

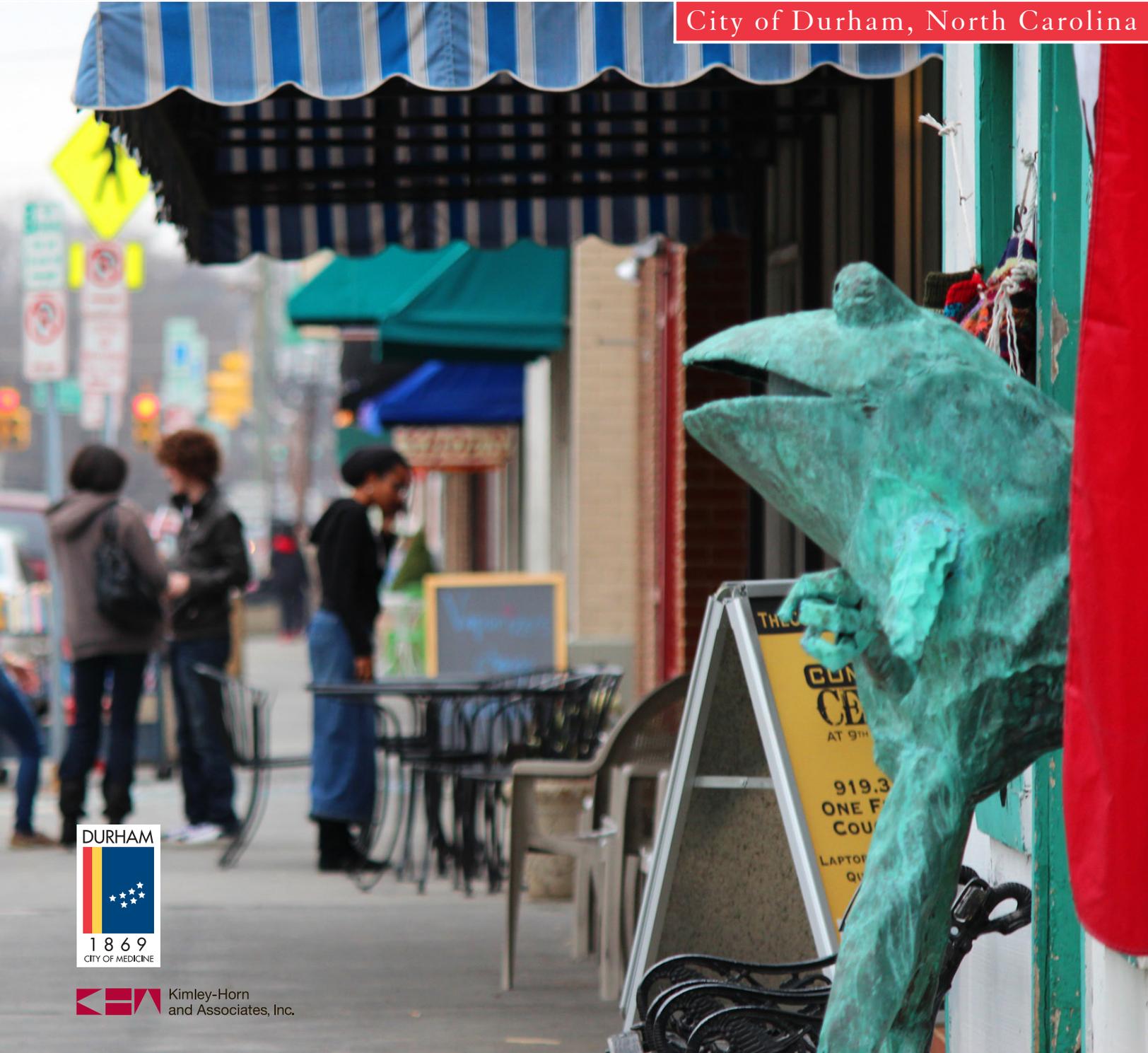


NINTH STREET STUDY AREA



REPORT COMPREHENSIVE PARKING STUDY

City of Durham, North Carolina



CITY OF DURHAM COMPREHENSIVE PARKING STUDY

Prepared for: City of Durham, North Carolina



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1 | Executive Summary

The City of Durham has performed a comprehensive examination of the existing parking system to be in a position to provide an improved experience to those that work, visit, and live in Durham. This document outlines the process and results of the City of Durham Comprehensive Parking Study, with emphasis placed on the Ninth Street study area. The study was performed by documenting existing parking conditions and projecting future parking demand based operational changes, recommendations documented in this report, and collaboration with City of Durham staff, Ninth Street business owners and stakeholders, as well as the general public.

A Parking Study Team (PST) was developed to act as a sounding board for recommendations being considered as a result of the study. The PST was also an integral part of the process throughout the study ensuring that appropriate items of interest were incorporated. The PST was composed of City staff from the Department of Transportation, Durham City-County Planning Department, Office of Economic and Workforce Development, as well as representatives from Durham County, Downtown Durham, Inc., and Blackwell Management Company. The PST helped to develop a list of business owners and community stakeholders that should be a part of the parking study process and were included in the outreach efforts with individual interviews. Key survey findings include:

- A majority of employees park, or are encouraged to park, off-street, either in public or private surface lots.
- A majority of customers park in on-street spaces or in the public surface lot along Ninth Street.
- A majority of stakeholders believe that there is a lack of parking supply within the study area to meet their needs. They suggest building parking lot(s) or garage(s) to increase supply or develop partnership with neighbors such as Wells Fargo or Erwin Mills to share supply.
- Several stakeholders believe that insufficient lighting within the study area is an issue.
- A majority of stakeholders would support a paid parking and/or validation program.
- A majority of stakeholders would support a Parking Enterprise Zone, keeping in mind the desire to minimize such a program's impact on customers.
- Rather than purchasing a permit for a space in the off-street lot, some employees of the 705 Broad Street building opt to park on-street and occupy the on-street parking spaces on Iredell Street for an extended period.

Parking demand associated with future operational modifications as well as the impacts from recommendations resulting from this study was estimated for the Ninth Street study area utilizing a parking demand model (Park+). Parking demands are such that existing City-owned parking spaces, both on- and off-street, are near capacity during peak conditions. As a result, it is recommended that the City work with private land owners within and adjacent to the study area, including proposed developments, to share parking supply, thus providing more convenient and available parking for Ninth Street employees and visitors. In addition, providing for a safer path of travel between Ninth Street and Iredell Street by improving the 8 Alley will help to provide more parking supply within a reasonable walking distance to the businesses along Ninth Street.

A review of existing parking operations and management was performed that focused on both on- and off-street spaces. One of the main recommendations as a result is implementation of a paid on-street parking system to encourage turnover and generate revenue toward a Parking Fund. Several options were considered for on-street paid parking technology with the goal of a system that provides exceptional customer service, several payment options, and ease of use. Another goal of the PST specific to on-street payment technology was to

provide an option that was technologically advanced, such that it could have a relatively long service life, rather than being outdated in the near future. Several technology options were considered, and in the end, pay-by-cell technology supplemented with pay-by-space pay stations located throughout the study area was selected as the recommended approach for on-street payment technology. The combination of these two technologies was selected to provide an easy to use and convenient program.

Finally, recommendations were developed to address identified parking inadequacies associated with on-street parking, off-street parking, and the parking system within the Ninth Street study area and its relationship with the greater City-wide parking system. The recommendations are categorized as Short Term (< 6 months), Medium Term (6 months – 18 months), and Long Term (18 months +).

Short Term Recommendations (< 6 months)

Stripe On-Street Spaces

Provide delineation for on-street spaces on Ninth Street, Perry Street, Markham Avenue, and Iredell Street to create order on block faces and easier operation and management.

Markham Avenue On-Street Parking

Restripe the two-way turn lanes for left turning traffic onto Ninth Street and onto Iredell Street from Markham Avenue, allowing implementation of an additional 8-12 on-street parking spaces along Markham Avenue, as the current alignment is not an efficient use of the roadway width.

On-Street Time Limits and Enforcement

On-street spaces in the study area should be converted from a 3 hour to a 2 hour time restriction to help encourage turnover, during the time in which the City plans for and implements paid on-street parking. In addition, on-street parking along Broad Street between West Main Street and West Markham Street should be time restricted to 2 hours.

Also, enforcement within the Ninth Street study area and along Broad Street should be heightened to limit those that abuse on-street parking time restrictions.

Employee Parking

Seek a partnership with Duke University that would allow free non time restricted public use of a portion of the off-street lot on Hillsborough Road (adjacent and to the west of the study area). Employees should be encouraged to use these spaces to make available more convenient spaces for visitors.

Wells Fargo Parking Agreement

Seek an agreement with Wells Fargo that would allow public use of the surface lot located mid-block on Perry Street, between Ninth Street and Iredell Street and/or the surface lot at the corner of Ninth Street and West Main Street during peak conditions (night and weekends). These locations could be utilized for valet services, providing a new service that could be offered to visitors.

Restripe Crosswalk

Restripe the distressed crosswalk located mid-block on Ninth Street between West Markham Avenue and Perry Street to maintain the intended high visibility of this area to drivers.

Medium Term Recommendations (6 months – 18 months)

Implement Paid On-Street Parking

Implement a paid on-street parking program that is concurrent with a similar program recommendation in the Downtown study area and to generate revenue to support the system. It is recommended that the rate for on-street parking be \$1.25 per hour to complement the off-street proposed parking rate of \$1.00 per hour. Revenue for paid on-street parking in the study area is estimated to be between \$140,000 and \$200,000 per year over the next 10-year timeframe considered with the exception of the year of installation due to the up-front capital cost of \$200,000. Technology implemented in the Ninth Street Study Area should be identical to that of the Downtown Study Area to reduce confusion and increase familiarity for users.

Remove “NC 70 Business” Designation

Continue efforts with the North Carolina Department of Transportation to remove or relocate the “US 70 Business” designation from Ninth Street. This designation results in increased traffic, including large trucks, creating an occasional thoroughfare environment rather than a destination.

Parking Lease Agreements

Begin conversations with the property owners of adjacent developments to discuss parking lease agreements. Having agreements in place and the ability to share parking resources will provide for an increase in usable parking supply for Ninth Street visitors.

Long Term Recommendations (18 months +)

Improve 8 Alley

Improve the 8 Alley to include a paved surface, pedestrian level lighting, and a focus on overall pedestrian safety to provide a more appealing path of travel from Iredell Street to Ninth Street. This connection makes available more easily accessible parking supply within a reasonable walking distance from the Ninth Street businesses.

Pave 9 Alley

The 9 Alley should be paved, signed and striped appropriately for deliveries. Better access to the 9 Alley will free up more of the prime on-street spaces for visitors to the study area, rather than delivery trucks, and given its width, additional parking supply could be obtained through parallel parking along the alley.

Additional Off-Street Parking Supply

Investigate obtaining a long term lease and converting the vacant lot bounded by Hillsborough Road, Gin Street, Carolina Avenue, and Hale Street into employee parking for Ninth Street businesses. It is estimated this lot could provide approximately 60 spaces.

Iredell Street Employee Parking

Coordinate with City Attorney and Department of Transportation to implement an employee parking program along Iredell Street. This program should be implemented after improvements to the 8 and 9 Alleys, such that a more secure path of travel exists between Iredell Street and Ninth Street for employees.

2 | Introduction

Study Area

The City of Durham Downtown Parking Study considered a smaller study area centered on Ninth Street, which represents a heavily used area of the City that is remote to the Downtown core. The official study area is bordered by Green Street to the north, West Main Street to the south, Iredell Street to the east, and Erwin Mills to the west.

This study area represents a district of the City that has historically been a retail and restaurant hub prime for future development and activity. Though the area is small, approximately 55 retail and restaurant businesses operate within the footprint. The anchor of the study area is along Ninth Street primarily between West Markham Street and West Main Street, with residential areas north of West Markham Street and ancillary businesses along Iredell Street. The Bull City Connector bus transit serves the study area with stops at the far south along West Main Street at the intersection with Iredell Street (westbound route) and Broad Street (eastbound route).

The Erwin Mills development, located in Figure 2.1, lies immediately outside and to the west of the study area. This development was not included, as the parking demand from the office space within the development is largely met with the surface parking surrounding the building. In addition, the ownership of the development has communicated no desire to engage in a lease agreement with business owners or the City, therefore, the potential of using this parking to meet evening and weekend parking demands within the study area shown cannot be relied upon.



Figure 2.1 – Ninth Street Study Area

3 | Existing Conditions

Prior to determining the overall parking demand in a study area, it is important to understand the existing parking supply and how it operates. A thorough inventory of the existing parking supply was conducted in August 2012. Parking data also was collected on a typical weekday (Wednesday, August 29, 2012) and a weekend day (Saturday, August 25, 2012), to identify occupancy, duration, and turnover. Figure 3.1 shows the existing parking facilities within the study area (on-street and off-street). The following sections document the parking inventory and existing conditions of parking within the Ninth Street study area.



Figure 3.1 – Ninth Street Study Area Parking Facilities

Existing Parking Inventory

Based on field observations and data provided by the City, it was determined that there are approximately 1,347 spaces within the Ninth Street study area. To quantify the existing parking supply in its entirety, the following parking types were noted.

- On-street unmarked
- On-street marked
- Surface lot

The parking inventory identified characteristics of the parking supply for each parking type. For on-street unmarked spaces, the total number of available parking spaces was documented, along with time restrictions. For on-street marked and surface lot spaces, the total number of parking spaces was documented, along with the type of parking space (handicapped, restricted, or public), the orientation of the parking space (perpendicular, parallel, or angled) and time restrictions. Table 3.1 summarizes the total number of parking spaces by parking type within the Ninth Street study area. The sections following the table further define the parking types.

Table 3.1 – Ninth Street Existing Parking Inventory

Parking Type	# of Spaces
On-street unmarked	348
On-street marked	4
Surface lot	995
Total	1,347

- On-street unmarked

On-street unmarked parking represents available public parking along streets in neighborhoods and commercial areas that are not delineated by any pavement markings. All parking of this type is parallel. Although these areas do not have a defined parking space count, they were included in the inventory because they do contribute to the Ninth Street study area parking supply. On-street unmarked spaces were estimated by measuring the length of unobstructed curb parking per block and dividing that length by an average parking space length of 25 feet. This calculation excludes areas adjacent to driveways, intersections, and other obstructions, such as fire hydrants. On-street unmarked parking, with 348 spaces, represents 25% of the total parking supply. Many of the spaces in this parking type were time restricted, which varied by location from 3-hour (Ninth Street, south of West Markham Avenue, and sections of Perry Street), 2-hour (Iredell Street, south of West Markham Avenue, and sections of Perry Street), and 1-hour (Ninth Street and north of West Markham Avenue)

- On-street marked

On-street marked parking represent available public parking along streets in commercial areas that are delineated by pavement markings for parallel parking. On-street marked parking, with 4 spaces, represents < 0.5% of the total parking supply. The on-street marked spaces within the study area are limited to a small quantity of spaces on Ninth Street adjacent to 8 Alley. These spaces are either time restricted to 3-hours or restricted to handicapped accessible parking.

- Surface lot

Surface lot parking represents public and private spaces located in off-street lots spread throughout the study area that serve a variety of uses. The majority of off-street surface lot parking is delineated by pavement markings for 90 degree parking and two-way traffic flow, with the exception of the surface lot at the southeast corner of Perry Street and Ninth Street, which has angled parking. Surface lot parking, with 995 spaces, represents 74% of the total parking supply. Of the total surface lot parking, 46 spaces (5%) are operated and maintained by the City as public parking and 949 spaces (95%) are privately owned. The City owned surface lot time restricts parking to 2-hours.

The City owned off-street surface lot located along Ninth Street between Perry Street and West Markham Avenue is currently in the process of being converted by the City from a free time restricted lot to a paid lot. It is expected that this transition will be complete in late 2013 or early 2014. The technology and equipment used in this lot should be identical to that implemented in the Downtown Study Area to increase familiarity and decrease confusion for users.

Parking Enforcement

There are a number of posted time restrictions throughout the Ninth Street study area. However, there is little active enforcement of these restrictions. Currently, the City contracts Lanier Parking Solutions to operate and enforce parking within the Downtown study area, as well as the residential areas around Duke University and North Carolina Central University. Areas beyond these, including the Ninth Street study area, are the responsibility of and enforced by the City of Durham Police Department.

When parking is enforced, however, Lanier Parking Solutions dedicates four “ambassadors” to patrol the streets in beats that are daily assigned on a rotating basis. The current enforcement method allows an ambassador to assign an electronic “chalk time” associated with a vehicle license plate number and parking space. A vehicle parked in a space beyond the posted time limit, plus a 5 minute grace period, is issued a citation. A typical parking citation is issued as a \$10 fine, if paid within 30 days from issuance. If paid between 30 and 45 days from issuance, the fine increases to \$20, and if paid after 45 days, the fine increases to \$45.

Data Collection

When analyzing existing parking conditions, it is important to understand the nature of the actual parking demands within the study area. Parking occupancy data can help determine peak usage periods, trends for usage, and hot spots that are used more than others. Parking duration and turnover data can help determine the actual effectiveness and usage of the parking supply, as well as the effectiveness of time restrictions. The following sections describe the data collection efforts for this study, specifically focused on the following:

- Occupancy: The number, or percentage, of vehicles occupying parking spaces in a particular facility (on-street, off-street) at a particular point in time.
- Duration: The length of time a given vehicle remains in the same parking space.
- Turnover: The number of different vehicles that park in the same parking space during a specified period of time.

Parking occupancy and duration data was collected throughout the study area to capture a typical weekday and weekend evening condition. The typical weekday data was collected hourly between 11:00 AM and 8:00 PM on Wednesday, August 29, 2012. The typical weekend evening data was collected hourly between 5:00 PM and 10:00 PM on Saturday, August 25, 2012. While occupancy data was collected for all on-street and off-street spaces within the study area, duration data was collected for select areas within the study area. Occupancy and duration data were collected in conjunction with one another to develop a more accurate picture of parking conditions in the study area. Duke University move-in occurred the week prior to the weekend evening data collection timeframe; therefore, the data collected is assumed to be a “peak existing condition” for the study area.

A comprehensive database was created with the data collected to map and analyze the utilization assessment. The following sections describe and graphically communicate existing conditions inclusive of occupancy, duration, and turnover.

Data Collection Results

- Occupancy

Occupancy was evaluated for a typical weekday and a typical weekend day to provide an understanding of the occupancy rates and their relationship within the study area. The occupancy data presented in this section is expressed in a range of percent occupied and color coded. The occupancy ranges used, associated color, and definition of each range is shown below.

0 – 50%	→	Facility operating under capacity
50 – 75%	→	Facility well utilized
75 – 90%	→	Facility approaching perceived capacity
90% +	→	Facility is perceived to be over capacity

Typically, a parking system is considered at capacity when occupancy approaches 85 – 90% of capacity. The 10 – 15% excess supply keeps the time required to find a parking space within reason and promotes a perception of adequate parking. When parking occupancy exceeds these levels, there may be delays and frustration in finding a space, patrons may be forced to use a space that is too far from their destination or does not offer a comfortable walking environment. This margin also allows for: (1) the activity of vehicles moving in and out of parking stalls during busy periods; (2) surges in short-term parking activity; and (3) the temporary loss of spaces due to improperly parked vehicles, weather conditions, construction activity, etc.

Weekday Occupancy

Figure 3.2 shows the study area occupancy for a weekday mid-day (1:00 – 2:00 PM). The majority of parking is efficiently utilized or operating under capacity. However, on-street parking adjacent to 705 Broad Street is over capacity. Another item to note is the timed off-street lot located on the west side of Ninth Street. This lot is the premier location for off-street parking in the study area.



Figure 3.2 – Weekday Mid-day Occupancy

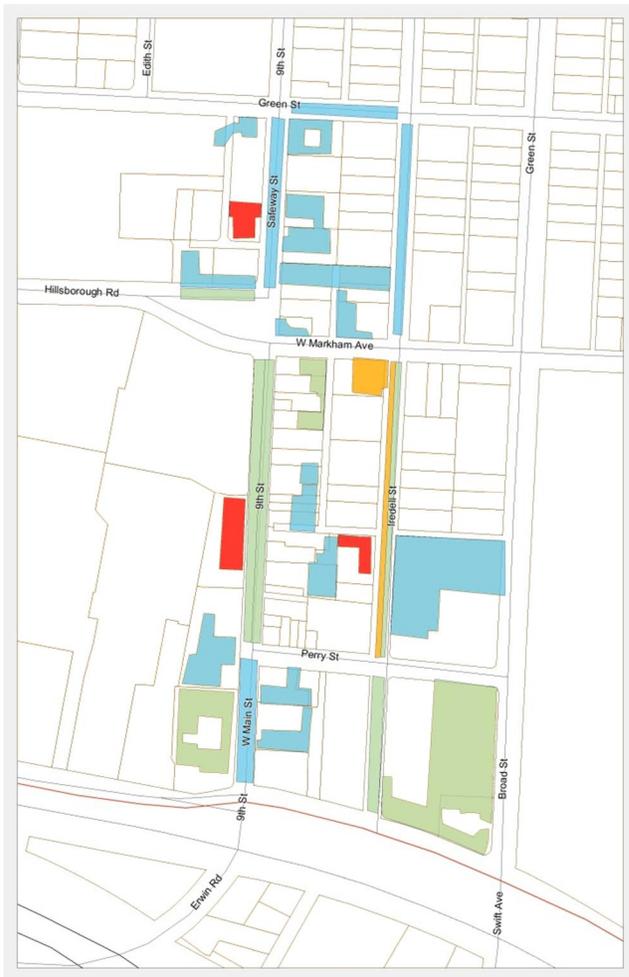


Figure 3.3 – Weekday Late Afternoon Occupancy

Figure 3.4 shows the study area occupancy for a weekday evening (7:00 – 8:00 PM). It should be noted that while additional on-street supply is available on Iredell Street, it remains underutilized, during a time when on-street parking is in high demand. Another item of note is the off-street lot on the corner of West Main Street and Broad Street. This lot remains highly utilized through the day, as this lot serves a grocery store, which typically remains active throughout the day.



Figure 3.4 – Weekday Evening Occupancy

Weekend Occupancy

Figure 3.5 shows occupancy for a weekend late afternoon (6:00 – 7:00 PM). In this timeframe, on-street parking along Ninth Street is fairly well utilized, while off-street parking along Ninth Street and Safeway Street are over capacity. On-street parking along Iredell Street remains underutilized, even during a time where the heart of the study area is near peak condition.



Figure 3.6 – Weekend Evening Occupancy



Figure 3.5 – Weekend Late Afternoon Occupancy

Figure 3.6 shows the study area occupancy for a weekend evening (9:00 – 10:00 PM). While the eastern portion of the study area is underutilized, the core along Ninth Street is approaching capacity. The off-street lot at the corner of Ninth Street and Perry Street remains highly utilized, drawing potential on-street patrons from Ninth Street. On-street parking along Iredell Street remains underutilized, during what is considered a peak condition for the study area.

The occupancy figures yield the following general observations for the study area.

- Typically, the highest occupancy levels were identified in the on-street and off-street facilities immediately surrounding the core of Ninth Street.
- On-street occupancy surrounding 705 Broad Street becomes over utilized during work hours. The likely cause for this high utilization is that employees of the 705 Broad Street building are required to purchase a parking permit to use a space in the off-street lot. As a result, employees opt out of the permit and find on-street parking as an alternative. This results in congested roadways along Iredell Street and Perry Street.
- On-street parking along Ninth Street experiences consistent use throughout all study periods with the highest utilization during the evenings.
- When Ninth Street on-street parking is at a peak, on-street parking on Iredell Street remains significantly underutilized.
- Areas north of West Markham Street are more used during the week, when compared to the weekend. The off-street lot to the west of Safeway Street remains highly used through all study periods.
- A private, gated, off-street lot located mid-block on Perry Street, between Ninth Street and Iredell Street is not used during any time period. This lot does not show on the occupancy figures, as a value of “0” was collected for each time period. This lot is owned by Wells Fargo and intended to be used for employee parking. However, it remained empty during all data collection periods.

• Duration

Duration data was collected for 50 on-street spaces along Ninth Street, from Perry Street to West Markham Avenue, and for the 46 off-street spaces located in the City leased surface lot on Ninth Street on October 18, 2012. These areas were selected, as they are within the core of the study area. Duration data was collected on a Tuesday, between the hours of 10:00 AM and 4:00 PM to capture a typical weekday condition.

As outlined in Table 3.2, there were 158 duration observations for the 50 on-street spaces and 102 duration observations for the 46 off-street spaces. The overwhelming majority of vehicles (76%) were parked for one hour or less, while approximately 15% of vehicles parked for more than 2 hours. This is a positive picture in regards to a majority of visitors obeying the posted time limits (2-hour and 3- hour). However, there are still a fair percentage of users taking advantage of the lack of enforcement within the study area by parking in a space for long periods of time.

Table 3.2 – Ninth Street Duration

Facility Type	0-1 hr	1-2 hr	2-3 hr	3-4 hr	4-5 hr	5-6 hr	Total
On-Street	121	16	12	5	2	2	158
Off-Street	76	9	6	3	5	3	102
Total Observations	197	25	18	8	7	5	260
Percent	76%	10%	7%	3%	3%	2%	100%

- Turnover

Turnover data was collected for the same on-street and off-street spaces as described in the previous section. Turnover is defined as the total number of vehicles per space over a given time period and should be reviewed in conjunction with duration and occupancy to obtain a complete and comprehensive understanding of the observed parking situation. Depending on the use, high or low turnover rates can be observed as good or bad. For example, in an employee parking area, one would expect low turnover rates, as vehicles are usually parked for long periods of time. Conversely, convenient customer parking spaces, such as those spaces observed in the Ninth Street study area, typically experience high turnover rates. In general, turnover rates can be influenced by many factors, including time restrictions, enforcement, land use, and location. The average turnover for on-street and off-street spaces is outlined in Table 3.3 below.

Table 3.3 – Ninth Street Average Turnover

Facility Type	Total Spaces Observed	Average Peak Occupancy	Total Vehicles Parked	Average Turnover
On-Street	50	39	153	3.92 veh/space
Off-Street	46	28	99	3.54 veh/space
Total	96	67	252	3.76 veh/space

As evidenced in Table 3.3, on-street spaces turnover at a greater rate than off-street spaces. This is typically the desired relationship between on-street and off-street space turnover for areas such as Ninth Street. Analyzing the data slightly differently, one can determine the number of vehicles that turnover each hour within the area that was observed. Table 3.4 does this by outlining the number of vehicles that vacated their parking space between the given hour time period and the preceding hour time period. The 10:00 AM – 11:00 AM time frame is left blank because data collection started within the 10 o'clock hour, therefore, data from the preceding time period is unavailable.

Table 3.4 – Ninth Street Hourly Turnover

Facility Type	10 AM – 11 AM	11 AM – 12 PM	12 PM – 1 PM	1 PM – 2 PM	2 PM – 3 PM	3 PM – 4 PM
On-Street	-	14	21	24	30	33
Off-Street	-	13	14	12	14	20
Total	-	27	35	36	44	53

As shown in the table, at least 25% (27 spaces) turnover each hour out of the 96 on-street and off-street spaces that were observed, with turnover increasing to over 50% (53 spaces) towards the end of the observation period.

Finally, turnover data can be used to determine the average length of stay for those that visit the study area. This can be calculated by dividing the average turnover into the length of time in which data was collected (six hours). This is outlined in Table 3.5.

Table 3.5 – Ninth Street Average Length of Stay

Facility Type	Average Turnover	Duration of Data Collection	Average Length of Stay
On-Street	3.92 veh/space	6 hours	1.53 hours
Off-Street	3.54 veh/space	6 hours	1.69 hours
Total	3.76 veh/space	6 hours	1.59 hours

As previously noted, the restricted time limit for the spaces where turnover data was collected is three hours for on-street spaces and two hours for off-street spaces. Comparing these restrictions to the average length of stay in the previous table suggests that the off-street lot spaces turnover prior to the time restriction by approximately 20 minutes (0.31 hours), while the on-street spaces also turnover prior to the time restriction by approximately 90 minutes (1.49 hours).

The City’s plan to convert the observed off-street surface lot to a paid parking lot will change the relationship between the off-street and on-street average length of stay data presented. Shifting to a paid off-street lot will likely shift demand to on-street spaces, as users will attempt to avoid paying for parking. As a result, the City should consider allowing one or two hours of free parking in the City owned off-street surface lot, with a fee for those that require parking for longer periods. Pairing this with a recommended two hour time limit for on-street parking until a paid on-street program can be implemented could provide consistency throughout the study area. For the off-street and on-street parking in the heart of Ninth Street to work hand in hand, especially with the shift to a paid off-street lot, it is important that the City consistently enforce parking regulations within the study area.

4 | Public Involvement

Many times parking recommendations rely solely on occupancy, duration, and turnover data that is collected, as well as parking demand that is projected into the future. This strict quantitative approach is beneficial for developing recommendations to improve parking in a study area. However, what is missing from this approach is the qualitative input from actual users of the system. In an effort to gather this qualitative input, a two-tiered approach for the Ninth Street Study area was implemented that included developing a Parking Study Team, as well as reaching out to, and seeking input from stakeholders within the study area. The following sections describe each.

Parking Study Team

Working closely with the Kimley-Horn team, the Parking Study Team (PST) was appointed by the City Project Manager, Harmon Crutchfield, and was intended to include a variety of City interests, as well as County and community development representatives. The intent of the PST is to be involved at several steps throughout the parking study process to ensure that appropriate items of interest are accounted for and addressed in the study. The PST also acts as a sounding board for recommendations that are being considered by the Kimley-Horn team throughout the study. Lastly, the PST provides input on the list of stakeholders within the study area that should be included in the project outreach efforts. The PST for this project included the following individuals:

- Harmon Crutchfield – City of Durham Department of Transportation – PST Chair
- Mark Ahrendsen – City of Durham Department of Transportation
- Aaron Cain – Durham City/County Planning Department
- Sara Young – Durham City/County Planning Department
- Joy Mickle-Walker – Office of Economic and Workforce Development
- Glen Whisler – Durham County Engineer
- Richard Polley – Blackwell Street Management Company, LLC (American Tobacco Campus)
- Bill Kalkhof – Downtown Durham Inc.

Throughout the project, four PST meetings were held to ensure that the project was progressing effectively and in a manner that met the City's needs. A brief description of each meeting is provided below.

- Parking Study Team Meeting #1
 - This meeting was held after data collection efforts and was used to present initial findings and critical issues within the Ninth Street study area, with minor discussion on data collected within the Downtown study area. Initial recommendations for the Ninth Street study area also were discussed.
- Parking Study Team Meeting #2
 - This meeting was held a couple weeks following PST Meeting #1 and was used to present initial findings and critical issues within the Downtown Study area. Initial recommendations for the Downtown study area also were discussed.

- Parking Study Team Meeting #3
 - This meeting was held several weeks after PST Meeting #2 and was used to present a draft version of the parking study report for the Ninth Street study area, along with the associated recommendations for parking improvements.
- Parking Study Team Meeting #4
 - This meeting was held several weeks after PST Meeting #3 and was used to present a final draft parking study report for the Ninth Street study area, as well as a draft version of the parking study report for the Downtown study area, along with the associated recommendations for parking improvements.

Stakeholder Outreach

A series of stakeholder input sessions were held in September 2012. The stakeholders included in these sessions were a result of recommendations from the PST and were different for the Ninth Street and Downtown study areas. Ninth Street study area stakeholders included restaurant owners, retail business owners, service providers, and property owners. Many questions were asked of each stakeholder, including the following:

- What is your role in the study area?
- Where do your employees typically park?
- Where do your customers typically park?
- During your hours of peak demand, how many customers do you estimate frequent your business?
- What do you believe the #1 parking issue is in the study area?
- What do you believe the City of Durham could learn from strategies seen in other locations?
- Do you have other parking related comments that you would like to communicate?
- Would you support a Parking Enterprise Zone?

The responses to the above questions are compiled and shown in Table 4.1.

Table 4.1 – Ninth Street Stakeholder Input Summary Matrix

Role	Where do employees park?	Where do customers park?	Estimate of Peak Customers (@ one time)	Number one issue on 9th Street	What could be learned from other areas?	Other Comments	Parking Enterprise Zone
Restaurant owner	No designated area. Tell them not to park on street.	On street. In lower Erwin Mill lot after 6:00.	150	Lack of parking.	Pay stations. Pay by cell.	Parking impacts business. Can the lot at Duke HR be used for employees?	In favor if fee is reasonable.
Retail owner	No designated area. "Russian Roulette"	On street or in lot.	10	Not enough HC parking. Lighting.	More parking decks. Validated parking.	Does not want angle parking on 9th Street. Could the Wells Fargo lot on Perry Street be used for employee parking? "Parking is the bane of our existence."	N/A
Restaurant Owner	On Iredell Street	In lot behind restaurant. Purchased land to provide customer parking.	N/A	Insufficient parking on weekends.	N/A	Signage is not clear. 1 hour parking is too short. Encourage biking. Use revenue from parking fee to build parking deck.	Supportive
Restaurant Owner	On street	Lot across street; on-street.	40	Need motorcycle parking.	Use pay stations to charge fee for parking.	Add additional parking capacity. If there is not parking, my customers leave. Willing to pay for parking.	Willing to pay for parking.
Retail owner	Have limited space in alley; in lot across street.	On street; wherever they can.	50 - 100	Inadequate parking capacity.	What about implementing angle parking to increase on-street capacity?	Remove US 70 designation. How can we get trucks off Ninth Street? What about a roundabout at Markham? Why doesn't the Bull City Connector come to Ninth Street? Would pay for employee parking.	No problem paying for parking.
Services provider	Tell them not to park on street.	On street.	25	Customers can't find a place to park. Late for appointments.	Use pay stations to charge fee for parking.	What about making 9th Street one-way? Add speed bumps (tables) to slow traffic down. Put parking in landscaped area in front of Vin Rouge. Use Wells Fargo gated lot. Could parking be provided in lower level of Erwin Mills Lot?	No problem paying for parking.
Service Provider	Wherever they can.	After hours Duke HR building or on-street.	30 - 40	Difficulty in finding parking.	Pay stations are fun, if you can figure out how to use them.	Could Erwin Mills provide public parking? Why not open Wells Fargo lot. Where are the bus stops?	In favor if rates are reasonable.
Retail owner	Brueggers lot or at Wells Fargo on weekends.	Customers circle looking for on-street parking.	N/A	Not enough parking for customers.	Dedicated parking lot or garage; improved directional signing.	Make better use of alley. Connect Iredell to Ninth Street at alley next to Regulator Books. Could we get more parking if spaces were marked? Could lot at Duke Bldg. be used? Taking away parking at George's Garage hurt area. People would be willing to pay, if they see where money goes.	Good idea. Would support.
Retail owner	In spaces behind building. No issues.	On-street. Surface lot across Ninth Street.	50	Not enough parking. Bull City connector should run on 9th Street.	N/A	Improve lighting in alley. Make connection to Iredell. Fee for parking may hurt business.	Concerned about impact of fees on customers.
Service Provider	Private parking behind building.	On-street. Surface lot across Ninth Street.	2 - 3	Lack of parking supply; panhandlers on Perry Street; lighting.	Boston Commons - underground parking.	Pay stations could be a good idea. More enforcement of time limits. Parking meters.	How would impact customers? Rates would need to be reasonable.
Retail owner	Wherever they can	Lot across street; on-street.	0 - 20	Poor management of parking; no strategy.	Consistency to enforcement; more of a system.	Not averse to paid parking. Improve lighting on Perry and Markham. Satellite parking for employees.	Not uncomfortable. Need to accommodate employees.
Retail owner	Private parking lot available for employees and customers.	Private parking lot available for employees/customers.	N/A	Lack of parking supply.	Like pay stations used at Duke and Wrightsville Beach.	Increase enforcement. Current arrangement is a deterrent to customers. It keeps people from coming here to shop. Sidewalks in area need to be improved.	No strong feelings.

Table 4.1 – Ninth Street Stakeholder Input Summary Matrix (continued)

Role	Where do employees park?	Where do Customers Park?	Estimate of Peak Customers	Number one issue on 9th Street	What could be learned from other areas?	Other Comments	Parking Enterprise Zone
Retail owner	Private parking lot available for employees and customers. No issues with employee parking.	Private parking lot available for employees and customers.	N/A	Improve lighting. More of an issue than parking.	Pay stations in Chapel Hill.	Keep surface lot adjacent to Ninth Street. Build a deck on the site of the existing City Lot.	Good idea.
Service Provider	In spaces behind building. No issues.	On-street. Use surface lot at Duke Building on weekend.	N/A	Lack of supply.	Does not like pay stations used in Chapel Hill.	Not a system. No planning or forethought put in to what exists today. Duke employees park on-street to avoid parking fees charged by Duke.	Would need more information.
Property Owner	Some spaces in rear of building.	Wherever they can.	N/A	Need additional parking.	N/A	Fee based parking great idea. Employees park on street. No enforcement.	
Retail owner	Employees park in rear of building. No problems for employees.	Park in the City lot and on street.	10 - 12	Retaining the off-street City leased lot.	Montpelier France. Underground parking connectivity with other forms of transportation. Promote walking.	No quite ready for paid parking. Make alley connection to Iredell Street. Improve lighting on Ninth Street. Do not implement a fee for parking until after a fee is implemented Downtown. Time limits are not a problem because there is no enforcement.	Would consider if implemented in Downtown. Would rather have the cost added to tax rates so as not to impact customers
Retail owner	1 -2 employees; No problems for employees.	75% park on site. The other park on street or in City owner lot.	10 per hour	Need more parking. Enforce existing parking limits.	Don't charge for nighttime parking.	Free parking is nice. Time limits are adequate. Promote use of alley for trucks instead of Ninth Street. Employees park on street and take spaces - enforce time limits. Need lighting on Perry, Markham and in the alley. Light the City lot. Lighting on Ninth Street is ugly.	Would definitely support. Education needed so customers know how the money is being used.
Retail General Manager	Employees park in rear of building. No problems for employees.	Park in the City lot and on Street.	30 - 40 per hour	Need more parking. Existing situation keeps customers away.	N/A	Customers are nervous about the posted time limits. I tell them not to worry,- I have never seen them enforced. Either remove the limits or enforce them. Panhandling is a problem. Add capacity. If a lot were convenient people would be willing to pay. You can find a space, but you have to circle the lot. Could the Bull City Connector stop on Ninth Street.	Great. Those types of improvements are needed in this area.

While a lot of feedback was provided and documented in the stakeholder input table, the following items summarize some of the comments responses/themes that were communicated, specific to the Ninth Street study area.

- A majority of employees park, or are encouraged to park, off-street, in either public or private surface lots.
- A majority of customers park in on-street spaces or in the public surface lot along Ninth Street.
- A majority of stakeholders believe that there is a lack of parking supply within the study area to meet their needs. They suggest building parking lot(s) or garage(s) to increase supply or develop partnership with neighbors such as Wells Fargo or Erwin Mills to share supply.
- Several stakeholders believe that insufficient lighting within the study area is an issue.
- A majority of stakeholders would support a paid parking and/or validation program.
- A majority of stakeholders would support a Parking Enterprise Zone, keeping in mind the desire to minimize such a program's impact on customers.
- Rather than purchasing a permit for a space in the off-street lot, some employees of the 705 Broad Street building opt to park on-street and occupy on-street parking spaces on Iredell Street for an extended period.

5 | Parking Demand

As part of the Ninth Street Parking Analysis component of the City of Durham Downtown Parking Study, Kimley-Horn developed a unique parking analysis tool, Park+, which is intended to allow the City to measure how changes in land use, parking, trip distribution, parking price, and management strategies affect the demands of parking. The following section describes the Park+ modeling application for the Ninth Street area.

Introduction

The Park+ Model is largely modeled after traditional supply and demand evaluations, which includes a multi-step process for evaluating parking demand conditions for a development, community, or campus. The multi-step process typically includes gathering data, defining assumptions or characteristics, selecting generation rates, applying reduction factors, creating scenarios, and evaluating results.

The Park+ Model allows the user to consolidate gathered data, define assumptions and characteristics through a user friendly interface, develop unique generation factors through the Park+ Proximity Parking Approach, apply reduction factors related to multi-modal and demand management assumptions, create and run scenarios using the models predictive gravity modeling algorithm, and evaluate the results on multiple levels using Park+ selection sets that can drill down from the study area level to a specific block, node, or intersection.

The Park+ Model is built on the principle of proximity parking, which assumes that parking demands are generally handled within a specific walking radius of a demand generator. This methodology is founded on the relationship between walking distance, price, attractiveness of facility, and general user decision making. The result of this methodology is localized parking generation rates that are predictive of actual demand conditions, which are representative of realistic parking generation characteristics for individual land uses throughout the specified study area.

This principle of proximity parking is used in both the initial calibration process as well as the predictive allocation process, which defines how many people need to park and where they want park. While the general methodology of the Park+ Model follows traditional shared use parking generation concepts, it differs from how generation rates are calculated.

The Park+ Model includes a predictive gravity demand modeling algorithm that allocates projected parking demand to adjacent parking facilities based on walking distance, price, and general attractiveness of each facility. The gravity modeling algorithm used in this model was developed specifically for the applications found in Park+. The algorithm uses the range of walking distances, price, and facility types in the model to define localized scores related to each facility and land use pair. These scores are then used to define the percentage of parking demand allocated to each parking facility, up to a user specified maximum occupancy percentage, which is defined as one of the user inputs to reflect the perceived effective capacity conditions within each Park+ community or campus.

The outputs of the Park+ Model include parking demand, parking supply, general surplus or deficit, met demand, latent (unmet) demand, and traditional parking demand required. The parking demand metric is a summary of the demand generated for the entire study area (or for the selection area). The parking supply metric is a summary of the parking capacity for the entire study area (or the selection area). The surplus or deficit metric is simply the difference between the demand and supply metrics for the given area. The met demand metric describes the amount of parking demand that is actually allocated using the proximity parking methodology, within the study area or for a given selection area. The latent demand represents the amount of demand that is not met within each localized walking radius defined within the model. While the overall supply and demand may be met within a given scenario, there may still be localized deficiencies within specific areas of the model—latent demand captures and identifies these areas.

The outputs from Park+ can be evaluated for the entire study area for a smaller subset, which can define localized demands at the zone, block, node, or intersection level. The benefit of this analysis tool is that it allows the Park+ Model to be free from zonal boundaries, allowing the user to define analysis areas as various development plans or master planned scenarios are evaluated.

Study Area

The study area for the Ninth Street Park+ model generally follows the study area for the project study area, and includes all of the parking facilities observed during data collection proceedings, as well as the land uses that are associated with each parking facility counted during that time period. Figure 5.1 represents the general study area, with the brown polygons representing land uses and the grey polygons representing parking facilities.

Within the study area, there are the following approximate land use and parking characteristics:

- 20,000 square feet of auto service space
- 5,000 square feet of bank space
- 25,000 square feet of church space
- 112,000 square feet of retail space
- 11,000 square feet of lounge or nightlife space
- 46,000 square feet of office space
- 46,000 square feet of restaurant space
- 352 on-street parking spaces
- 995 off-street parking spaces

The following sections describe the model calibration process and the resulting supply and demand projections.

Calibration Settings

The Park+ Calibration process uses existing parking demands (collected by the project team) to calibrate parking generation rates for each individual land use within the study area. The result is a more accurate depiction of parking generation characteristics for the study area, rather than depending on city/county code or national parking generation rates reported by the Institute of Transportation Engineers (ITE) or the Urban Land Institute (ULI). The Calibration process uses the previously described parking occupancy data, land use characteristics, multi-modal characteristics, public-private parking relationships, and area specific walking tolerances to define the adjusted generation rates.

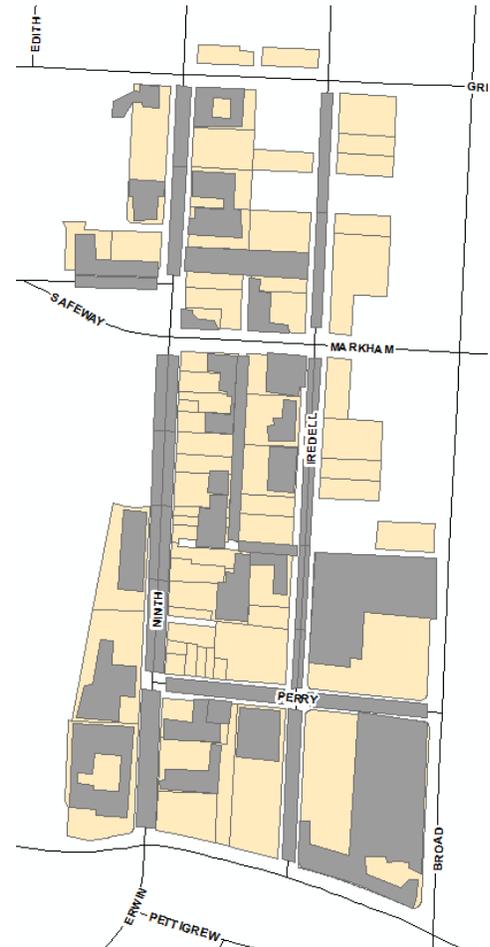


Figure 5.1 – Park+ Demand Analysis Study Area

The Ninth Street specific inputs are as follows:

Multi-Modal Inputs

The following graphic provides the model specific multi-modal inputs, which were pulled from 2010 U.S. Census data. In the absence of more specific information, the census data was applied to all user types within the study area.

Specify the scenario's percentage of transportation modes.

Mode	Employees %	Residents %	Visitors %	General %
Biking	2	2	2	2
Walking	3	3	3	3
Bus	4	4	4	4
Shuttle	0	0	0	0
Light Rail	0	0	0	0
Other	15	15	15	15

Public-Private Relationships

The following graphic provides a representation of some of the public-private parking relationships implemented in the model calibration process. These relationships represent parking that is provided solely for the benefit of a singular or small set of land uses. By setting these relationships, the model can accurately relate observed parking demands to specific uses in the study area, creating more realistic parking generation calculations during the calibration process.

Tools

Pricing Influence | Parking Management | Parking Allocation by Land Use | Parking Allocation by User Type

Maximum Occupancy Percentage: 0.95

	Parking Facility	Land Use	Relationship
Delete	One World (Rear)	General Retail	Restricted
Delete	One World (Front)	General Retail	Restricted
Delete	Vin Rouge	Restaurant	Restricted
Delete	Vin Rouge	Restaurant	Restricted
Delete	Nancy Turtle	General Retail	Restricted

Walking Tolerances

The walking tolerances within the model represent how far a user is willing to walk from their parking space to their destination. The Park+ model defines walking tolerances for several user types, including residents, employees, visitors, and general users. The graphic to the right provides the Ninth Street specific walking tolerances, which are based on discussions of the area with project stakeholders and a general understanding of the area user characteristics.

User Type	Walking Tolerance (ft)	Walking Tolerance (min)
Residents	800	3.33
Employees	400	1.67
Visitors	200	0.83
General	400	1.67

Weekday Calibration Results

Based on the inputs described in the previous section, the following results were developed for the Park+ calibration process:

Proximity Based (in spaces)		Traditional Demand Calculation	
Demand	835	When evaluating the parking demands in this area, the single use parking demands would be	1,429
Supply	1,347		
Surplus/Deficit	512		
		Latent Demand	0
		Met Demand	835

These results indicate that there is a 835 space peak hour demand for parking versus a 1,347 space supply within the study area, indicating that the study area is operating at approximately 62% of total supply. Additionally, the output indicates that the latent demand is zero spaces, meaning that the study area is able to meet all of the demand within the walking characteristics identified within the model. Finally, the model indicates that the demand when modeling within traditional demand metrics is 1,429 spaces, meaning that the actual demand is approximately 42% less than demand predicted by traditional measures (in this case ITE or ULI).

Figure 5.2 shows the actual occupancy of each of the parking facilities within the study area. This should closely resemble the data collection results (indicated on pages 1-6 and 1-7) because that data was used as the baseline for calibration.



Figure 5.2 – Park+ Weekday Calibrated Parking & Land Use Dataset

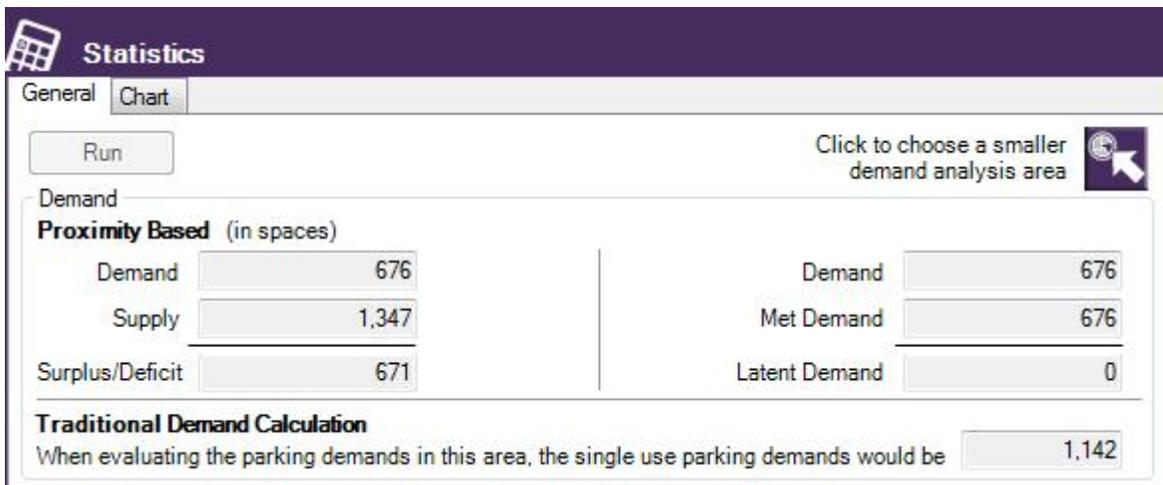
One of the key outputs of the calibration process is the development of location specific parking generation rates for each land use (and consolidated land use category). Table 5.1 provides a summation of the initial weekday parking generation rates for the Ninth Street area¹.

Table 5.1 – Ninth Street Weekday Parking Generation Rates

Land Use Category	Minimum Generation Rate	Maximum Generation Rate	Average Generation Rate	Traditional Generation Rate ²
Auto Service	1.7 per ksf	13.5 per ksf	5.85 per ksf	4.17 per ksf
Bank	2.68 per ksf	6.15 per ksf	5.38 per ksf	2.64 per ksf
Retail	0.73 per ksf	13.01 per ksf	3.14 per ksf	1.13 per ksf
Nightlife	1.9 per ksf	12.8 per ksf	8.6 per ksf	16.5 per ksf
Office	0.35 per ksf	5.0 per ksf	3.0 per ksf	3.5 per ksf
Restaurant	0.55 per ksf	20.1 per ksf	8.1 per ksf	18 per ksf

Weekend Calibration Results

Based on the inputs described in the previous section, the following results were developed for the Park+ calibration process for a typical weekend:



These results indicate that there is a 676 space peak hour demand for parking versus a 1,347 space supply within the study area, indicating that the study area is operating at approximately 50% of total supply during typical weekend conditions. Additionally, the output indicates that the latent demand is zero spaces, meaning that the study area is able to meet all of the demand within the walking characteristics identified within the model. The model indicates that the demand when modeling within traditional demand metrics is 1,142 spaces, meaning that the actual demand is approximately 41% less than demand predicted by traditional measures (in this case ITE or ULI).

¹ The initial parking generation rates are based on the parking data collected as part of this study. The City should assimilate several iterations of data for a statistically significant sample size prior to incorporating these design characteristics into ordinance or governing documents.

² Traditional generation rate is based on ITE Parking Generation Manual, 4th Edition, or ULI Shared Parking Manual.

Figure 5.3 shows the actual occupancy of each of the parking facilities within the study area. This should closely resemble the data collection results because that data was used as the baseline for calibration.

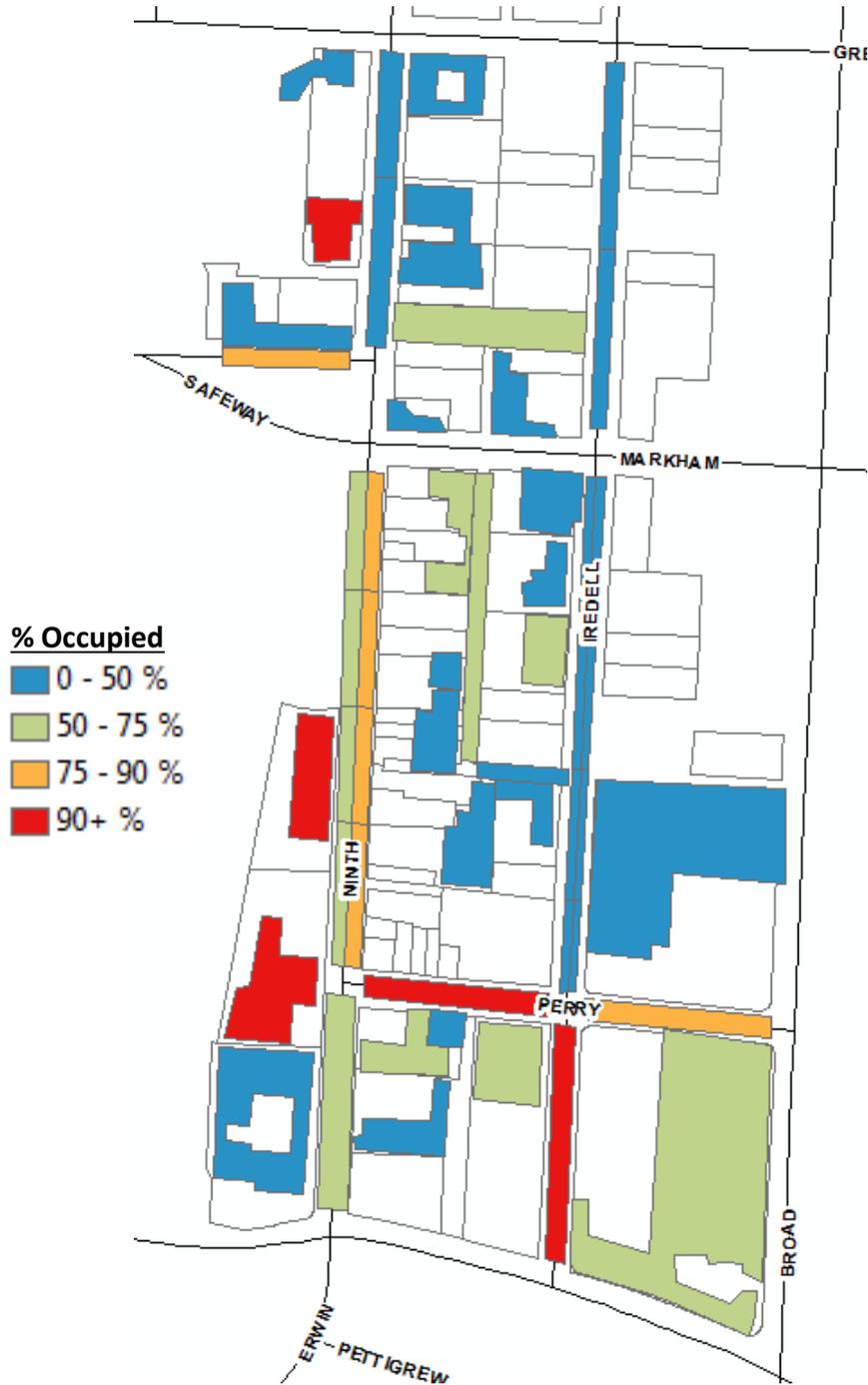


Figure 5.3 – Park+ Weekend Calibrated Parking & Land Use Dataset

Finally, one of the key outputs of the calibration process is the development of location specific parking generation rates for each land use (and consolidated land use category). Table 5.2 provides a summation of the initial weekend parking generation rates for the Ninth Street area³.

Table 5.2 – Ninth Street Weekend Parking Generation Rates

Land Use Category	Minimum Generation Rate	Maximum Generation Rate	Average Generation Rate	Traditional Generation Rate
Auto Service	3.0 per ksf	5.9 per ksf	4.1 per ksf	4.17 per ksf
Retail	1.9 per ksf	3.1 per ksf	2.7 per ksf	2.13 per ksf
Nightlife	1.4 per ksf	15.3 per ksf	8.6 per ksf	19 per ksf
Office	0.2 per ksf	5.1 per ksf	1.74 per ksf	0.35 per ksf
Restaurant	3.3 per ksf	18.6 per ksf	7.9 per ksf	20 per ksf

Projection Results

In addition to the calibration settings, the Park+ model is able to run projected conditions for the existing scenario, as well as additional scenarios. The projected conditions differ from calibration because the model predicts where parkers would prefer to park if given the choice – based on the relationship between walking distance, price, and attractiveness of parking.

Weekday Results

The output below provides the initial existing weekday conditions projection from the model. The supply and demand results do not differ from the calibration process, because none of the inputs were changed. However, parking demands were allocated based on the Park+ principles of proximity parking, which is represented by Figure 5.4. The resulting latent demand, meaning parking demand not met within the walking characteristics identified within the model. The latent demand is occurring along Ninth Street, near the center of the study area (identified with red cross-hatch).

The screenshot shows the 'Statistics' window in the Park+ software. It has two tabs: 'General' and 'Chart'. A 'Run' button is visible. A note says 'Click to choose a smaller demand analysis area' with a cursor icon. Under the 'Demand' section, there are two columns of data:

Proximity Based (in spaces)		Traditional Demand Calculation	
Demand	835	Demand	835
Supply	1,347	Met Demand	810
Surplus/Deficit	512	Latent Demand	25
		When evaluating the parking demands in this area, the single use parking demands would be 1,429	

³ The initial parking generation rates are based on the parking data collected as part of this study. The City should assimilate several iterations of data for a statistically significant sample size prior to incorporating these design characteristics into ordinance or governing documents.

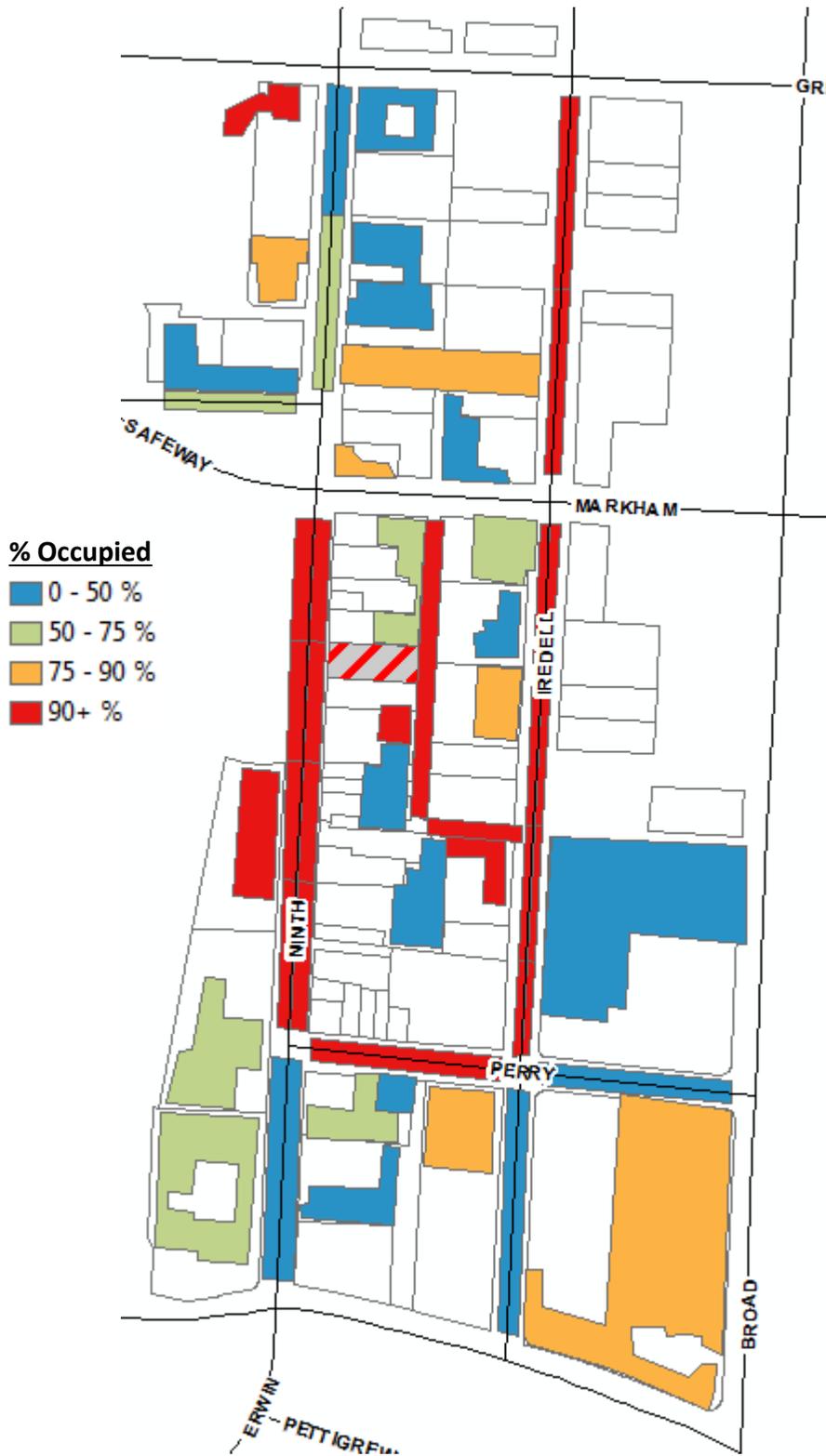
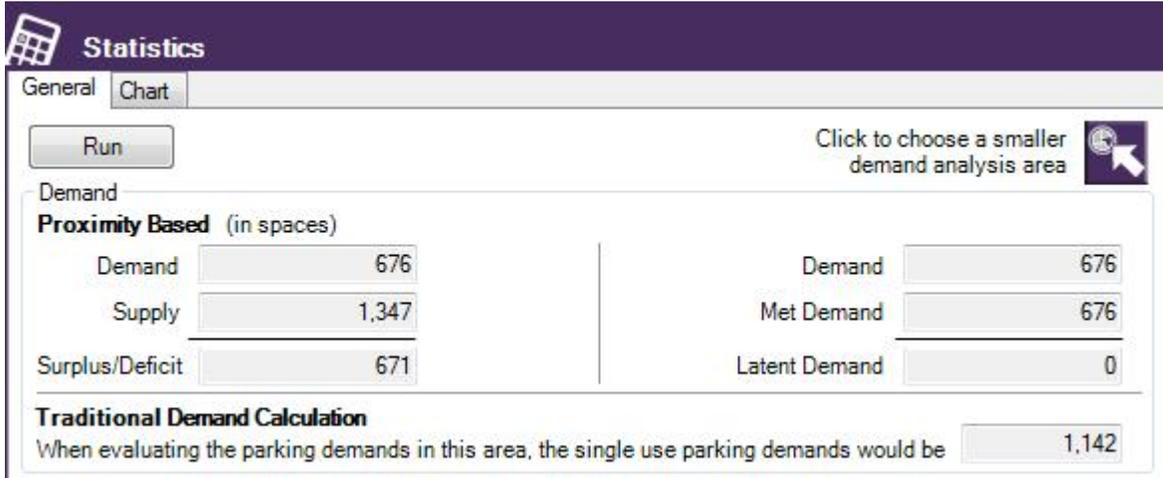


Figure 5.4 – Park+ Existing Weekday Scenario Demand Projections

Weekend Results

The output below provides the initial existing weekend conditions projection from the model. The general results do not differ from the calibration process because none of the inputs were changed. Parking demands were allocated based on the Park+ principles of proximity parking, which is represented by Figure 5.5.



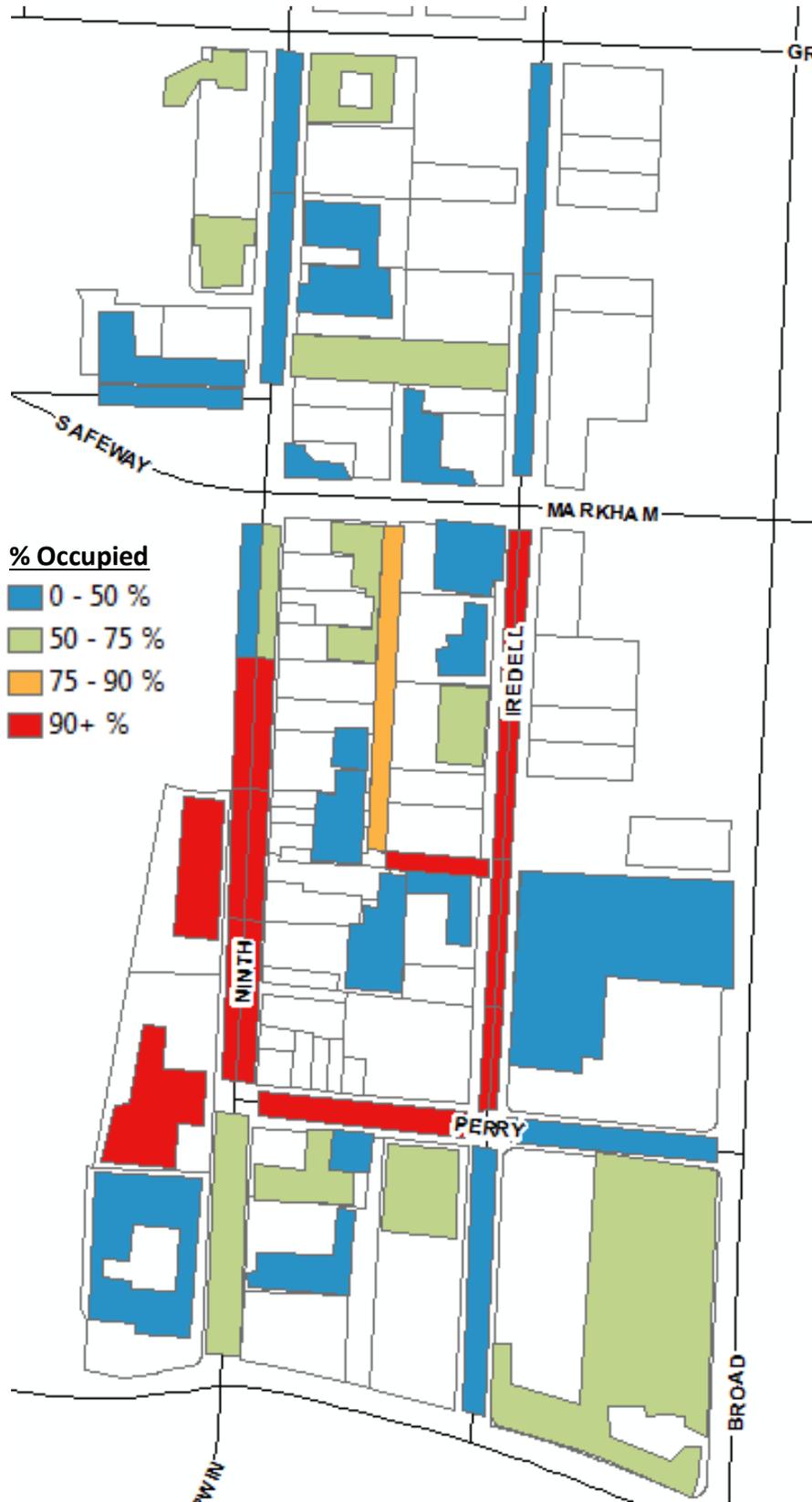


Figure 5.5 – Park+ Existing Weekend Scenario Demand Projections

Projection Scenario #1 – Paid Parking in the Ninth Street Timed Lot

The first projection that was developed for the Ninth Street Area was the application of paid parking in the Ninth Street lot. The model input criteria was held constant, but the pricing for the Ninth Street lot was set to \$1.00 per hour, with a daily maximum of \$8.00. The results from this projection are shown below.



The overall results do not differ from the previous projection. However, when visually reviewing the occupancy levels of the Ninth Street timed lot and surrounding on-street parking, it is clear that the introduction of a price for that lot influences behaviors for parkers in the area.

Figure 5.6 shows that weekday occupancy in the lot during the observed hour doesn't change much with the application of a price component, primarily because the demand for parking in that area is so high. Table 5.3 compares weekday occupancy levels from the initial projection to the scenario with the introduction of price.

Table 5.3 – Ninth Street Timed Lot Occupancy Comparison

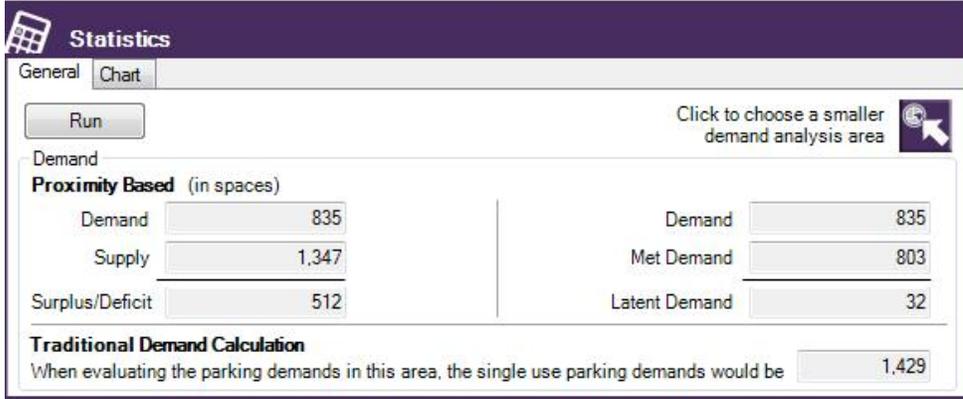
Hour	Original Occupancy Level	Occupancy Level w/ Price	Delta
11:00 AM	95%	95%	0%
12:00 PM	95%	95%	0%
1:00 PM	95%	95%	0%
2:00 PM	95%	95%	0%
3:00 PM	93%	79%	-4%
4:00 PM	95%	95%	0%
5:00 PM	95%	95%	0%
6:00 PM	95%	65%	-30%



Figure 5.6 – Park+ Paid Off-Street Lot Demand Projections

Projection Scenario #2 – Paid Parking On-Street and in the Ninth Street Timed Lot

The second projection that was developed for the Ninth Street Area was the application of paid parking on-street, as well as in the Ninth Street lot. The model input criteria was held constant, but the pricing for on-street parking was set to \$1.25 per hour, with three hours maximum duration of stay. The three hour duration of stay was implemented with the intent that restaurants and evening nightlife are best served with a longer duration of stay than the typical two hour window. As with the previous scenario, the Ninth Street lot was set to \$1.00 per hour, with a daily maximum of \$8.00. The results from this projection are shown below.



The overall results still do not differ from the previous projection, as we have not introduced a new demand generator into the system. However, when visually reviewing the occupancy levels of the Ninth Street timed lot and surrounding on-street parking, it is clear that the introduction of price structures for those parking areas affects behaviors for parkers in the area.

Figure 5.7 shows that weekday occupancy on-street changes somewhat in areas of lessor demand – however, in the Ninth Street retail area the demand for parking is too high to recognize demand balancing impacts. Table 5.4 compares weekday occupancy levels from the initial projection and the two scenarios introducing price as a component of parking in the area.

Table 5.4 – Ninth Street Timed Lot Occupancy Comparison

Hour	Original Occupancy Level	Occupancy Scenario 1	Occupancy Scenario 2
11:00 AM	95%	95%	95%
12:00 PM	95%	95%	95%
1:00 PM	95%	95%	95%
2:00 PM	95%	95%	95%
3:00 PM	93%	79%	95%
4:00 PM	95%	95%	95%
5:00 PM	95%	95%	95%
6:00 PM	95%	65%	95%

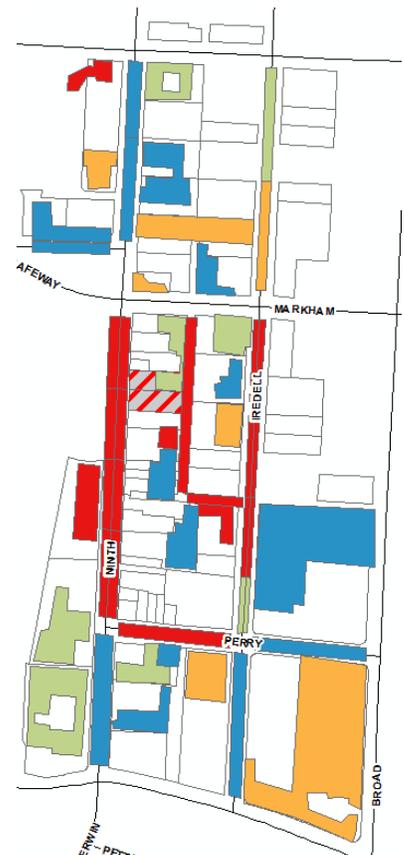


Figure 5.7 – Park+ Paid On- & Off-Street Lot Demand Projections

The introduction of paid on-street parking incrementally increases the occupancy levels in the Ninth Street Timed Lot back to the original demand levels during different times of day, as shown in Table 5.5.

Table 5.5 – Average On-Street Occupancy Comparison

Hour	Original Occupancy Level	Occupancy Scenario 1	Occupancy Scenario 2
11:00 AM	80%	78%	76%
12:00 PM	81%	79%	77%
1:00 PM	80%	81%	75%
2:00 PM	77%	77%	75%
3:00 PM	66%	70%	69%
4:00 PM	71%	73%	73%
5:00 PM	76%	74%	74%
6:00 PM	77%	77%	76%

The introduction of paid on-street parking incrementally lowers the average on-street parking occupancy throughout the area by approximately 1 – 5% during the different times of day. The average occupancy levels include all on-street parking in the area. The most utilized on-street parking areas, between Markham and Perry on Ninth Street and Iredell Street, still see higher than average occupancies.

6 | Adjacent Development

The City of Durham has several potential projects with that could impact parking demand within the area surrounding Ninth Street. However, the potential development in the area lies outside of the study area defined for this project and shown in Figure 2.1. Listed below and shown in Figure 6.1 are the potential development projects currently being considered in the Ninth Street area.

- Hotel
 - Located immediately west of Erwin Mills, adjacent to Main Street
 - Approximately 130 rooms
 - Approximately 150 on-site surface parking spaces
- Multi-Family Development
 - Located immediately west of Erwin Mills and north of the proposed hotel mentioned above
 - Approximately 310 apartment units
 - Approximately 400 on-site structured parking spaces
- Grocery Store & Miscellaneous Retail
 - Located immediately north of Erwin Mills and north of proposed multi-family development mentioned above, adjacent to Hillsborough Road
 - Approximately 53,500 square feet of grocery
 - Approximately 25,800 square feet of miscellaneous retail
 - Approximately 335 on-site surface parking spaces

Each of the potential developments shown and listed together provides a total of approximately 885 parking spaces. Utilizing Urban Land Institute peak parking generation rates, the estimated parking demand for these developments is shown in Table 6.1.

Table 6.1 – Ninth Street Area Potential Development Parking Demand

Development	Size	ULI Peak Parking Generation Rate	Parking Demand	Parking Provided
Hotel	130 rooms	1.25/room	163 spaces	150 spaces
Multi-Family	310 apts.	1.65/unit	512 spaces	400 spaces
Grocery & Misc. Retail	79,300 SF	4.0/1,000 SF	318 spaces	335 spaces
Total			993 spaces	885 spaces

As shown in Table 6.1, the estimated peak parking demand exceeds that of the parking provided for each development. It is evident that certain levels of shared parking between these developments would likely be required for the potential developments to successfully park their users and overcome the approximately 108 space parking deficit. Considering that these developments, with the exception of the eastern extent of the grocery and retail, are located opposite Erwin Mills from the study area, it is unlikely that parking demand and supply will share with the area analyzed in this study. As a result, these developments were excluded from the analysis performed on the Ninth Street study area.



Figure 6.1 – Potential Ninth Street Area Development

In addition to the potential development west and north Erwin Mills, there is also a proposed development at the northern extent of the study area on the southeast corner of the intersection of Ninth Street and Green Street. This proposed development is also shown in Figure 6.1 and is referred to as Ninth Street North. The uses within the development include the following:

- Ninth Street North
 - Located on southeast corner of Ninth Street and Green Street
 - Approximately 230 apartments
 - Approximately 6,400 square feet office
 - Approximately 10,000 square feet retail
 - Approximately 400 on-site structured parking spaces

Utilizing Urban Land Institute peak parking generation rates, the estimated parking demand for the Ninth Street North development is shown in Table 6.2.

Table 6.2 – Ninth Street North Potential Development Parking Demand

Development	Size	ULI Peak Parking Generation Rate	Parking Demand	Parking Provided
Apartments	230 apts.	1.65/unit	380 spaces	
Office	6,400 SF	3.8/1,000 SF	25 spaces	
Retail	10,000 SF	4.0/1,000 SF	40 spaces	
Total			445 spaces	400 spaces

On the surface, the peak parking demand and parking supply provided shown in Table 6.2 do not align, however, the mix of uses within the potential development are conducive to sharing parking supply throughout the day. As a result, this development is considered “self-parked” and will not need to rely on surrounding parking supply to meet its needs. Coupling this with the unknown timeframe of this potential development coming to fruition, the Ninth Street North development was excluded from the parking study. Should this development come back to the table as a viable project, the City should consider engaging this property owner to discuss potential parking lease agreements, depending on the then current makeup of parking supply and demand within the study area.

7 | Financial Analysis

This section summarizes the cost and revenue projections related to the prescribed paid parking implementation in the Ninth Street Timed Lot, as well as recommended paid on-street parking in the Ninth Street study area.

On-Street Paid Parking

The following projections are related to implementing paid on-street parking in the Ninth Street study area. For the purposes of this financial analysis 150 spaces within the study area are assumed to be transitioned to paid parking, primarily located along Ninth Street, Iredell Street, and Perry Street. Further, it was assumed that on-street paid parking would be implemented in 2014/2015. Financial projections are made for each year between 2014/2015 and 2022/2023. For this exercise, the following assumptions were made. It should be noted that the assumptions presented assume that on-street and off-street paid parking within the study area acts cohesively as a system; ie, the financials presented for on-street and off-street parking should not be considered as standalone projections.

• Number of Paid On-Street Parking Spaces	150
• Number of Pay Stations	20
• Annual Revenue per Parking Space	\$1,000
• Annual Operating Expense per Pay Station	\$400
• Annual Enforcement Expense per Pay Station	\$100
• Installation Cost per Pay Station	\$10,000

Paid on-street parking revenue projections were developed using the estimated number of paid on-street parking spaces, along with an estimated annual revenue per space, which for 2014/2015 was \$1,000 per space. It was assumed that the on-street parking rates would remain constant until 2017/18 when rates should experience a 20% increase. Similarly, another 20% increase in revenue is projected in 2022/2023 to account for steadily increased parking rates. The result is an annual revenue projection of approximately \$150,000 until 2017/2018 when the revenue projection increases to \$180,000. The annual on-street parking revenue is projected to increase to \$216,000 in 2022/2023.

Paid on-street parking expenses were calculated using the estimated number of pay stations to be installed (1 pay station per 7.5 spaces) and the annual expense per pay station. The calculation for expenses takes into consideration the annual operating costs and the cost for enhanced area enforcement and other associated expenses. A 25% increase of operating expenses was applied to account for enhanced enforcement, additional staff, and future assessments/studies. Expenses were then increased 2% annually to account for inflation.

The calculations for expenses do not include the upfront capital cost of procuring and installing the pay stations. It was assumed that 20 pay stations would be installed at a cost of \$10,000 per pay station, resulting in a total installation cost of \$200,000 that is applied to the financials in 2014/2015.

In 2014/2015, the installation cost of the pay stations results in a net parking deficit of approximately \$60,000 in the Ninth Street study area. After initial installation, approximately \$150,000 in revenue is estimated with total expenses of approximately \$10,000, resulting in a net surplus of approximately \$140,000 each year. This surplus is estimated to grow to approximately \$170,000 annually in 2017/2018 and approximately \$205,000 in 2022/2023 as a result of parking rate increases within the study area. A summary of the paid on-street parking financial analysis is provided in Table 7.1.

Table 7.1 – Paid On-Street Parking Projection

	2014/2015	2015/2016	2016/2017	2017/2018 ¹	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023 ¹
On-Street Paid Parking Revenue	\$150,000	\$150,000	\$150,000	\$180,000	\$180,000	\$180,000	\$180,000	\$180,000	\$216,000
Total Annual Revenue	\$150,000	\$150,000	\$150,000	\$180,000	\$180,000	\$180,000	\$180,000	\$180,000	\$216,000
Annual Revenue per Space	\$1,000	\$1,000	\$1,000	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$1,440
On-Street Paid Parking Expense	\$10,000	\$10,200	\$10,400	\$10,600	\$10,900	\$11,000	\$11,300	\$11,500	\$11,700
Total Annual Operating Expense	\$8,000	\$8,200	\$8,300	\$8,500	\$8,700	\$8,800	\$9,000	\$9,200	\$9,400
Annual Operating Expense per Pay Station	\$400	\$410	\$415	\$425	\$435	\$440	\$450	\$460	\$470
Total Annual Enforcement Expense	\$2,000	\$2,000	\$2,100	\$2,100	\$2,200	\$2,200	\$2,300	\$2,300	\$2,300
Annual Enforcement Expense per Pay Station	\$100	\$100	\$105	\$105	\$110	\$110	\$115	\$115	\$115
On-Street Pay Station Install Cost	\$200,000	-	-	-	-	-	-	-	-
Number of Pay Stations	20								
Cost Per Pay Station	\$10,000								
Net Surplus / Deficit	(\$60,000)	\$139,800	\$139,600	\$169,400	\$169,200	\$169,000	\$168,700	\$168,500	\$204,300

¹ 20% increase in hourly parking rate

Ninth Street Timed Lot Paid Parking

The City leased off-street surface parking lot, referred to as the Timed Lot, is currently free of charge with a 2-hour time restriction. In FY2014, this lot will be converted to a paid parking lot. The lot will feature one multi-space parking meter and rates will be set at \$1 per hour. Revenue and expense projections were made for this lot following the same methodology used to calculate on-street paid parking projections. Assumptions for this analysis are listed below. It should be noted that the assumptions presented assume that on-street and off-street paid parking within the study area acts cohesively as a system; ie, the financials presented for on-street and off-street parking should not be considered as standalone projections.

• Number of Paid Off-Street Parking Spaces	46
• Number of Pay Stations	1
• Annual Revenue per Parking Space	\$1,000
• Annual Operating Expense per Pay Station	\$400
• Annual Enforcement Expense per Pay Station	\$100
• Installation Cost Per Pay Station	\$10,000
• Annual Lease	Years 1-5: \$85,000/year Years 5+: \$90,000/year

Based on the above assumptions, total annual revenues for this lot were calculated. Similar to the on-street paid parking assumptions; revenues were estimated to increase by 20% in 2017/2018 then again in 2022/2023. The result is an annual revenue of approximately \$46,000 until year 2017/2018, when revenues increase to approximately \$55,000. The annual revenue is projected to increase to \$66,000 in 2022/2023.

The expenses for the surface lot were divided into operating expenses and enforcement expenses, similar to the on-street paid parking. A 25% increase in operating expenses was assumed to account for the enhanced enforcement and other associated expenses. Additionally, a 2% increase was applied annually to all of the expenses to account for inflation. Cost for installation of the pay station remained \$10,000.

In 2014/2015, paid off-street parking in the Timed Lot results in a net parking deficit of approximately \$50,000. After initial installation, approximately \$46,000 in revenue is estimated with total expenses of approximately \$85,000, resulting in a net deficit of approximately \$40,000 each year. This deficit is estimated to decrease to approximately \$30,000 annually in 2017/2018 and approximately \$24,000 in 2022/2023 as a result of parking rate increases within the study area. A summary of the paid on-street parking financial analysis is provided in Table 7.2.

Table 7.2 – Ninth Street Timed Lot Paid Parking Projection

	2014/2015	2015/2016	2016/2017	2017/2018 ¹	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023 ¹
Timed Lot Paid Parking Revenue	\$46,000	\$46,000	\$46,000	\$55,200	\$55,200	\$55,200	\$55,200	\$55,200	\$66,200
Total Annual Revenue	\$46,000	\$46,000	\$46,000	\$55,200	\$55,200	\$55,200	\$55,200	\$55,200	\$66,200
Annual Revenue per Space	\$1,000	\$1,000	\$1,000	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$1,439

Timed Lot Paid Parking Expense	\$85,500	\$85,500	\$85,500	\$85,500	\$85,500	\$90,600	\$90,600	\$90,600	\$90,600
Total Annual Operating Expense	\$400	\$410	\$420	\$420	\$430	\$440	\$450	\$460	\$470
Annual Operating Expense per Pay Station	\$400	\$410	\$420	\$420	\$430	\$440	\$450	\$460	\$470
Total Annual Enforcement Expense	\$100	\$100	\$100	\$110	\$110	\$110	\$110	\$110	\$120
Annual Enforcement Expense per Pay Station	\$100	\$100	\$100	\$110	\$110	\$110	\$110	\$110	\$120
Annual Lease	\$85,000	\$85,000	\$85,000	\$85,000	\$85,000	\$90,000	\$90,000	\$90,000	\$90,000

Timed Lot Pay Station Install Cost	\$10,000	-	-	-	-	-	-	-	-
Number of Pay Stations	1								
Cost Per Pay Station	\$10,000								

Net Surplus / Deficit	(\$49,500)	(\$39,500)	(\$39,500)	(\$30,300)	(\$30,300)	(\$35,400)	(\$35,400)	(\$35,400)	(\$24,400)
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¹ 20% increase in hourly parking rate

8 | Recommendations

Parking strategy recommendations have been defined for the Ninth Street study area based on observations, analysis of existing parking data, community stakeholder outreach, peer city interviews, and PST input. These strategies are designed to address existing and future demand in the study area and are intended to represent a toolbox of available solutions that could be implemented based upon ability and opportunity. Some solutions should be easily and quickly achieved, while others will likely require a larger commitment of resources and cooperation of others.

The strategies for the Ninth Street study area are organized into three different categories—short-term, mid-term, and long-term. The short-term category is recommendations for immediate implementation within the next 6 months, the mid-term category is recommendations for implementation between 6 months and 18 months, and the long-term category is recommendations for implementation beyond the 18 month timeframe.

Many of the recommendations are inter-related and as such, during implementation, other recommendations may require re-defining or re-prioritization. The City should consider this parking study report a tool, with the understanding that periodic updates (every 1 – 3 years) may be required to appropriately react and respond to a developing community. The parking strategies recommended for implementation within the Ninth Street study are further defined in the remainder of this section.

Short Term (< 6 months)

- Stripe on-street spaces

Currently, the Ninth Street study area only has a handful of on-street parking spaces (primarily accessible parking) that are striped, while the overwhelming majority of the study area has no delineation of on-street spaces. Leaving on-street parking without space delineation could result in inefficient use of the curb face, resulting in underutilized parking supply. While this is possible, the larger benefit to delineating on-street parking is that it creates order on a block face, thus easier operation and parking management. For these reasons, it is recommended to stripe on-street spaces on the following streets:

- Ninth Street (including motorcycle spaces where appropriate) – Main Street to Green Street
- Perry Street – Ninth Street to Broad Street
- Markham Avenue – Ninth Street to Broad Street
- Iredell Street – Main Street to Markham Avenue

These streets were chosen, as they represent the locations that immediately surround the businesses that draw parking demand to the study area.

- Markham Avenue on-street parking

Currently, Markham Avenue is striped with a continuous two-way left turn lane between Ninth Street and Iredell Street. This current striping is not an efficient use of the roadway width. As such, it is recommended to restripe the two-way turn lanes for left turning traffic onto Ninth Street and onto Iredell Street, allowing implementation of on-street parking on Markham Avenue. Depending on the length of striped space, this recommendation could add between 8 and 12 on-street spaces to the study area. On-street parking is in high demand for visitors and is important to business owners within the Ninth Street study area. Providing more on-street spaces is aimed to reduce the perception of insufficient parking within the study area.

- On-street time limits & enforcement

The off-street City-owned surface lot is expected to be converted from a time restricted to a paid parking lot. This will have an adverse impact on the on-street parking spaces, as it will push users to free on-street spaces. Considering this and the realistic timing of implementing a paid on-street program (which is recommended), the on-street spaces in the Ninth Street study area should be converted from a 3 hour to a 2 hour time restriction to help encourage turnover, during the time in which the City plans for and implements paid on-street parking. In addition, considering its immediate adjacency to the study area, on-street parking along Broad Street between West Main Street and West Markham Street should be time restricted to 2 hours as well to inhibit all day parking.

Furthermore, to help ensure that the on-street and off-street parking systems work in unison, enforcement within the Ninth Street study area and along Broad Street should be heightened to limit those that abuse on-street parking time restrictions.

- Employee Parking

Employees that work within the study area frequently occupy prime visitor parking spaces (on-street and the City leased off-street lot on Ninth Street). This may discourage visitors from the Ninth Street area since convenient parking can be difficult to find, especially during peak times. To minimize the impact that employees have on the convenient spaces, it is recommended that the City seek a partnership with Duke University that would allow free public use of a portion of the off-street lot on Hillsborough Road (adjacent and to the west of the study area). Preliminary discussions with representatives of Duke University have indicated they would be willing to allow public parking in this lot during nights and weekends.

It is likely that an agreement to use approximately 30 spaces for employees of Ninth Street businesses would have a positive impact on the study area. If this agreement can be reached, employers within the study area should encourage their employees to use this parking, rather than the convenient spaces along Ninth Street.

- Wells Fargo parking agreement

Located mid-block on Perry Street, between Ninth Street and Iredell Street, is an off-street lot that is owned by Wells Fargo. This lot is restricted to private, employee use only. However, this lot is gated and unable to be used. It was noted by some stakeholders that this lot has remained vacant for years. Given that this off-street lot is located immediately adjacent to the Ninth Street businesses, it is prime parking that currently goes unused. It is recommended that the City or the Ninth Street merchants seek an agreement with Wells Fargo that would allow public use of this lot. An agreement with Wells Fargo also could include considerations for using this lot, or the lot surrounding Wells Fargo on the corner of Ninth Street and West Main Street, for restaurant valet parking, thus providing additional parking supply to the study area and a new service that can be offered to visitors.

- Restripe crosswalk

Mid-block on Ninth Street, between West Markham Avenue and Perry Street, is a pedestrian crosswalk providing connection from the City owned off-street lot to the east side of the street where the restaurant and retail businesses are located. The crosswalk paint is aging and is faded

and chipping in several locations. It is recommended that the City restripe this crosswalk to maintain the intended high visibility to drivers.

Medium Term (6 months – 18 months)

- Implement paid on-street parking

To continue to encourage healthy turnover of valuable on-street parking spaces, it is recommended that the City implement a paid on-street parking program that is concurrent with a similar program in the Downtown study area. With the knowledge that the City leased off-street lot on Ninth Street is expected to be converted from a time restricted to a paid parking lot, it is highly recommended to do the same for on-street parking in the Ninth Street study area. Having paid off-street parking without a paid on-street system will result in pushing patrons to the on-street system, likely resulting in lower parking turnover and increased traffic within the study area, as visitors will tend to circle the block looking for a free space. While it is recommended to implement paid on-street parking as soon as possible within the study area, it is understood that several steps are required prior to doing so. These steps include evaluating and selecting the technology for revenue collection that best fits the needs of the City and timing implementation so that it aligns with implementation of paid on-street parking in the Downtown study area. The technology that is likely to be the best fit for the City is a pay-by-cell phone option, paired with pay stations and scratch-off tickets that can be used by those without cellphones, thus maximizing user convenience. It is recommended that the City perform a separate, focused study on available technologies prior to selection and implementation. It is further recommended that the technology and equipment selected and implemented in the Ninth Street study area should be identical to that of the Downtown Study Area to increase familiarity and decrease confusion for users.

The hourly rate to be charged for on-street parking should be considered in relation to the rate being charged in the off-street surface lot. To help ensure the off-street and on-street systems are working together, the hourly rate for on-street parking should exceed that of the off-street rate. Given current parking rates within the City, region, and state, it is recommended to charge \$1.00 per hour for off-street parking and \$1.25 per hour for on-street parking. This should be further discussed and approved by the City and PST prior to implementation.

It is estimated that on-street paid parking revenues could be between approximately \$140,000 and \$220,000 per year over the 10-year timeframe considered, with the exception of the year of installation due to up front capital cost of \$200,000.

- Remove “NC 70 Business” designation

An item brought to light by stakeholders within the study area is that Ninth Street is currently designated by the North Carolina Department of Transportation as “US 70 Business.” This results in increased traffic, including large trucks, passing through the study area. Ninth Street should act as a destination. However, with this route designation, pass through traffic will continue, thus increasing unwanted activity on the street and negatively impacting the safety of those that are walking within the study area and crossing Ninth Street. In an attempt to negate these negative impacts, it is recommended that the City continue efforts with the North Carolina Department of Transportation to remove or relocate the “US 70 Business” designation from Ninth Street. In discussions with the PST of this issue, a potential recommended alternate for

“US 70 Business” could be to continue the route along Main Street to the northwest and merging back in with the existing route at its intersection with Hillsborough Road.

- Parking Lease Agreements

Several proposed developments in the Ninth Street area are planned, with unknown timeframes for implementation. For example, the Ninth Street North development located at the corner of Ninth Street and Green Street is an example of a project with the potential to share parking with the Ninth Street businesses. During the development review process, the City and developer should discuss the possibility of sharing parking with other Ninth Street businesses.

Long Term (18 months+)

- Improve 8 Alley

Currently, a large supply of on-street parking within the study area is located one block east of Ninth Street on Iredell Street. Those that park in this location are required to either walk all the way around the block or through the 8 Alley (located between Regulator Bookstore and Vaguely Reminiscent). Given the long walking distance around the block, most choose the 8 Alley, which is not paved and very poorly lit. These negative characteristics will typically detract patrons, thus pushing users to the highly used Ninth Street on- and off-street spaces. To better utilize more of the on-street parking within the study area, specifically those spaces along Iredell Street, it is recommended to improve the 8 Alley to include a paved surface, pedestrian level lighting, and wayfinding signage. Figures 7.1 and 7.2 are renderings of potential improvements to the 8 Alley.

It should be noted that current City right of way along 8 Alley does not extend all the way to Ninth Street. Rather, there is an approximate 10' strip between the Regulator Bookstore and Vaguely Reminiscent that is privately owned. As a result, improvements to the 8 Alley, particularly at the intersection with Ninth Street, would require an encroachment agreement with the adjacent building owners. Based on preliminary conversations with stakeholders and business owners, it is not anticipated that there would be many challenges for the City in implementing improvements along 8 Alley related to property owner agreements.

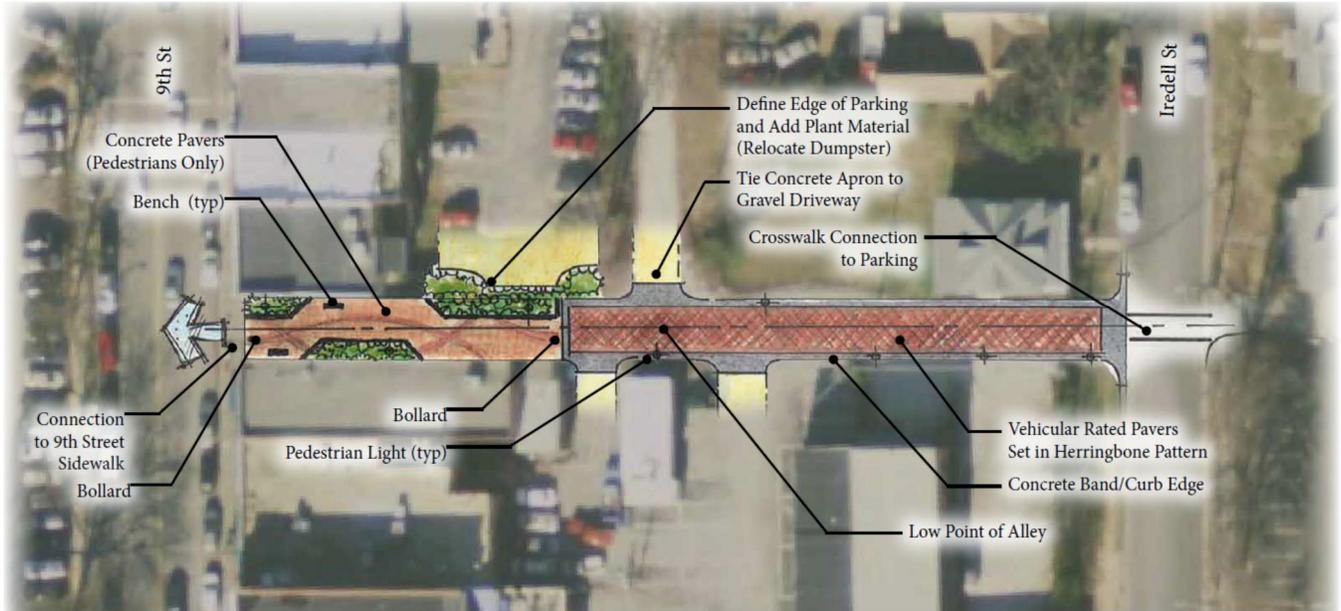


Figure 7.1 – 8 Alley Plan View Rendering

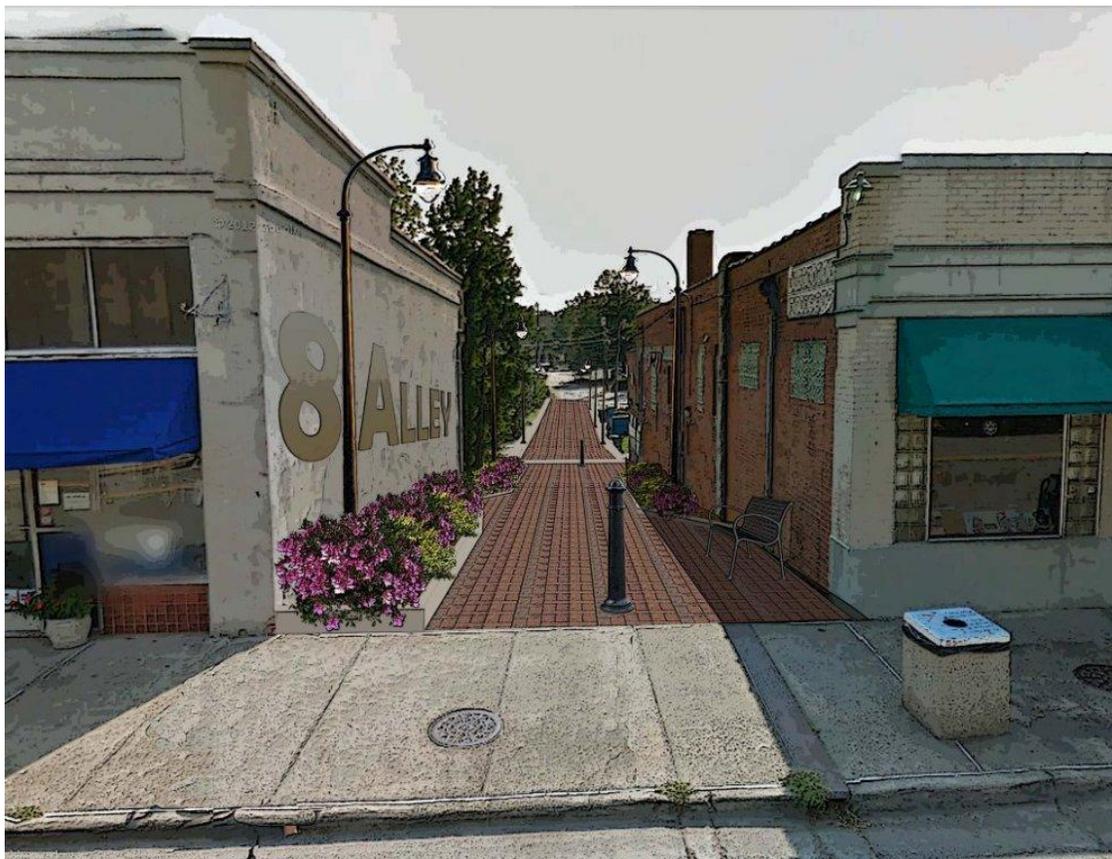


Figure 7.2 – 8 Alley Perspective (Ninth Street Looking East)

- Pave 9 Alley

Many deliveries to businesses are made from Ninth Street, thus blocking parking spaces for users, in addition to providing a crowded sidewalk condition while the deliveries are made. The current condition of 8 and 9 Alleys, located behind the Ninth Street businesses, mid-block between Ninth Street and Iredell Street, are such that deliveries are difficult as a result of uneven terrain and ponding. It is recommended that the 9 Alley be paved, signed and striped appropriately for deliveries. This will free up more of the prime on-street spaces for visitors to the study area and given its width, additional parking supply could be obtained through parallel parking along the alley. Improvements to 9 Alley could be funded through the general Parking Fund.

- Additional Off-Street Parking Supply

A potential location for additional off-street parking supply is the currently vacant lot bounded by Hillsborough Road, Gin Street, Carolina Avenue, and Hale Street. This parcel is approximately 275 feet by 70 feet and could accommodate approximately one bay of parking and approximately 60 vehicles. However, this parcel is located approximately 1,900 feet from the center of Ninth Street. This distance is too far from Ninth Street to provide parking for visitors, but could provide employee parking for existing and future development.

- Iredell Street Employee Parking

The City should implement an employee permit parking program on Iredell Street. This program, which would be similar to a neighborhood parking program, would allow vehicles displaying valid parking permits to park on Iredell Street for a period longer than the posted time limit. The Department of Transportation has requested an opinion from the City Attorney's office regarding legal issues associated with the implementation of such a program. If the program does proceed, there are a number of issues to resolve including who is the permit holder (the individual or business owner), enforcement, program costs and fees, and possible limits on how many and to who permits are distributed.