.

One of the key challenges with wayfinding relates to optimally placing signage. Driver-oriented signs should be placed along key automotive roadways, ideally in advance of important intersections related to directing drivers to appropriate parking resources, as described above. Pedestrian-oriented signage should be placed nearby public parking lots and/or along the busiest commercial blocks. Ideally, pedestrian-oriented signage should be placed regularly throughout a downtown.

There are a number of guides and best practices regarding wayfinding systems and signage available to cities jurisdictions looking to implement or improve wayfinding, including guidance from the Victoria Transport Policy Institute[2] and the Sign Research Foundation[3]. Some examples of wayfinding signage from around Oregon are shown in Figure 4.

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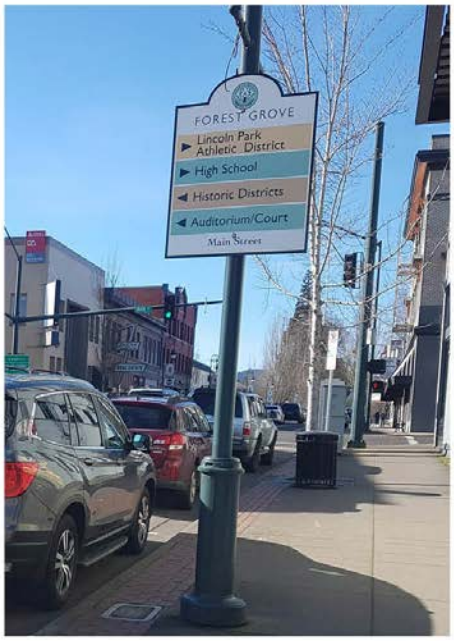
[2]Todd Litman, *Transportation Demand Management Encyclopedia,* Victoria Transport Policy Institute, March 2016, https://www.vtpi.org/tdm/tdm113.htm retrieved March 20, 2024.

[3] Urban Wayfinding Planning and Implementation Manual (2020 Edition), Sign Research Foundation, 2020.

Forest Grove



Forest Grove

Newport

Newport

Grants Pass

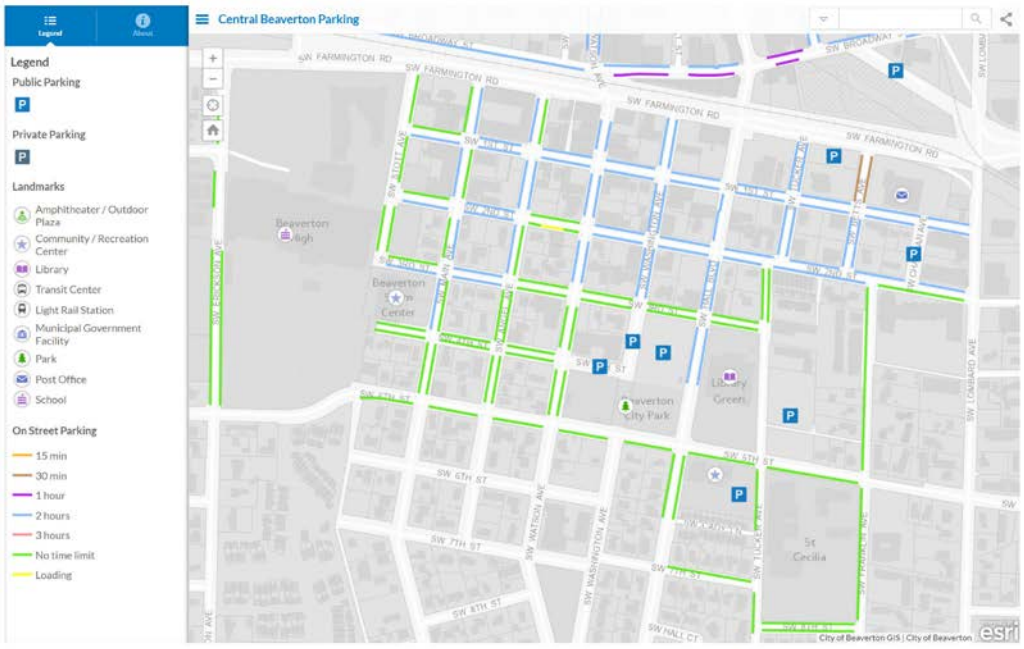
Figure 4: Examples of wayfinding signage in use in communities throughout Oregon. The signage from Forest Grove in this example is more oriented toward pedestrians, while the signage from Grants Pass and Newport are oriented more toward drivers. Note that Forest Grove's signage labels public parking lots relative to its own location, and includes a color coded list of destinations. Also note the elements of branding and placemaking incorporated into each sign.

Maps, Websites, Etc.

In addition to provided signage, wayfinding can be incorporated into public facing maps and visitor guides. In tandem with branding and identification efforts, it can be a powerful tool to help downtown's visitors navigate to parking both in their cars and on foot.

Commonly, cities will produce visitor-facing maps with parking areas and regulations clearly marked, relative to key destinations within the city. These can range from simple, illustrated maps such as Albany's, to maps produced in GIS that are thus scalable and interactive, such as Beaverton's; these maps are shown in Figure 5.

Albany



Beaverton

Figure 5: Maps from Albany and Beaverton, showing two approaches to parking-related wayfinding and communication

4

Time Limits and Special Use Stalls

Introduction

This chapter discusses considerations regarding time-limited parking and special use stalls. Together, these strategies represent the next step in parking management cities tend to implement. Unlike the identification and wayfinding strategies, which seek to activate parking that is known or thought to be underutilized, time limits and special use stalls seek to improve turnover and the ease of finding a parking space in congested conditions. These complement the earlier steps, seeking to move demand for parking from the busiest on-street stalls to more lightly used lots and street parking, which often lie just outside the busiest areas.

Limiting the permissible stay times for parking spaces and reserving certain parking spaces for special uses are the two primary non-revenue tools available to jurisdictions seeking to improve turnover and availability of stalls. These are covered below, with revenue measures covered in future sections of the Guide.

Time Limits

In downtowns, parking congestion often arises from a simple dynamic: the people earliest to arrive downtown—most commonly, employees of downtown businesses—park as near as possible to their workplaces or destinations, and their cars remain for the duration of their shifts or stays. Those cars occupy much of the “best” parking, and people arriving later are then forced to drive around in search of parking, often in circles; this is commonly dubbed “cruising for parking.”

There are two primary strategies cities can use to address this dynamic: Limiting the stay times for these centrally located stalls, or by metering them or otherwise charging for their use. Time limits are generally considered a simpler intervention, as they tend to be less politically contentious and carry a lower cost to implement at the front end. Thus, time limiting parking tends to be the first intervention a city implements in growing downtowns as parking becomes problematic.

One impact of time-limited parking is employees (and other long-term parkers) displaced by the time limits will need an alternative place to park. Most often, this takes the form of employee-specific stalls located within public lots (addressed in the following section), by employees parking a couple blocks from the core area, or by implementing some sort of permit program for employees (see Chapter 5 on Permit Systems for more information).

How to Set Time Limits

Time limits are typically set based upon the goals and desires of a particular area, and should balance the needs of accommodating various users, encouraging turnover, etc. In many downtown contexts, a key goal for the parking system is to support customers who would like

to park once and patronize multiple businesses. In others, encouraging rapid turnover may be desirable. Setting the appropriate time limits is important to achieving these outcomes.

In some cases, time limits can vary from block to block, but the best practice for smaller downtowns is to use one standard time limit. For larger downtowns where multiple time limits may be appropriate, the best practice is to divide the area into common-sense, contiguous districts with a single time limit. This helps avoid confusion and allows the time limits to be easily communicated on wayfinding materials, websites, etc. Astoria provides a good example of this, limiting stay times to two hours throughout most of downtown, but one hour in higher demand areas and 15 minutes in certain stalls and block faces adjacent to the Post Office. A map of Astoria's stay times is shown in Figure 1.

Time limits under one hour can be installed on a stall-by-stall basis rather than on whole block faces. These shorter time-limited stalls are treated as special use stalls herein and described in the next section. Additionally, in many contexts people are able to obtain permits which allow them to park longer than the assigned time limits; the details and implications of this are described in the chapter of permit programs.

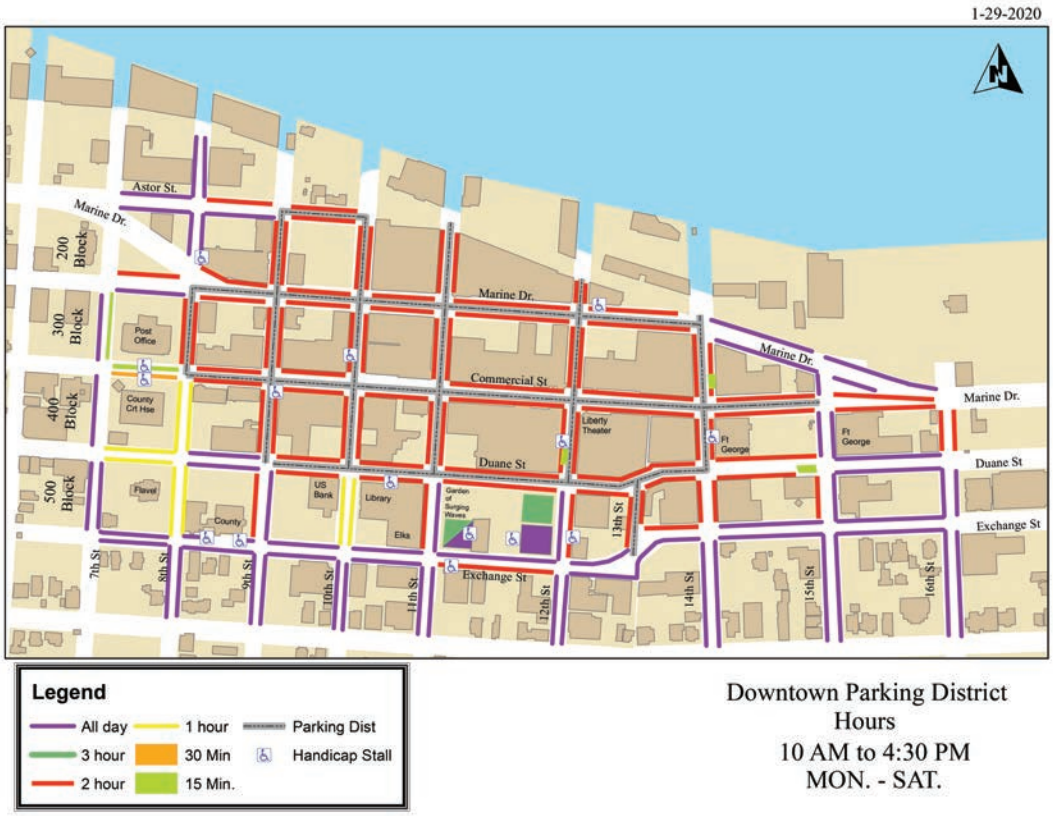


Figure 1: Map of downtown Astoria's time limits

- ***1-hour stalls*** are aimed at providing rapid turnover. They are capable of supporting some, but not all, single use visits such as retail stops, quick lunches or coffees, etc. However, they typically do not provide enough time for many potential single uses downtown, and rarely provide opportunity to visit more than one destination. Longer-term zones are much more common in downtowns. 1-hour stalls should be installed primarily when encouraging turnover is at a premium, and nearby destinations are characterized by short stays.

- ***2-hour stalls*** are typically sufficient to accommodate most single-destination visits to a downtown, including meals, meetings, doctor appointments, and retail visits. In some cases, two hours provides enough time to visit multiple destinations, adding additional utility to these stalls. Because these stalls balance accommodating a large set of trip types with encouraging robust turnover, these are arguably the most popular time zones downtown and should be installed where balancing these factors is a priority.

- ***3-hour stalls*** generally allow time for a visitor to visit multiple destinations in one trip, including longer meals, retail stops, and appointments of various sorts. They generally encourage longer stays at the expense of more robust turnover and are thus most commonly found in downtowns and commercial areas where a goal is to encourage people to park once and walk to multiple destinations during their stay.

- ***4-hour stalls*** provide visitors ample time to visit multiple destinations in one trip. They serve many of the same purposes and demand streams as 3-hour stalls, while providing greater flexibility in terms of stay times at the expense of encouraging turnover.

- ***8-hour stalls*** are typically intended to accommodate employees and other longer duration activities, often related to tourism. While relatively uncommon on streets, they are sometimes used in parking lots intended to serve longer duration stays.

- Finally, time limits of ***12+ hours*** and/or restrictions regarding overnight parking are used either to preclude long-term residential parking in downtown/mixed use contexts where residential demand competes with commercial demand streams, or to prevent camping or use by hotel/motel guests in areas with a significant amount of demand from tourism.

Of course, other limits are possible, with 90 minutes being the most common. Time limits should be set or updated to accommodate existing demand and encourage a good balance of turnover and usage. A partial list of the time limits in place in a sample of Oregon downtowns and commercial corridors is shown in Table 1.

Table 1: Time limits for sample non-metered downtowns and commercial corridors throughout Oregon.

Time Limit	Where in use
<1 hour	Typically limited to special use stalls adjacent to high-turnover uses.
1-hour	Usually targeted to specific high-demand blockfaces within other timed zones (see, for example, the map of Astoria in Figure 1)
2-hour	Downtowns: Albany, Ashland, Astoria, Beaverton, Dallas, Forest Grove, Hillsboro, McMinnville, Newberg, Newport (City Center), Troutdale
3-hour	Downtowns: Albany, Corvallis, Grants Pass, Newport (Nye Beach), Salem, Seaside
4-hour	Newport (Bayfront), Albany parking lots
8-hour	Newport (Bayfront Parking Lot)
12-hour/Overnight	Public lots (Newberg, Newport)

Extents and Times of Day for Time Limits

Generally, parking where demand is regularly at or above 85% of capacity indicates the need for further management. Thus, if data are available or can be obtained per the parameters described in Chapter 2, areas with peak demand approaching or exceeding this capacity represent a good starting point for the timed area. However, it is typically necessary to set the timed area at least a small distance beyond the most crowded areas. A key goal of timed zones (as well as other related interventions) is to distribute demand more widely geographically (or temporally) than it would otherwise occur. Thus, by implementing time limits on certain block faces, some of the demand from these block faces likely will move to the nearest available parking without time limits. Cities should anticipate this and set the extents for the time limited zone accordingly.

Striped areas, described in the previous chapter, often go hand-in-hand with timed zones, particularly when introduced together in growing downtowns. These two interventions are complementary, with striping aiming to maximize the efficient use of space and time limits meant to maximize the efficient use of time. When implementing time limits, it often makes sense to stripe any unstriped parking concurrently, extending the impact of the interventions.

Most often, time limits are only in effect for a portion of the day. Having data can be a valuable resource for determining appropriate times of day, but in Oregon time limits are typically in effect for business hours (8 am/9 am to 5 pm weekdays). In practice, maximal demand periods often occur outside of these hours, so extending time limits to later in the evening or weekends is sometimes effective at reducing congestion during these times. The availability or lack of enforcement resources is also a consideration, one that can preclude cities from neatly aligning policy with demand (see *Notes on Enforcement* below).

Signage Considerations

While cities have broad discretion to design the identifying and wayfinding signs described in the previous chapter, most design elements of signage limiting stay times and uses are prescribed by the Manual on Uniform Traffic Control Devices (MUTCD), as these constitute regulatory signs. As such, these signs must contain a white background, with the regulations printed in either green type (to permit parking) or red type (to prohibit parking). Of course, in off-street facilities it is not strictly necessary to follow these standards, but signage conventions should be kept as simple as possible to avoid confusion.

The guidance for these signs is presented within MUTCD Sections 2B.52 to 2B.54[1]. Figure 2B.25, showing many of the standard sign designs, is presented as Figure 2 below.

Notes on Enforcement

A key challenge with time-limited parking is the need for enforcement of the time limits to realize their full benefit. Considerations around enforcement are discussed in detail in Chapter 8. Cities can (and do!) implement time limits with minimal or sometimes no enforcement. While locals tend to be aware of lax enforcement and thus sometimes disregard time limits, some combination of the “honor system,” people’s desire to follow laws, rules, and community standards, and nonlocal demand serve to lend some level of effectiveness to time limits even absent enforcement.

It can be difficult for parking enforcement to bring in more revenue than costs absent metering or some other sort of revenue generation. Cities needn’t let a real or perceived inability to systemically enforce limits preclude them from implementation, as they still may realize a substantial benefit from this strategy even without meaningful enforcement.

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[1] US Federal Highway Administration, *Manual on Uniform Traffic Control Devices,* 11th Edition, December 2023. https://mutcd.fhwa.dot.gov/pdfs/11th_Edition/Chapter2b.pdf retrieved April 11, 2024.

Special Use Stalls

Another common parking management strategy is implementing special use stalls, stalls reserved for certain users or activities. Some of the most common types of stalls used throughout Oregon are described below, along with considerations regarding when and where to install them. Note that signage considerations here are again generally prescribed by the MUTCD, with a number of examples shown in Figure 2. The stall types listed below are the most common; cities can of course reserve parking for whatever user types are needed most or provide the most value locally.

No Parking (Certain Times of Day)

There are a number of reasons to prohibit parking in a location, from the presence of a fire hydrant or hard-to-see driveway access to daylighting and safety considerations. In many cases where it is not apparent, it is useful to add signage indicating as much.

Similarly, a jurisdiction may want to prohibit parking at certain times of day (school hours, business hours, and peak traffic hours are common) but allow it at others. In these cases, it is useful to treat these as special use stalls and install signage as shown in Figure 2.

Short Stay

Short stay stalls are stalls with time limits of below one hour. As described above, stalls with time limits below an hour have relatively limited utility since many if not most visits to downtown necessitate longer stays. However, in areas adjacent to appropriate land uses (coffee shops, takeout food, and dry cleaning are often classic examples), reserving stalls for these short stays helps to ensure parking is available for these trips. While they typically see lower occupancy percentages than stalls with longer limits, they play an important role in reducing cruising and parking-related congestion.

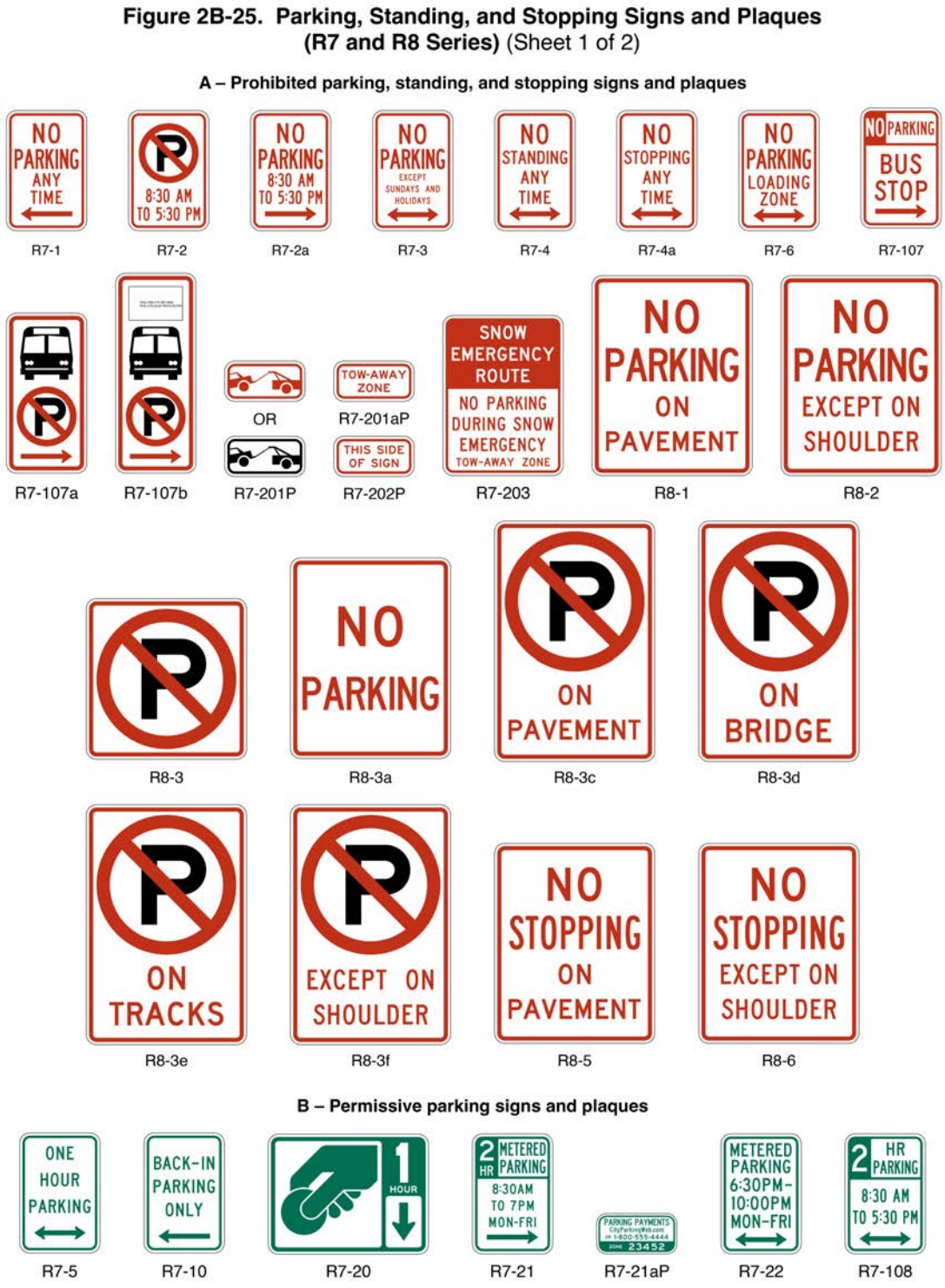

Figure 2a: Standard signage for regulating parking via time limits and various prohibitions, part 1 (Image: MUTCD)

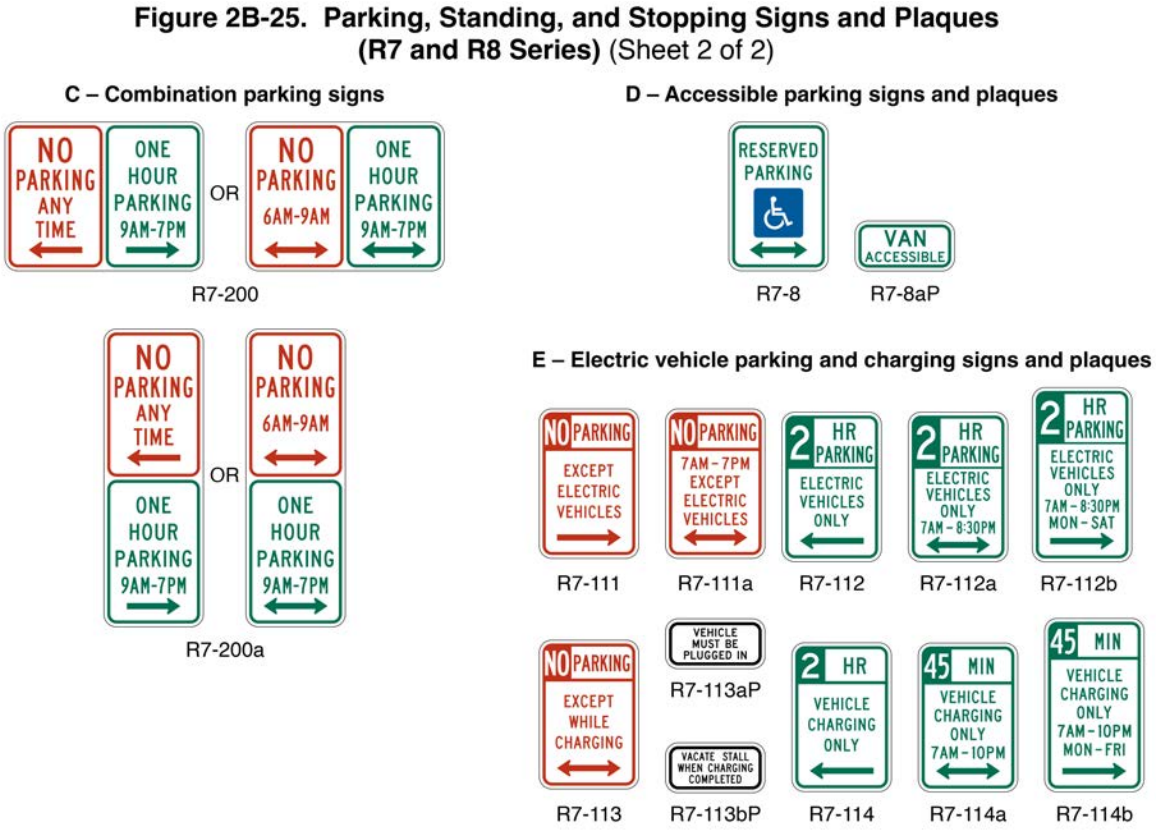

Figure 2b: Standard signage for regulating parking via time limits and various prohibitions, part 2 (Image: MUTCD)

DLCD

Case Study:

Setting Time Limits, Newport

The City of Newport includes three distinct commercial areas: City Center, situated along Highway 101 and home to a retail district and the County Seat; Nye Beach, a vibrant and growing oceanfront district; and the Bayfront, a “working bayfront” that generates heavy demand from a mixture of tourism, fishing, and related uses. The different characteristics and needs of each district require distinct parking management strategies.

In the City Center district, which handles demand from city and county business and the retail destinations primarily cater to locals, a two hour time limit is in place. Single-stop trips make up the majority of parking demand in this area, and practically speaking, the local segment of Highway 101 makes walking to multiple destinations difficult or unpleasant.

Nye Beach, by contrast, is far more walkable and caters primarily to tourists and visitors, with a mix of retail, restaurant, and related land uses. Here, the time limit is three hours, which aims to allow visitors to park once and patronize multiple destinations. However, the time limit intends to restrict people from parking and spending the day on the beach, pushing beach traffic to nearby parking lots and freeing up street parking for commercial activity.

At the Bayfront, there are again a number of restaurants and retail establishments that cater to tourists, as well as a significant presence of fishing-related uses. The four hour time limit aims to serve the gamut of potential demand streams, keeping in mind that the large, walkable district attracts both locals and visitors who want to park once and spend several hours enjoying the area.

A parking study demonstrated that, while the time limits were effective at keeping demand in check in the City Center and Nye Beach districts, demand regularly exceeded 85% at the Bayfront for large swaths of the day. However, the study also showed that people were typically parking for most or all of the allowed four hours, and the city certainly wanted to encourage the “park once and patronize many” behaviors the longer time limits allowed. So Newport would need an intervention that helped redistribute demand from crowded Bay Boulevard to the less busy lots and street parking nearby, without reducing the four hour time limits…

(To be continued in Chapter 6)

Deco District/City Center

Nye Beach

Bayfront

Figure 3: The different contexts of Newport's City Center (2-hour), Nye Beach (3-hour) and Bayfront (4-hour) districts call for different time limits

Accessible Parking

Accessible parking follows guidance provided by the Americans with Disabilities Act[2] to ensure broad accessibility for people using wheelchairs and other mobility devices. While common in lots, it can be tricky to site these spaces on-street due to the spatial requirements for wheelchair/mobility device access.

[2] Guidance on stall counts, design, and siting of accessible spaces can be found at https://www.ada.gov/topics/parking/.

Nonetheless, it is increasingly important for jurisdictions to consider adding accessible parking on-street and in public lots. Demographically, Oregonians are become older and more likely to have a mobility-related disability. Meanwhile, more cities are reducing costly requirements to provide ample off-street parking with each new development, particularly in their downtowns. Cities should work with their communities, particularly people with disabilities, to best understand the demand for accessible stalls and any challenges with them, such as lax enforcement. As demand moves from single-use private parking to shared public resources over time, cities may need to increase the percentage of on-street spaces that are accessible.

Salem represents a good example of providing a high frequency of accessible stalls on-street, which the diagonal parking prevalent in the downtown area helps facilitate. Accessible stalls are common throughout downtown, quite often found at the end of blocks where the space needed for wheelchair access can do double duty daylighting crosswalks (often in tandem with curb extensions).

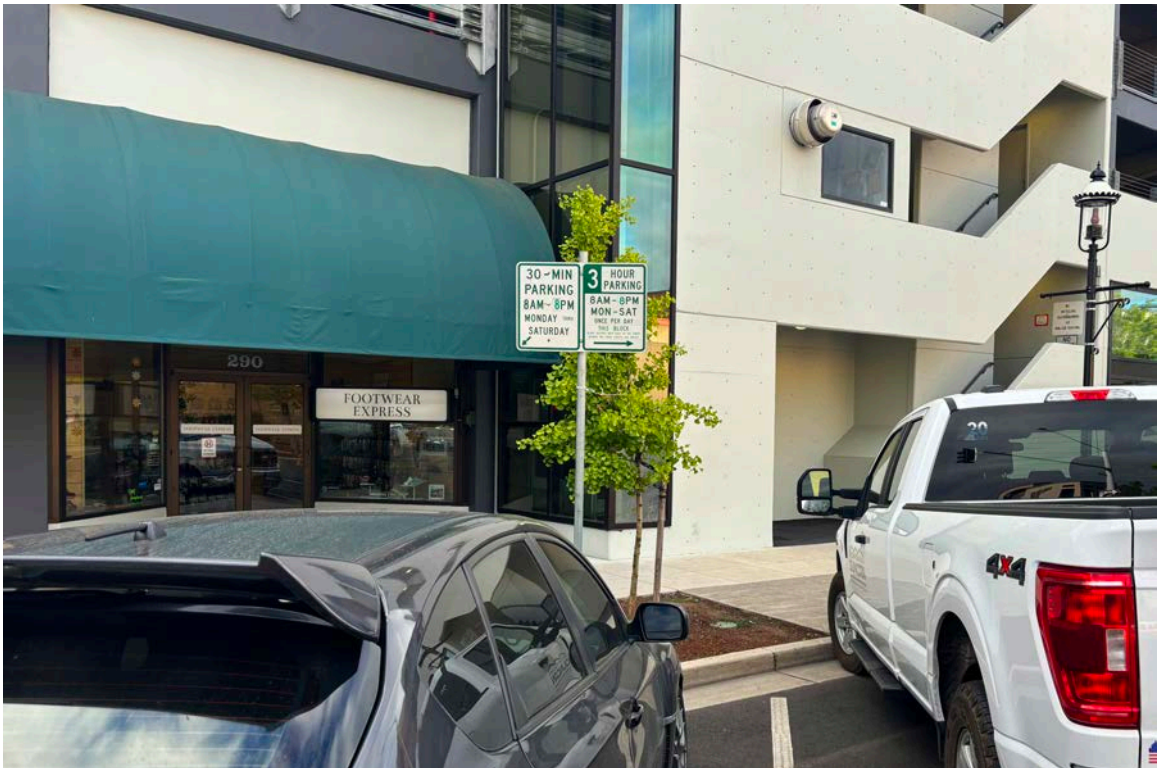

Figure 4: 30-minute parking within a 3-hour zone in Salem. Note the shared signpost. (Image: Eunice Kim)

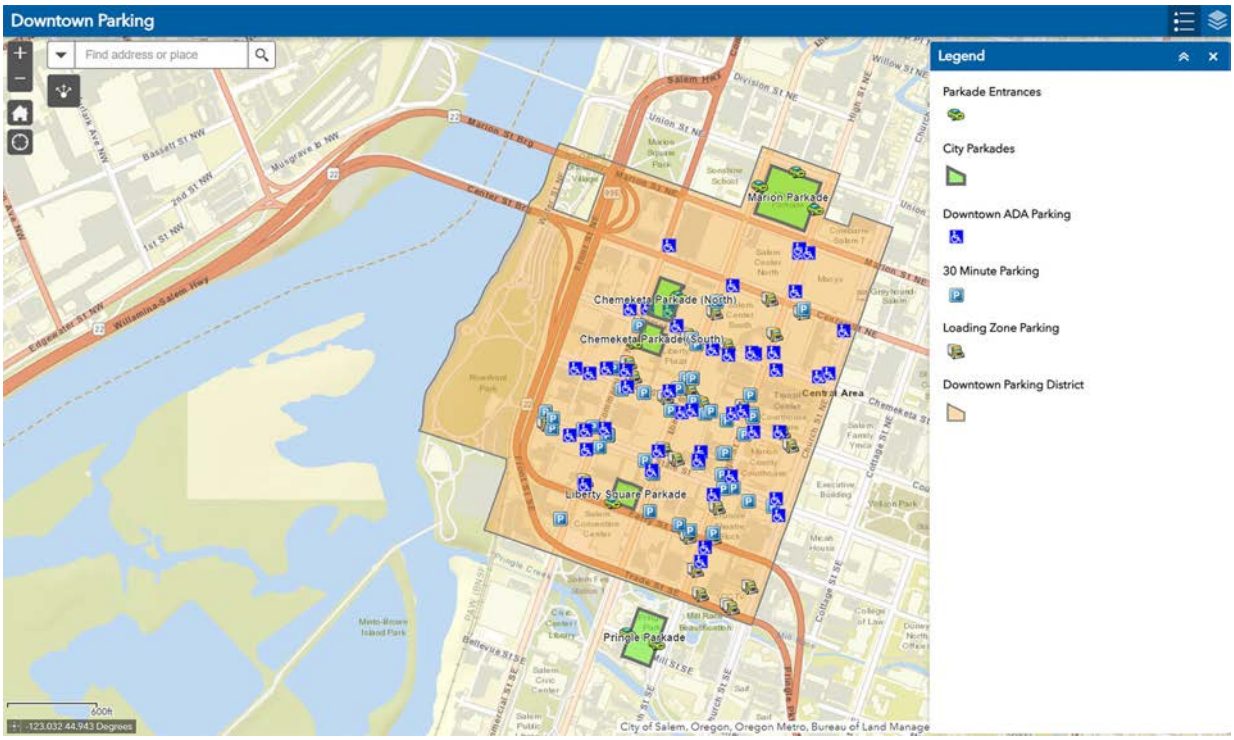

Figure 5: Interactive parking map from Salem, showing the locations of special use stalls throughout downtown

Loading Zones

Loading zones are segments of the curb zone that are reserved for loading and delivery, typically for only a portion of the day (e.g., business hours or other known high-demand times for loading activity). Note that loading and delivery activities in downtowns tend to take place earlier in the day, so time restrictions for loading zones should be set accordingly. In some downtown contexts, loading can be intense in the morning but sporadic later in the day, so right-sizing provision of loading space can be challenging. Given these challenges, measures like allowing double-parking of large trucks for unloading are sometimes needed in addition to or in lieu of dedicated loading zones.

Further, on-street loading zones can be tricky to site. Loading zones need to be reasonably proximate to important destinations (stores, restaurants, and hotels, for example), while also being accessible to large vehicles. When loading zones are close to a corner, for example, trucks can most readily maneuver safely into and out of the stall. However, this can also impact visibility at intersections, so balancing these daylighting considerations with practical considerations around maneuverability is crucial for successfully siting loading zones.

Case Study:

Repurposing Underutilized Loading Zones, Northwest Portland

Northwest Portland features a dense and robust mix of uses that accordingly includes some of the highest-demand parking in Oregon. As part of an ongoing series of management initiatives, the city conducted a comprehensive study of loading zone utilization to understand how these stalls were (and weren't) meeting the neighborhood's current needs.

Historically, the loading zones were implemented on a piecemeal basis, typically driven by requests from nearby businesses that needed the space. However, over the years, the land uses in the area have changed significantly, with industrial uses in particular giving way to residential or commercial uses as the area grows.

Suspecting that loading zones may be oversupplied, Portland conducted a study of their use in 2015. Indeed, the study showed the 55 loading zones within the district never exceeded 50% occupancy and were typically much lower, with parked cars ignoring the loading restrictions being a key base of users.

Since loading zones can typically be replaced with two (or sometimes more) stalls, the underused loading space represented a significant amount of street frontage that the city was able to put to better use in alleviating congestion in Northwest Portland as part of a robust overhaul of the district's parking management measures implemented shortly after the study.

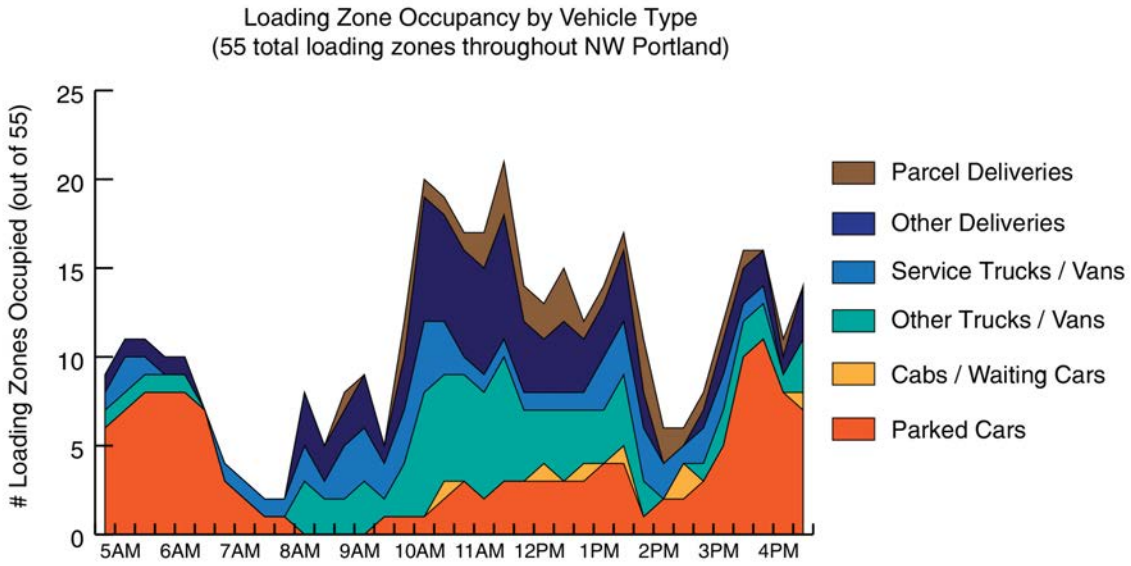

Figure 6: Loading zone usage by observed use type and time of day in Northwest Portland (Image: Lancaster StreetLab)

Employee

As described above, a common dynamic causing parking congestion arises when early-arriving employees of local businesses take the most visible and highest-demand parking, staying in those stalls for the length of their shifts. Since a key focus of time limited stalls is to manage employee demand, it often makes sense for a city to reserve some parking spaces explicitly for employees. Most often, this is done by signing all or part of a parking lot as employee parking, with the goal of pushing these longer-duration stays to outlying, off-street facilities where available.

Employee parking can work well on an “honor system” basis; since employees often represent the first traffic to arrive to a busy district, these (ideally non-premium) stalls are readily available when they arrive. Thus, they can be installed as something of a “carrot” to complement installation of time limits, which displace employee demand. However, most commonly employee stalls are supported by a permit program of some sort; these are discussed in Chapter 5. Cities should ensure employees leaving work after dark have safe, well-lit pedestrian connections to their parking spaces.

Taxi/Ridehail

In downtown contexts with heavy usage of taxis or ridehail services, cities may wish to provide dedicated spaces. Without dedicated spaces, these uses can be problematic in terms of double parking or otherwise causing congestion in the right-of-way due to frequent loading and unloading of passengers. Dedicating stalls specific to these uses can alleviate this, although it is hard to site these frequently enough to reduce the impacts while not oversupplying them.

Hotel/Valet

Relatedly, adjacent to hotels, cities can designate hotel zone or valet zones. Cities often charge a fee for this allocation of space, particularly (but not necessarily only) where paid parking is removed.

Juror Parking

Juror stalls are sometimes provided in close proximity to courthouses, because of the unique travel and parking needs of jury pools. Oregon jurisdictions that set aside parking for jurors include Grants Pass and Oregon City. Salem provides a parking pass for use in a nearby parking garage.

Electric Vehicles

Increasingly, cities are providing stalls for electric vehicles (EVs). While usually found in garages, as EV use grows cities are increasingly devoting street space to EV stalls as well, sometimes with adjacent charging stations funded by grants or through partners. Examples of this include the Portland General Electric's Electric Avenue sites, located throughout the Portland metro area.

School, Library, City, and Other Uses

Particularly in areas where parking demand is otherwise high, it can be beneficial to reserve stalls near a school for school-related uses during some or all of the school day, near a library for library patrons, or near city offices for those conducting official city business.

Figure 7: "Electric Avenue" along SW Salmon Street in Portland, one of several on-street sites featuring charging infrastructure installed by PGE

Coordination with ODOT on State-Owned Streets

One complication that frequently arises in many downtowns is that the "Main Street" through downtown is a state highway, restricting what a jurisdiction can do to manage parking. The intergovernmental agreements that address right of way can vary significantly from city to city. In some cases, the State manages the entire right-of-way including sidewalks, the furnishing zone, etc., so the city will need to coordinate closely with ODOT for any management; one example is Highway 101 in Newport. In other cases, the city may control the entire width of the roadway (e.g., Highway 8 in Forest Grove) or control the sidewalks while ODOT controls the travel way (e.g., Highway 99 in Newberg), allowing more discretion on the city's side in terms of signage and general parking management.

In these cases, it is important to work closely with ODOT on management initiatives. Each ODOT Region has several points of contact, with each region's Planning Manager representing a good first point of contact to begin discussions on how to move forward.

5 Meters and Payment Systems

Introduction

This chapter discusses parking meter systems, and the various considerations around parking meter systems and pricing parking on a per-hour basis. Metering is perhaps the most powerful tool available to cities to manage parking demand, particularly when parking is right-priced. This chapter covers the basics of implementing a meter system.

This document uses the term “metering” generically to discuss parking priced on a temporal basis, even as classic coin-operated parking meters are becoming less common. Additionally, this memo discusses pricing considerations around public lots and garages, and briefly analyzes competition between public and private parking markets.

History/Background

Metered parking was first implemented in 1935 in perhaps a surprising location: Oklahoma City, Oklahoma. Following the discovery of an oilfield on the city’s outskirts in 1928, oil-related businesses began to emerge downtown. Their early-arriving employees had their pick of parking spaces downtown, typically selecting the most centrally located street parking. This left the later-arriving retail and restaurant customers to either park on the outskirts or cruise for closer parking, which owners of the businesses that depended upon them as obviously found problematic.

In 1933, Oklahoma City’s Chamber of Commerce proceeded to form what was likely the world’s first parking advisory committee and appointed a local journalist and business owner named Carlton Magee to head it. Enlisting the help of Oklahoma State University professors H.G. Thuesen and Gerald Hale, Magee had a working design for a parking meter, dubbed the Black Maria, by early 1935. The first meters were installed on July 16, 1935. Because the impacts of the new technology were unknown, they were only installed on one side of the street so that their effectiveness could be analyzed. However, the new technology was so successful at managing demand that business owners on the other side of the street began petitioning for them within three days.

Oregon cities were some of the earliest adopters of the technology. The state’s first parking meters were installed in 1938 in downtown Portland. 1,336 meters were installed on 49 square blocks in the central city, with parking costing 5 cents per hour and tickets $1. Eugene quickly followed suit, installing 145 meters on Broadway and Willamette in 1939. Nine Oregon cities use meters as of mid-2024, with rates ranging from $1 to $4 per hour (though during soccer games, Portland prices near the stadium are $5 per hour).

Metering has been studied extensively in academic literature, and in both theory and practice has been remarkably successful at managing parking demand. When meters are installed in downtown contexts, or when cities take efforts to right-price parking, commercial activity in the

impacted area tends to increase. Because sales tax revenues are often used as a proxy for measuring this impact, there is unfortunately little data available from within Oregon, but cities like San Francisco and Seattle have seen commerce increase following implementation of demand-responsive pricing schemes[1].

Since its first days in Oklahoma City, metering has been an effective way of ensuring customers can access the businesses they want - so effective, people appear glad to pay a small amount to park rather than spend significant time looking for a parking space, and are more likely to visit the area. While metering is often controversial as businesses worry about potential lost customers, if the underlying business has value, people tend to be willing to pay a dollar or two to easily visit it.

Where and When to Meter

Pricing parking is likely the most significant and effective step that cities can take to manage demand. As downtowns and mixed-use commercial areas begin to grow and thrive, they tend to implement successively more impactful parking management measures to accommodate demand.

Often metering will be preceded by measures discussed in previous chapters, especially the implementation of time-limited parking. When street parking usage regularly exceeds 85% of capacity in time-limited areas, metering is the next logical management initiative. However, in some cases it makes sense to implement metering without time restrictions or other earlier management, for example in downtowns or neighborhoods that have seen significant recent construction.

Whereas previous management initiatives like time limits require less intensive data, it becomes more important to have a robust understanding of demand patterns as measures like metering are considered. This in-depth understanding helps in both setting metered areas, prices, and hours, and also in building support for metering among interested parties and members of the public. As with timed areas or permit areas, metered areas tend to be set through a combination of data and common sense. Of course, in addition to areas that are at or near 85% occupancy, it is typically necessary to meter some of the surrounding blocks as well, anticipating future reallocations of demand. Ideally, data will be available to inform where metered areas should be set, as well as the prices, on an ongoing basis.

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[1] See, for example, Kolozsvari, Douglas and Donald Shoup, *Turning Small Change Into Big Changes.* ACCESS Magazine #23, Fall 2003, or Are Parking Meters Boosting Business by Eric de Place, Sightline Institute, March, 2012: https://www.sightline.org/2012/03/28/is-metered-parking-boosting-business/, retreived September 12, 2024.

How to Price Parking

The fundamental consideration when implementing metering is how to price parking: what the base cost will be, how to vary it, etc.

Donald Shoup has defined the “correct price” for parking as the lowest price that results in one to two parking spaces being free on every block. This correlates to usage rates of about 85%, with 15% of stalls free, striking a balance between well-used parking and readily available stalls.

So how does one set this correct price? This question—generalized as the relationship between the cost of parking and the resulting usage rates—has been an active topic of research for nearly a century. The concept of pricing street parking was first introduced in 1927 by Newark, NJ traffic engineer Hawley Simpson, who posited, ““Free storage offered to shoppers by merchandising interests is an economic error and acts as a boomerang not only to the merchant, but to regular storage garage enterprises.[2]”

Demand-responsive pricing—varying the price of parking by area or time of day based upon demand—was first proposed by economist and Nobel Laureate William Vickrey in 1954, defining the goal of pricing as, “to keep the amount of parking down sufficiently so that there will almost always be space available for those willing to pay the fee.[3]” However the idea was mostly unknown outside of economic circles before being reintroduced by Shoup with the publication of 2005’s The High Cost of Free Parking, along with his other work. The combination of Shoup’s influence and the advance of technology to support more complex pricing schemes have led many cities to begin to experiment with demand-responsive pricing. This can take many forms that can sometimes be resource-intensive to implement, but represent a powerful tool for cities with significant variation in parking demand patterns from block to block or from time to time.

The various ways to price parking are described below. Modern payment and enforcement technologies allow for any amount of creativity in pricing schemes, so cities should be thoughtful and deliberate in designing a pricing policy consistent with management needs and goals. The right approach and right prices will likely change over time. Unlike many city investments, adjustments to parking meter systems can be done granularly and somewhat affordably.

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[2] Simpson, Hawley S. *Downtown Storage Garages.* The Annals of the American Academy of Political and Social Science Volume 133 pp. 82-89, 1927.

[3] Vickrey, William. *The Economizing of Curb Parking Space.* Traffic Engineering, pp. 62-67, November 1954.

Fixed Pricing

The simplest and still most common way of charging for parking is charging a fixed fee for parking at specified times throughout an entire metered area. Until recently, this was the only way to feasibly price parking and remains in place for most or all on-street parking in Oregon. Ideally, the price of parking would be set such that district-wide peak demand would be about 85% of capacity. In practice, cities will often set lower rates, especially when first introducing metering to a district, to build political support for metering and to manage demand to the extent possible without overly burdening people parking.

Increasing/Decreasing Pricing

In areas where a goal is to increase turnover, cities will often charge increasing rates for each hour a car is parked. For example, cities might charge $1 for one hour and $3 for two hours. Alternatively, they might allow one hour (or some other time increment) for free before charging a steady rate thereafter. Alternatively, a city might decrease costs for those who stay for more longer-term stays, a common strategy with garages.

Medford uses both strategies to manage parking throughout its downtown. In paid parking lots, the charge is $0.50 for the first hour and $1 thereafter. Conversely, daily parking can be purchased for $5 or weekly parking can be purchased for $8. The goal is to make quick commercial visits cheap while discounting parking for employees and other longer-term stays.

Area/District-Based Parking

Rather than setting an entire metered district to the same price, cities can charge different prices in different areas. The ideal way to do this would be on a blockface by blockface basis, as this would allow a city to strive for the Shoupian ideal of one to two open spaces on each block. However, data are often not available to support this level of detail, and it can be difficult to communicate the specifics of such a plan. So, metered areas are commonly divided into multi-block subareas that have similar land use and demand patterns. This is the approach the City of Portland is using.

Regardless of the size of subareas, setting the price is usually an iterative approach where prices are “nudged” up over time—typically in $0.25/hr increments—in areas where peak demand is above the target range (typically something like 75% to 85%) and adjusted downward in areas where demand is below that range. After an adjustment period, new demand data are collected and the prices are accordingly nudged up or down again. Seattle and San Francisco do this four times a year, but cities can do it less frequently.

Time-of-Day Pricing

Another powerful way to implement pricing that is responsive to demand patterns is to vary the price by time of day. Often, downtowns and commercial districts see notable peaks in demand—often coinciding with lunch and dinner times, especially on weekdays—and valleys at other times.

Cities can again attempt to push this demand into the target range by nudging prices up during the hours where demand is above the target, and down during hours where it is below.

Discounts

Often, it may make sense to give certain groups discounted parking in metered areas, which can help build or maintain support for paid parking, address equity concerns, or further climate goals. The following are common types of users and discounts cities implement. As with other pricing measures, more complicated discounts will require more modern technologies to employ; however, the current best-practice—pay stations along with app options—allows for most if not all feasible mechanisms.

Residents: A common strategy, particularly where cities need to build support among local residents for metering, is to allow residents to park at a discounted rate or for free in a metered area. Often this takes the form of overlaying a permit district on top of a metered district, where permit holders are exempt from the meters. Other ways to discount parking for residents include charging lower hourly rates at meters, granting a certain amount of free time in metered spaces prior to normal rates applying, or allowing residents to park for free at otherwise priced off-street facilities.

Low-income: To address equity concerns that often arise when implementing metering, cities may offer discounts to low-income citizens, senior citizens, etc. In these cases, upon qualifying, the user's license plate is entered into the system and subsequently charged a lower rate for meters or other parking payments. For instance, Portland offers evening or swing shift workers that earn below $46,000/year to purchase a reduced rate pass for its public Smart Park garages.

Clean cars or compact cars: Cities may want to incentivize the use of cleaner cars because of the lower environmental impact, or discount smaller cars for requiring less curb space than their larger counterparts. Again, these discounts are based upon the vehicle's license plate and, while requiring an initial set-up, can be applied fairly easily on an ongoing basis. While not yet popular in the US, European cities such as Paris are beginning to charge higher meter rates for higher-weight vehicles.

Table 1: Parking meter rates and enforcement hours for Oregon jurisdictions using metering

Where?	Price	Times
Corvallis	$1/hour	9am to 5pm Monday to Saturday
Eugene	$1.35/hr	7am to 6pm Monday-Saturday
Hood River	$1/hour	8am to 6pm Monday-Saturday
Medford	$0.50/hour for first 2 hours, $1/hour thereafter	7am to 6pm Monday-Friday
Newport Bayfront	$1/hr	11am to 7pm, 7 days a week, May-October 11am to 7pm, weekends only, November-April
Oregon City	$1/hour	8am to 5pm Monday-Friday
Portland Lloyd District	$1.20/hr*	8am to 10pm Monday-Saturday (On and west of NE Grand) 8am to 6pm Monday-Saturday (East of NE Grand)
Portland Central Eastside Industrial District	$1.40/hr	8am to 6pm Monday-Friday
Portland Downtown	$2.20/hr*	8am to 7pm Monday-Saturday 1pm to 7pm Sunday
Portland Lloyd District	$1.20/hr*	8am to 10pm Monday-Saturday (On and west of NE Grand) 8am to 6pm Monday-Saturday (East of NE Grand)
Portland Marquam Hill	$1.80/hr	8am to 6pm Monday-Friday
Portland Northwest District	$1.80/hr*	9am to 7pm Monday-Saturday
Salem	$1.50/hr	8am to 6pm Monday -Saturday in the Capitol area; 8am to 8pm Monday-Saturday downtown
Silverton	$0.25/hour	Not specified

* Note that special pricing is in effect for events at Providence Park in Downtown ($5/hr from 3 hours before an event begins to 3 hours after it ends) and Northwest Portland ($6/hr from 3 hours before an event begins to 3 hours after it ends) and the Lloyd District ($3/hr for events over 10,000 people at Moda Center, Memorial Coliseum, or Oregon Convention Center).

Figure 1: Information from Salem on paying for parking at pay stations

Pricing Lots and Garages

Where off-street public lots and garages exist within metered areas, it is important to price or manage these facilities in a way that complements the management of the nearby on-street parking. This can take a number of different forms, depending upon the context and goals for parking management.

Commonly, cities will want to accommodate longer-term parking in lots and garages and dedicate street parking to patrons of local businesses and other shorter stays. Thus, it is common to charge hourly rates in garages that are near or above on-street rates on an hourly basis, but to discount longer stays and full day stays.

The strategies above largely apply to parking lots and garages; however, it is noted that the 85% rule doesn't necessarily apply to lots and garages as it does to on-street parking. Again, the 85% rule is meant to provide one to two free spaces on each blockface—a concept that doesn't apply to garages. Depending upon capacity, demand, and other factors, lots

or garages may fill to capacity, or may perform perfectly adequately as a relief for spillover parking at much lower occupancy levels.

Thus, the typical best practice is for cities to price garages and lots such based upon the relative performance of the garage and the performance of street parking in the neighborhood of the garage. For instance, if street parking is overly full near a garage or lot that has additional capacity, it may be a sign that the garage or lot is priced too high relative to street parking. Similarly, lightly utilized street parking near a well-utilized lot or garage may indicate overpriced street parking relative to the garage.

As with all parking pricing, a data-based iterative approach is recommended, where prices are revisited on a periodic basis and adjusted in accordance with the area's management goals.

Enforcement and Hours

Enforcement is typically necessary to support metering, and unlike with non-revenue management measures, enforcement of metered areas is often revenue-neutral or -positive, as the enforcement activity ensures reasonable compliance with paying fees in addition to any revenues generated from tickets.

Enforcement itself is discussed in more detail in Chapter 8. It is important to consider the availability of enforcement when setting metered hours. For instance, while parking demand is often high on Sundays, jurisdictions typically often don't meter during these times due to the increased cost of enforcement and/or contracts with enforcement officers or companies.

Fortunately, the busiest times of day in most downtowns tend to be weekday afternoons and evenings, which typically align well with enforcement schedules. However, evenings, nights, and weekends are often challenging for jurisdictions in cases where metering is necessary but enforcement may not be available.

Technology and Impacts

From the inception of metering until around the turn of the century, coin operated meters in the mold of Magee's original design were essentially the only option available. As technology advanced, single space meters capable of taking bills and eventually credit cards began to become commonplace. Currently, single-stall meters are largely being phased out in favor of pay stations, which are more efficient as only one paystation per block or so is needed.

A key impact of these advances is that paying for parking based upon one's license plate, rather than by one's parking space, has become standard in recent years. Pay-by-plate systems have a number of advantages including ease of integration with enforcement efforts

and compatibility with a number of advanced pricing schemes, discounts, etc. Further, these typically can be supported with smartphone applications, and thus allow for a number of different payment options. Jurisdictions newly implementing metering should seek to use a pay-by-plate system, and older metered areas should ideally be transitioned to pay-by-plate systems as finances and resources allow.

Competition with Private Market

A key factor impacting parking demand beyond the control of most jurisdictions is the pricing of private parking resources. Jurisdictions should understand the motivations of private operators, and price public resources accordingly.

Whereas jurisdictions tend to price parking based on mobility and access goals, which the recommendations in this guide are tailored toward, private operators tend to optimize prices to maximize profit. For example, public parking would be optimally priced if a city charged $1/hr and saw 85 of 100 stalls occupied, resulting in $85 in revenue. However, a private garage might find that increasing prices to $2 would result in 50 of 100 stalls occupied, thus serving fewer vehicles but generating $100 revenue. The private operator would look at this as the more optimal scenario.

Case Study:

Implementing Metering, Newport

Continuing the story of Newport from Chapter 4, while the existing time limits combined with some recommended signage and wayfinding were found to be effective in managing parking in the Nye Beach and City Center districts, the Bayfront needed a more significant intervention.

Newport's Bayfront district is a "working bayfront," with fishing and fishpacking industries generating year-round parking on and near the district's main road, Bay Boulevard. The district is also home to a number of restaurants, shops, and other attractions that attract significant demand from tourists during the warmer months. These demand streams combined with the relatively constrained area of the district to create significant parking congestion for much of the year.

Reducing the Bayfront's generous four-hour time limits might have been effective at reducing congestion to some degree, but the time limits supported the sorts of desired trips from tourists especially, allowing them to park once and patronize a number of businesses during their stay. Thus, the city decided to move forward with a metered district.

The metered district covers most of Bay Boulevard in Newport and charge $1/hour parking. The metered hours are aligned with the observed demand in the district, in effect 7 days a week from 11 am to 7 pm during the busy May to October period. During the rest of the year, the metered hours are only in effect on weekends. The parking meters in Newport took effect on May 1, 2024. The meters seem to have reduced parking congestion during the busy summer months on the Bayfront to some extent within the first few months of metering, balancing the competing streams of demand from the tourism, fishing, and fishpacking industries.

Moving forward with metering was not without complications or controversy. The plan to implement metering took fully two years to develop, and an advisory group met a total of 15 times to inform the process. While significantly delayed by COVID, the subsequent implementation of the metered district took a further 6 years of consistent outreach from the city before going live.

DLCD

Case Study:

Bagging Meters, Hood River

Hood River presents an interesting case study for justifying the need for meters in the first place by turning them off when they're most needed.

"Bagging meters"—the practice of turning meters off for the holiday season, traditionally by covering old single-space meters with bags—has been taking place in Hood River since the city first installed meters. This practice tends to be civically popular, but from a parking management perspective it represents removing a powerful management tool at the worst possible time. When meters are bagged, early-arriving employees are again able to fill premium spaces before customers arrive. What's more is that during the holiday season, there tends to be an increase in employees in downtowns, to accommodate an expected increase in customers. This is precisely the dynamic meters were invented to solve. Turning them off in this case is about the worst thing a city can do from a management perspective.

Not surprisingly, the city experiences a number of problems related to the bagging of the meters. According to city staff, it can be "impossible" to park near one's destination during busy times and the city fields a number of complaints regarding parking during this time.

6 Permit Systems

Introduction

This chapter discusses the implementation and administration of parking permit systems. Permit systems can be a valuable tool for managing parking in a variety of circumstances, including both residential areas and the downtown and mixed-use commercial areas predominantly covered in the previous chapters. There are any number of ways to design and administer permit programs, and many different models are used throughout Oregon. The various considerations and tradeoffs, along with case studies from around the state, are discussed herein.

Types of Permitting and Use Cases

Permit programs charge a fee, typically on a monthly or annual basis, in exchange for a permit that allows a vehicle to be parked in a particular area that would otherwise be subject to time limits, restrictions on overnight parking, or other management, or disallows non-permitted vehicles altogether. Permit programs can be structured in numerous ways based upon known demand characteristics and management goals. Key factors cities must consider in designing a program include determining the boundaries of the permit area, permit pricing, how many permits to sell, and what to do with the revenue.

Oregon's first parking permit program was implemented in Portland's Gander Ridge neighborhood in 1981. Today, permit programs are common throughout the state, used to manage demand in contexts from residential neighborhoods to commercial areas and event districts.

By and large, parking permit programs fall into two categories: residential programs and employee programs. In mixed use contexts where there is demand from both streams, it is common to use a hybrid program which includes both residential and employee permits. In all cases, street parking in the permit area is managed—historically with time limits or "no parking" restrictions, but increasingly, with meters—for non-permitted vehicles.

Residential Programs

Residential permit programs are the most common form of permit program. These are intended to manage street parking in areas where the primary stream of demand arises from local residents. When demand approaches or exceeds 85% in areas with significant residential demand streams, a permit program is a powerful potential remedy.

Residential areas typically have little to no public off-street parking, so residential programs seek to manage demand for on-street parking within the subject neighborhood by prioritizing parking for residents, over visitors or employees or visitors to a nearby commercial area. Residential parking programs may also work to encourage full use of off-street parking within the neighborhood, such as garages that may otherwise be used for other purposes, and in the

longer term, encourage lower vehicle ownership within the neighborhood. To support the latter, revenues from residential permit programs are often reinvested to support transit, biking, or walking within the permit neighborhood. This is discussed in more detail in Chapter 7, *Parking Benefit Districts.*

Typically, street parking within residential permit areas will be managed with time-limited parking, restrictions on overnight parking, or increasingly, meters. Permitted vehicles are typically exempt from these regulations.

With a robust demand for housing combining with the state's Climate-Friendly and Equitable Communities program to produce more housing types without parking requirements, cities throughout Oregon can expect to see increased demand for street parking in residential areas. Residential permit programs, when thoughtfully administered, represent the most effective way to manage this demand.

Figure 1: Sign and permit from Portland's first residential permit district in the Gander Ridge neighborhood (Images: PBOT)

Employee Programs

Employee programs are used primarily in the context of downtown or similar commercial areas, where employees of local businesses constitute a significant portion of the local demand stream.

As discussed previously, a common source of downtown parking problems arises from early arriving employees taking the most centrally-located parking, leaving later-arriving customers to cruise for parking or park further from their destinations. When cities implement measures addressing this issue, cities should consider alternative parking arrangements for employees. Commonly, this takes the form of dedicating all or part of a public lot or lots to employee parking.

To support these efforts, employee permit programs are often used. Employee lots are typically either designated as permit-only or are subject to either time limits or hourly/daily fees for non-permitted cars, like residential zones. However, unlike residential permit zones, employee permits typically apply only to designated facilities, and do not allow permit-holders to use on-street parking without abiding by limits or meter charges.

Hybrid Programs

In some mixed-use areas and downtowns where there are significant streams of demand from both employees and residents, it is common to issue both sorts of permits under the same permit program.

These sorts of hybrid programs typically are administered similarly to residential programs, with the obvious exception of allowing employees of neighborhood businesses to purchase passes in addition to residents. The two permit types can be sold in different amounts and/or at different price points, but typically the permit types carry the same privileges, i.e., permit holders of both types are exempted from timed parking restrictions or metering otherwise in place.

Setting Permit Areas

As with other parking management measures described herein, permit program areas should be established through a combination of data and common sense. The “85% rule”—the idea that increased management becomes necessary as usage rates approach 85%—continues to apply. However, it often makes sense politically or for ease of administration to align permit areas with known neighborhood boundaries or obvious geographic boundaries.

While permit areas typically encompass whole neighborhoods or large sections of a neighborhood, there is no theoretical minimum size, so they could be applied to a single block face. (Indeed, this Donald Shoup’s recommendation to Portland in a 2013 Oregonian editorial as new residential construction began to strain parking resources in neighborhoods). When other permit programs are in place, it is typically inexpensive to add additional permit areas or blockfaces, so it is feasible to customize permit areas to be demand-responsive to a large extent.

As described above, employee programs are often limited to lots in downtowns and commercial areas that typically have other management initiatives in place, so these considerations apply primarily to residential programs.

Pricing Strategies & How Many Permits to Issue

As with other parking management measures, a goal when implementing a permit program is ideally to encourage usage rates as close to 85% as possible. Thus, many of the right-pricing strategies and ideals described in the section on metering apply to the sale of permits as well.

With permits, there are a number of strategies a jurisdiction might implement to accomplish this. A crucial related question emerges when considering the options available: how many permits to sell. Oftentimes these questions inform one another. For example, a jurisdiction seeking to sell permits totaling 75% of available spaces can raise or lower prices until finding the right price to do so.

Pricing strategies are described below, with some example prices and hours from around the state shown in Table 1.

Free Permits

Sometimes, cities provide permits free to residents (or less commonly, employees). This is a strategy commonly employed in residential areas where the primary streams of demand are from non-residential uses (e.g. residential areas adjacent to downtowns or near schools) and there is not an explicit need to limit the issuance of residential permits via pricing.

Fixed, Predetermined Fee

The simplest and most common way to price permits is to charge a fixed monthly fee. Often, this is a small fee (e.g., fees between $25 and $75 per year or $10 per month are commonly seen in Oregon), as these amounts are politically palatable to residents while in aggregate generating a meaningful sum of revenue which can (and often should!) be returned to the district to fund improvements and projects.

Even smaller fees can significantly help manage demand for on-street parking in subject areas. However, in busier areas it is often necessary to sell permits at higher prices to have the desired management effect. For example, in Portland's busy Central Eastside Industrial District, permit prices are $377.50 per year for both employees and visitors. This equates to about $1 per day and is much less than private parking fees at self-storage companies, which often cost around $70 per month ($840 per year), or private parking lots, which are often in the $40 to $80 per month range. Even Oregon's most expensive parking permit district—Eugene's busy Zone H south and west of the University of Oregon campus, which charges $150/quarter—still equates to less than $2/day and costs less than UO's permits for adjacent parking ($55/month for Zone B which includes nearby lots, or $125/month for Zone A which includes on-street parking and other lots).

Higher Fees for New Permits

While even the highest on-street permit prices are cheaper than private markets, raising permit prices can be unpopular, particularly for long-time residents who are used to paying the historical cost. If it's necessary to raise prices for management purposes but existing permit holders oppose the move, a city can elect to sell only new permits at the market rate and allow existing permitholders to renew at the historical rates. This is the model the city of Vancouver, BC employed in the busy West End district, which in 2017 raised permit prices to "market rate," currently (as of mid-2024) $449.34 CAD, or about $325 USD per year from the legacy rate of $132.03 CAD (about $95 USD). This "grandfathering" agreement allowed the necessary price increases to move forward, supporting the creation of a robust Parking Benefit District in the West End. Notably, the legacy rate is also made available to low-income households, helping to mitigate equity implications of market-race pricing.

Here in Oregon, the City of Eugene has experimented with a similar model to help manage both residential growth and student parking in tandem. In Eugene's Zones B and C, the standard parking permits of $99/quarter are discounted to the historical rate of $40/year for homeowners or long-term (>4 year) renters. This has different implications than the Vancouver model, regressively allowing homeowners access to historical rates, regardless of when they buy, but has successfully helped Eugene manage residential demand arising from student renters in these areas. The system leverages the fact that student populations are more transitory, and relatively less-engaged in city issues, than older homeowners. It also creates a financial incentive for students, who often can adjust to live car-free, to consider the issue four times a year.

Varying Fee per Household

Another common way to charge for permits is to charge a fee that varies for each permit issued to a particular household. This can take the form of either increasing fees for subsequent permits or decreasing them.

When it is not necessary to limit the supply of permits sold to successfully manage parking, decreasing fees for subsequent permits can help cover administrative costs without imposing a significant cost burden on residents. For example, in Salem's residential permit district, where parking demand from residents is relatively low but demand from non-residents can sometimes strain residential supply, residents are charged only $20 annually for the first permit and $12.50 for subsequent permits.

In contrast, by increasing fees for subsequent permits (e.g., first permit $75, second permit $100, etc.), cities can incentivize using off-street parking and limiting street parking generally. Portland experimented with this model within the Northwest Portland Parking District shortly after expanding the residential area. However, the city has since changed to a model which caps supply by permits instead, and directs residents unable to buy sufficient on-street permits to off-street parking options.

Auctions

An interesting and innovative approach to pricing permits in contexts where demand can reasonably be expected to exceed supply is to hold auctions for permits. Donald Shoup proposed an auction process for permits with the goal of charging a market-optimal rate for parking[1].

Shoup suggests auctioning permits via a uniform price auction. In this scenario, a certain number of permits would be for sale and people would bid the highest amount they'd be willing to pay in a blind auction. At the conclusion of the auction, all available permits are then sold for a price equal to the lowest winning bid. This approach theoretically provides the most efficient and fair way to "right price" permits based on market demand. Some universities, like Chapman University in Orange County, California, use this approach[2], although it remains uncommon among cities.

Permit Caps

In many cases, there are no caps on the number of permits sold. While this can work in districts where demand is generally not excessive, or in areas where spillover parking rather than local demand is the key issue, in busier districts the sale of too many permits can be problematic. Commonly, parking can be functionally full in these districts despite the permit requirement, and the permits become "hunting [for parking spaces] licenses."

This can be addressed by capping the number of permits issued within a district. The caps can either be district-wide or specific to certain buildings. As an example of the former, in Eugene, the goal is to sell permits totaling no more than 75% of the number of spaces. An example of the latter is Northwest Portland, where new buildings are allocated on-street permits equal to 30% of the number of units. Residents with cars either get one of those permits, or find off-street parking (some new buildings offer off-street parking at the building).

Visitor Permitting

In addition to the monthly or annual permits that typically comprise most of a permit program, other considerations when designing a permit program are temporary or visitor permits. Permit programs typically have an option for residents or employees to buy affordable temporary permits for guests, often supply-capped at a certain number at once or a maximum number per year. For example, residents in Salem's residential parking permits can purchase a pack of 25 guest passes for $2.50 each.

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[1]Shoup, Donald, Quan Yuan, and Xin Jiang, *Charging for Parking to Finance Public Services.* Journal of Planning Education and Research, January 2016. https://doi.org/10.1177/0739456X1664941

[2]Boyd, Sheryl, *Going Once, Going Twice, Sold!* The Parking Professional, pp 31-33, September 2012.

Table 1: Example permit program costs, hours, and other properties from throughout Oregon

Neighborhood	Price	Permit Hours	Comments
Corvallis – 3 residential districts	$25/year, capped at 3 permits per address	8am to 5pm weekdays	Permit year coincides with school year (Sept 1-Aug 31). Even with permit, maximum stay time of 48 hours in effect.
Klamath Falls Downtown	$144/year residential $75/year full-time employees $55/year part-time employees	10am to 5pm weekdays	
La Grande	$60/year, discounted based on month of purchase (e.g., $45 if purchased April – June, $30 if purchased July-Sept).	All hours	Permit zone is residential area near La Grande HS and Eastern Oregon University. Permit parking only in permit zone.
Oregon City - McLoughlin neighborhood	Free	8am to 5pm weekdays	Manages parking from adjacent downtown
Portland – Central Eastside	$377.50/year for both employees and residents $15 guest permits (sold in 10-packs, up to 100/year/address)	7am to 6pm weekdays	
Portland – Northwest Portland	$202.50/year for both employees and residents	9am to 7pm Mon-Sat	
Salem – 9 residential districts	$20/year first permit; $12.50/year each additional vehicle.		One-day passes can be purchased for $2.50 each.
Tigard – Tigard HS Neighborhood	$23/year for residents Guest permits free	8am to 3pm school days	Intended to balance school and residential demand
West Linn	Free (up to 3 per household)	8am to 3pm school days	Permit parking only within district

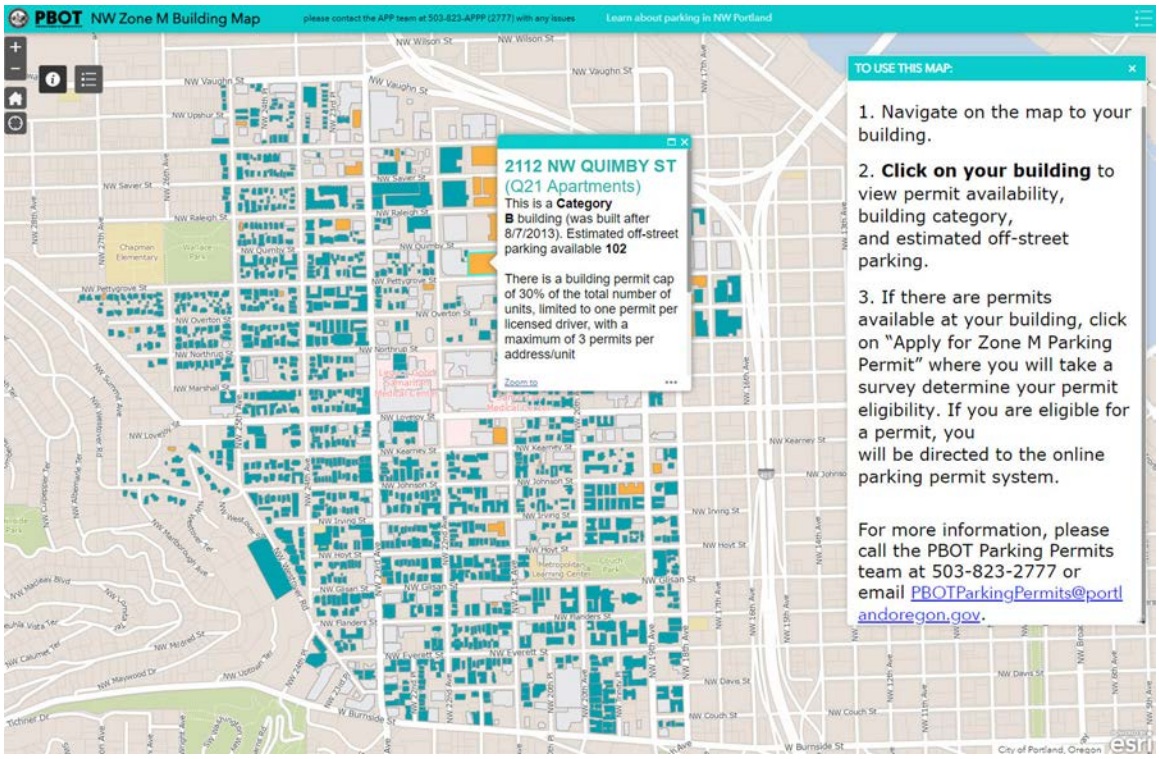

Figure 2: Permit availability, caps, and purchasing information for permits for a sample building in the Northwest Portland Parking District

Permit Hours and Enforcement

Other important aspects of a permit program are the times of day that the permit program is in effect, and how to enforce permit zones.

In permit zones, non-permitted vehicles are typically either subject to a time limit or prohibited altogether. As discussed in the previous section on time limits, there is still some benefit to this strategy even absent enforcement; however, there are likely to be increased management benefits with enforcement. Thus, some enforcement is typically in place to support permit areas, especially in cases where revenues from permits are significant.

Accordingly, the times a permit zone is in effect tend to align with hours of enforcement, which are typically daytimes and business hours, as seen in Figure 1. While this approach is effective in downtown contexts and residential areas where spillover parking from businesses or schools is at issue, it is suboptimal for residential areas where the primary demand source is local.

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Case Study:

Right-Pricing Residential Permits, Eugene

The City of Eugene uses permit programs extensively to manage demand in a number of contexts. With a large population and the University of Oregon centrally located within the city, Eugene's residential areas can be subject to both local demand from residents and spillover demand from both campus and downtown.

To manage this, Eugene recently adjusted prices within the residential permit districts, with a goal of selling permits for up to 75% of available spaces within a district. This would preserve at least 25% of stalls for general use at all times. With this goal in mind, prices were set based on observed demand patterns, which resulted in parking permit fees ranging from free to $600/year—the highest rates in Oregon. The program has been largely successful. Permit sales throughout the city are around 50% of available stalls, which is within the city's desired range. While the price increases were predictably met with some consternation from the public, the net result is that parking is much easier to find in permit zones than previously and citywide the program takes in more than $200,000 annually.

A key challenge in Eugene is managing the large flux of demand originating from the University of Oregon. As discussed above, in two of the districts most heavily impacted by student traffic: Zones B and C, the City allows homeowners and long-term residents to buy parking at the historical rate of $40/year, which helped facilitate price increases to $99/quarter in these zones.

An interesting piece of Eugene's program concerns the management of parking outside of Matthew Knight Arena, a 12,500-person venue that opened in 2011 with no off-street parking beyond that already in place on the UO campus. To manage parking, a 20-block event district was created, with residents of the district eligible to receive two permits per household. The permits are paid for by the University and free to residents. The University also sells up to 500 event permits for the events, for which it pays the City. These revenues pay for increased enforcement in the district during events. Additionally, fines double for non-permitted vehicles exceeding the two-hour stay limit, essentially creating an event-based Parking Benefit District. This is discussed further in Chapter 7.

Residential parking demand typically peaks overnight, so a best practice for administering a residential permit zone would be to prohibit non-permitted parking during overnight hours. This is relatively simple to enforce—enforcement officers would simply visit each block face one time during the restricted hours and ticket any unpermitted vehicles—and provides the most effective structure for managing this demand stream.

Table 2: Eugene's parking zones and fees

Residential Permit Parking Zone	Price
Zone A, E, F, G	$40 per year
Zone B, C - Quarterly Permit	$99 per quarter
Zone B, C - Homeowner/Long-Term Resident	$40 per year
Zone H - Quarterly Permit	$150 per quarter
Zone J	First two free, $40 per year for additional

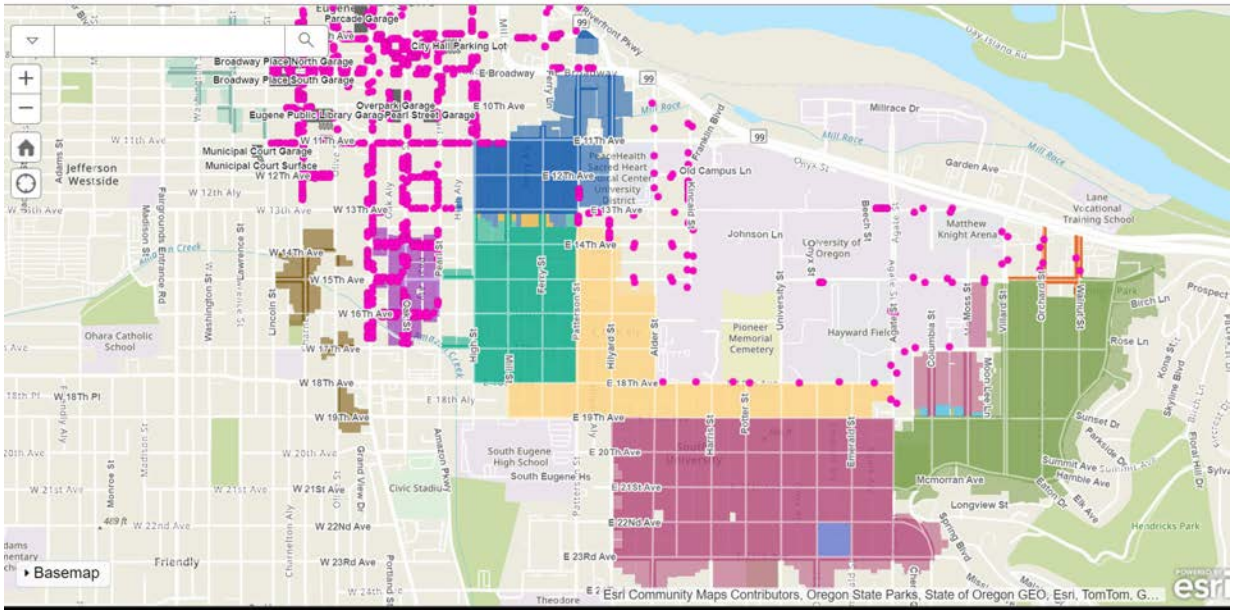

Figure 3: Permit zones of Eugene

Permit Display

Historically, permits were typically sold either as a window hanger or windshield/bumper sticker that users would display in/on their vehicles. While a number of cities still use these, they are generally being phased out in favor of license plate-driven solutions.

Tying permits to license plates reduces administrative costs and enforcement costs, since there is nothing physical to produce and sales can easily take place online. Further, it allows for efficient enforcement, as license plate readers are employed to easily determine the permit status of vehicles. This can allow administration of permit and meter systems and other enforcement/management initiatives to be integrated, as well. Finally, tying permits to license plates provides some anonymity to people who are under protective order, as their car has no sticker indicating the neighborhood of their residence.

Plate-based permit systems are considered a best practice currently, and are therefore recommended for new systems. Legacy systems should transition to plate-based as resources allow.

7

Parking Benefit Districts

Introduction

This chapter of the Parking Management Jump Start Guide covers Parking Benefit Districts, which are an ideal approach to parking management in most conditions where demand is significant. Parking Benefit Districts are areas with paid on-street parking, where some or all excess revenue is returned to the district to fund services and improvements.

The concept of using meter revenues to fund public services has a long history, dating back to the establishment of the Old Pasadena Parking Management District in Pasadena, CA in 1993. Here, meter revenue funded projects like repaving sidewalks, improving utilities and streetlighting, and installing amenities like street trees and benches, as well as ongoing services like cleaning and enforcement. It was an unequivocal success, as business revenues within the district rose significantly, accompanied by increased property values, which in turn spurred various redevelopment and historic preservation efforts.

Influenced by the success of the Old Pasadena program, with the publication of The High Cost of Free Parking in 2005, Donald Shoup recommended the strategy of returning revenues to the metered district—along with charging the "right price" for curb parking and eliminating off-street parking requirements—as one of his three core tenets of parking management. Soon thereafter, the term "Parking Benefit District" began to be used to describe districts that employ the strategy, and the concept continues to be refined and formalized. Benefit Districts are considered a best practice in many common situations and, as such, there are several recent explorations and guides, including Donald Shoup's *Parking Benefit Districts*[1] and the Parking Reform Network's *Parking Benefit Districts – A Guide for Activists*[2]. The advice offered herein aims to be consistent with those publications, focusing on the specific contexts and cases encountered throughout Oregon.

Parking Benefit Districts potentially offer win-win solutions to parking congestion. They are powerful tools for managing parking demand that also can grow to be politically popular, since they raise money for local services and amenities. Additionally, over a longer term Benefit Districts tend to increase property tax revenues and spur private investment in the neighborhoods where they are in place. There are also benefits to public safety, as parking enforcement officers serve as a deterrent to crime, and there are more eyes on the street from visitors and enforcement officers.

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[1] Shoup, Donald, Parking Benefit Districts. Journal of Planning Education and Research, March 2023. https://doi.org/10.1177/0739456X221141317

[2] Kindler, Evan, Tony Jordan, and Jane Wilberding, Parking Benefit Districts—A Guide For Activists. Parking Reform Network, https://parkingreform.org/playbook/pbd/, retrieved June 20, 2024.

Where and When to Consider Benefit Districts

Consider Benefit Districts wherever curb pricing is needed. As discussed previously, pricing is typically needed in areas where peak parking demand is more than around 85% of supply and non-pricing interventions have not significantly reduced this. While cities have historically directed parking revenues into general funds, there is potentially greater management benefit from spending the money locally on supportive projects. Combined with the fact that Benefit Districts often turn meters from a political loser to a winner, the strategy should be considered for any area that uses (or is considering installing) parking meters.

While the first Benefit Districts were established within commercial areas and supported by meter revenue, Benefit Districts are increasingly emerging in residential and/mixed use areas, with permit programs providing some or all of the funding in addition to or in lieu of meters. Donald Shoup argues the residential areas where Benefit Districts will work best are densely populated ones where curb parking is overcrowded, public services are undersupplied, and most residents either have access to off-street parking or do not own a car.

Using parking revenue to fund local improvements and infrastructure is typically popular politically. Although metering is likely the most powerful tool a city can deploy to manage parking, it can be politically contentious to charge for what people have experienced as free (although the time lost searching for parking is a different sort of cost). Parking Benefit Districts provide an effective mechanism to assuage concerns and build business and customer support for metering.

From a management perspective, returning funds to the local district allows for improvements to walking conditions, transit access, and other amenities that can reduce car dependency within the area and thus the need for parking supply. Cities directing parking revenues to the general fund risk getting caught in a vicious cycle where they grow dependent upon that revenue. In the long term this can perpetuate a cycle of auto dependency, whereas revenues from Benefit Districts offer far more avenues to reduce dependence on cars and thus overall parking demand.

Key Elements and Best Practices of Benefit Districts

Spurred by the work of Shoup, the Parking Reform Network, and others, the popularity of Benefit Districts has grown quickly in recent years, and several of common elements and best practices related to implementation of Benefit Districts have emerged. Based upon a survey of existing Benefit Districts as well as the previously cited articles, the following are common and recommended elements of a Benefit District. Technically only the first element—paid parking with some of the revenue returned to the district—is a requirement of Parking Benefit Districts, however the other elements below are often featured as well and have emerged as best practices in the implementation and administration of Benefit Districts.

1) Parking is priced with meters, permit systems, or some combination, with a portion of revenue returned to the district

The defining characteristic of Benefit Districts is that they include priced on-street parking (whether through meters, permits, or both), with some portion of excess revenues spent within the district on locally preferred services or amenities.

There are any number of different ways to price parking via meters and permits—these are described in detail in Chapters 5 and 6. Additionally, there are several different arrangements by which money can be returned to the district. For instance, in Portland's Northwest and Central Eastside Industrial Districts, a fixed amount of revenue—50% of all meter revenues and 100% of all permit revenues, less administration costs—are returned to the districts. Similarly, in Old Bend, excess revenues from permits sold within the district are split 50/50 between the district and the Parking Services Division Fund. Outside Oregon, Brookline, Massachusetts uses an approach somewhat akin to tax-increment financing, with the 2019 ordinance creating the Benefit District directing existing revenues to the general fund, but incremental increases in revenues back to the Benefit District.

2) A standing committee of interested parties to advise on pricing, policy, and expenditures

To build and maintain support for the Benefit District, cities typically establish a standing committee to decide on the specific parking management prices and policies in place within the district, and to identify or approve the projects and services that the revenues will fund. The advisory board should include a mix of impacted interested parties, including homeowners, renters, merchants, employees, etc., and cities should aim to create as diverse and representative a group as feasible. The committees meet on a regular basis, often monthly or bimonthly, with meetings typically open to the public. This committee plays a key role in supporting the city in the administration of Benefit Districts. An existing committee with overlapping interests, such as a downtown advisory board, may be able to serve this purpose.

3) Collection of regular and reliable usage data

To inform how parking is priced and how other management policies are structured, it is critical to understand the usage and demand patterns within the Benefit District. Reliable data is essential for understanding where, when, and how high to price parking, and for measuring the impacts of management undertaken. Further, it helps build and maintain support for a Benefit District, as decisions around pricing are made to clearly and transparently further management goals.

4) Market-rate pricing

Pricing parking at market rate—the lowest price that results in occupancies around 85%—will both maximize the management impact of the Benefit District while maintaining broad support for pricing, as market rate pricing shows that the primary goal is management rather than maximizing revenue.

The simplest way to achieve market rate pricing is to set a meter and/or a permit price for the entire district, and then adjust those prices on a regular basis such that average occupancies regularly peak at or just below 85%. More involved and precise approaches include following the same set-and-adjust strategy but for smaller areas such as subdistricts or individual block faces, or varying prices based on times of day or days of the week, with the goal of achieving target occupancies as often as possible and as widely as possible.

Market rate parking pricing is not strictly essential to the establishment of a Benefit District, but it does contribute to its popularity and success, and as such, most Benefit Districts are supported by some level of market rate pricing.

5) Few to no parking requirements

Benefit Districts are often seen in areas that have reduced or eliminated off-street parking requirements for new development and redevelopment. In some cases, the Benefit Districts are implemented after the reforms are in place to manage the expected increase in demand for street parking. However, as Shoup explains in The High Cost of Free Parking and elsewhere, managing parking with market rate pricing and Benefit Districts renders parking requirements unnecessary as off-street parking will be developed as the market demands. Further, elimination of parking requirements within Benefit Districts can help spur redevelopment of older buildings with little to no off-street parking.

6) Regular public outreach

To maintain ongoing support for Benefit Districts, cities often hold regular open houses, workshops, or other public events to educate and inform people living, working, or playing within the Benefit District. These initiatives often complement the work of interested party committees, occurring less frequently—perhaps one to two times per year—and aim to include as wide a swath of the public as feasible.

As parking benefit districts are still a fairly new way to manage parking, these outreach efforts are crucial to winning and maintaining widespread buy-in for the management strategies. A frequent aim of these public workshops is to publicize the benefits financed by the Benefit District, particularly in the cases of services that people need to know about to opt into, such as Portland's Transportation Wallet program, described in the case study below.

7) Reinforcement and signage

Relatedly, it is recommended that cities showcase Benefit Districts and the improvements that they pay for through signage and identification. This can be done with stickers or signs placed on meters or pay stations, or a decal or indication on new amenities. The goal is to make people aware of the amenities the Benefit District is providing and reinforce the notion that meter revenues are both necessary for parking management and providing for public goods. Some examples are shown in Figure 1.

Figure 1: A refuse and recycling container in NW Portland paid for with Benefit District revenues and proudly advertising it and a parking meter from the Old Pasadena Parking Benefit District from Kolozsvari and Shoup[3]

[3] Kolozsvari, Douglas and Donald Shoup, *Turning Small Change Into Big Changes.* ACCESS Magazine #23, Fall 2003.

Case Study:

The Ultimate Mixed-Use Parking Benefit District, Northwest Portland

A previous case study examined Northwest Portland's unique management system: all parking within the district is metered, but residents and employees can buy an annual permit in lieu of feeding the meters.

As Northwest Portland began to grow and thrive coming out of the Great Recession of 2008, sentiment within the neighborhood was divided on how to manage demand, with many looking for opportunities to add new supply in lieu of pricing solutions. However, by committing to returning 50% of meter revenues to the district (at the time all existing meter revenue in Portland went to the general fund), PBOT won support to install meters in a wide swath of the district in 2016.

While the meters were immediately impactful at managing demand, permits were oversold and at $60/year, far too inexpensive, so parking congestion remained. To address this, the District took a market-based approach, capping the number of permits sold on a per-building basis and adjusting prices based on observed demand to the current (2024) price of $202.50/year. Again, the idea that revenues are returned to the district—100% of net permit revenues are returned to the district after administration and collection costs—was instrumental in winning and maintaining support for this policy.

A key benefit funded by this program is the Transportation Wallet program. The Transportation Wallet concept evolved over many years, with significant study and outreach focused on the Northwest District and aims to reduce the need for street parking by providing access to transportation options available in the area. The 2024 Transportation Wallet costs $99 and includes an annual pass on the Portland Streetcar, a TriMet Hop Card loaded with $200, $99 in Biketown credits, and $30 in e-scooter credits. Additionally, an Access-for-All Transportation Wallet program aims to increase access to these modes for low-income households, by providing these resources for free.

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Case Study:

A Parking Benefit District around Events, Eugene[4]

The City of Eugene has a number of unique parking management challenges arising from the University of Oregon's campus and the dense residential neighborhoods surrounding it. A textbook example of this is the Matthew Knight Arena, home to the Ducks basketball teams which also hosts events like concerts, tennis matches, rodeos, and monster truck rallies. Though the arena seats 12,500, it was proposed with only 370 new on-site parking stalls.

This plan predictably raised concerns about parking within the Fairmount neighborhood where it was to be located. To address these concerns, a Neighborhood Arena Liaison Committee was formed, consisting of representatives from the University of Oregon, local businesses, the City of Eugene, and the Fairmount Neighbors Association. The committee worked to develop an Arena Impact Mitigation Agreement, identifying impacts and potential mitigations, the latter of which included measures such as street improvements, litter patrol, free permits for residents, and enforcement and monitoring. This would be paid for by the University in exchange for the ability to sell permits for on-street parking during events, creating a Benefit District that was fully funded by event parking.

Overall, the event-based Benefit District around Matthew Knight Arena has been successful in balancing the needs of the arena with maintaining neighborhood livability. In addition to the event-funded services and amenities, the creation of the event parking district virtually eliminated congestion from employee and student parking. The district remains financially self-sustaining, with the university allowed to sell event parking permits for up to 22 events per year. According to Eugene's Curbside Services Director Jeff Petry, "Ultimately, the new arena allowed the city, the university, and the neighborhood to find a way, through sometime difficult conversations, to come together, develop a plan, and function as a community team."

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[4] Petry, Jeff, *Shooting for Three*. The Parking Professional, pp 20-23, April 2012. This case study is drawn from this source and direct conversations with the author.

Case Study:

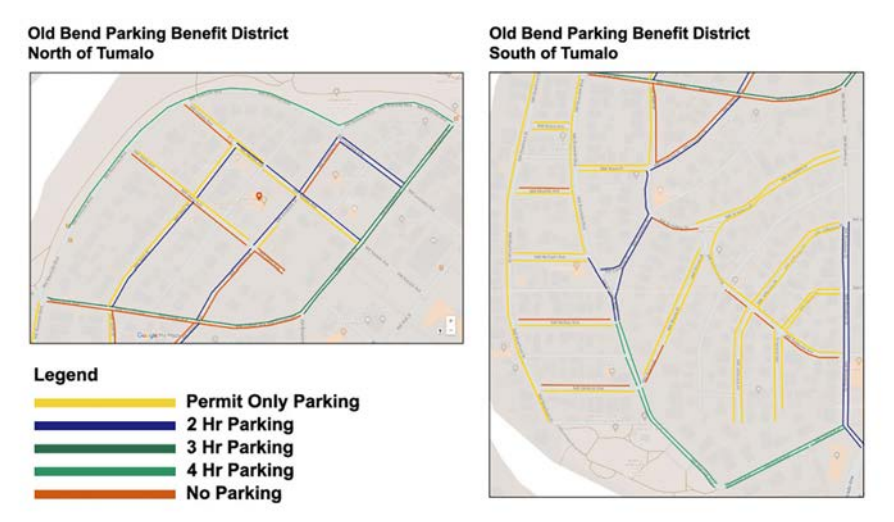
A Residential Parking Benefit District in Old Bend

The City of Bend recently implemented its first Parking Benefit District within the Old Bend neighborhood, a dense residential area just southwest of downtown that has seen significant growth at its outskirts. From the city's website:

"The Old Bend Parking District was created to bridge the gap between parking availability and demand, increase neighborhood livability and safety, and efficiently manage parking. The Parking Benefit District is overseen by a committee composed of neighbors living in the geographic boundaries of the parking district. People living in the Parking District who own a car that they need to park on the street may purchase an annual parking permit to utilize street parking in their neighborhood."

Bend implemented the Old Bend Parking Benefit District as a pilot program in 2020, and made it permanent in 2021. Unlike many Benefit Districts, there is no metered parking; instead, all revenue is derived from sale of residential permits. The city allows residents to purchase permits for an annual fee of $25, businesses to purchase monthly permits for $5 ($60/annually), or operators of short-term rentals to purchase permits for $150/year. There are also options for visitor passes or special event passes. For non-permit holders, parking on some streets is prohibited while on others it is limited to 2, 3, or 4 hours based on demand.

Revenues from the sale of permits above the collection and administrative costs are split 50/50 between the Parking Services Division and the district, with district revenues intended to fund parking supportive projects "including but not limited to walking and biking infrastructure, street trees, benches, and lighting, or projects previously identified but not funded under the Neighborhood Street Safety Program."



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A Guide to Parking Benefit District Implementation

1. Identify a preliminary parking management area

The first step is to select a preliminary area for a potential Benefit District. At this stage, it is not necessary to precisely define the boundaries of the district or identify where specific parking management measures will or won't be implemented. Rather, envisioning a general area or district where a Benefit District might be appropriate is sufficient to start the process.

So how does one identify areas that may be appropriate for Benefit Districts? Any area where metering may be warranted is a candidate, as Benefit Districts are currently seen as something of a best practice in implementing metering. Additionally, per Shoup, residential areas are good candidates for Benefit Districts when they are (1) reasonably dense and have high demand for on-street parking; (2) could benefit from additional funding for services and improvements; and (3) feature non-driving travel options and/or off-street parking opportunities for many residents.

2. Determine the process for implementing a Parking Benefit District

Depending upon what parking management a city already has in place, introduction of a Benefit District may require amendments to code or new sections of code. City staff or Benefit District proponents should determine any new code or procedural hurdles that must be addressed to implement a Benefit District, considering factors like timeline and any potential political allies or opponents. Winning support for Benefit Districts may require outreach to city councilors or other elected officials. Ideally, proponents of the Benefit District can identify a "champion" serving on the deciding body to spearhead efforts to pass any needed code amendments.

3. Identify a group of interested parties and form an advisory committee

Ideally, Benefit Districts will be initiated by neighborhood residents, often driven by local business owners or other stakeholders as parking congestion becomes problematic. Cities should facilitate this process, helping to identify stakeholders and elevate voices from underrepresented communities. As with all public processes, there is a delicate balance between ensuring the loudest voices are heard in earnest and the quieter ones are drawn out. Ongoing management of this group is one of the biggest challenges cities face in the administration of Benefit Districts. General guidance on parking-related stakeholder engagement is provided in Chapter 2.

The advisory committee will play a key role over the life of the Benefit District, informing or making decisions on management measures and expenditures of funds, and will be a key liaison between the city and community for building and maintaining support for the Benefit District.

4. Conduct outreach and collect and analyze utilization data

Successful and well-supported parking management strategies must address actual parking issues while remaining responsive to people's perceptions regarding the parking experience. Thus, it is crucial to ensure ample data and engagement initiatives to have a solid understanding of the functioning of the system and the dynamics that need to be managed.

This Guide provides information on how best to do that in Chapter 2. Like the parking supply itself, data collection efforts should be right-sized to thoroughly understand any issues, while still being efficient and cost effective. Further, the initial round of outreach and data collection should be thought of as providing a snapshot in time prior to implementation of management. The process will need to be repeated following implementation to determine how the management measures are working and what changes, if any, are needed. Data collection and outreach efforts should be designed accordingly.

5. Decide on management strategies and prices for meters and permits, refining district boundaries in the process

With a sound understanding of how the parking system is functioning and experienced, the city and advisory committee can begin to make specific decisions regarding the geographical extents of the Benefit District, prices for meters and/or permits, strategies to make prices demand responsive, time limits, and other policy or management initiatives.

6. Decide what the revenue will be spent on and begin planning improvements

From the perspective of local residents and business owners, one of the best things about Benefit Districts is that they provide a revenue stream for any number of popular or attractive improvements or services. Thus, a key piece of implementing Benefit Districts is identifying the particular projects that will be funded, the priority order of funding, and related matters. Sometimes there are known needs, such as unfunded projects as part of a broader neighborhood or community plan, while at other times the city and advisory committee may have considerable discretion over what sorts of projects are funded.

In addition to the ongoing revenues obtained from meters, the Benefit District provides a reliable source of future revenue cities can bond against to finance immediate improvements. This is indeed what Old Pasadena did upon establishing the nation's first Parking Benefit District in 1993, financing a streetscape project that provided an instant, significant benefit to the metered district by adding lighting, street trees, seating, and other improvements.

7. Implement

With the key decisions around strategies, prices, and funded amenities made, it's time to implement the Benefit District! The timing of implementation is often a balancing act; any required code updates must be approved legislatively, all key decisions regarding policy and pricing must be finalized, and all new equipment and signage must be in hand. The initial roll-out of Benefit Districts typically includes a significant outreach element since many of the management techniques are new or may be unfamiliar. Cities often include a grace period with warnings, prior to enforcement beginning in earnest.

8. Monitor and Reevaluate

Lastly, it is important to continually monitor and re-evaluate the performance of a Benefit District, adjusting prices and other management interventions based upon the impacts to demand patterns of the initial interventions and changes in land uses or other usage patterns in the neighborhood.

If a Benefit District is implementing demand-responsive pricing, it is necessary to collect new data regularly, as funding allows. As technology evolves, innovations that make continual monitoring of usage patterns are becoming more accessible, making more powerful performance-based pricing schemes feasible. Regardless, the city and advisory committee should regularly review performance of the program, making necessary adjustments to prices, policies, and district extents to ensure the district is working optimally.

Parking Benefit Districts:

A Guide to Implementation

I. Planning

1. Identify a preliminary management area where parking is in high demand and Benefit Districts represent a potential solution.

2. Determine the process for implementation, including code adjustments or additions to existing parking regulations.

3. Identify a group of diverse and representative stakeholders and convene an advisory committee.

The three planning stages can occur interchangeably or concurrently.

The implementation and evaluation stages are iterative. Set policies, observe the impacts, adjust as needed.

II. Implementation

4. Conduct outreach and collect and analyze utilization data to understand use patterns and pain points.

5. Decide on management strategies, prices, and policies, with the goal of demand-responsive, right-priced parking.

6. Decide on projects and priorities where revenues will be spent, in close consultation with the advisory committee.

Steps 5 & 6 can occur interchangeably or concurrently.

7. Implement the district, updating the code as needed and procuring necessary equipment, signage, etc.

III. Evaluation

8. Monitor and reevaluate, ensuring prices and policies align with optimal management outcomes.


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8 Enforcement

Introduction

This chapter discusses enforcement of parking regulations. The goal is to complement the discussion in previous chapters regarding the various management initiatives cities implement at various stages of the Parking Management Journey through a deep dive into the sorts of enforcement strategies that are (or aren't) necessary to support parking management strategies.

There are three primary ways that Oregon communities enforce their parking regulations:

- Directly, with members of the police force;
- Directly through deputized civilian employees that function primarily or exclusively as parking management officers; or
- Indirectly, by contracting with a partner (e.g., downtown association or chamber of commerce) or a private company specializing in management/enforcement.

The pros and cons of each approach are discussed herein, along with a detailed look at how enforcement complements and reinforces the various management strategies described in this guide.

Goals of Enforcement

The top-line goal of parking enforcement is to ensure management measures achieve their full impact, optimizing the efficiency of the parking system, by strategically ensuring parking regulations are followed.

There are several secondary goals of enforcement, and other factors to consider when designing an enforcement program. During the outreach process, local partners emphasized parking enforcement officers are often a first point of contact for visitors. In this capacity, they can help manage parking in a proactive and non-penal way, pointing visitors to appropriate parking and enforcing regulations with discretion. Many parking/code officers handle impacts of the houselessness crisis, including street camping, nuisance vehicles, etc.

With this in mind, enforcement programs should be designed first and foremost to support parking management initiatives in place, while giving due consideration to second-degree factors including enforcement of other issues within the right-of-way and the impact on visitors and relations.

Case Study:

Right-Sized Enforcement, Oregon City

Oregon City provides a good example of a right-sized parking enforcement program that is responsive to the various contexts and management initiatives in place throughout the city.

In downtown Oregon City, one full-time officer is responsible for enforcement of the metered and time-limited areas of on-street parking, as well as parking in the downtown municipal lot. The goals of the enforcement program are to ensure payment in metered areas and within the municipal lot, and to maximize turnover. The multiple payment options Oregon City allows add a degree of complexity, as the officer must check the app (HotSpot), the coin-operated meters, and the kiosks for payment.

On average, the officer writes about ten $20 tickets per day. In addition to ticket revenue, the enforcement efforts increase meter revenues to some degree by ensuring maximal compliance with paying and observing time limits, so the city regards this effort as essentially revenue neutral. In addition to parking work, the officer plays a crucial role as a de facto visitor guide for downtown. In this role, the officer gets to know the downtown businesses and regular visitors and can help point visitors to the best parking for their destinations, while enforcing regulations with contextual awareness and discretion. The community tends to view this as a net positive from visitor relations and communications standpoints.

Outside of downtown, the city employs 1.5 full-time equivalent (FTE) parking officers, responsible for enforcement of the parking regulations in place beyond downtown (ADA parking violations, permit violations, etc.), and an additional 2.5 code enforcement officers responsible for handling abandoned vehicles and similar complaints.

Image: Google Earth

Enforcement Structures

As described above, there are three basic enforcement "structures" in use throughout Oregon at present: enforcement with regular police officers, enforcement with deputized civilian employees, or enforcement on a contractual basis with an outside partner.

Table 1 summarizes which cities use each approach, and the high-level considerations of each.

Table 1: Basic enforcement structures, some locations where they are used, and considerations around implementation

Structure/ approach	Used in…	Considerations
Enforcement with police	Dundee, Forest Grove, Madras, Newberg	This is typically the easiest structure to employ when implementing or expanding parking enforcement, as cities can simply assign enforcement duties to existing police departments. However, it can be expensive for these officers to devote a significant amount of time to parking enforcement and enforcement issues are of low priority relative to other duties of sworn officers. Well-managed parking is rarely the reason police officers enlist. Therefore, police-based enforcement typically only occurs on a complaint-driven basis, in cases where there is relatively low need for enforcement.
Enforcement with deputized civilian employees or code enforcement officers	Dallas, Portland, Eugene, Klamath Falls McMinnville, Newport, Oregon City, Troutdale	Enforcement with deputized civilians or code enforcement officers tends to be more cost effective than with sworn police officers. Dedicated parking enforcement personnel command lower salaries (e.g., $25-$35/hour compared to $40+ for sworn officers, plus lower PERS rates and higher retirement ages). Further, since these officers spend most or all of their time enforcing parking, they typically represent a far more impactful, experienced, and skilled enforcement solution than relying upon sworn officers. This can be more time intensive to first implement, as it often requires a city to create a new employee classification and brings up questions about where in the government structure the position will be based (often Public Works, Transportation, or Planning/Development). Dedicated enforcement personnel are often used in conjunction with metered parking, as meter programs require a robust level of enforcement and provide a revenue stream to pay staff. It is also seen where enforcement needs justify dedicated employees, and projected revenues from the enforcement justify the expense. Code enforcement officers are often used to complement parking-specific personnel, and provide a good way to "split the difference," costing less than police officers but able to enforce a variety of city ordinances in addition to parking.

Table 1: Basic enforcement structures, some locations where they are used, and considerations around implementation (continued)

Structure/ approach	Used in…	Considerations
Enforcement on a contractual basis with an outside partner	Albany, Ashland, Bend, Medford	Contracting with a business or local partner often provides a simple and streamlined solution for city staff, as agreements can often be tailored to suit management measures and enforcement needs that are straightforward to scale with the management in place. These agreements often entail little to no up-front cost to the city, and thus can be readily implemented with minimal impact to staffing or budget, even in cases where little to no enforcement has previously occurred. The key drawback of this approach is that the city will typically forego some or all of the parking revenue to pay for these services. While a revenue-neutral parking system often is fine, it can make it difficult to implement best management practices, such as parking benefit districts. Private enforcement officers are often paid a lower hourly rate than sworn officers or deputized city employees (typically around $20/hour), with the contractor incentivized to minimize wages and other costs. Additionally, tweaking things like enforcement hours or other elements of the approach may be difficult depending upon how the contract is written.

Designing Enforcement to Support Management Strategies

It is helpful to consider management strategies and related enforcement strategies as something of a feedback loop. Management strategies like permit programs, meters, etc., are influenced by what a city can and cannot feasibly enforce, while enforcement efforts are influenced by the design of the management program that they aim to support. This dynamic is illustrated in Figure 1 below. Previous chapters focused on management strategies discussed some of the considerations of enforcement, expounded on below. When implementing management and the supporting enforcement, it is important for cities to consider the impacts and outcomes from both directions within the feedback loop.

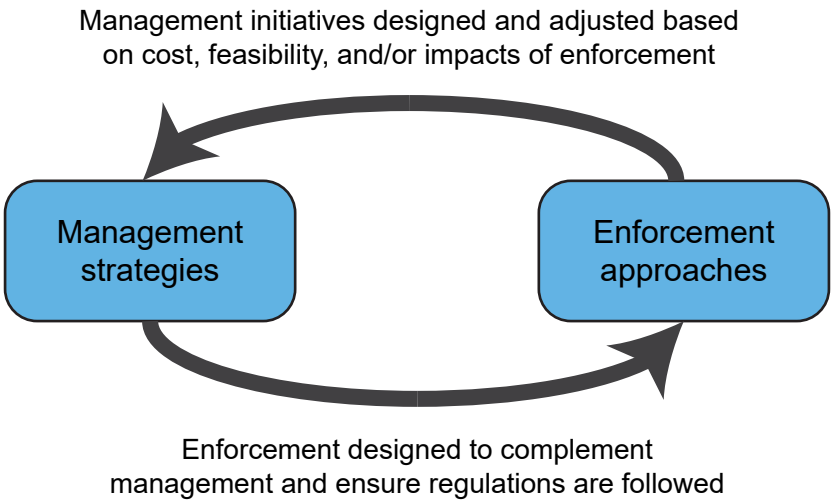


Figure 1: The Parking Enforcement Feedback Loop

Enforcement Hours

A key consideration when designing or updating an enforcement program is setting the hours that parking regulations are enforced to optimally address parking issues. This has been a challenge for cities in Oregon and beyond, as the optimal hours for enforcement can be difficult to enforce from a practical and personnel standpoint.

Case Study:

Enforcement with a Community Partner, Albany

Albany currently contracts with the Albany Downtown Association to manage downtown parking and conduct enforcement via a program branded as ParkWise. The program employs two "Parking Ambassadors" who split six 7-hour shifts each week, responsible for a combination of public relations—helping people understand regulations and find appropriate parking—and traditional enforcement. They are supported by about 35 hours per week of work from office staff, whose role is administrative. ParkWise manages permitting, enforcement and light maintenance, while the City is responsible for major maintenance. Revenue from tickets goes to ParkWise and is sufficient to support the program. Unpaid tickets are followed up on first with a letter from ParkWise and, if still unaddressed, are sent to collections.

This has historically worked well in Albany, as ParkWise can tailor its management and enforcement efforts to provide robust access to downtown in consultation with business owners and other stakeholders. As their name suggests, the Parking Ambassadors serve as liaison for visitors in much the same way as Oregon City's downtown enforcement officer, and the program tends to be accordingly popular locally (insofar as parking management can be described as "popular").

However, the City is currently considering a number of management changes including the potential introduction of metering downtown. When implemented, these changes may trigger the need for the City to reassume parking enforcement responsibility, with citations adjudicated through the local court system.

Image: Tim Davis

For example, in downtown Portland metered hours are in place from 8 am to 7 pm on weekdays and Saturdays and 1 pm to 7 pm on Sundays. The cost of enforcement plays a key role in setting these hours; the workers are unionized under the District Council of Trade Unions, and command higher wages to enforce at nights and on weekends. However, parking demand tends to be fairly light downtown prior to 11 am. Conversely, it is often quite high after 7 pm, particularly on weekends. A more optimal enforcement schedule would be from 11 am to 9 pm weekdays, and perhaps extend until midnight Fridays and Saturdays. This is currently infeasible to implement from a personnel standpoint.

Time limits and other regulations are often lightly enforced or not enforced at all and still provide some management value despite the lack of enforcement. Likewise, nothing prohibits a city from requiring a payment, permit, etc. during times that are not practical to enforce. While compliance might be significantly lower without the support of enforcement, some compliance is still of more value than no compliance from a management perspective.

Enforcement of Time and Use Restrictions in Non-Metered Areas

Enforcement of time restrictions in non-metered areas has historically been challenging for cities. It is a labor-intensive process and, absent meters or permits, there are typically limited revenue streams for supporting it.

Historically, time restrictions were enforced via an officer chalking tires, wherein a literal chalk mark is placed on a tire. If the allotted stay time is exceeded without the chalk mark moving, a ticket is issued. Though labor intensive, this provided a straightforward method for enforcement in these contexts. However, recent court cases have brought the legality of this practice into question as a Fourth Amendment issue, and other traditional ways of enforcing time limits, such as with handheld license-plate readers, are just as labor intensive.

This has led many cities throughout Oregon to enforce time limits on a primarily complaint-driven basis, and in some cases, they are unenforced altogether. In Newberg and Dundee, for example, time limits are in place throughout downtowns but not enforced. As described in Chapter 4, the time limits still have some benefit, as many people don't know they are not enforced or choose to follow the time limits anyway.

As technology advances, other potential solutions are emerging to efficiently, and often passively, enforce time limits. This is discussed further in Chapter 9, *Technology and Parking Management.*

Enforcement of Metered Areas

Enforcement of metered areas is typically much more straightforward than enforcement of time-restricted areas for two reasons:

1. The meters indicate whether or not a particular vehicle is in violation or not; there is no need to chalk tires or otherwise manually check for violations; and

2. The value proposition of enforcement is clearer, since the enforcement process not only generates revenues directly via tickets but also indirectly by discouraging people from failing to pay or overstaying their paid times.

Because of this, metered parking is typically enforced robustly, and adequate enforcement is considered an essential element of a metered system. However, as with timed parking, meters could have some benefits absent enforcement; this is the case in Silverton, where meters are unenforced but enough visitors and patrons are unaware of this, so they still create turnover.

Historically, meter enforcement was conducted via an officer visually inspecting the meter's status or the receipt/window sticker provided upon payment. However, as coin-operated meters are increasingly replaced with pay stations and/or kiosks supported by web- or phone-based payment systems, enforcement officers need to check all of these mechanisms for payments before issuing a ticket. Again, technological innovations are streamlining this process, with many license-plate recognition-based systems able to track all payment methods simultaneously. This is discussed further in Chapter 9.

Enforcement of Permit Areas

As with meters, enforcement is a crucial element of a permit program's success. Because these programs are primarily in places where demand for on-street parking is high, tightly enforcing permit regulations is essential to maintain the value of the permits and general efficacy of the program.

Permit areas tend to be managed via time limits for non-permitted users, which results in the difficulties with enforcement described above also applying here with an added complication: The officer must first check for a permit to determine if it's necessary to check for time limit compliance. Again, technological solutions are increasingly available to reduce this complexity, allowing for both permit recognition and "digital chalking" via license-plate recognition and related technologies.

Residential permit areas offer a good example of a situation where it is important to align enforcement efforts to the desired impact. For example, the peak demand periods for residential parking tend to occur overnight (approximately 12 am to 4 am) on weeknights, as this is when the highest percentage of people are typically at home, so this can be an important (if difficult) time to enforce. However, parking congestion in residential areas is often caused by employees of nearby businesses or uses such as schools, churches, etc. during their peak times. So enforcement strategies should be tailored to address these demand streams as well.

To streamline enforcement, cities might consider replacing time limits within residential permit districts with a prohibition on overnight parking. This would enable an enforcement officer to enforce the permit district with a single overnight visit, whereby they could simply check vehicles for permits and ticket any vehicle without one. Where feasible, a city might consider implementing meters for unpermitted vehicles in lieu of time limits. This would add revenue and streamline enforcement for reasons described above while streamlining adoption of proper Parking Benefit Districts, as described in Chapter 7.

Setting the Ticket Price

Of course, a key consideration with enforcement is selecting an appropriate ticket price. The cost of a violation needs to be sufficiently high to discourage violations but not so high that it is viewed as overly penal, which could erode support for management and enforcement in general. Practically speaking, cities tend to charge somewhere around $25 for most meter or time limit violations. Parking ticket prices and considerations for cities throughout Oregon are shown in Table 2.

One option to boost compliance is to have escalating tickets for habitual offenders - that is, for the first violation to cost $25, a second violation $50, and so forth. This is the approach Ashland and Bend take. Another potential approach is to advertise the cost of violations on the meters, so users can see that it is cheaper to pay the meter.

Ideally, the enforcement and ticketing process itself will be revenue-neutral, or reasonably close (notwithstanding meter revenues, which are quite often revenue-positive and are likely buoyed by enforcement actions). For obvious budgetary reasons, it is important for the enforcement process to generate enough revenue to cover its costs; however, if significant excess revenues are generated this can diminish support for enforcement (and management in general). In the ideal circumstance, most or all revenues (less administrative costs, etc.) from the combination of meter, permit, and ticket revenue is returned to the neighborhood where it was generated. This is the basis for a Parking Benefit District, as described in Chapter 7.

Case Study:

Contracting Enforcement, Medford

For cities that need some level of parking enforcement but lack the resources to implement it directly, a potential solution is to contract enforcement out to a private company. The cities of Medford and Ashland represent interesting complementary case studies in enforcement via contractual relationships with a private parking management partner.

Medford uses a private company called Diamond Parking to manage parking. Diamond handles all aspects of the management and revenue handling for the city, collecting revenue from both meters and tickets and managing administration of the "PayByPhone" application. The city is charged for the operational expenses of the program—primarily staff time for enforcement officers and administrative support, with standard mark-ups—along with a flat fee of $600/month. Since Diamond handles all revenue directly, the city simply receives a check—or occasionally a bill, if revenues fall short of expenses—at the end of the month.

By and large, this enforcement set-up tends to work well; However, it also provides a good example of management decisions negatively impacting enforcement strategies and revenues. In Medford's metered areas, the first hour is free and patrons only pay for the second (or more) hours. This policy can sometimes cause confusion about when it's necessary to pay and has led to a dynamic where the city brings in more revenue from tickets than meter/lot payments. The city considers this suboptimal from a management standpoint, and local merchants and businesses also have raised concerns regarding the propensity of their customers to get ticketed. At the same time, business owners see the free first hour as a welcome sign to their customers, providing a good illustration of the various trade-offs inherent in setting pricing and enforcement policies.

Image: Google Earth

Case Study:

The Benefit of Changing Enforcement Providers, Ashland

Medford's neighbor Ashland also conducts parking enforcement via an outside contractor and represents a good example of how cities can use the competitive nature of the industry to obtain the best value. Ashland awards a contract for parking enforcement every five years on a competitive basis, most recently in early 2024.

Ashland awarded the current contract to LAZ Parking, which offered a substantial reduction in the annual fee and a better value proposition for the City. Under the previous contract, the City paid a fixed annual fee of $175,600 and $175,900 in 2022 and 2023 respectively. Revenues were $134,600 and $194,000 for those same years. While the City saw a modest surplus in 2023, there was a $45,000 cost to the enforcement efforts in 2022. Under the new contract, the fixed annual cost was reduced to $118,000, with 2024 revenues exceeding $200,000 as of the end of May. The more favorable contract and Ashland's continued rebound from COVID have resulted in a significant increase of revenue from enforcement available to the City.

An interesting outcome is that when the previous provider lost Ashland's contract, they were forced to lay off much of the Ashland-based staff. Some of these employees were picked up by LAZ upon assuming enforcement efforts. By switching providers, the City was able to get a much better value while still effectively retaining many of its existing enforcement officers.

Image: Google Earth

Table 2: Parking ticket prices and notes for cities throughout Oregon

City	Ticket Price	Management/Notes
Albany	$5 for overtime violations $25 other violations	
Ashland	$25 for overtime parking	Additional fines of $25 for 3-4 offenses, and $50 for 5+ offenses in a calendar year
Bend	$45 for overtime violations $50+ for other	“Habitual offenders” are charged 2x, 3x, or 4x these fees for more than 5, 10, or 15 offenses per calendar year, respectively.
Corvallis	$25 for overtime and meter violations	Price increased from $15 on April 1, 2024.
Eugene	$25 for meter violations and most other offenses	
Grants Pass	$25 for first overtime & most other violations $50 for each additional violation within 30 days	
Medford	$25 for first overtime & most other violations $50 for each additional violation within 30 days	
Newberg/Dundee	$50 for most violations	Enforced in partnership via Newberg/Dundee PD
Newport	$30 for meter violations $20 for overtime parking	Meters (and meter violation tickets) implemented May 1, 2024
Oregon City	$20 for meter or time violations downtown	
Portland	$65 for not feeding meter $44 for other meter violations (e.g. overstaying paid time) $85 for permit zone violations	Various other fines for regulations such as parking in loading zones, no-parking areas, etc.
Salem	$25 for most violations	

Adjudication and Appeals

A final consideration in setting prices and policies around violations is providing a channel for adjudication and appeal. The default, and by far the most common method, for parking tickets to be adjudicated is like any other violation, through the municipal court system.

However, in some cases it may make sense for cities to adopt a process to adjudicate them directly. As an example, Eugene's parking violations are currently handled via the municipal court. However, the wheels are in motion to transfer this responsibility to the city's Parking Services department. Eugene's municipal courts would rather focus on criminal cases and the city believes it will be more efficient to handle adjudication and appeals itself due to economies of scale, with one point of contact for parking tickets for the entire process.

Case Study:

Educating through Adjudication, Bend

Bend has recently taken an innovative approach to parking ticket adjudication, attempting to make it easier for people to contest (and win!) parking tickets.

Prior to 2023 Bend's parking tickets were adjudicated through the municipal court system. Tickets were reasonably hard to get dismissed, however 40 to 45% of enforcement actions were warnings rather than tickets.

The city viewed this as something of a missed opportunity, and when the responsibility of parking adjudication was taken over by the Bend's Parking Services Division, they ceased issuing warnings entirely. However, the new in-house resolution system streamlined the appeals process, not only making it easier to appeal tickets but in fact actively looking to dismiss them. The goal is to use the appeal process as a one-to-one opportunity to communicate with and educate members of the public on parking issues. People who fail to get their parking tickets dismissed through this process can still file for a secondary review with the municipal court.

This system has generally been popular with the public, and successful from a revenue standpoint as well. A key goal in Bend is to increase the number of people using the paid parking garage in lieu of timed street parking. To this end, the number of garage transactions increased 12.5% from December 2022 to 2023. This outpaces overall demand growth in Bend, showing that the new policies are effective at pushing users to the garage.

Image: Google Earth

9

Technology and Parking Management

Introduction

This chapter discusses various technological solutions employed to manage parking throughout Oregon and beyond. The emergence and growth of technologies, from license plate recognition to mobile apps, has had a significant impact on how cities manage parking, and can greatly improve the efficiency of system monitoring, fare collection, permit administration, and enforcement. A high-level survey of the landscape is provided herein.

Technological innovations are not a substitute for the basics of parking management—factors like activating under-used parking, right-pricing parking, and otherwise regulating and enforcing appropriately. However, there are currently any number of technologies, products, and packages that can support management plans, often with a revenue-neutral or revenue-positive value proposition. These are explored with the goal of helping cities understand how these technologies can support their management efforts, wherever they are on their Parking Management Journey.

Key Technologies and Context

As detailed in Chapter 5, coin operated meters were first introduced in 1935 and meters based on this original design remained the dominant technology until recently. These meters were enforced via the prominent indicator they displayed when the time paid for had expired. Enforcement necessitated an officer walking patrol route, visually checking for cars parked adjacent to expired meters. Enforcement against “meter feeding”—the process of paying for additional time beyond the permitted limit—required an additional step like recording a license plate number or chalking tires, which often was not done in practice.

Perhaps the biggest technological game changer from a parking management perspective is the emergence of **license plate recognition (LPR)** technology. As LPR technology was introduced to parking management contexts, it eased enforcement of violations while concurrently allowing cities to enforce turnover policies with no added effort.

Concurrently, **cloud-based systems and applications** have also evolved, allowing for greater integration of management and enforcement. This has enabled cities to migrate information on payment statuses in metered settings to the cloud, and to track any permits a vehicle holds. These are tied to the vehicle’s license plate, so an officer in the field is able to retrieve this information in real time with a license plate scan.

At first, LPR systems still required enforcement personnel to walk routes, scanning plates individually, easing the process of enforcement without necessarily expediting it significantly. However this too is changing with the recent growth of **automatic or automated license plate recognition systems (ALPR).** These systems consist of cameras mounted to a vehicle that scan the environment continuously for license plates. When it locates one, it uses **geolocation** to determine the rules of the parking space the vehicle occupies, ensuring

that the stay time, payment status, and/or permit status are all in compliance. If a violation is detected, the officer is notified and will typically verify the violation and print a warning or ticket with a handheld device.

In addition to using ALPR to detect the presence and stay times of vehicles, the recent emergence of machine learning and artificial intelligence technologies have introduced new possibilities for optical detection and analysis. These systems use **Light Detection and Ranging (LiDAR)** or pole-mounted cameras to detect when a vehicle arrives or departs a particular space. This provides real-time data on system utilization, and allows for passive enforcement, as the system is constantly monitoring compliance with regulations and can push a notification to an enforcement officer whenever a violation is detected. This can be especially useful in contexts where parking is timed but not metered.

The City of Bend is currently employing a fascinating mix of most of the technologies described above; the case study is presented below.

Payment Systems and Apps

The explosion of technology has resulted in any number of mobile applications entering the market to facilitate paid parking. Indeed, all Oregon's metered cities aside from Silverton, and most cities with paid lots or garages, allow for payment via app in lieu of payment at the physical site.

By and large, most applications function in much the same way. The user creates an account tied to their phone number (and/or email address), and enters the license plate number of their vehicle(s) and payment information, which can be stored for future use. The app then either geolocates the user and/or the user enters a code to locate their parking space, typically found on a nearby sign or paystation. The process takes about five minutes the first time for most apps, and when the user's account and vehicles are set up, subsequent payments can be made in under a minute. Many apps also allow for phone- or text-based payments.

The key differences in apps tend to be related to compatibility, with some apps much easier to implement with a variety of new and legacy equipment types, and other apps having specific use cases or requiring a backend with certain properties or functionalities. Particularly as cities seek to "layer" a phone- or web-based payment system on top of existing technologies, it is important that the app selected works with the payment and enforcement systems in place. To select a suitable and compatible app, many cities identify a provider through an RFP process. Others aim to be "app-neutral" and accept payments from multiple apps. An example is Hood River, which accepts Parkmobile, Passport, and Waytopark.

Some of the various apps in use in Oregon as of summer 2024 are summarized in Table 1. Of course technologies and the options available to cities are changing rapidly.

Table 1: A sample of parking payment apps and features in use in Oregon

Payment app/ system	Where used	Features and Comments
Flowbird	Beaverton, Clackamas, Port of Hood River	Good integration of parking availability information, and includes reservation system for off-street lots. Unique in tailoring some service to businesses paying for employee parking.
Hotspot	Oregon City	Easy to adapt to existing payment systems. Includes capacity to pay for permits or transit. User-paid fees to use, and some features are not available to users who haven't purchased a "premium" option.
Park Smarter	Eugene	Reliant on users location in lieu of zones. Displays metered spaces individually in red or green indicating whether they're available, and clearly displays pricing information for a space when selected. Capable of supporting and communicating complex pricing structures.
Parking Kitty	Portland	Unique to Portland and includes a number of features specific to Portland like parking maps and FAQs about management. Based on the Passport app.
Parkmobile	Hood River, OSU	Good options to search for parking and reserve parking. Reserving parking is unique to this app, though seems to be geared toward private operators.
Passport	Bend, Eugene, Hood River	Simple interface, based on parking zones. Need to know your zone to pay, no search functionality.
PaybyPhone	Medford, Ashland	Simplest interface for collecting payment among apps, at the expense of features that others include like payment histories and receipts.

Integration of Enforcement

Historically, cities would have to purchase and maintain enforcement equipment on a piecemeal basis, procured separately from other equipment such as meters. These systems could be cumbersome to install, as they required cities to manage data storage, processing, and the integration of LPRs with existing enforcement tools and payment systems.

In practice today, when a city adds enforcement technology to their approach, it is typically in support of implementing pricing or some other management change, and any enforcement tech needed is procured alongside, and heavily integrated with, the other technologies necessary to support the management.

For example, when Newport implemented metering along the Bayfront, the city solicited bids for vendors for an end-to-end solution capable of handling the process from detection to citation. The winning provider, T2 Systems, offered a comprehensive package that included six solar-powered and cloud-connected kiosks ($101,000 over five years); T2's proprietary app and cloud-based payment management ($5,250); electronic parking permits and related LPR technology with citywide applicability ($22,500); and ALPR technology—a vehicle mounted Genetec camera—capable of scanning 3,000 stalls per hour ($107,000). Including contingency, the total cost to implement metering and related enforcement within the approximately 400-stall district was $260,000. This is significantly less than the $430,000 cost projected by the 2018 study, which assumed far more kiosks would be necessary prior to widespread app adoption, and projected more enforcement personnel would be needed based on the existing technology.

DLCD

Case Study:

A Suite of Technology Pursuing "Parking Happiness," Bend

The City of Bend is currently on the leading edge of employing a mix of technologies to monitor and manage parking, including many of the latest tools in both visual detection and license plate recognition and enforcement.

Bend currently represents an interesting case for collecting and understanding parking data, which might well provide a glimpse of what smaller communities will be able to do as technological solutions become more accessible. Beginning in 2023, Bend began working with a vendor, Cleverciti, to measure real-time use of parking spaces within the study area. Using new, purpose-built sensors mounted to streetlight posts, occupancy, time stays, violations, and the like are monitored in real time.

Bend also has installed a number of digital signs throughout downtown, sited along key routes so people see them when entering the downtown core. This provides a wayfinding system that can point people toward lots or street frontage where there is current availability, reducing cruising for parking.

In addition to the real-time monitoring from Cleverciti, the city has also partnered with Passport to manage the payment systems and back end. By integrating the two, the city is able to know

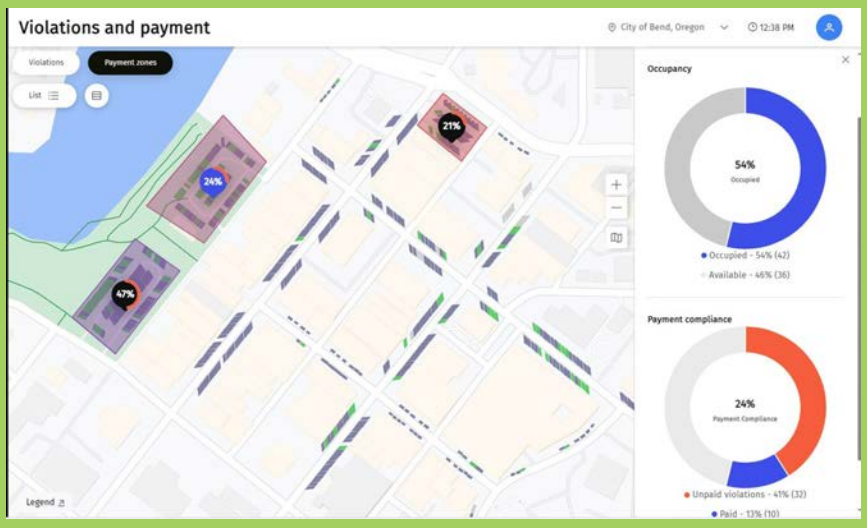
Wayfinding signs in Bend. Image: Ryan Marquardt

which spaces are occupied, when, and for how long with a high degree of accuracy, while also being able to monitor the payment status of any paid stalls. This allows the city's human officers to be laser-focused on violations, as they are alerted quickly if a vehicle overstays the maximum permitted time or time that was paid for. This efficiency leads to further creative possibilities with management, such as Bend's efforts to grant a high number of ticket appeals discussed in Chapter 8.

Longer-term, the city can examine its management and consider any changes needed based upon hard data on the usage of the system. The detailed level of understanding of demand patterns has the potential advantage to help the city transition to on-street metering in the near future, as the city will know when, where, and how significantly its problematic areas are above the optimal 85% occupancy rate.

While the technology represents valuable tools for Bend, the success of Bend's parking management plan depends on the vision that the technology is deployed to support. Tobias Marx, Bend's parking manager, has described the city's vision as "parking happiness"—the idea that a well-managed parking system will bring about joy (or at least absence of significant stress or anger) for all of those who depend on and are responsible for it, from users, to residents, to merchants, to enforcement officers and city staff.

Some examples of Bend's data monitoring and signage are shown in the figures below.



Bend violations monitoring

10

Parking Benefit District Model Code

Introduction

Several code additions or amendments are typically necessary for implementation of a parking benefit district. To aid cities in developing and implementing these code amendments, the structure of code implementing Parking Benefit Districts in Portland and Bend is summarized below, with relevant code sections cited.

The examples below are drawn from a mix of Portland's Chapter 16.35, *Parking Management Plan District,* and Bend's Chapter 6.20.035, *Parking Benefit District.*

1. Purpose Statement

Benefit District ordinances typically begin with a general statement of the purpose and goals:

> *Chapter 16.35 is added to Title 16 to address parking challenges presented in congested inner neighborhoods of the City, while striving to maintain livability and business vitality in those designated parking districts. Parking Management Plan Districts seek to balance these various aspects through such mechanisms as residential and business parking permits, varying times for parking meters and flexibility for visitors to the districts.*
>
> Portland City Code 16.035.010

> *Parking Benefit Districts are intended to reduce hazardous traffic conditions resulting from the use of streets within areas zoned primarily for residential uses for the parking of vehicles by persons attending nearby recreational or commercial facilities, events, or districts; to protect the residential and commercial users along the streets from polluted air, excessive noise, and trash and refuse caused by entry of such vehicles; to protect residents, businesses, customers, and guests of those areas from unreasonable burdens in gaining access to their residences, businesses, or accommodations; to preserve the character of those areas as primarily residential areas; to promote efficiency in the maintenance of those streets in a clean and safe condition; to preserve the value of property in those areas; and to preserve the safety of children and other pedestrians and traffic safety.*
>
> Bend City Code 6.20.035.A

2. Definitions

Any new or unique terminology used in enacting the Benefit District or setting policy should be described. Typically, this is where the boundaries of the Benefit District will be defined. For example, Bend provides definitions for Benefit Districts themselves, the Old Bend Benefit District, and the "Parking supportive projects" funded via revenues.

> ***1. Parking Benefit District*** *means a defined area within which parking may be restricted by signs or require parking permits, fees for which will be established by Council by resolution, in which a portion of revenues from permit sales and citations is allocated for projects supportive of parking and pedestrian infrastructure within the district boundary.*
>
> ***2. Old Bend Neighborhood Parking Benefit District (OBNPBD)*** *encompasses all public streets, alleys, parking lots and sidewalks within the following boundary description and as shown on the map following the boundary description:*
>
> > *a. Beginning in the north at the corner of NW Riverside Boulevard and Broadway Street, then following the east side of NW Riverside Boulevard to the west and south until the corner of NW Riverfront Street, then going south on NW Riverfront Street to Miller's Landing Park, then turning west following NW Riverfront Street to the corner of NW Riverfront Street and NW Riverside Boulevard, then turning southeast onto NW Riverside Boulevard, then turning northeast onto NW Carlon Avenue to the corner of NW Broadway Street and NW Carlon Avenue, then turning north onto NW Broadway Street to the corner of NW Broadway Street and NW Tumalo Avenue, then following both sides of NW Broadway Street north to the point of beginning.*
>
> > ***b. Parking supportive projects*** *means projects to improve the right-of-way within the district, including but not limited to walking and biking infrastructure, street trees, benches, and lighting, or projects previously identified but not funded under the Neighborhood Street Safety Program.*
>
> Bend City Code 6.20.035.B

3. Directive

Benefit District ordinances should include a statement formally empowering the city (or a specific employee or division thereof) to administer and enforce the Benefit District. This could be a self-contained statement, like with the Old Bend Benefit District:

The City Manager is directed to implement the OBNPBD as follows:

1. Establish regulations setting the days of the week and the times of day for parking management solutions, which may include but are not limited to:

a. Time limited parking;

b. Paid special event parking;

c. Paid on-street parking;

d. Permit parking.

2. Erect signs indicating the required permits or limitations on parking throughout the OBNPBD.

Bend City Code 6.20.035.D

Alternatively, it could refer back to other controlling ordinances regarding parking, like the Portland Benefit District code:

Except where explicitly addressed in Chapter 16.35, the provisions of Title 16 shall control parking of motor vehicles. The Council separately establishes Parking Area Management Plans. The City Traffic Engineer has authority under Title 16 to adjust boundaries within Parking Area Management Plans for meters and permit requirements through signage within the boundaries of established Parking Area Management Plans.

Portland City Code 16.035.010

4. Permit policies and rules

In Benefit Districts where permits are used, ordinances indicating any permit policies and rules, such as prices, expiration dates, display rules, violation parameters, etc. should be specified. Ideally, these ordinances should allow for the city and/or stakeholders to adjust policies and prices as needed to ensure optimal management.

In the case of Northwest Portland, where permit policies are specified elsewhere in code, this section can be relatively brief:

Violations established in this Section will be cited as Upper Northwest Permit Violations:

A. Within the Upper Northwest Parking Permit Area during permit designated hours, it is unlawful for any person to park any vehicle without a valid Upper

Northwest Zone M Permit to either:

1. Exceed the maximum visitor time limit allowed within the Upper Northwest Parking Permit Area; or,

2. Return to the same Upper Northwest Parking Permit Area block face for a period of 4 hours after parking for any time period.

Portland City Code 16.035.120.A

By contrast, Bend's Benefit District ordinance includes all information and rules related to permits in a self contained section:

One permit shall be available for each vehicle owned by a resident or registered at the residential address or owned and/or used by each owner or employee of any business within the OBNPBD (maximum of one vehicle per employee), as well as for short-term rental guests and contractors/service providers for residences and businesses within the OBNPBD. Applications and application procedures shall be provided by the City Manager or designee. Fees for such permits and renewals will be established by the City Council in the City's fee resolution. No permit shall be issued unless the applicable fee has been paid.

1. All parking permits expire the last day of the calendar year in which the permit is issued. Permits are not prorated and are not transferable. A permit may be renewed by filing an application pursuant to this section and paying the applicable fee. A renewal permit application shall be reviewed and approved in accordance with this section; provided, that a person who has had a permit revoked shall not be reissued a permit for a period of two years from the date of revocation.

a. The renewal period for parking permits shall begin on November 1 and end on January 31 of the following year. If a permit is not renewed by January 31, the holder of the permit may apply for a new permit for the calendar year and shall pay the required application fee.

2. No parking permit shall be issued to a person who is neither a resident nor associated with a business within the OBNPBD.

3. A holder of a parking permit who is no longer a resident of or associated with business in the OBNPBD no longer qualifies for a parking permit. The holder shall surrender the permit to the parking official. Use of a permit when the holder is no longer a resident of or associated with business in the OBNPBD is a parking offense subject to citation.

4. Issuance of a parking permit does not guarantee or reserve a parking space within a Parking Benefit District. A parking permit issued pursuant to this chapter does not authorize the standing or parking of any motor vehicle in any place

or during any time when the stopping, standing or parking of motor vehicles is prohibited or set aside for specified motor vehicle types. The issuance of a permit shall not excuse the observance of any traffic regulation.

5. Whenever the holder of a parking permit is not in compliance with one or more of the applicable provisions of the policy controlling the issuance or renewal of permits, the City may direct the permit holder to surrender the permit or present evidence that the permit has been removed from the motor vehicle.

6. Until its expiration, surrender or revocation, a parking permit shall remain valid for the length of time the holder continues to reside or own and/or operate a business within the OBNPBD.

7. A parking permit issued under this section shall be valid only in the OBNPBD.

8. In addition to the penalties provided for violation of this section, the City Manager or designee shall revoke the parking permit of any individual found to have committed three or more violations of this section within any preceding 12-month period. This City Manager or designee shall provide written notification to such person by certified mail, return receipt requested, revoking the permit and ordering the surrender of such permit to the City. Failure to surrender a revoked permit when ordered to do so constitutes a separate violation of this section, and a signed return receipt shall be prima facie evidence of the delivery of the notice to surrender the permit.

Bend City Code 6.20.035.E

5. Meter policies and rules

In areas where meters are used within the Benefit District, policies unique to these meters should be specified explicitly. In the case of Northwest Portland's Benefit District, this section is again brief since general meter policies are specified elsewhere in the code:

Violations established in this Section will be cited as Upper Northwest Meter Violations.

A. At any parking space signed for an Upper Northwest Long-Term Meter, it is unlawful for any person to park a vehicle during the hours of operation of the meter without paying the applicable parking meter fee.

B. Upon expiration of an Upper Northwest Long-Term Parking Meter a citation may be issued if a vehicle remains parked or stopped on the same block face.

C. A vehicle in an Upper Northwest Long-Term Parking Meter space may remain in said space longer than the time designated time limit upon payment of the applicable parking meter fee.

D. It is unlawful for any person to park any vehicle in an Upper Northwest Short-Term meter space during the hours of operation of the meter without paying the applicable parking meter fee.

1. It is unlawful for any person to extend the parking time beyond the designated limit for parking in the Upper Northwest Short-Term Meter space.

2. Upon expiration of the designated time limit, for the Upper Northwest Short-Term Meter space, a citation may be issued if a vehicle remains parked or stopped on the same block face unless it has moved 500 linear feet , as measured along the curb or edge line.

3. Upon leaving an Upper Northwest Short-Term Meter space, a vehicle may not return to an Upper Northwest Short-Term Meter space in the same block face for a 3-hour period, unless it has moved more than 500 linear feet as measured along the curb or edge line from the previously used Upper Northwest Short-Term Meter space.

E. Successive Violations. Within the Upper Northwest Parking Area, if a citation has been issued for any Northwest Parking Meter Violation:

1. To a vehicle parked or stopped at an Upper Northwest Short-Term Parking Meter space, and the cited vehicle remains parked or stopped on the same block face, a separate violation occurs upon the expiration of each successive maximum period of parking as designated by official signs, markings or meters. A separate citation may be issued for each successive violation.

2. To a vehicle parked or stopped at an Upper Northwest Long-Term Parking Meter space, and the cited vehicle remains parked or stopped at the same space, a separate violation occurs upon the expiration of a parking receipt for the vehicle at that space as designated by official signs, markings or meters. A separate citation may be issued for each successive violation.

Portland City Code 16.035.130

Note that the Old Bend Benefit District does not currently use metering so there is no code addressing this in Bend's Benefit District ordinance

6. Other technical considerations, such as hybrid meter/permit districts

Northwest Portland's Benefit District includes a relatively unique element: hybrid meter/permit districts where permitholders may park for free and non-permit holders must feed the meter. These, and other unique elements, should be explicitly addressed within a Benefit District ordinance:

Within the Upper Northwest Parking Permit Meter Area, except for vehicles displaying a valid Upper Northwest Zone M Permit:

1. It is unlawful for any person to park any vehicle in any parking meter space during the hours of operation of the meter without paying the applicable parking meter fee; and,

2. Upon expiration of the parking meter, a citation may be issued if a vehicle remains parked or stopped on the same block face.

Portland City Code 16.035.120.B

7. A statement directing the funds back to the district

Lastly, since the defining element of a Benefit District is that some or all of the excess revenue from parking management are directed back to the district, a statement specifying this, and including any rules for how the funds are spent, should be included. Bend's PBD ordinance provides a good example.

Fees and revenue from the OBNPBD shall be first used for administrative costs; then the remaining funds shall be split between parking supportive projects in the OBNPBD and the Parking Services Division Fund. Additional private or public funds may be combined to fund projects under this section, but no project may be initiated until at least $50,000 has been allocated for projects under this section.

1. In the event that the OBNPBD is terminated, any fees and revenues generated that have not been expended shall be transferred to the Parking Services Division Fund.

Bend City Code 6.20.035.F

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