



## TECHNICAL MEMORANDUM #4 - LAND USE AND ZONING

To: Heather Pope, Columbus Redevelopment Commission  
From: Ralph DeNisco and Lisa Jacobson, Nelson\Nygaard  
Date: December 12, 2013  
Subject: Technical Memorandum 4 – Land Use and Zoning DRAFT #2

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### INTRODUCTION

Parking does not exist independently. It is intricately intertwined with the overall mix of land uses and activity it serves. As Downtown Columbus evolves and attracts a variety of land uses, this relationship is critical. This memo explores the current relationship between zoning, land use, and parking in Columbus.

Downtown Columbus does not represent typical suburban development. The historic downtown, mix and proximity of land uses, walkable environment, active retail, and even the presence of transit helps enhance its local feel. When land is at a premium in this center of activity, careful consideration of what the land is dedicated to (built environment, roadways, open space, parking) has a significant impact on the vitality of downtown.

This memo compares expected parking demand using national standards (based on land uses) and compares that to both current parking provision and use in downtown Columbus. Furthermore, the combination of downtown land uses are analyzed in a shared parking model that determines how much parking would be needed assuming that parking is shared between uses, and people (customers, employees, visitors) visit multiple destinations. The combined results of these analyses are then compared to the actual observed parking demand. Lastly, for comparative planning purposes, this memo explores several potential buildout scenarios, and what impact these scenarios would have on the existing parking supply.

Specifically, this memo presents the following analysis:

- Existing Parking Standards - an evaluation of downtown's parking zoning code
- Existing Land Use – within the study areas
- Parking Supply – observed supply compared to expected supply by land use
- Expected Parking Demand – based on land use, observations and national demand models
- Shared Use Parking Analysis – an analysis based on Shared Parking methodology
- Observed Parking Demand – on-the-ground data collection utilization counts
- Future Growth Potential - added potential land use scenarios within the existing parking capacity

# EXISTING PARKING STANDARDS

## GENERAL PARKING REQUIREMENTS

In our review of the most up-to-date overall Columbus Zoning Bylaws (April 2008), it appears that in most cases the City’s general parking requirements are higher than the peak parking demand rates found in ***Parking Generation 4th Edition*** (Institute of Transportation Engineers, 2010), as illustrated in Figure 1. The peak parking demand rates found in the ITE guide are primarily derived from studies conducted in pure auto-dependent suburban sprawl settings. These rates are generally considered to be very conservative and when applied as minimum requirements in a more dense setting –such as downtown Columbus – these are likely to reproduce a similar auto-dependent suburban sprawl pattern that is not reflective of a downtown’s more compact development. The current parking requirements generally exceed the ITE rates for many of the described land uses, though not all, as some of Columbus’ requirements are in-line with or even below the ITE rates.

## Special Districts

However, recognizing that these requirements are not conducive to downtown vitality, much of downtown Columbus falls into the “Commercial Downtown” or “Commercial Downtown Support” zoning districts. These districts have modified parking standards as follows:

- Properties in the Downtown Commercial Zoning District (CD) are exempt from providing off-street parking.
- Properties in the Downtown Commercial Support Zoning District (CDS) may provide half of the parking spaces that the zoning ordinance requires. However, this only applies if the use is “not-auto oriented” and if the primary structure has a main pedestrian entrance and zero setback on at least one public street frontage.

Much of the southwest of the study area falls in the CD district.

Figure 1      General Parking Requirements under Columbus’ Zoning Bylaw

Principal Use	Existing Regulation	ITE Peak Parking Demand Rates	Columbus vs. ITE
Single Family	2 spaces per dwelling unit.	1.83 spaces per dwelling unit.	Above
Multi-family Residential	1.5 spaces per dwelling unit.	Rental townhouse: 1.62 spaces per dwelling unit	Below
Hotel and motel	1 space per rentable room, plus 1 space per 100 sq ft UFA of lounge, restaurant, conference or banquet rooms or exhibit space	1.2 vehicles per occupied room at a hotel with accessory uses. .66 vehicles per occupied room at a business hotel. .71 vehicles per occupied room at a motel.	Above

**DOWNTOWN COLUMBUS PARKING ANALYSIS: TECHNICAL MEMORANDUM 4**  
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Principal Use	Existing Regulation	ITE Peak Parking Demand Rates	Columbus vs. ITE
Schools	Up to grade 8: 1 space per classroom plus 1 for every 3 persons by seating capacity in the largest assembly area  Grade 9+, college or trade: 1 for every 3 persons by seating capacity in the largest assembly area. IF NONE, then 12 spaces/classroom	.17 spaces per student at elementary. .09 vehicles per student at middle school. .23 spaces per student at high school (suburban).	Above
Hospital	2 spaces per exam or bed, procedure/operating room, plus 1 per lab or recovery room plus 1 for every 2 rooms (employee parking)	4.49 vehicles per bed, plus .81 vehicles per employee.	In-line
Nursing Home	1 space per unit, or 1 space per 3 beds/2 patient rooms – whichever is less	.35 spaces per bed.	In-line
Retail Use	1 space per 250 square feet gross floor area.	1.2 to 4 spaces per 1,000 square feet (depending on type).	Above
Restaurant	1 space per 4 seats	.49 spaces per seat at quality restaurants. .48 spaces per seat at high-turnover (sit-down) restaurants. .52 spaces per seat at a fast-foot restaurant with drive-through window.	Below
Commercial/office	3 spaces per 1,000 square feet	2.84 spaces per 1,000 square feet.	Above
Library	1 space per 100 square feet UFA, plus 1 per vehicle stored on-site, plus 1 per employee	2.61 spaces per 1000 square feet GFA	Above

## Mixed Use Development Parking Requirements

The parking regulations for mixed used facilities are similar to the general requirements applicable throughout Columbus. Buildings or lots which contain more than one principal use are considered mixed use facilities and each use component is treated as a separate principal use for the purpose of determining parking requirements.<sup>1</sup> However, in non-residential zoning districts, two or more uses may provide this off-site parking collectively on one or more lots.<sup>2</sup>

<sup>1</sup> Columbus and Bartholomew County Zoning Ordinance, 7.1.1.A.5

<sup>2</sup> Columbus and Bartholomew County Zoning Ordinance, 7.1.2.A.1

## SMART PARKING REGULATORY INSTRUMENTS

### Parking Maximums

As currently configured, zoning in the Commercial Downtown has no minimum or maximum parking requirements. The City may want to consider implementing a cap or limit on the maximum number of spaces that one builds.

Parking maximums restrict the total number of spaces that can be constructed. Reasons for setting maximum requirements may include a desire to restrict traffic from new development, promote transportation options besides the private automobile, or limit the amount of land that is devoted to parking. Parking maximums can be introduced in any place where there are or could be measures in place to combat overspill. While the policy is most likely to be appropriate in transit corridors, downtown, and areas with high levels of traffic congestion, it can be useful in any district that wants to limit traffic or the amount of land devoted to parking.

Figure 2 Parking Maximum Requirements under Columbus' CD Zoning Bylaw

Existing Regulation in CD	Best Practices
No minimums or maximums	<p><b>Parking Maximums:</b></p> <p>In a growing number of municipalities, parking minimums have been replaced with parking maximums. In some cases, the amount required as a minimum is directly converted to a maximum. In others, the current standards are rejected altogether and a new analysis is carried out based on local auto ownership rates and commuting patterns.</p>

### Shared Parking

Mixed-use developments offer the opportunity to share parking spaces between various uses, thereby reducing the total number of spaces required compared to the same uses in stand-alone developments. This is a primary benefit in mixed-use development contexts of moderate-to-high density. Shared parking operations offer many localized benefits to the surrounding community, including a more efficient use of land resources and reduced traffic congestion.

Outside of the downtown Columbus study area does allow for multiple non-residential or uses to share parking facilities, so long as the property owners can demonstrate and document that “normal hours of operation do not substantially overlap.”<sup>3</sup> The Board of Zoning appeals must approve all shared parking agreements as conditional uses. Approvals are based determinations that the shared parking will:

- Not provide hardships for pedestrians
- Not result in potentially hazardous traffic conditions
- Provide the minimum number of parking spaces for the uses involved
- Be located a maximum of 300 feet from the use(s) to be served

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<sup>3</sup> Columbus and Bartholomew County Zoning Ordinance, 7.1.2.A.2

The ordinance is not clear as to whether the “minimum number of parking spaces” must be the sum of those otherwise required by the uses, or whether that number of spaces must be available when a given use is operational.<sup>4</sup>

Shared parking agreements also require documentation not only of the agreement but of the following issues:<sup>5</sup>

- Snow removal
- Maintenance
- Ownership
- Liability

**Figure 3 Shared Parking under the General Columbus Zoning Bylaw**

Existing General Regulation	Best Practices
<p>(7.1.2) 1. Off-Site Parking: Two or more uses may provide off-site parking collectively on 1 or more lots; however, the total number of spaces shall not be less than the sum of the spaces required for each use.</p> <p>2. Shared Parking: Two or more types of land use (not specific businesses) for which the property owners can demonstrate and document that the normal hours of operation do not substantially overlap may share parking either on or off-site.</p> <p>3. Location Requirements: The shared and/or off-site parking shall be located a maximum of 300 feet from the use(s) to be served (measured from the nearest property lines). The shared and/or off-site parking shall not be located in any agricultural or residential zoning district.</p> <p>4. Approval Requirements: All off-site and shared parking space arrangements are subject to the approval of the Board of Zoning Appeals as a Conditional Use. Approvals shall be based on the determination that the use of off-site and/or shared parking will not provide hardships for pedestrians, will not result in potentially hazardous traffic conditions, and will provide the minimum number of parking spaces for the uses involved. The parking needs of possible future uses of the property shall also be considered by the Board of Zoning Appeals.</p> <p>5. Required Documentation: Documentation of any off-site and/or shared parking agreement must be signed by all involved property owners. The written agreement shall include, but is not limited to the following items: maintenance, snow removal, ownership, and liability. The agreement shall be subject to approval by the Planning Director. Upon approval, the agreement shall be recorded in the office of the Bartholomew County Recorder and a copy of the recorded agreement shall be retained for the files of the Plan Commission.</p>	<p>Shared parking can be provided as of right at least a 5 minute walk from the associated use (~1,000 feet).</p> <p>Required parking spaces for all uses in all districts need not be limited to use by residents, employees, occupants, guests, visitors, or customers of such uses and may be used for general public parking. This enhances the inherent “park-once” efficiency of a downtown area.</p>

<sup>4</sup> Columbus and Bartholomew County Zoning Ordinance, 7.1.2.A.2 & 4

<sup>5</sup> Columbus and Bartholomew County Zoning Ordinance, 7.1.2.A.5

## Dimensional Requirements

Requiring buildings to provide a minimum setback encourages greater dispersal of development and decreases the likelihood that one will walk between various uses. Allowing or requiring parking between the building and the street increases the incentive for drivers to use their vehicle to travel between nearby destinations. Columbus is employing best practices by prohibiting front yard parking in the downtown area.

For non-residential uses, there is a minimum front yard setback of 10 feet from all existing or planned right-of-way. For properties in the Downtown Center District (CD), there is a minimum front yard setback of 5 feet from the existing right-of-way, and no parking spaces or driveways are to be provided in the front yard of any property. For side and rear setbacks, a minimum of 5 feet is required.

Figure 8 Dimensional Requirements under Columbus' Zoning Bylaw

Existing Regulation (CD)	Best Practices
Parking spaces and driveways in the CD are required to have 5 feet setback on the front (reduced from 10 feet in other parts of the City), sides, and rear. Parking spaces or driveways may not be provided in the front yard of any property. Buildings are required to maintain a 0-foot build-to-line at the right-of-way in the CD.	No front yard parking in downtown area. Eliminated minimum setback requirements in downtown area.

## Driveway Curb Cuts

Driveway curb cuts are a major source of vehicle-pedestrian-bicycle conflicts as well as introducing more congestion on busy thoroughfares due to left turns in and out of the driveway. When alternatives are available and feasible, limiting or prohibiting driveway curb cuts along key vehicle, pedestrian, and bicycle routes reduces or eliminates these conflicts, providing safer, more efficient, and less congested public rights-of-way.

The Zoning Bylaw provides guidance on the design and width of curb cuts to allow for safe passage of cars by each other and into parking lots. The requirements establish maximums for the size of entrance and exit drives.

Figure 4 Curb Cut Guidance under Columbus' Zoning Bylaw

Existing Regulation	Best Practices
(7.3.D.1) Curbs: All entrances from streets serving uses other than farms and single- and two-family residences shall be curbed from the beginning of any acceleration or deceleration lane, taper, or turning radii up to and including any landscaping area that separates the entrance from parking and loading areas.  2. Entrance Widths: All entrances shall be designed to provide clear, distinct points by which vehicles enter and exit property. Typically, a vehicle access point shall include one entry and one exit lane of adequate, but not excessive, width to accommodate the anticipated vehicle user types. Multi-family and non-residential accesses may also include turn lanes as deemed acceptable by the City Engineer. All access point widths shall be measured at the right-of-way line. The measurement shall exclude any acceleration or deceleration lanes, tapers, and turning radii. No access point to a single or two-family residential use shall exceed 24 feet in width. No access point to a multifamily residential or non-residential use shall exceed 14 feet in width per lane	In walkable districts, reviews emphasize a prohibition of curb cuts and driveway openings along key transit, bicycle, and/or pedestrian routes whenever possible. Where curb cuts are present, standards expect a level crossing for pedestrians (raised driveway) and clear sightlines for exiting motorists to see pedestrians.

where typical access is by passenger automobiles and 20 feet in width per lane where access is by large vehicles (service vehicles, school buses, delivery vehicles, semitractor trailers, etc.). (Revised per City Ord. 22, 2011 (9.6.11) & County Ord. 6, 2011 (9.6.11))	
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## Parking In-Lieu Fees

In some communities, new developments can waive their minimum parking requirements by making an annual payment (in-lieu of providing parking) to the municipality. The fee is usually utilized for transportation improvements, particularly shared public parking facilities. This allows the redevelopment of constrained sites and provides a revenue stream to support the construction/maintenance of shared public parking facilities such as a central lot or garage.

Columbus may consider requiring developers to pay an assessment or per space in lieu of providing parking, and/or purchasing employee parking permits for their employees. This would help generate revenue for the parking program, and contribute to the long term ability of the City to operate and maintain its parking assets. As no parking requirements currently exist in the CD, Columbus should consider a sliding scale, that begins only for developments over a certain size so as not to discourage infill development.

Figure 5 Parking In-Lieu Fee Regulation under Columbus' Zoning Ordinance

Existing Regulation	Best Practices
None	Where zoning requirements for minimum numbers of parking spaces exist, a parking in-lieu fee or payment has found great success in the U.S. at reducing parking supply for dense mixed-use areas that have lower parking demand or high potential for sharing. Fees vary widely.

## Bicycle Parking and Facilities

Bicycle parking is an essential part of encouraging bicycling and typically serves two important markets. Long-term parking is needed for bicycle storage for residents and employees. This parking is located in secure, weather-protected, restricted access facilities. Short-term parking serves shoppers, recreational users and other. As well as security, convenient locations are a priority – otherwise, bicyclists will tend to lock their bicycles to poles or fences close to their final destination. Bicycle improvements increase mobility, reduce auto dependency, congestion and air pollution and can be a very important mode of transportation for lower-income families.

The Zoning Ordinance requires bicycle parking to be provided in relation to the number of vehicular parking spaces provided. Although Columbus has made strides in requiring bicycle parking provisions, an improvement would be to decouple the quantity of bicycle parking required from the quantity of vehicle parking that is provided. In areas where mitigating an over-provision of vehicle parking is an explicit growth objective, such decoupling is an important part of supporting a complementary expansion of bicycle parking.

In addition, zoning code should make a distinction between spaces provided as appropriate for long-term (resident, employee) parking, as compared to short-term visitor parking. As short-term accommodations (most typically, racks) tend to be much less expensive compared to long-term accommodations (most typically building-interior spaces or lockers), requiring a certain share of

bicycle parking be provided as long-term spaces can be critical to ensuring that such investments effectively support bicycle commuting and general rates of ownership and use. Additional facilities to attract bicyclists, such as showers and changing facilities should be requested in developments over a certain size.

The City may also want to designate standards for long-term parking and require the branded "C" racks for short-term parking.

**Figure 6** Bicycle Parking Regulation under Columbus' Zoning Ordinance

Existing Regulation	Best Practices
(7.1.C.1) All commercial and public/semi-public uses shall provide bicycle parking based on the number of vehicle parking spaces provided, consistent with the Bicycle Parking Standards Table.	Minimum bike parking facilities are provided in relation to the scale of development (as opposed to tied to the number of vehicle parking spaces required), and minimum design standards for such parking facilities are specified.

## Transportation Demand Management Measures

Transportation Demand Management (TDM) refers to a package of strategies to encourage residents and employees to drive less in favor of transit, carpooling, walking, bicycling, and teleworking. It encompasses financial incentives such as parking charges, parking cash-out, or subsidized transit passes; Guaranteed Ride Home programs to give employees the security to carpool or ride transit; compressed work schedules; and information and marketing efforts. TDM programs have been shown to reduce commuting by single-occupant vehicle by up to 40%, particularly when financial incentives are provided.

The Zoning Bylaw does not address Transportation Demand Management.

**Figure 7** Transportation Demand Management Measures under Columbus' Zoning Bylaw

Existing Regulation	Best Practices
None	<p>Pre-Tax transit benefits – Employees are provided with access to “transit checks,” vouchers, or debit card systems that allow the use of pre-tax income for purchase of transit fares.</p> <p>Preferential parking for carpooling, for instance 10% of all parking spaces are set aside for carpool vehicles prior to 9:00 AM on weekdays, provide carpool parking in prime locations, and/or offer a discount on parking permits.</p> <p>Provide ride-sharing services, such as a carpool and vanpool incentives, customized ride-matching services, a transportation information package for new employees and residents, a Guaranteed Ride Home program (offering a limited number of emergency taxi rides home per employee), and an active marketing program to advertise the services to employees and residents.</p>

# EXISTING LAND USE

## KEY FINDINGS

- The study area encompasses over two million square feet of buildings/structures
- About half (52%) of this is office space
- Observed parking demand closely mirrors the shared parking model demand estimates throughout the day
- Columbus uses about 1,000 fewer parking spaces in the study area than its parking supply (and land use data corroborates this ratio)
- There are 1,500 available parking spaces at peak when parking is shared, which indicates that Columbus may be able to absorb additional development without building many new parking spaces

The consultant team analyzed existing built square footage in Columbus in relationship to parking supply and utilization. To complete this analysis, the team pulled individual parcel record information from Bartholomew County's Assessor website.

Overall, there is just over two million built square feet in the Columbus study area. Figure 8 shows the breakdown of land use by category in the study area. This analysis excludes single-family homes. The commercial and retail space classification includes nearly a half-million square feet, followed by residential apartments, townhomes, and condos, and office space, which includes both private and municipal offices.

Figure 8 Existing Land Use in Columbus

Land Use	Square Feet	Percentage
Office	1,054,478	52%
General Retail	285,718	14%
Church	155,849	8%
Apartments	145,579 (326 units)	7%
Drive-in Bank	142,119	7%
Quality Restaurant	77,364	4%
Hotel	66,116 (85 rooms)	3%
Library	41,842	2%
School	36,450 (849 students)	2%
Performing Arts/Theater	16,653	1%
Warehouse/Light Industrial	13,960	1%
Auto Repair & Gas Stations	9,976	~0%
<b>Total</b>	<b>2,046,104</b>	

## PARKING SUPPLY

Within the Downtown Columbus study area, the team completed an inventory of about 5,800 parking spaces. About 85% of these parking spaces are in off-street facilities (lots and garages). Figure 9 shows the parking supply in Columbus with an additional breakdown provided by parking access, or who parking is "available to". General access parking is available for public use and is generally owned by a public entity. Restricted access parking is dedicated to a specific population, such as customers, tenants, or employees of a particular property or use.

Figure 9 Parking Inventory: Concord Center

	Count	Percentage	% Available for General Use	% Restricted Use
On-street	815	14%	97%	3%
Off-street	5,016	86%	20%	80%
Total	5,831			

## EXPECTED PARKING DEMAND

The Institute of Transportation Engineers (ITE) produces a periodic report titled *Parking Generation*, which is the prevailing national standard in determining parking demand for a development. ITE standards are based on parking demand studies submitted to ITE by a variety of parties, including public agencies, developers and consulting firms. The most recent parking generation manual available is the 4th edition (2010) and is a comparative starting point to determine baseline assumptions. This study includes ITE peak period parking demand rates as guidelines to benchmark how the existing parking supply in Columbus compares to its land uses.

The average peak period parking demand rate calculation is meant to represent the number of parked cars at the peak period divided by the quantity of the independent variable, such as building area or employees. Standard rates come from the ITE manual. To estimate the average peak period demand in Columbus, this study used County Assessor's data to determine the gross square footage of each land use, and multiplied that square footage (or other independent variable, such as residential units or employees) by the ITE average peak period demand. The ITE rates for land uses in the Columbus study area are in Figure 10.

Expected parking demand is a way to examine the amount of parking that would be needed to support the level of development and activity present within the study area. In this case, the analysis is completed using industry standard methodology to equate land use with expected parking demand.

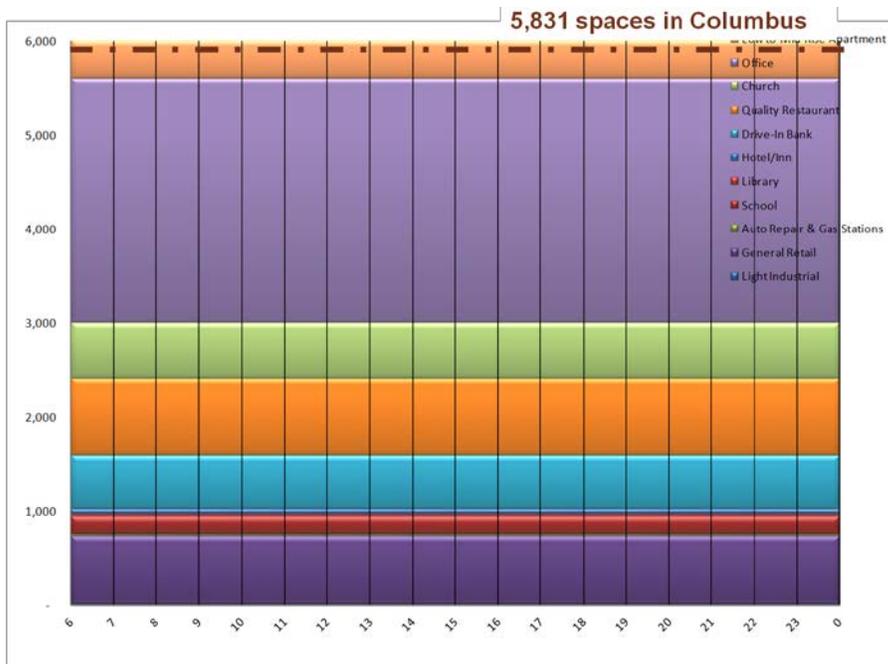
**DOWNTOWN COLUMBUS PARKING ANALYSIS: TECHNICAL MEMORANDUM 4**  
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**Figure 10 ITE Parking Demand Rates in Columbus**

Land Use	SF or Units	ITE Weekday Rate	Parking Spaces
Office	1,054,478	2.47	2,605
Apartments	145,579 (326 units)	1.23	401
General Retail	285,718	2.55	729
Church	155,849	3.79	591
Drive-in Bank	142,119	4.00	568
Quality Restaurant	77,364	10.60	820
Hotel	66,116 (85 rooms)	0.64	54
Library	41,842	0.42	18
School	36,450 (849 students)	0.23	195
Performing Arts/Theater	16,653	3.20	53
Warehouse/Light Industrial	13,960	0.75	10
Auto Repair & Gas Stations	9,976	2.14	21
<b>TOTAL</b>			<b>6,066</b>

According to national parking standard calculations from ITE, the needed number of parking spaces for Columbus is 6,066 spaces. The study area has a total of 5,831 spaces. This confirms that Columbus has built a comparable parking supply to national standards for single-use suburban development, within a couple of hundred spaces.

**Figure 11 ITE Parking by Land Use (Unshared) in Columbus**



ITE parking standards are often based on peak hour demands of suburban sites with isolated, single land uses which have free parking (Institute of Transportation Engineers, Parking Generation 4th Edition, 2010, page 2). Nelson\Nygaard's experience indicates that projections using standard ITE parking rates tend to overestimate demand for downtown areas like Columbus. Mixed-use areas offer the opportunity to share parking supply between various uses. This reduces the total number of spaces which would be required by the same land-uses in stand-alone developments.

## **SHARED USE ANALYSIS**

Columbus' walkable environment allows for parking to be shared. Visitors can park once and walk to multiple downtown destinations; employees can park once for the day and walk to run errands. Each land use does not need its own dedicated supply of parking, yet that is exactly what typical zoning codes indicate is needed. In reality, throughout the day, different uses have different peak demands: for example, an office may have a high demand until 5pm, and a restaurant open for dinner may have a high demand only after 5pm.

Columbus has some existing shared parking arrangements; for example, the First Christian Church leases parking spaces to downtown employees. Whether formal or informal, shared parking opportunities allow for better use of available parking resources and management, and can allow for the accommodation of additional development.

To model a park-once environment, Nelson\Nygaard used an adapted shared parking model using inputs from the Urban Land Institute's (ULI) Shared Parking Manual (2nd Edition, 2005) and ITE's Parking Generation (4th Edition, 2010). Besides demand by time of day, we tailored the shared parking model for Columbus to include a parking demand reduction for internal capture. Mixed-use downtowns allow for parking efficiencies through "internal capture" or "captive market" trips. Such trips are made by patrons who, having already parked, travel between uses without accessing their vehicle. Restaurants and retail services are common generators of internal capture trips in mixed-use developments, as they serve both employees and residents within the same area. The shared parking model includes a conservative percent reduction to account for the mix of Columbus development patterns.

If each land use were to build enough parking to accommodate its peak demand, then the supply of spaces would be grossly underutilized. Shared parking allows for accommodation of peak parking demand, but shares a supply among different uses. This concept is demonstrated in Figure 12 below. The bar chart on the left shows that each land use needs more than 2,000 parking spaces; the shared parking chart (right) shows the number of spaces needed with shared parking (in this example, 31% less).

**Figure 12 Shared Parking Conceptual Illustration**

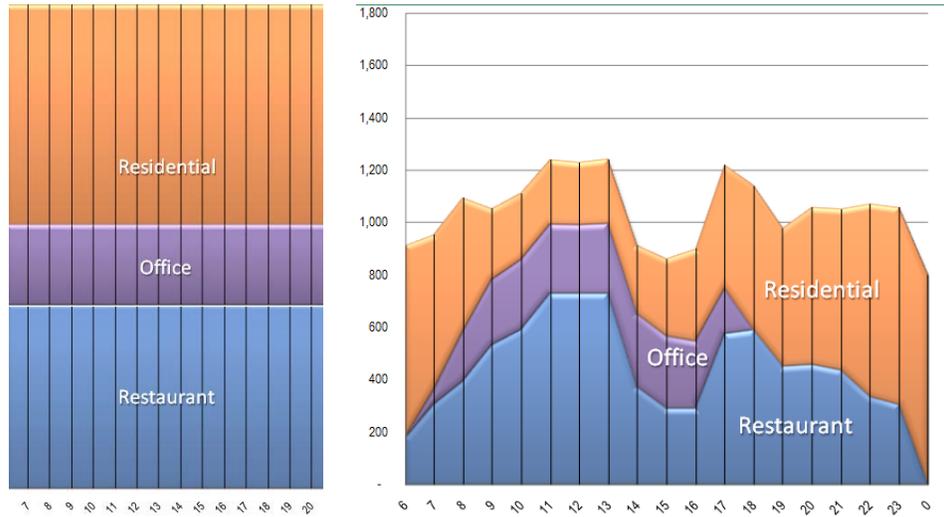
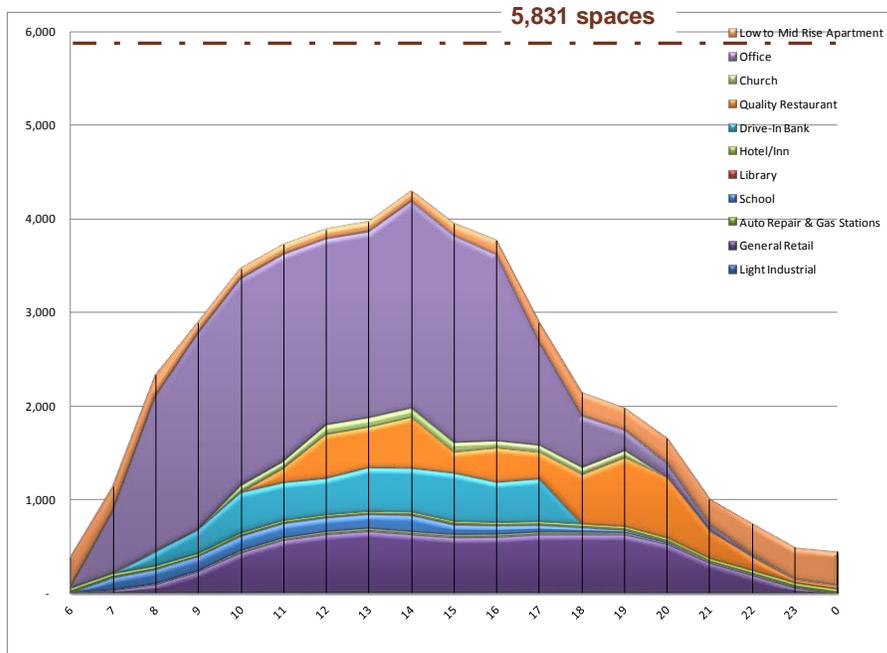


Figure 11 shows the number of parking spaces, by land use, that ITE estimates are needed in Columbus. Figure 13 is the output of the shared parking model, which demonstrates the number of parking spaces needed in Columbus (by land use) after factoring in the shared parking reductions. The model starts with the ITE estimated demand of 6,065 spaces. Shared parking peak demand is estimated to be 4,311 spaces at 2pm. With Columbus' current supply of 5,831 parking spaces, at peak, there are nearly 1,000 available spaces when parking is shared (assumes 10% reserve capacity).

**Figure 13 ITE Parking by Land Use (Shared) in Columbus**



## OBSERVED PARKING DEMAND

Understanding how realistic the shared parking model assumptions are can be tested by comparing them to the actual observed parking demand in Columbus.

Figure 14 shows the actual parking demand throughout the day (on- and off-street) in Columbus. Observed peak demand was 3,513 between 11am – 1pm, with second highest demand immediately following from 1pm – 3pm, with 3,505 observed cars. With a peak of 3,513 cars and 2,046,104 square feet of development (not including single-family residential), the Columbus "ITE" peak parking rate is 1.72 spaces per 1,000 square feet of land use.

Columbus' "ITE" peak parking rate is 1.72 spaces per 1,000 square feet of land use.

Figure 15 shows the same observed demand curve (Figure 14) on top of the expected shared parking curve. The graphic shows that throughout the day, observed parking demand closely mirrors the modeled shared parking curve.

Figure 14 Columbus Parking Observed Demand (Weekday)

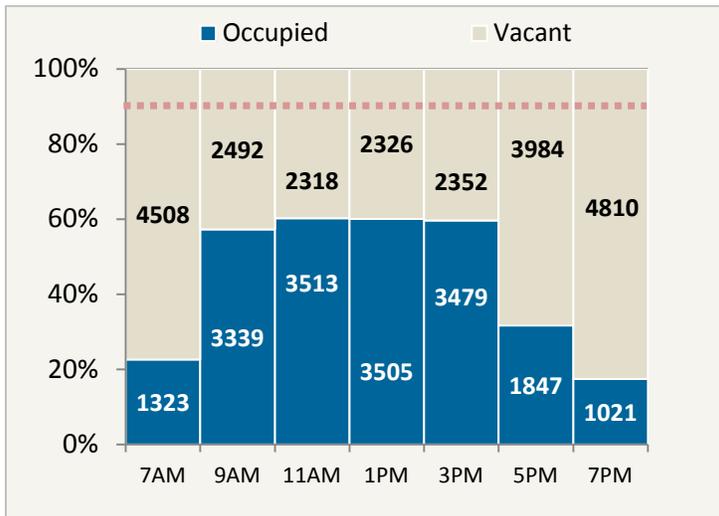
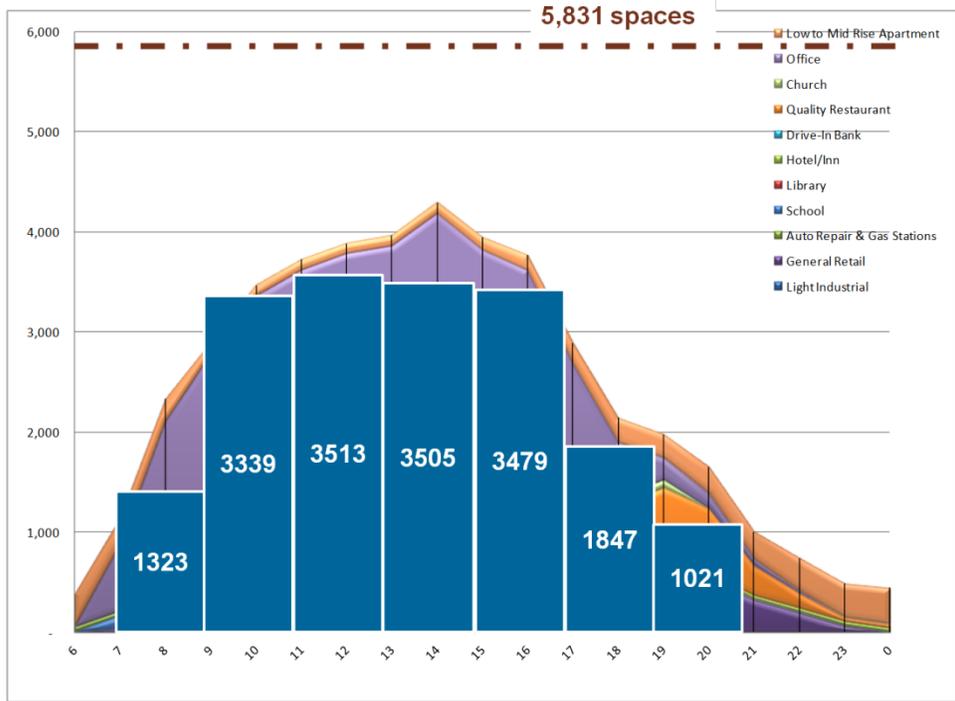


Figure 15 ITE Parking by Land Use (Shared) in Columbus Compared to Observed Demand



## FUTURE GROWTH POTENTIAL

An important component of the shared parking analysis is to understand what impact future development may have on the available existing parking supply. This section demonstrates this impact using growth scenarios to determine future parking demand, and compares the future demand to what available parking already exists. This type of analysis is important because it helps to guide zoning code and management of parking going forward. This is a high-level analysis that is not provided as a guideline for future growth, but merely an illustration of how much development potential exists with using the existing parking supply.

As described earlier, parking is considered functionally full when occupancy reaches 85%, not 100%. At 85% occupancy, some parking (about 1 in 8 spaces) is available, so that drivers can reasonably find a space. Parking in Columbus, even at the observed peak hours of 11am and 1pm is only 60% full. Therefore, in this scenario, we evaluate the overall level of development that can be built in downtown Columbus using the 85% parking occupancy as a cap.

### SCENARIO 1: EXISTING RATIOS

Since no official projections exist, we start by using existing ratios of commercial, office, and residential land uses projected forward. Looking at the entire study area, and using the total supply of on and off street parking spaces, downtown Columbus could theoretically support an

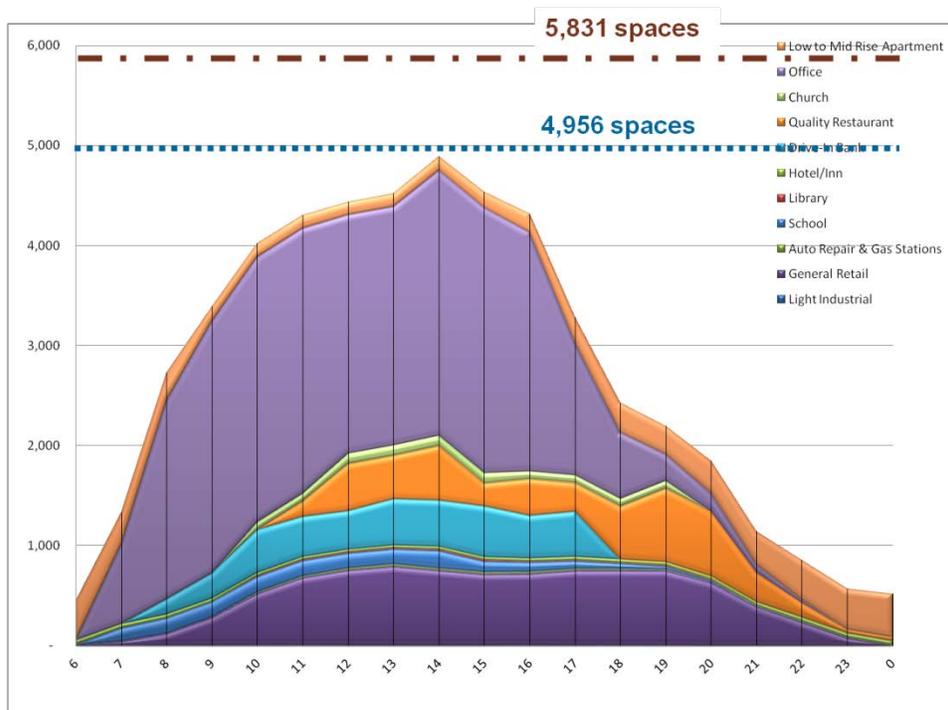
additional 270,000 square feet of new development and 66 apartments (keeping land use ratios consistent with current levels) without building another parking space.

Table 1 shows the additional square footage that could be built using the calculations described above. The additional square footage is based on the percentage that the land uses already comprised, which assumes that the general mix of uses in Columbus would remain the same. This scenario of adding about 270,000 additional square feet in development plus 33 housing units would utilize about 4,900 spaces at peak, or 85% of the total supply, compared to the 3,500 that are utilized at peak today.

Table 1 Additional Development in Columbus with 85% Parking Demand (assumes current land use ratios)

Land Use	Existing Square Feet	Additional Square Feet	New Total
Office	1,054,478	212,915	1,267,393
Retail	285,718	57,691	343,409
Apartments	326 units	33 units	359 units

Figure 16 Parking Demand Peaks with Additional Development (assumes current land use ratios)



## SCENARIO 2: MORE RESIDENTIAL

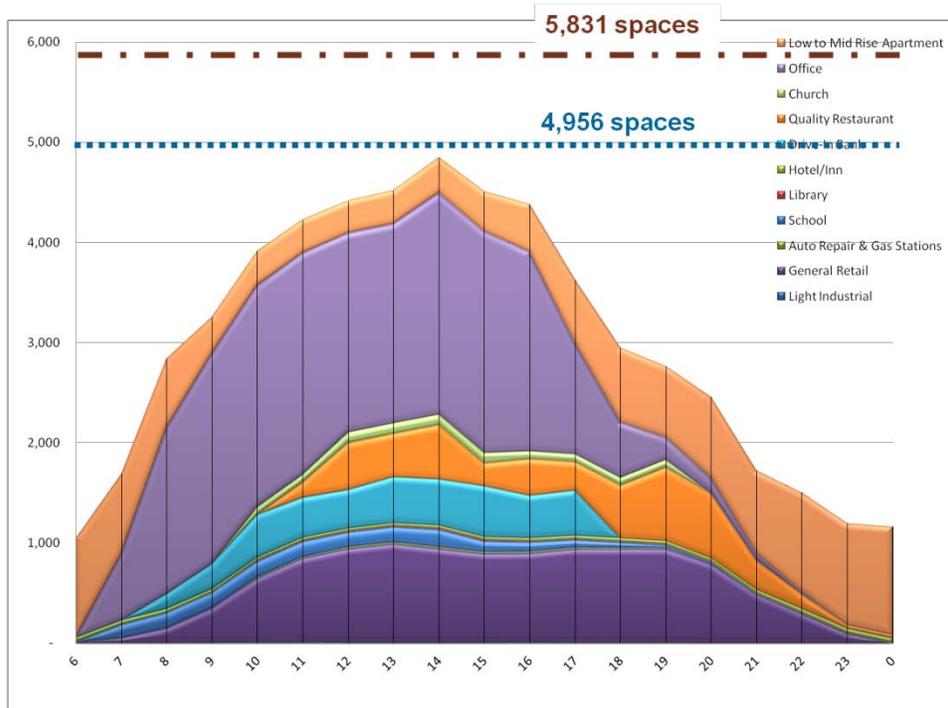
Table 2 shows the additional square footage that could be built if the City triples its residential apartments from 326 units to 978 units and increases its retail space by 50%. This scenario would also utilize about 4,900 spaces at peak, or 85% of the total supply, compared to the 3,500 that are utilized at peak today.

**DOWNTOWN COLUMBUS PARKING ANALYSIS: TECHNICAL MEMORANDUM 4**  
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**Table 2 Additional Development in Columbus with 85% Parking Demand (assumes 150% residential increase)**

Land Use	Existing Square Feet	Additional Square Feet	New Total
Office	1,054,478	0	1,054,478
Retail	285,718	142,859	428,577
Apartments	326 units	652 units	978 units

**Figure 17 Parking Demand Peaks with Additional Development (assumes residential increase of 300% and retail increase of 50%)**



**SCENARIO 3: MORE OFFICE**

Table 3 shows the additional square footage that could be built if the City increases the office space by 300,000. This scenario would also utilize about 4,900 spaces at peak, or 85% of the total supply, compared to the 3,500 that are utilized at peak today.

**Table 3 Additional Development in Columbus with 85% Parking Demand (assumes 300,000 sq ft additional office space)**

Land Use	Existing Square Feet	Additional Square Feet	New Total
Office	1,054,478	300,000	1,354,478
Retail	285,718	0	285,718
Apartments	326 units	0	326 units

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Figure 18 Parking Demand Peaks with Additional Development (assumes 300,000 sq ft additional office space)

