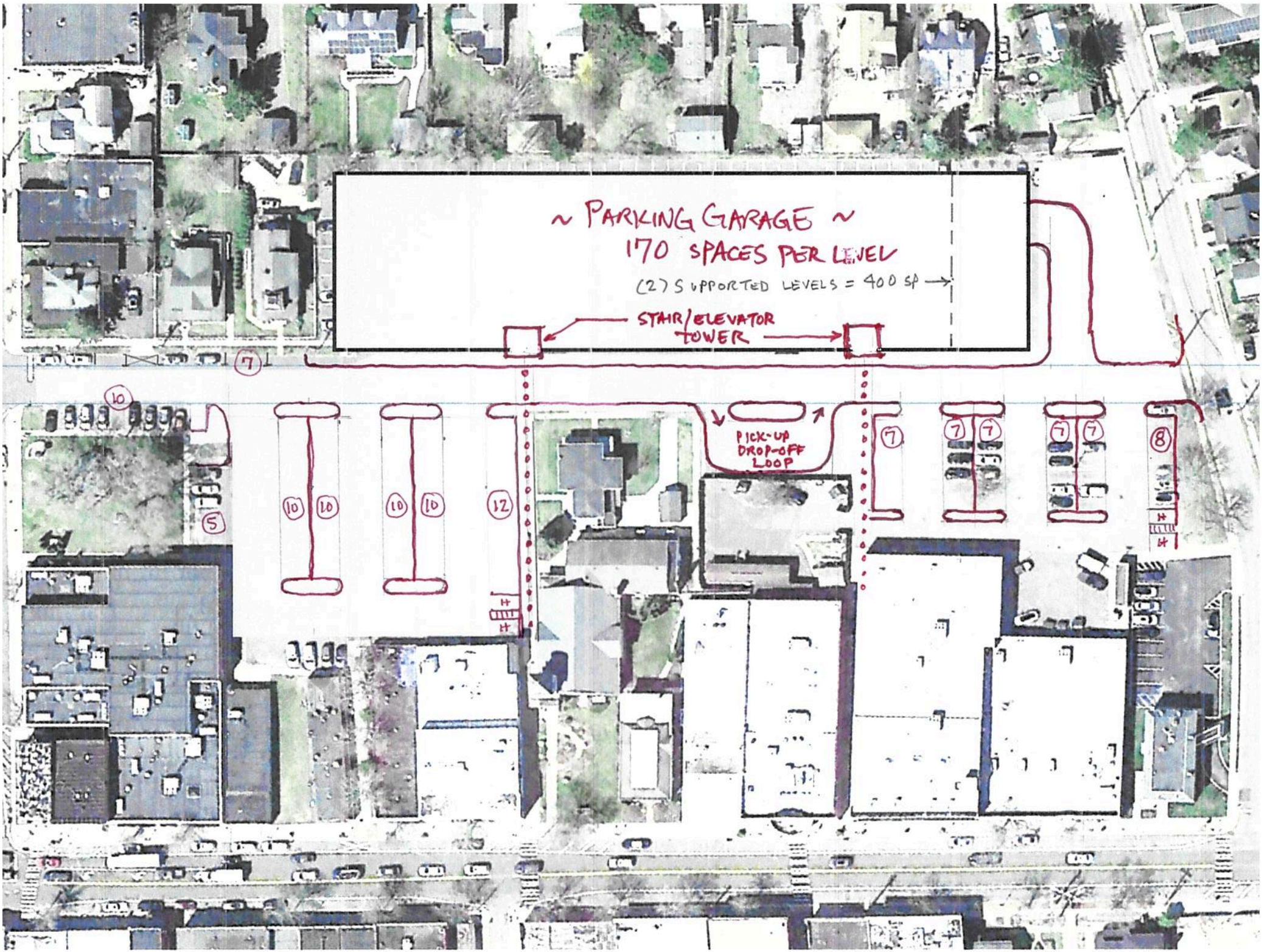

~ PARKING GARAGE ~
170 SPACES PER LEVEL
(2) SUPPORTED LEVELS = 400 SP
STAIR/ELEVATOR TOWER
PICK-UP DROP-OFF LOOP
10
7
10
10
10
10
12
7
7
7
7
7
8
5

Sam Schwartz
A TYLin Company

MEMORANDUM

To: Dawn Thomas, Community Development Director, Town of Riverhead
From: Sam Schwartz Consulting Project Team
Re: Town of Riverhead Parking Generation and Analysis
Date: October 13, 2022

Introduction

The Town of Riverhead, NY has asked Sam Schwartz Consulting to update their Strategic Parking Plan completed in 2020 to include three new developments that are planning/proposed for the Town. These developments are:

- The Town Square Site
- The Transit-Oriented Development Transformation
- The Suffolk Theater Residential/Green Room Renovation

Additionally, there are other sites within the Town of Riverhead that are potential redevelopment parcels. These lots have been accounted for by providing a miscellaneous category within the analysis.

This memorandum summarizes the methodology used and the results of a parking demand analysis. The parking demand analysis will provide the Town with a parking demand estimate that will inform the development of two potential parking garages at Griffing Avenue and Railroad Avenue and Roanoke Avenue and 1st Street.

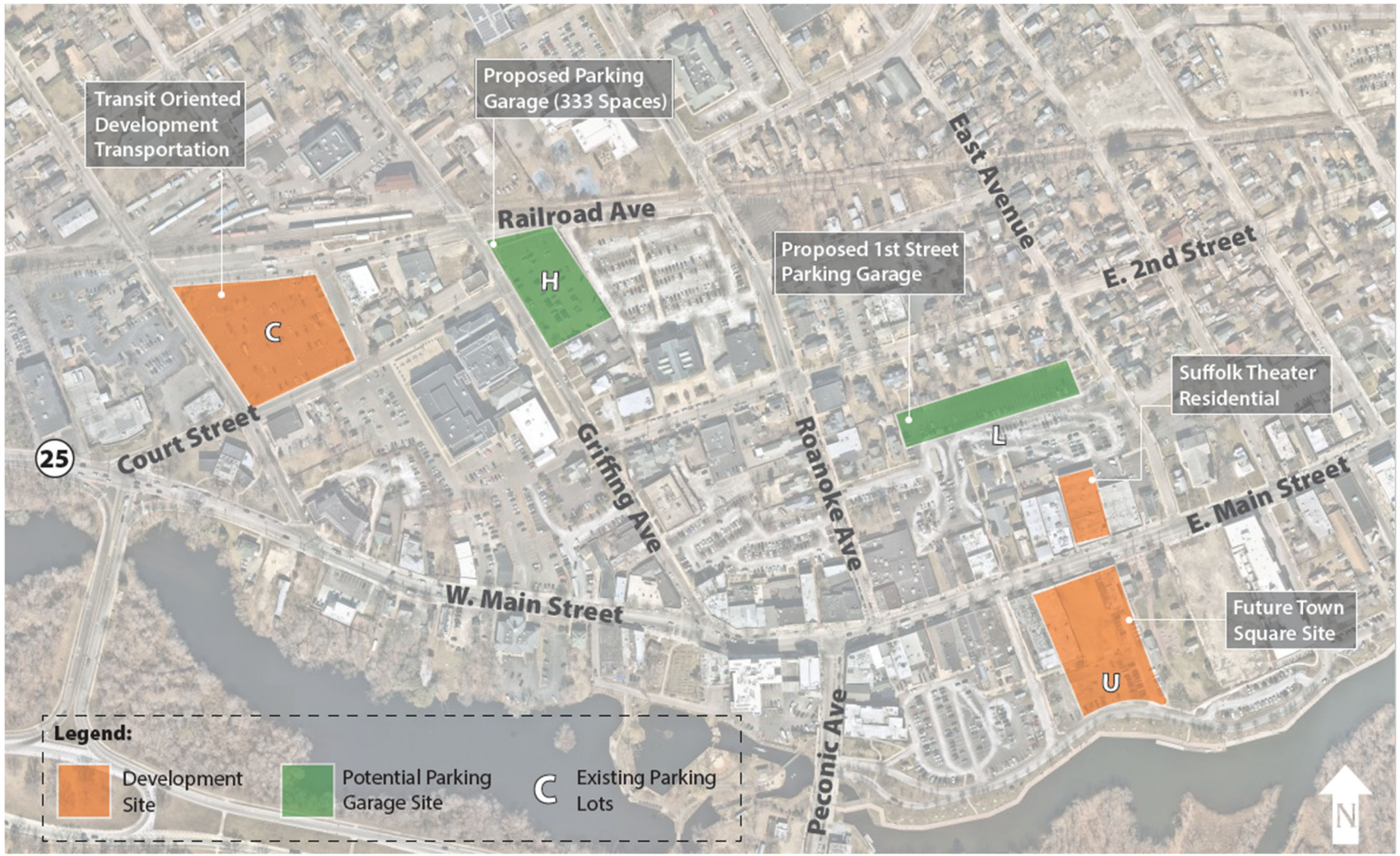
Future Parking Supply

In the future condition available parking will be reduced as the previously mentioned developments will be constructed on existing parking lots. To calculate the total number of spaces to be removed by the developments, the utilization analysis from the Strategic Parking Plan completed by Sam Schwartz in 2020 was referenced. The existing parking supply in Riverhead was also obtained through data previously collected for the 2020 Strategic Plan and includes both on-street and off-street parking for a total of 2,881 spaces. The maximum parking loss due to planned development was calculated and subtracted from the current parking supply, shown in, **Figure 1**. It is assumed that the development would encroach Lots C, H, L, and U, shown in **Figure 2,** resulting in the loss of 728 parking spaces. The labeling system from the original Strategic Parking Plan was utilized for consistency.

Parking Loss due to Development	
Lot Name	**Inventory**
C	237
H	119
L	287
U	85
Total Spaces Lost	728

Figure 1: Parking Loss

Figure 2: Study Area



Future Parking Demand

The 2020 Strategic Parking Plan Addendum was also referenced to establish the current parking demand (1,671 parking spaces). The future parking demand for the downtown area of Riverhead is based on the plans for three upcoming development projects. The new land uses, and the respective square footages or estimated number of units (where available) were compiled. When the number of development units were not available, assumptions were documented (listed below) as part of the calculations. The ITE Park Generation Manual, 5th Edition was utilized to estimate parking demand for each land use category (LUC).

Initial parking generation numbers were presented to the Parking Committee at their Thursday, July 28, 2022 meeting. Based on feedback from members a miscellaneous (or buffer) category was added to the Park Generation to account for developments still in the planning stages. An additional 5,000 SF of retail space and 5,000 SF of residential space were included in the calculations to account for those developments.

Several assumptions were made based on the current development plans:

1. Given the 100'x100' ground dimensions of the residential condominium ownership building at the future town square site, it was assumed that each unit would average 850 square feet, and the building would consist of three residential floors, totaling 30 residential units.
2. Based on a visual representation of the future town square kiosk plaza, 20 kiosks, with each kiosk requiring one employee, were included in the calculations.
3. To estimate the parking demand created by the new amphitheater, the comparably sized Richard Rogers Amphitheater in New York City was referenced for seat estimation.
4. The square footage of the café in the transit-oriented development was estimated using the average square footage of a Dunkin' Donuts location without a drive-through.
5. The expansion of the Suffolk Theater's backstage will not impact the parking demand.
6. Assuming all 5,000 SF of the miscellaneous residential space would be livable, the square footage would equate to a low rise building with 6 residential units

The additional parking demand generated by the three developments and additional miscellaneous uses total 1,129 parking spaces. A detailed breakdown of the parking generation calculations is provided in **Figure 3** on the following page. The superscript within **Figure 3** corresponds to the above assumptions.

Development	LUC	Description	Units	Quantity	ITE Parking Generation
Future Town Square Site					
Hotel, General Urban/Suburban, Person Trips	310	Hotel	Rooms	80	59
High-Turnover (Sit-Down) Restaurant, General Urban/Suburban, Assumed Person Trips	932	High-Turnover (Sit-Down) Restaurant	KSF GFA	3.85	36
Museum (First Floor Hotel), General Urban/Suburban, Person Trips	580	Museum	KSF GFA	4.175	3
Retail Shops, General Urban/Suburban, Person Trips	820	Shopping Center	KSF GFA	12.7	119
Museum (Firehouse), General Urban/Suburban, Person Trips	580	Museum	KSF GFA	0.8	1
Communal Office Rentals, General Urban/Suburban, Person Trips	710	General Office Building	KSF GFA	5.083	46
Residential Condominium Ownership Building, General Urban/Suburban, Person Trips - [1]	221	Mid-Rise Residential	Units	30	4
Plaza, General Urban/Suburban, Person Trips[2]			Employees	20	20
Amphitheater, General Urban/Suburban, Person Trips[3]	444	Movie Theater	Seats	1,324	129
Youth Recreational Area, General Urban/Suburban, Person Trips	495	Rec Community Center	KSF GFA	30	62
			Total Parking Spaces		**479**
Transit Oriented Development					
Retail, General Urban/Suburban, Person Trips	820	Shopping Center	KSF GFA	2.34	104
Flex/Commercial, General Urban/Suburban, Person Trips	820	Shopping Center	KSF GFA	12.8	119
Residential Units, Studio and 1-Bedroom, General Urban/Suburban, Assumed Person Trips	221	Mid-Rise Residential	Units	243	179
Cafe, General Urban/Suburban, Person Trips[4]	936	Coffee/Donut Shop w/o Drive-Through	KSF GFA	2.6	27
			Total Parking Spaces		**429**
Suffolk Theater Renovation					
Suffolk Theater, General Urban/Suburban, Assumed Person Trips[5][6]	444	Movie Theater	Seats	950	-
Residential Units, Studio and 1-Bedroom, General Urban/Suburban, Assumed Person Trips	221	Mid-Rise Residential	Units	28	3
Retail Shops, General Urban/Suburban, Person Trips (PM Only)	820	Shopping Center	KSF GFA	3	105
			Total Parking Spaces		**108**
Miscellaneous/Buffer Developments					
Retail, General Urban/Suburban, Person Trips	820	Shopping Center	KSF GFA	5	108
Mid-Rise Apartments, General Urban/Suburban, Person Trips[7]	220	Low-Rise Residential	Units	6	5
			Total Person Trips		**113**
			Total Spaces		**1,129**

Figure 3: Parking Generation Details

Based on the current number of parking spaces available in Riverhead (2,881), and the 728 parking spaces estimated to be removed, a total of 2,118 parking spaces would remain (2,881 – 728 = 2,153). The existing demand of 1,671 parking spaces along with the estimated new demand from developments (1,129) provides a new total parking demand of 2,800 parking spaces.

This calculation is also shown in Figure 4 below.

Existing Parking Infrastructure		**Parking Demand**	
Existing Parking Spaces	2,881	Existing Demand	1,671
Parking to be Removed	728	New Demand	1,129
Total Parking Spaces	**2,153**	**New Parking Demand**	**2,800**

Figure 4: Parking Demand

Therefore, the existing demand (2,800) less the existing total spaces (2,153) leaves a total new parking demand of 647 spaces.

Parking Needs Sensitivity Analysis

The 647-parking space demand assumes 100% capacity at all times and is the minimum number of parking spaces needed to meet the calculated demand. 100% capacity assumes every spot will be available and utilized. The effective and efficient turnover of convenient parking spaces is most successful when the facility reaches an 85% occupancy rate, meaning that 10% to 15% of spaces are not occupied at any given time and are available for incoming parkers. This is also called 'functional capacity.' Accordingly, it is recommended that the Town of Riverhead aim to provide enough parking so that the standard occupancy rate is equal to 85% or functional capacity. For this instance, functional capacity would be equivalent to 761 parking spaces.

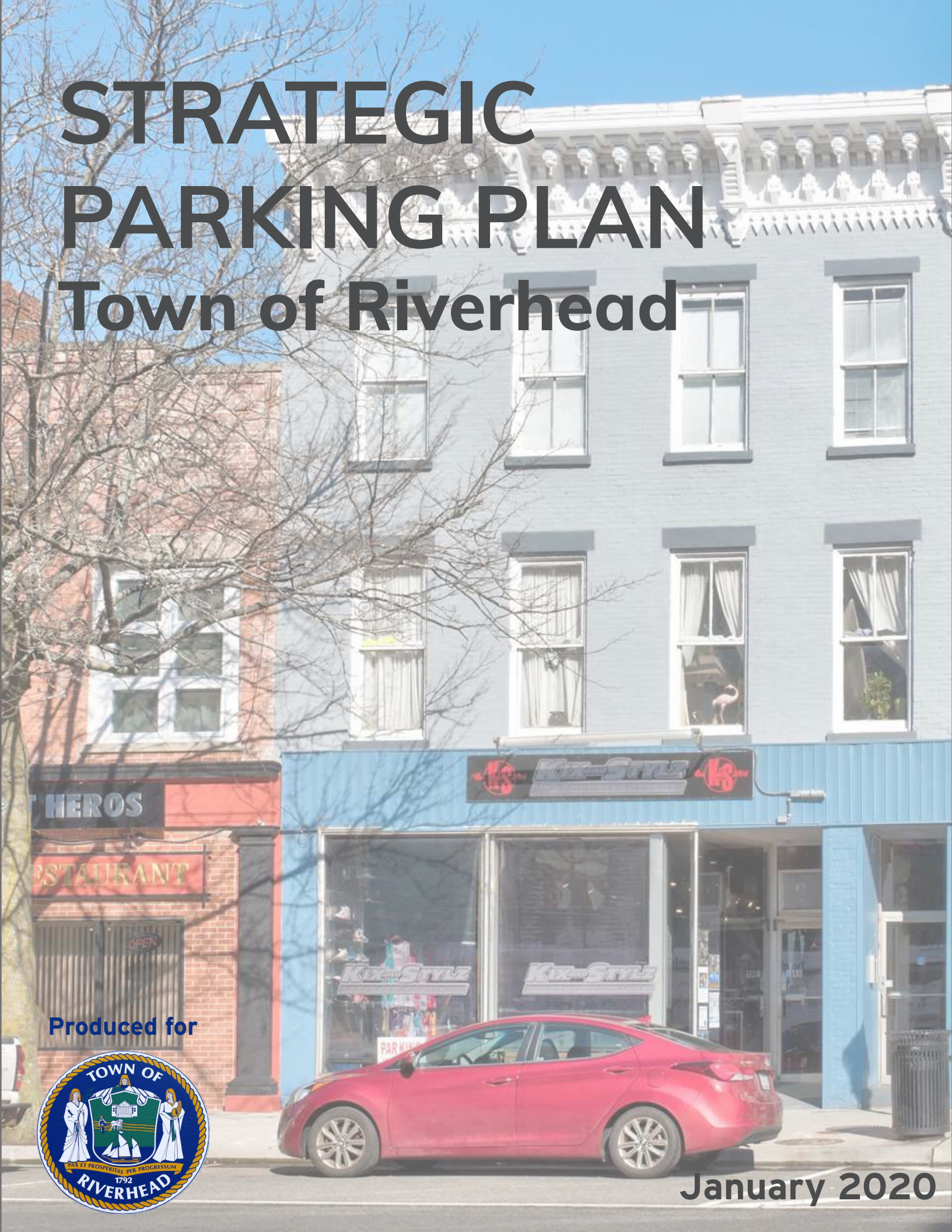
Recommendation

Assuming 333 parking spaces in the Griffing Avenue and Railroad Avenue parking garage (data previously provided by the Town of Riverhead) it is recommended that the proposed Roanoke Avenue and 1st Street Garage hold approximately 428 vehicles. If that parcel is unable to host a garage of that size it is recommended that the Griffing Avenue and Railroad Avenue parking garage size be adjusted accordingly. As the majority of the new developments are closer to Roanoke Avenue and 1st Street, parking garage capacity should favor this location.

FIRST STREET PARKING GARAGE		
Spaces	569	
Construction Cost/Space	27500.	
USES OF FUNDS		
Acquisition	1.	
Parking Construction	15,475,000.	76%
Soft Costs	2,347,125.	11%
Capitalized Interest	2,528,888.	12%
TOTAL:	20,351,013.	100%
Total Cost/Space	35,766.	
SOURCES OF FUNDS		
Sale of TOD 2-acre parcel	7,300,000.	
Municipal Bond	3,051,013.	
RAISE	10,000,000.	
TOTAL:	20,351,013.	

STRATEGIC PARKING PLAN

Town of Riverhead



Produced for

TOWN OF RIVERHEAD
PAX ET PROSPERITAS PER PROGRESSUM
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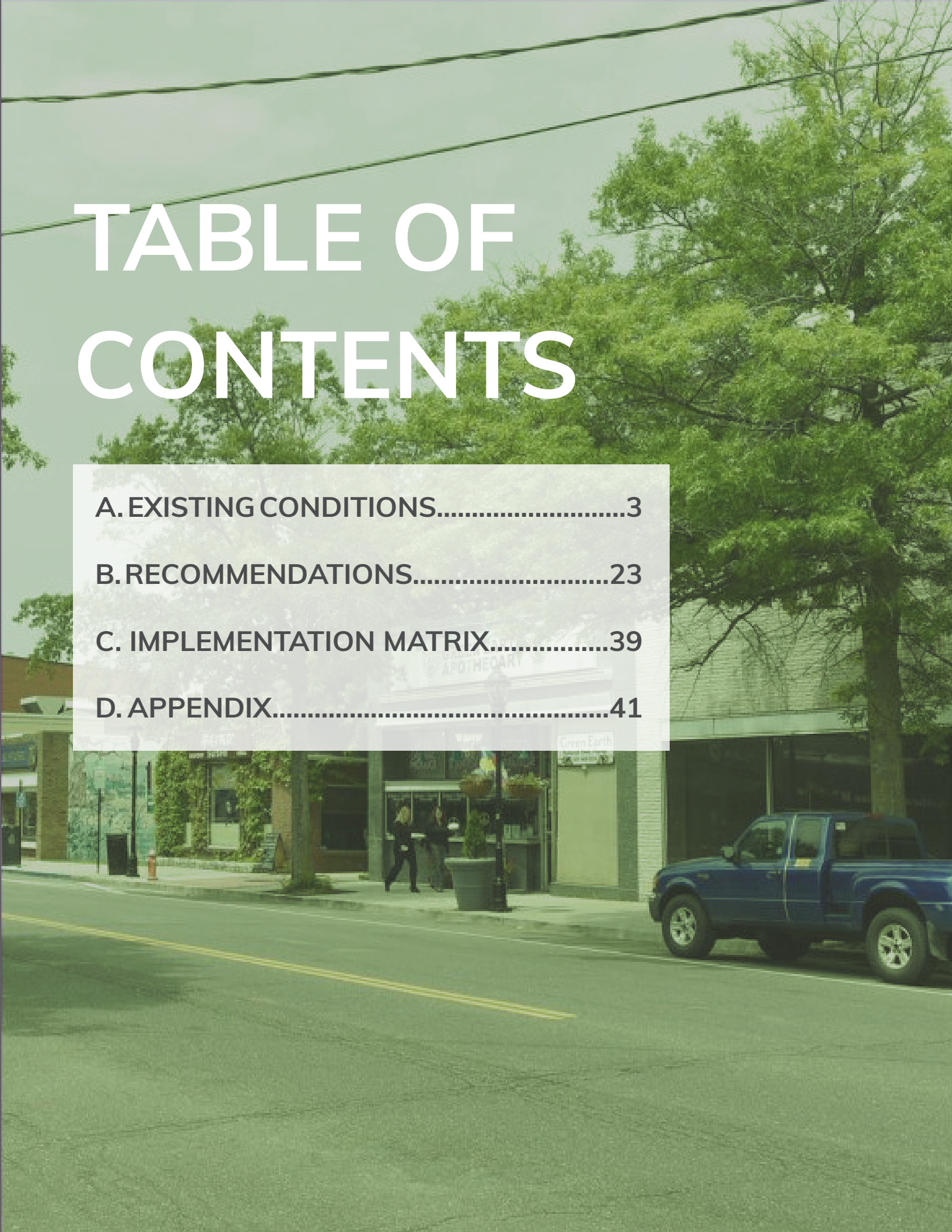
January 2020



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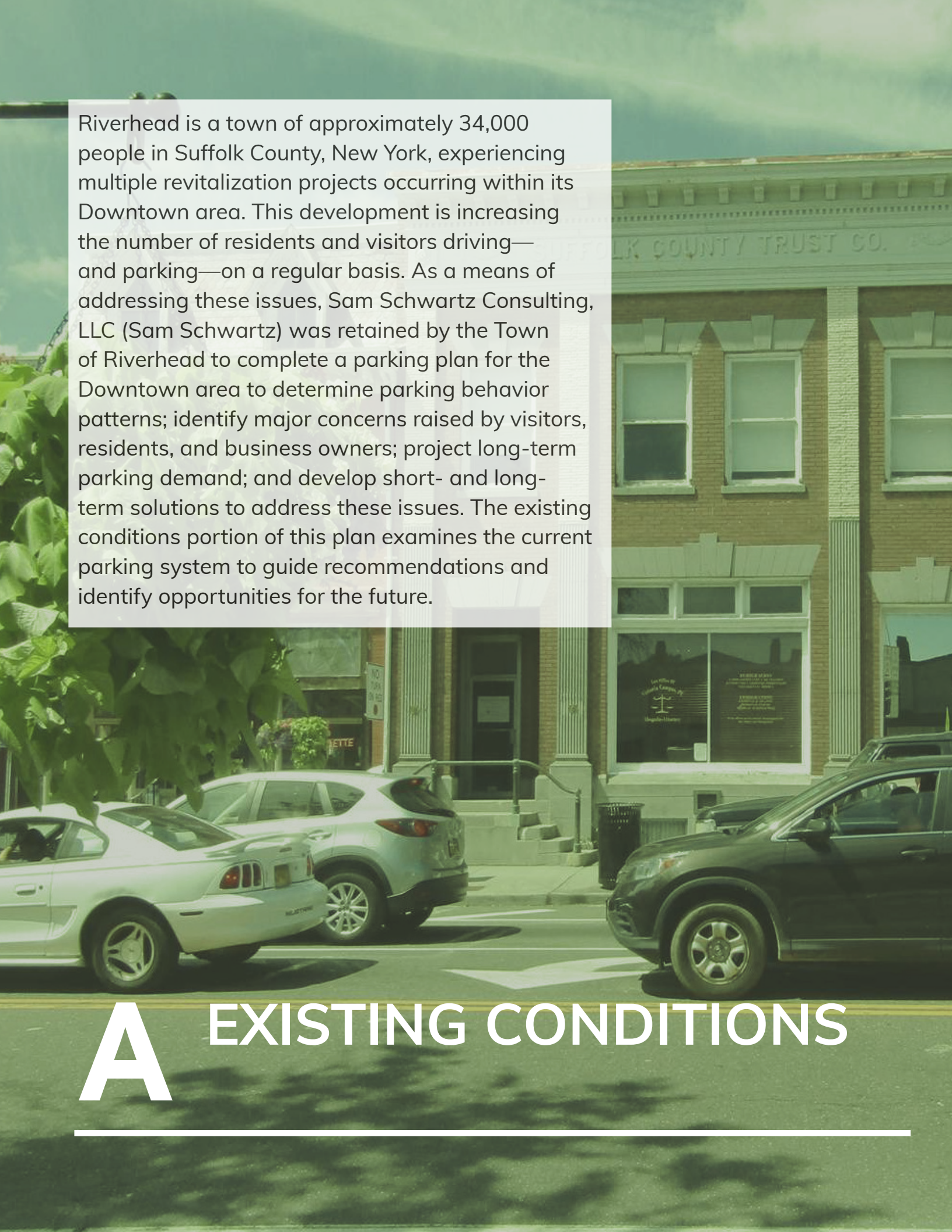


Riverhead is a town of approximately 34,000 people in Suffolk County, New York, experiencing multiple revitalization projects occurring within its Downtown area. This development is increasing the number of residents and visitors driving—and parking—on a regular basis. As a means of addressing these issues, Sam Schwartz Consulting, LLC (Sam Schwartz) was retained by the Town of Riverhead to complete a parking plan for the Downtown area to determine parking behavior patterns; identify major concerns raised by visitors, residents, and business owners; project long-term parking demand; and develop short- and long-term solutions to address these issues. The existing conditions portion of this plan examines the current parking system to guide recommendations and identify opportunities for the future.

A EXISTING CONDITIONS

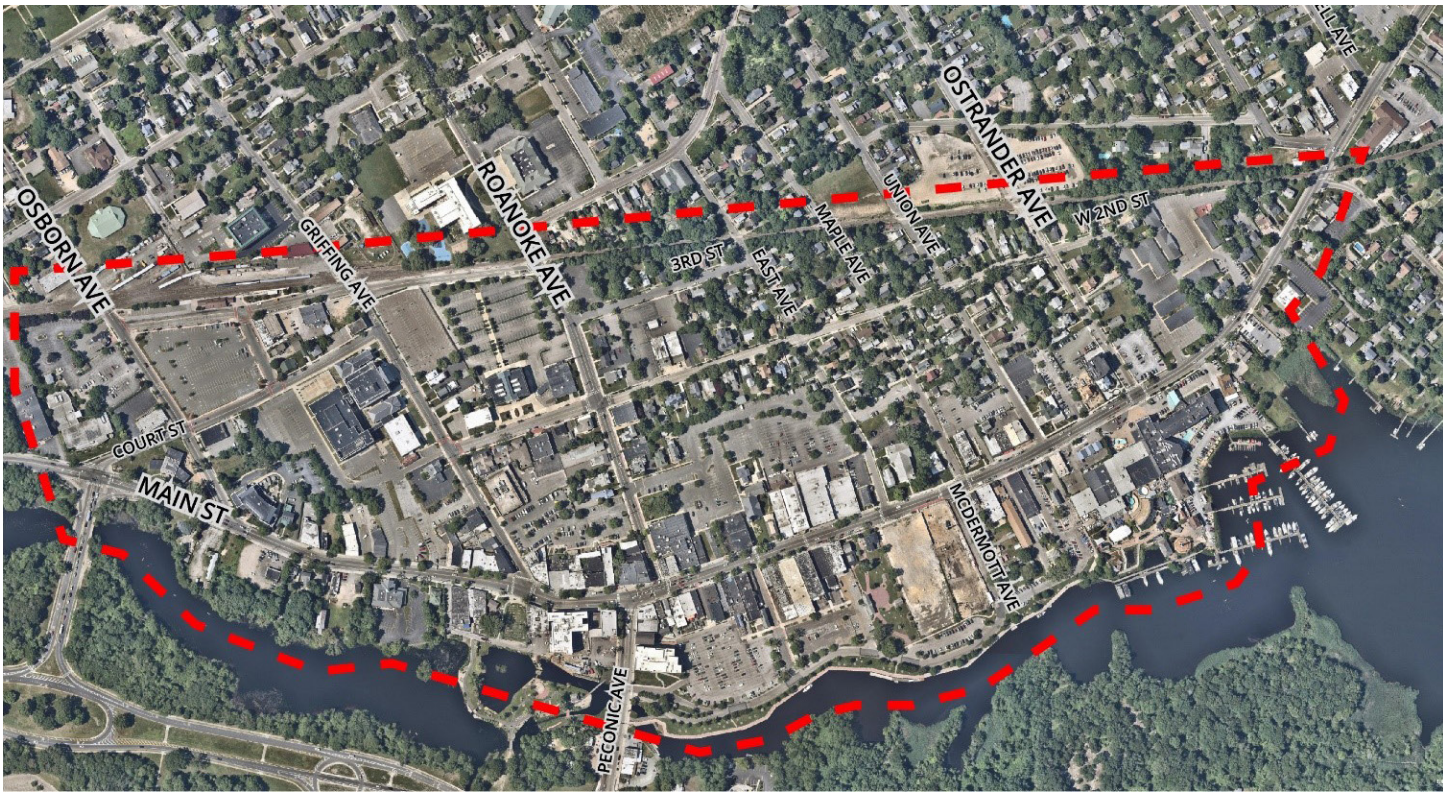
Background

According to the US Census Bureau, the Town of Riverhead had a population of 33,628 in 2016, and 33,783 in 2017, indicating a gradual growth in population. One of the key attributes of Riverhead is its location at the mouth of the Peconic River, which is the point in which Eastern Long Island splits into the northern and southern portions. Downtown Riverhead is also approximately 75 miles from the heart of New York City, and attracts a large number of tourists and visitors to the Long Island Aquarium, the Riverhead Riverwalk, and a variety of unique shops and restaurants.

These attractions, as well as being the County seat, creates a mixture of residential, commercial, institutional, and retail uses located in close proximity to one another within the Downtown area. And with this combination of land uses in close proximity to one another comes a large volume of visitors, employees, and tourists traveling—and parking—each day. The presence of a convenient, comprehensive parking system is key to managing the demand patterns of these different user groups, spurring economic development, and creating a more vibrant community.

Our study focuses on Riverhead's Downtown area, bounded by the railroad/3rd Street to the north, Main Street to the east, the Peconic River to the south, and Osborn Avenue to the west, as seen in Figure 1. While this study will focus on on- and off-street parking facilities, it will also examine privately owned and operated facilities in order to develop recommendations from a comprehensive perspective and optimize parking assets system-wide.

Figure 1: Study Area



Parking management principles & Strategies

Parking management is key to creating a livable community, with the goal of balancing supply and demand through pricing, time limits, and/or other regulations. Well-designed parking policies ensure the continued health and vibrancy of a downtown. When parking is the dominating land use, it separates and expands the area of each individual store or land use. This forces shoppers to park more than once when completing several tasks, creating a car-oriented landscape surrounded by surface lots as opposed to a walkable area that encourages cross-shopping and increases social interaction. Accordingly, best practices in parking management are inclusive of many mobility options necessary to serve the future of the community, as opposed to its primary land use.

Evolution of Parking Management

Typically, the amount of parking supplied influences its demand, making it impossible to determine the optimal supply without considering the long-term costs and benefits of increasing the number of spaces. Although each municipalities approach these issues differently, trends have emerged in how to address parking demand issues. Most communities begin by providing free parking for residents, visitors, and employees. However, as more development occurs, more visitors come downtown, and main commercial corridors become congested and negatively impact the area's ability to attract shoppers or other pedestrians. Local governments then tend to put parking regulations in place, including time restrictions, establishing boundaries for specific users, and increasing enforcement fees.

If the demand for available spaces, as well as complaints and frustration of visitors continues to increase, cities often construct additional parking in the form of surface lots or garages. Although increasing the supply of parking will reduce the number of complaints in the short-term, longer term issues occur as the demand for parking will inevitably increase. If this practice continues the downtown will quickly be dominated with parking and the community will have spent a large portion of its revenue on increasing its parking supply as opposed to improving physical appearance or economic initiatives. Often there is actually enough supply throughout a city's downtown to accommodate the demand. However, it is in areas that are not directly in front of the driver's ultimate destination, perceived as dangerous, or in locations that are difficult to find. Parking management works to balance this demand and supply. Below are several best practices to manage supply and "right-size" the parking system.

1) Encouraging a "Park Once" environment. One of the most valuable aspects of a downtown is that drivers are able to complete a variety of tasks within a single area. For example, a shopper might come to the Business District to get a manicure at A A Nail Spa, stop by First National Bank, and grab a snack at the Asian Market, all within the same Business District. Ideally a driver would be able to do all those things while only using one parking space, as opposed to getting back into their car and parking in a separate space or lot for each.

The "Park Once" strategy allows people to complete tasks quickly, conveniently and in a lively, safe environment, while encouraging walking and social interaction. The particular characteristics that enable people to do a lot of different things in a small area are distinctly what makes downtowns attractive places to live and visit: density, mix of uses, and walkability. Each of these characteristics are enhanced in a Park Once environment.

2) Introducing pricing policies to manage demand. In an effort to balance parking demand and encourage parkers to use the system in its entirety, parking management strategies can be used to shift the demand to some of the downtown's more underutilized areas. Parking pricing policies align supply with demand, typically increasing the rate of parking in high demand areas and decreasing the rate of parking in low demand areas. This is intended to encourage those who are parking long term to locate in areas with lower demand while ensuring that spaces are available for incoming shoppers.

3) Reinvest parking funds to the community. One of the main reasons people are opposed to paying for parking is because the revenue typically doesn't fund any immediately tangible benefits. Reserving a portion of the generated revenue and putting it back into the community to increase safety efforts, promote alternative transportation modes, or enhance physical improvements ties the payment to a benefit, and makes parkers more likely to support these changes.

What motivates parkers?

Prior to discussing existing rates and proposed alterations, it is important to identify who currently parks where and what motivates them. Gaining an understanding of existing parking behavior within a downtown will allow us to more effectively shape policies that will alter their behavior. Although each person acts in their individual self-interest when parking, the majority of parkers can be identified as one of three types, based on their behavior: Convenience Parkers, Reasonable Parkers and Bargain Parkers. The defining characteristics of each are presented below:

1) Convenience Parkers: Convenience parkers are generally new or occasional visitors traveling to downtown for a relatively short period of time to shop, eat, or run errands. They are typically unfamiliar and sometimes even uncomfortable with the higher concentration of activities within a downtown and would like their parking experience to be as seamless as possible. They prioritize convenience and are willing to pay or park in a timed area for a space in close proximity to their destination. This user group is also the most likely to give up and drive to an alternative location to shop, eat, or run errands if they are unable to locate a space.

2) Reasonable Parkers: Reasonable Parkers are frequent visitors, nearby residents or customers who are typically familiar with the area, making medium length trips to meet a friend for coffee, shop for the day, or go out to dinner. They may also be part-time or full-time employees who are willing to pay a higher price to park closer to their job. Like all user groups, Reasonable Parkers prefer free parking but are willing to pay or walk, as long as it is within reason and they understand why their choice is logical.

3) Bargain Parkers: Bargain Parkers are residents, employees, or long-term shoppers frequently making longer trips downtown. As the name implies, bargain parkers avoid paying for parking at any cost. They are the most willing to circle the block to locate a space, walk a few blocks away, or alter their commute in order to save money. Some thrifty parkers may even decide to walk or bike instead of paying for parking or they may decide to shop somewhere else altogether if they can't find free parking.

Each type of parker has different priorities. These priorities can be managed by implementing parking management policies that distribute parkers throughout a downtowns parking system. In a typical downtown, the most desirable parking spaces are on-street along commercial corridors in which the majority of businesses and retail activities take place, closely followed by on-street spaces along side streets. Surface lots are less desirable but are still easily accessible for patrons to enter and exit. Structured parking facilities or remote surface lots are typically the least popular due to the perceived hassle associated with getting in and out of them, although winter weather conditions can make garages more desirable than surface lots.

Riverhead Parking District

On April 24, 1967 the Town of Riverhead adopted a "Public Parking District" which appropriated $530,000 for the acquisition of public parking assets (their estimated value at the time of purchase), as well as $122,000 for the associated construction costs on-site.

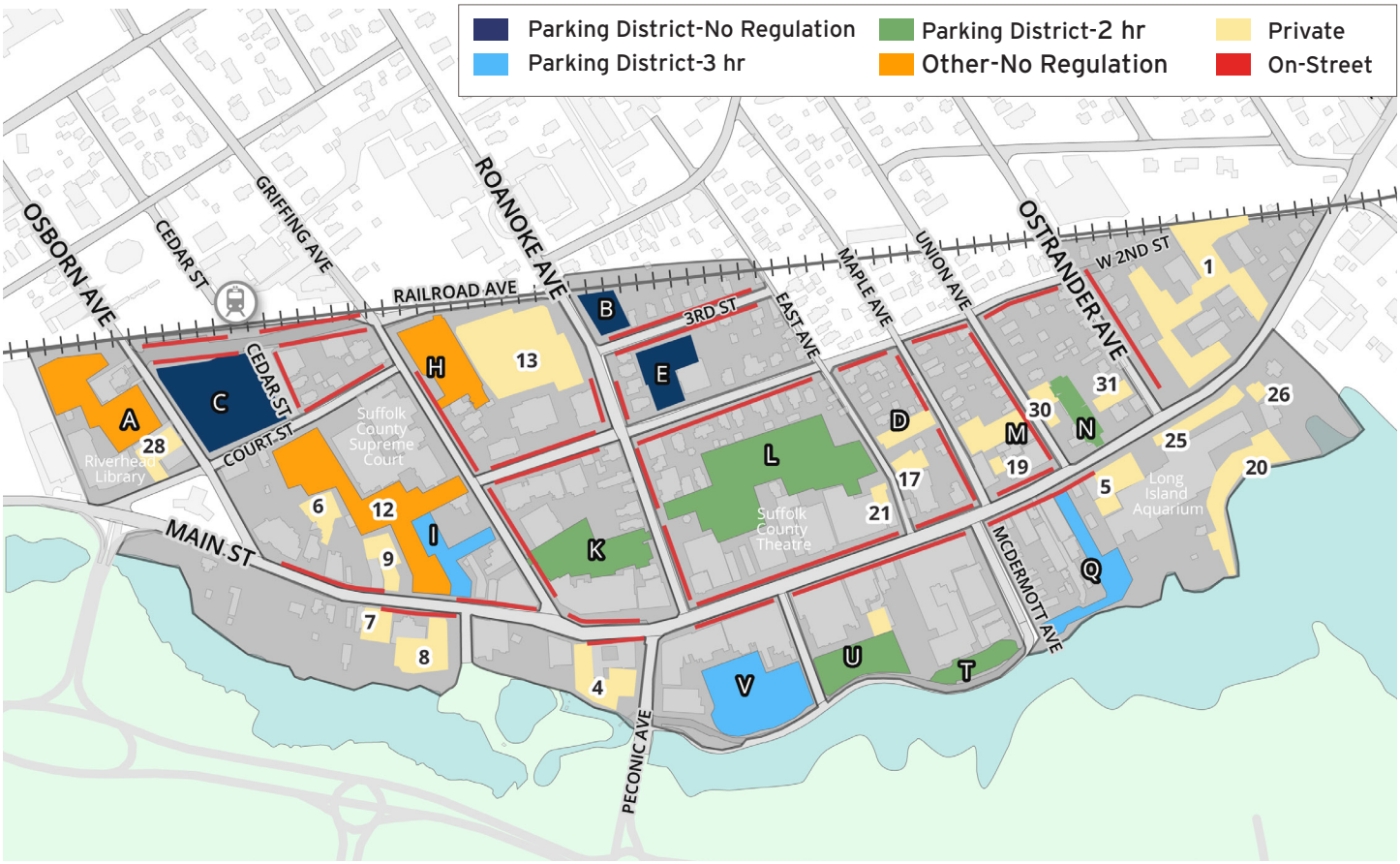
As stated on the Town's website, the Parking District's mission is to "act in advisory capacity... on all matters pertaining to maintenance, management and future development of areas within the Parking District." This also includes overseeing the management decisions made regarding on-street parking, unifying the regulations of parking assets within the Downtown area, encouraging residents and visitors to share parking among different user groups, and upgrading parking assets to be convenient and comfortable for parking users.

Funding for the Parking District is received by charging all properties owners in the District's boundaries the annual cost of parking expenses (maintenance, operations, and other infrastructure etc.). All property owners within the Parking District are then no longer required to provide parking per the town code and are able to utilize the Parking District's assets to accommodate their demand.

Current members of the Parking District include representatives from Tweed's Restaurant, Griffing Hardware, Perabell Foodbar, Ricmond Real Estate, Sendlewski Architecture, Giacalone Insurance, and the Long Island Aquarium. As mentioned above, the parking district board functions as an advisory board, with the Town Board ultimately approving or denying the Parking District's recommendations.

There are 14 publicly available lots within the study area specified below, 10 of which are overseen by the Parking District, and will be discussed throughout this report.

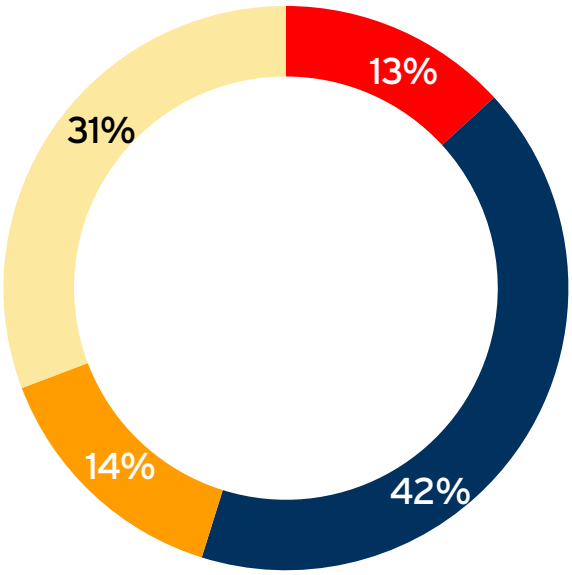
Figure 2: Riverhead NY

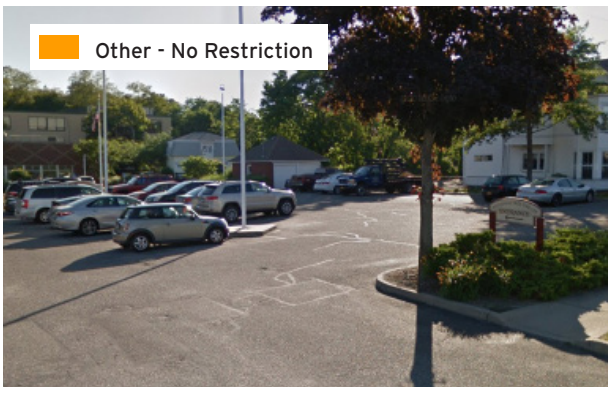


Existing Parking Supply

Riverhead's parking system accommodates a variety of users through a combination of on-street and off-street parking, both publicly and privately owned. There are approximately 3,011 total spaces within the Study Area between these parking types, which are broken down in **Figure 2** and discussed in more detail below.

Figure 2: Parking Supply Breakdown





On-street Facilities

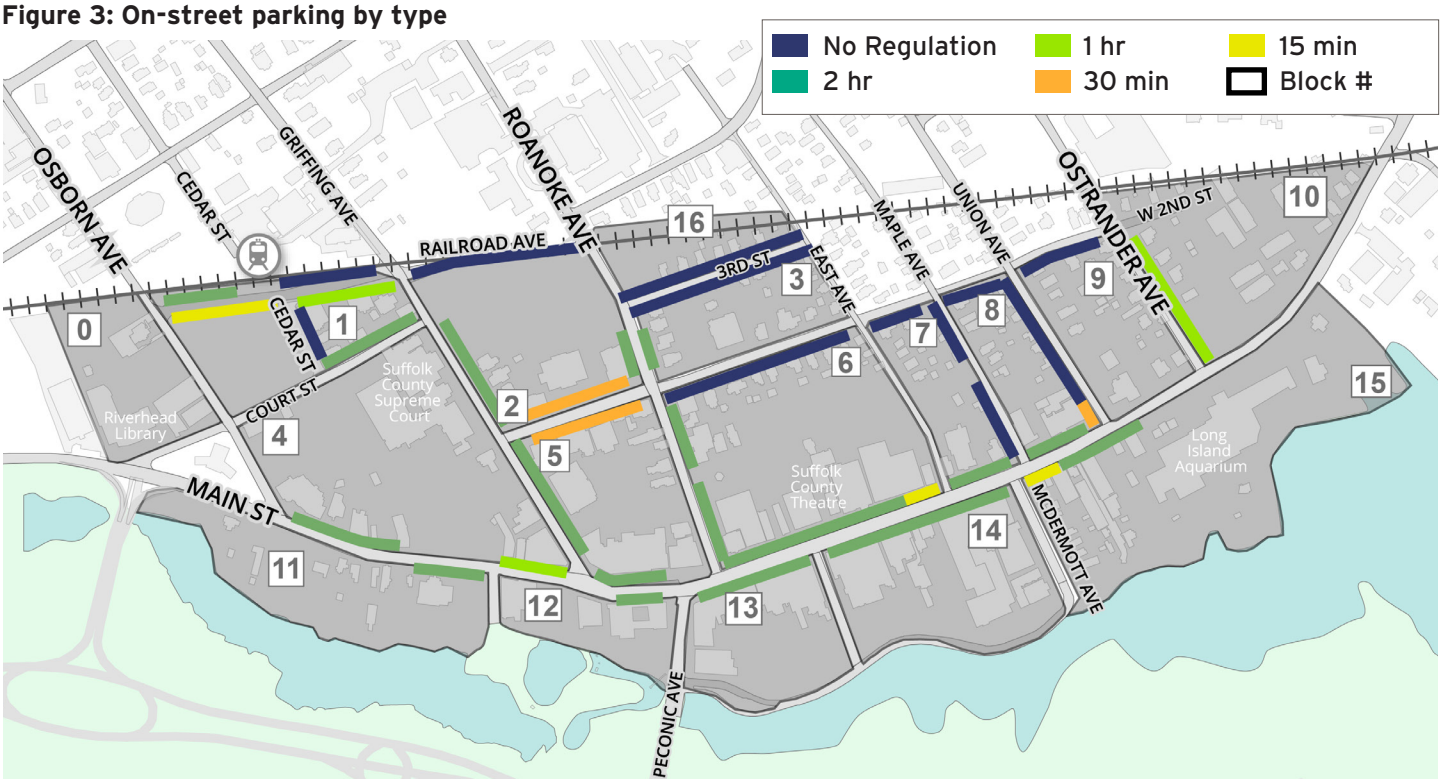
With just under 300 spaces, Riverhead's on-street facilities are some of the most sought-after parking assets within the Downtown area. Sam Schwartz performed an on-street parking inventory and designation analysis to better understand the characteristics of these spaces, which is summarized in **Table 1**.

Half of the spaces spaces examined have a 2-hour time limit (50%), followed by free parking (31%), with 15-minute, 1-hour and 30-minute time restrictions making up less than 10% of the total on-street parking supply. A map of these designations can be seen in **Figure 3**.

Table 1: On-street parking by type

Type	Inventory	Percentage
2hr	200	50%
1hr	27	7%
Free	124	31%
30min	30	8%
15min	16	4%
Total	**397**	

Figure 3: On-street parking by type



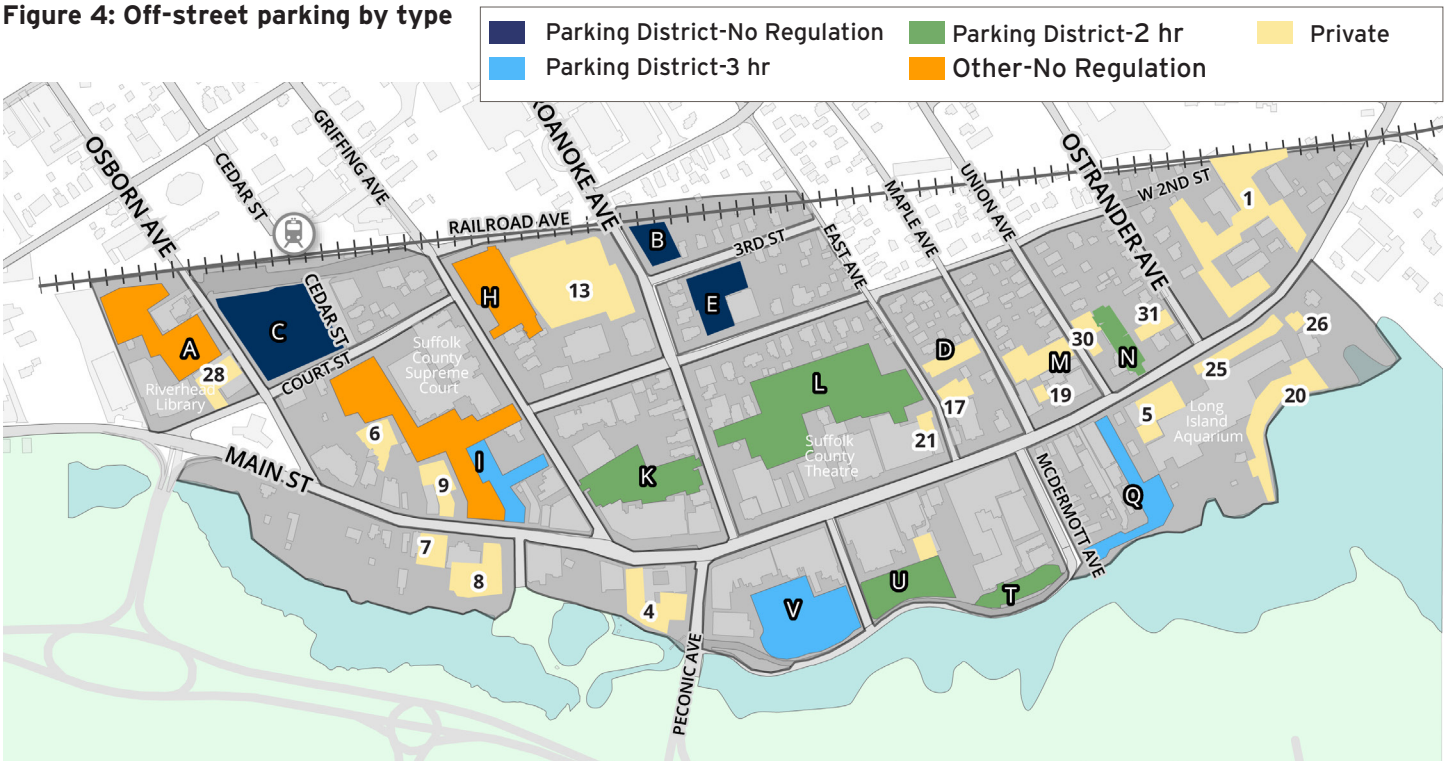
This shows that the 2-hour parking designations are primarily located along Main Street, Griffing Avenue, and Roanoke Avenue, adjacent to retail/commercial and office land uses. While free parking is located in more residential areas, including 2nd Street, Union Avenue and Maple Avenue. The single block of 30-minute parking is adjacent to the Peconic Bay Medical Center and was installed to provide a means for short-term employees and visitors to access the building.

Similarly, the 1-hour parking restriction located on the block of Ostrander Avenue between Main Street and 2nd Street, was installed due to a high concentration of employees parking on this street throughout the day. The two 15-minute parking spaces along Main Street are located in front of the Blue Duck Bakery and were recently installed to allow pick-up/drop-off at this and nearby businesses.

Off-street Facilities

There are ap ographic location of each is presented in **Figure 4**.

Figure 4: Off-street parking by type



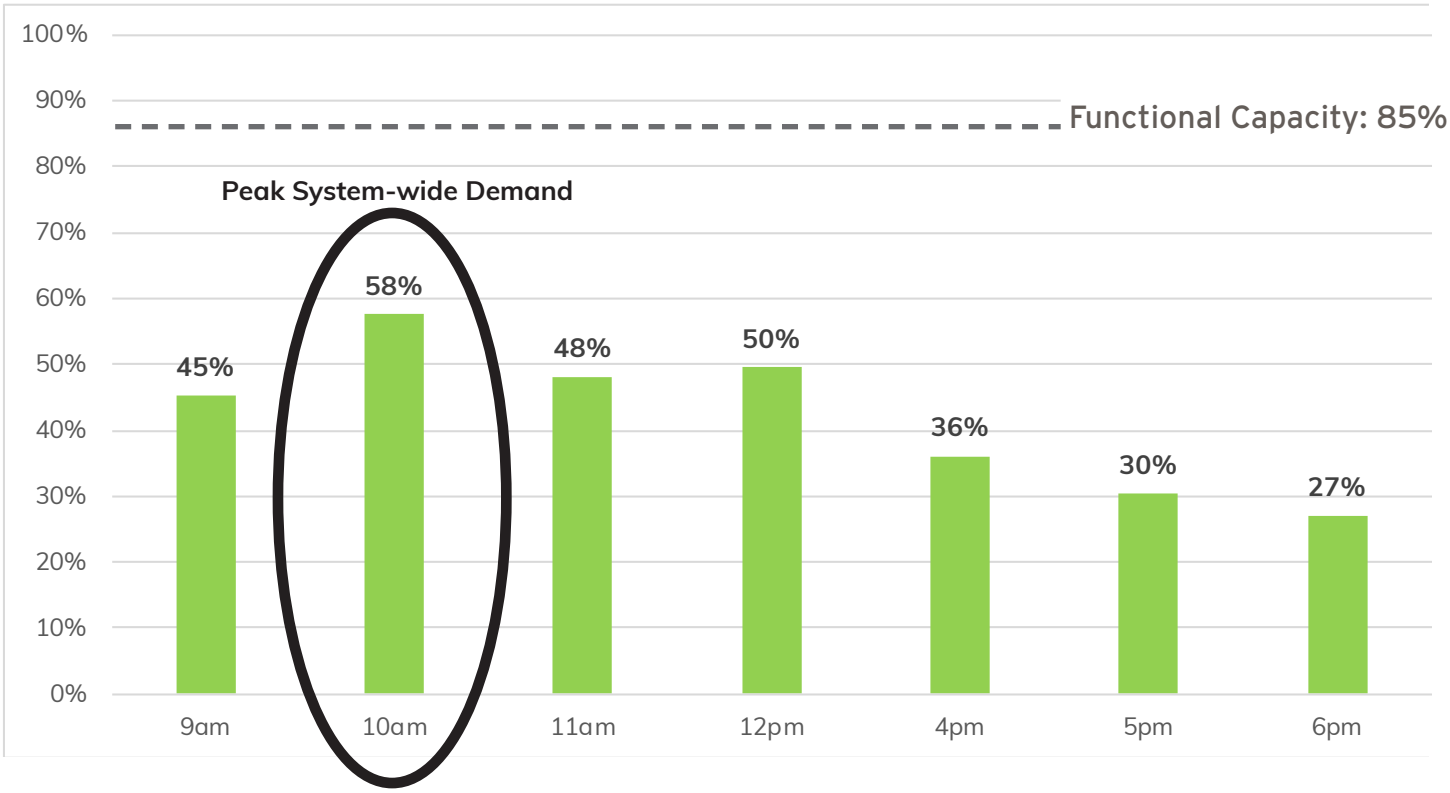
Generally, the surface lots owned by the Parking District are larger and located in proximity to more retail/ commercial land uses, while the privately-owned surface lots are smaller in size and tend to be located adjacent to residential land uses. There are approximately 2,588 off-street spaces within the Study Area, among 32 facilities. Figure 5 summarizes the relationship between the public and private facilities presented above.

While 20 of the 32 examined off-street facilities are privately owned and designated for employees, customers, or residents, the majority of the Study Area's off-street spaces are overseen by the Riverhead Parking District or have no regulation (65%).

Existing Parking Demand

Parking demand was analyzed through a system-wide utilization survey completed on Wednesday, July 17, 2018 between the hours of 9:00 am and 6:00 pm to determine the peak period of demand within the Study Area. A summary of the survey results can be seen in **Figure 5**.

Figure 5: Hourly Surveyed Parking Demand



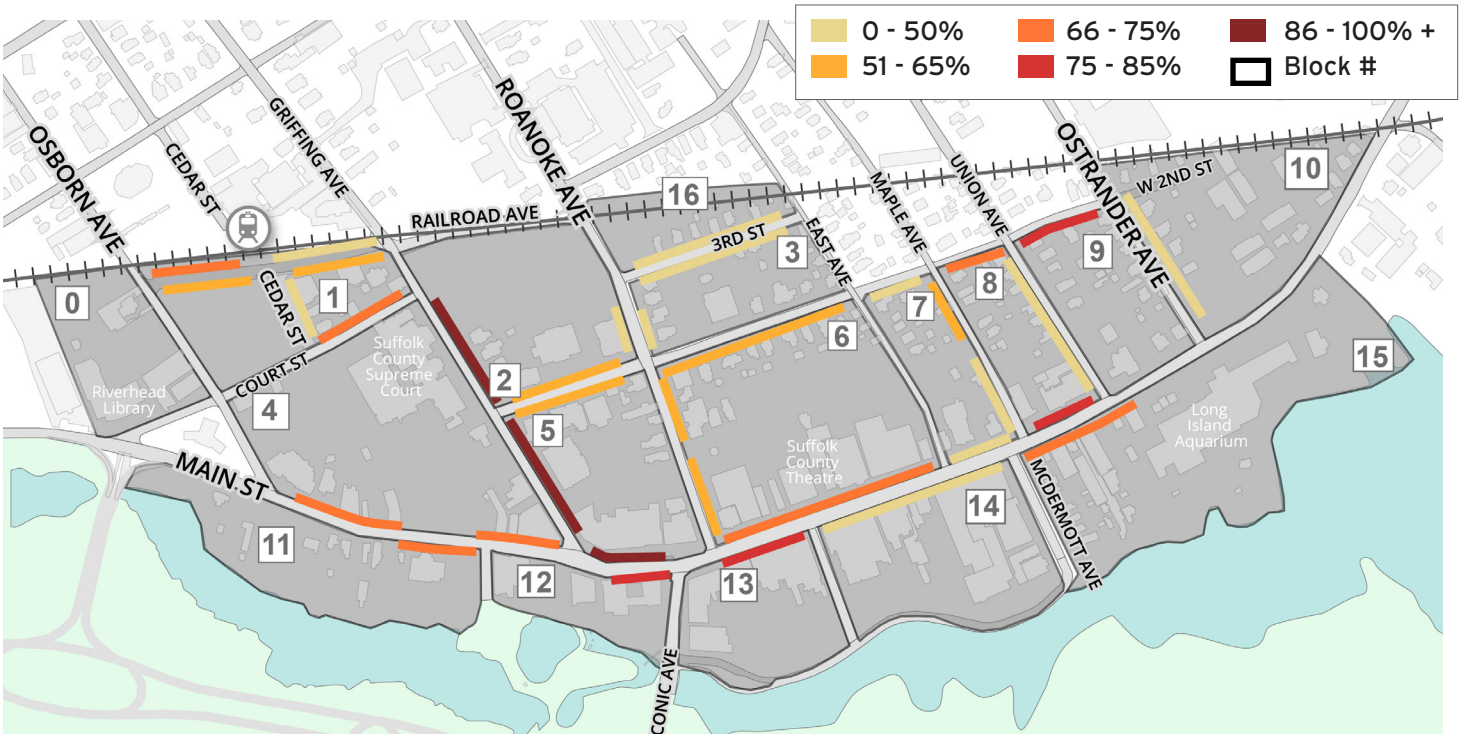
This shows the peak system wide demand for all on-street and off-street parking facilities counted during this survey. As a whole, the greatest system wide demand recorded was 58% at 10:00am.

The effective and efficient turnover of convenient parking spaces is most successful when the facility reaches an 85% occupancy rate, meaning that 10% to 15% of spaces are not occupied at any given time and are available for incoming parkers. This translates to approximately one to two open spaces per block. Accordingly, the remainder of the report will refer to a parking facility as exceeding its "functional capacity" or its "effective utilization rate" if the parking occupancy is greater than 85%.

Although the system wide utilization rate was well below this threshold for each of the examined time periods, specific lots and street segments examined exceeded their functional capacity which is discussed further below.

Figure 6 shows on-street utilization for the system-wide peak demand period (10:00am).

Figure 6: Peak on-street parking demand (10am) per street segment

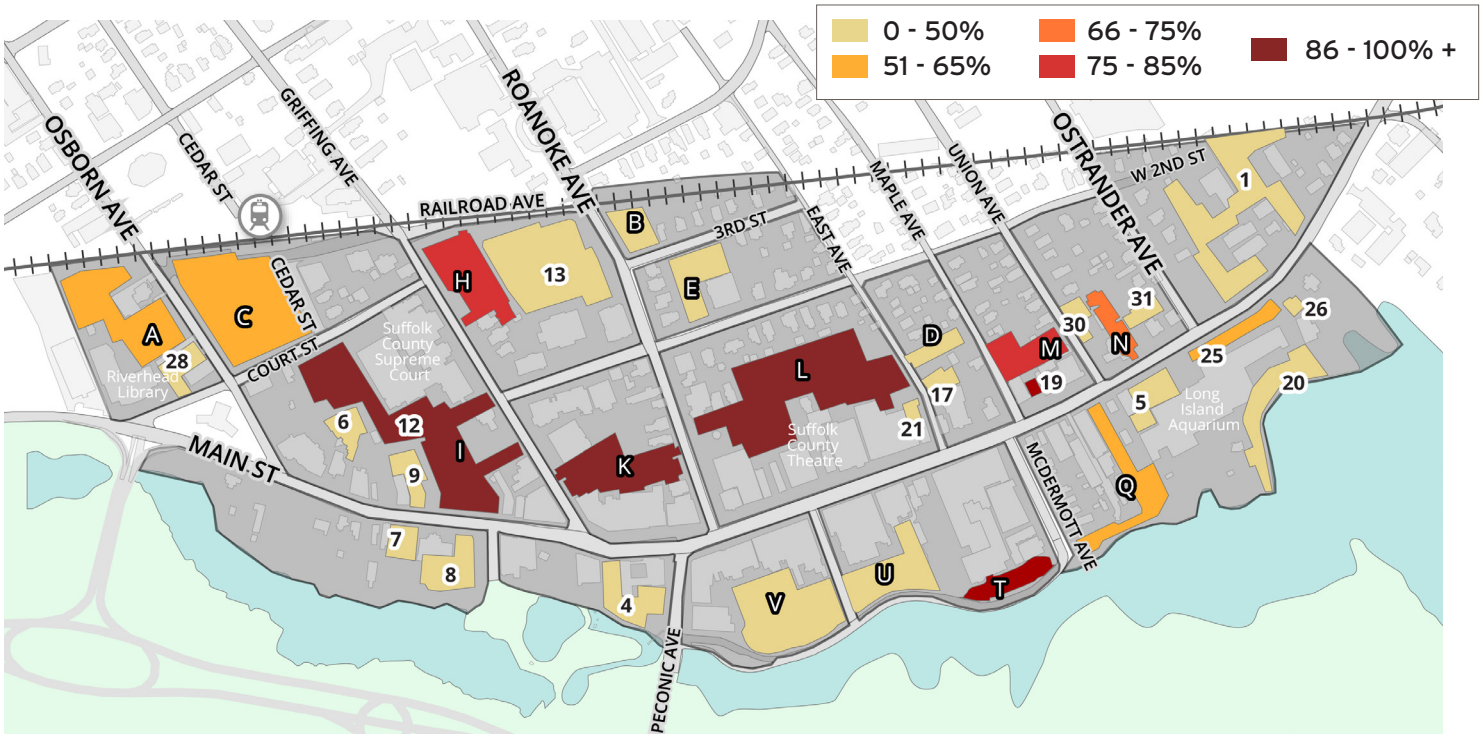


The streets with the lowest demand are streets designated as "Free" in Figure 3, including Maple, Union, and Ostrander Avenue which are located in more residential areas where residents are more likely to park during evening hours. Conversely, the streets with the highest demand are Griffing Avenue, and portions of Main Street. These streets are located in direct proximity to the Suffolk County Supreme Court, the Suffolk County National Bank, and a variety of restaurant, personal service, and retail amenities. The parking time limit designation for both of these roadways is 2-hours.

It is critical to ensure that street segments do not exceed their functional utilization rate (85%) and that spaces are available for incoming customers and visitors. Although there are street segments that exceed their functional capacity within the Study Area, the presence of street segments with low occupancy indicate that there are locations in which this demand can be absorbed.

Figure 7 shows the peak period of demand for off-street facilities.

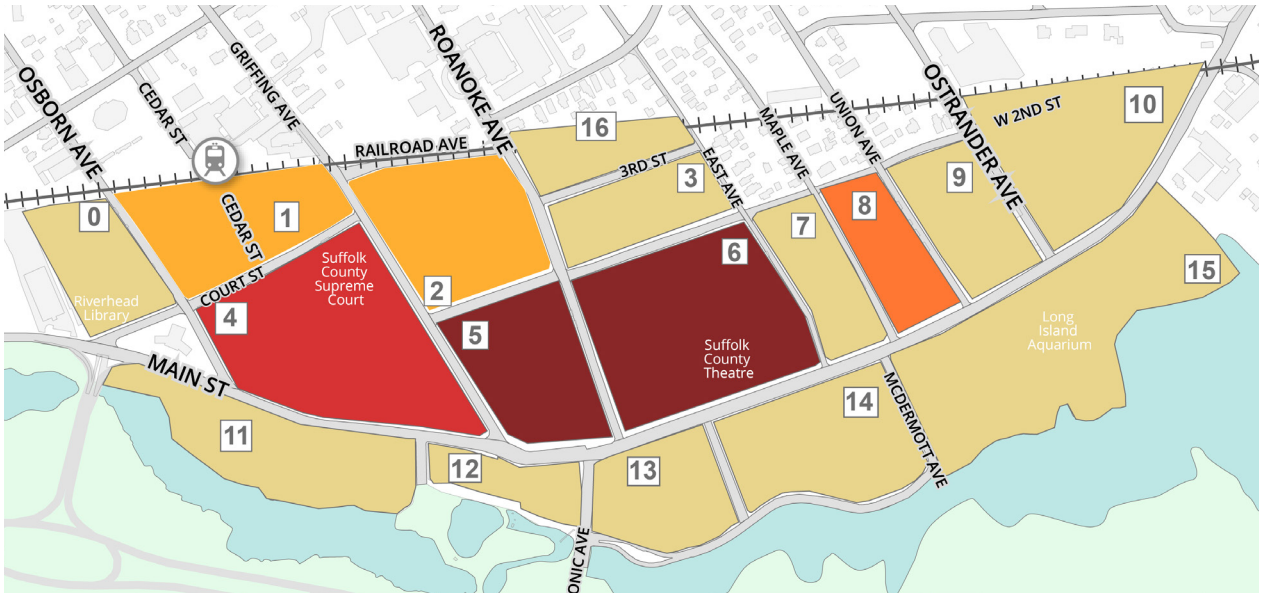
Figure 7: Peak off-street parking demand (10am) per facility



While the overall demand during this time period was 58%, there are several facilities that exceeded the 85% threshold including Lot L, K, and I. Each of these facilities are centrally located along Main Street and Roanoke Avenue and are owned by the Parking District. This graphic also indicates that publicly available, centrally located parking has a high utilization rate, while the surrounding, privately-owned facilities have a lower utilization rate, indicating a distinct preference for facilities in the central portion of Downtown.

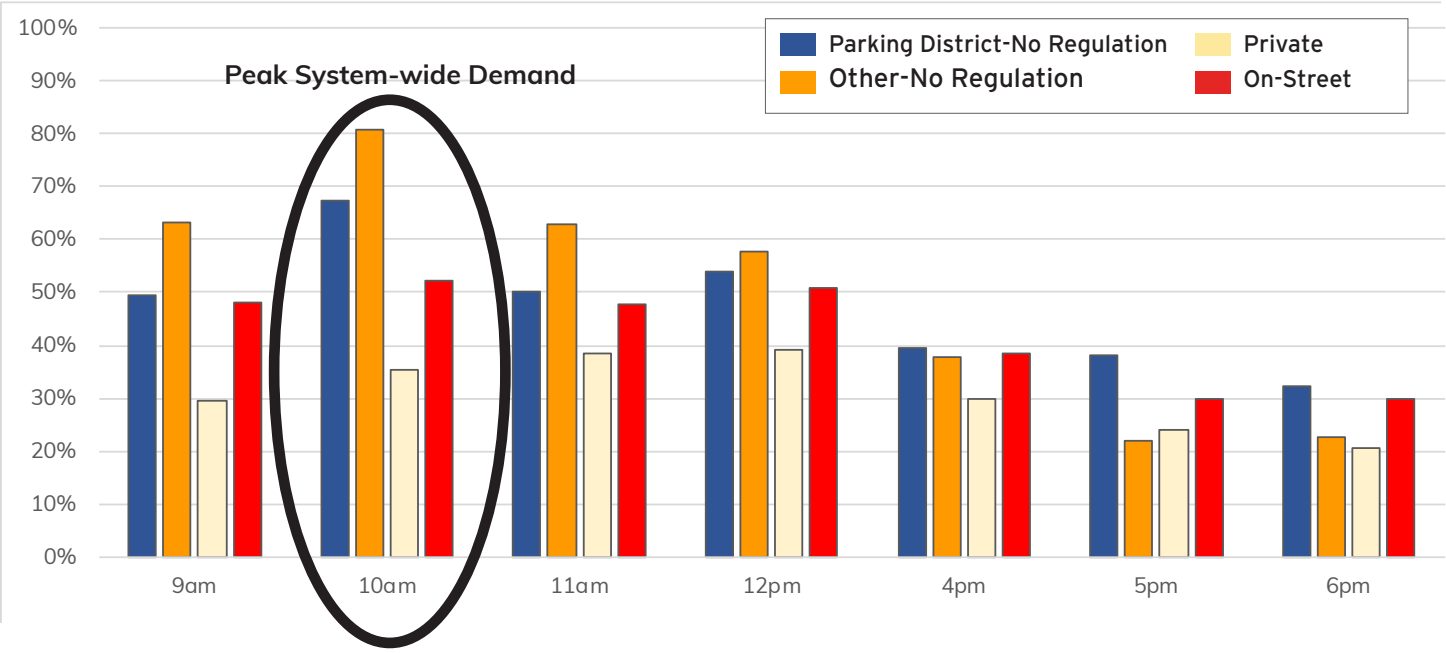
The combined utilization of the examined on- and off-street facilities, per block is shown in **Figure 8**.

Figure 8: Peak Parking Demand (10am) per block



Similar to both the on- and off-street demand figures examined, a concentration of parking demand occurred in the central Downtown area, specifically blocks 5 and 6. Each of the surface lots located on these blocks are owned by the Parking District and publicly available. While the demand for these blocks exceeds the functional capacity, many of the surrounding blocks displayed a utilization rate below 65% which would categorize them as underutilized and, therefore, able to absorb the excess demand created from blocks 5 and 6.

Figure 9: Hourly parking demand by facility type



The peak demand for Parking District facilities occurred at 10:00 am and was 68%, which quickly tapered off until 12pm, reaching its lowest point at 6pm (32%).

While the 'Other-No Regulation' category also followed this pattern, the demand for private parking facilities was more steadily consistent throughout the day, between 20% to 40% during the observation periods.

On-street parking recorded a peak utilization of 52% at 10am, which gradually fell throughout the course of the day, reaching a 30% utilization rate at 5pm and 6pm.

Overall, this analysis shows a strong preference for centrally located facilities that are not regulated and publicly available, as these are the most convenient and allow users to remain for the longest period of time. While some of these facilities exceeded their functional capacity, there are a number of outer-lying parking facilities that can absorb excess demand through, particularly privately owned facilities.

Parking enforcement. On- and off-street parking enforcement is performed by the Riverhead Police Department (PD). The PD has three (3) foot patrol officers who oversee parking facilities and chalk parked vehicles along Main Street and the surrounding Downtown area between the hours of 8:00 am to 12:00 am daily. In addition to enforcement, these officers oversee the Town's parks, streets, quality of life, alleys, merchant relations, and other general tasks. Due to the large number of responsibilities these officers are tasked with, there are no designated routes or times foot patrol officers dedicated to parking enforcement routes specfically. Additional enforcement support is provided during the Downtown's peak season (May 15th through September 15th).

There are over 22 parking violation types in Riverhead, varying from signage negligence to beach enforcement issues. The issuance tickets recorded within the Parking District were recorded and presented in **Table 2**.

Table 2: Annual Parking Violation Tickets, 2017

Name	# of tickets issued	% of total	Fine Rate
Expired registration or inspection	513	68%	$50
Parked in handicapped only zone	74	10%	$280
Parked in prohibited area (no standing, fire zone, outside of stall)	151	20%	$50
Parked over 2 hour time limit	17	2%	$50
Aditional parking regulations	5	1%	$50

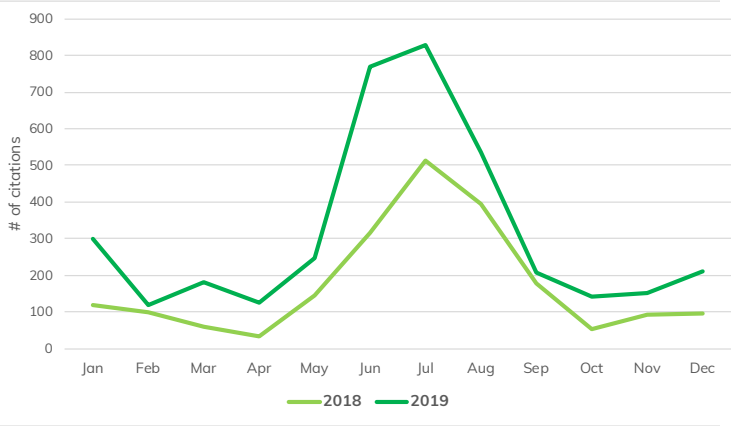
This shows that the clear majority of parking tickets issued in the Study Area were expired registration or inspections (68%), with parking in prohibited areas and parking in a handicapped zoning being the second and third most common parking violation type. Parking over the 2-hour maximum and additional parking regulations making up less than 2%.

The fine rate for these violations is $50, with the exception parking in a handicapped space which is $280. The $50 fine increases to $100 after 60 days, and $200 after 90 days.

Tickets are issues by placing them on vehicle windshields and recorded/stored digitally in a third party system managed by FBS (Finance and Banking Solutions). The Town recently adopted a web based payment system allowing violators to pay on line as well as in person.

Figure 10 shows the number of parking violations per month for 2018 and 2019.

Figure 10: Parking Violation Tickets, 2018 and 2019



For both 2018 and 2019, the total number of tickets was dramatically higher during the summertime months (May - August) when additional parking enforcement support is present, with 2019 seeing a 35% increase in the total number of tickets issues compared to 2018. As of December 2019, the total revenue collected was $225,000 and the Downtown area recorded a compliance rate of 90%. The increase in tickets issued coupled with the high compliance rate may indicate that fine rates are not deterring drivers from complying with posted designations.

Alternative Transportation

In addition to driving and parking, Downtown Riverhead can be accessed through a variety of other transportation modes, which are listed and described below:

Long Island Rail Road. The LIRR is a commuter rail line that includes a service line that travels from Manhattan's Penn Station, through Ronkonkoma, to Greenport Station. The Riverhead Station is included on this route, with 5 trains stopping per day, per direction. Table 3 summarizes the annual number of passengers on the Greenport Line for each of its east and westbound trains, combined.

In November of 2017, an additional train came online. Departing from the Greenport station at 9:43am, the added frequency offers North Fork customers with an early afternoon arrival into New York City. Despite this increase, the Riverhead Train Station is widely perceived as not frequent or reliable enough to be a viable transportation alternative for residents and visitors.

Suffolk County Transit. Suffolk County Transit services five separate bus lines through downtown Riverhead—8A, S58, S62, S90, and S92. The Riverhead Station functions as a stop for five of these routes (routes S58, S62, S90, S92 and 8A), however train arrivals and departures are not coordinated with the SCT bus schedule making the connection inconvenient for travelers.

Bicycle Infrastructure. There is currently one bicycle facility in Downtown Riverhead along Peconic Waterfront Park from Peconic Avenue to East Main Street and is approximately 0.4 miles in length. There are also bicycle racks at the Riverhead train station.

A map detailing the location of train station, bicycle lanes, and bus stops in the Study Area can be seen in **Figure 11.**

Figure 11: Alternative Transportation Amenities

Stakeholder Interviews

The primary parking concerns, issues, and experiences of local business owners, developers, institutions, and other organizations throughout Riverhead were discussed in a series of stakeholder interviews conducted by Sam Schwartz. Namely, the following entities were interviewed:

- Blue Duck Bakery
- Tweed's Restaurant
- Mazi Restaurant
- Griffing Hardware
- Perabell Foodbar
- Richmond Real Estate
- Long Island Aquarium
- Riverhead Police Department
- Dark Horse Restaurant
- Riverhead Town Council
- Peconic Green Growth
- Riverhead Fire District
- Digger's Restaurant
- Atlantis Banquet and Events

Key comments, issues and concerns are summarized below:

- Employees are generally told to park in the same lot as customers and visitors, but away from the entrance points in order to allow spaces to be available for customers and visitors, or they are told to park in remote lots and walk. However, business owners do not specifically monitor or keep track of these policies and have limited capacity to do so.
- Employers reported that employees working night shifts are less likely to park remotely due to perceived safety issues.
- The train is not perceived as a viable alternative to driving. Service at the Riverhead station was reported as being infrequent, unreliable, and inconvenient to residents and visitors.
- The enforcement of timed parking signage is minimal. Several business owners commented that employees will park on Main Street for their entire shift without receiving a ticket.
- Several of the surface lots within the Parking District (both privately- and publicly-owned) have overgrown landscaping, poor lighting and an absence of striping. This creates an uncomfortable

In addition to stakeholder interviews, Sam Schwartz team held a kickoff meeting on July 17th, 2018 that was attended by over 20 stakeholder and Parking District committee members. This meeting included a series of discussion surrounding Riverhead's key parking issues including time limits, enforcement, and incoming development. Feedback from this session was used to guide the study's recommendations and outcomes.

experience for parkers, particularly at night.

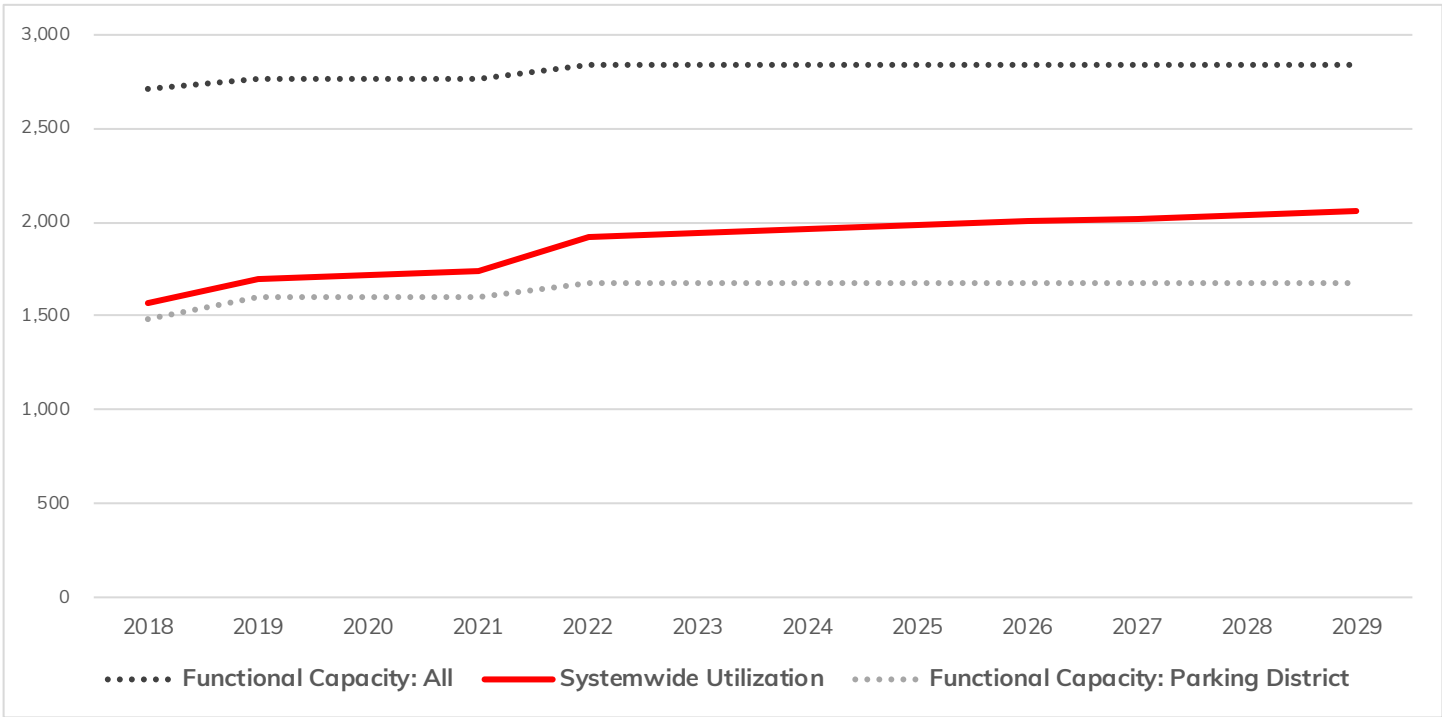
- The majority of Riverhead's visitors are coming from suburbs in Suffolk and Nassau County, driving to and from the area. The vast majority of Riverhead residents and visitors drive when traveling to and from work and leisure, as well as within the Downtown area who are willing to walk and park one to two blocks from their destination. If these spaces are not available, they will circle the block or go somewhere else.
- Parking meters were removed due to lack of demand and enforcement. Stakeholders are open to reinstalling meters if the demand is high and enforcement is effective.
- Riverhead's core downtown has seen a sharp increase in residential development being constructed without parking. This has increased the demand for the Parking District's facilities, with business owners reporting that long-term parkers are using spaces that customers and visitors can no longer access. Business owners recognize that more residential development can help their businesses, but want to ensure there is also enough parking available for visitors and customers.
- Generally, visitors and customers do not complain of lack of available parking. Complaints are more typically associated with a lack of handicapped parking or short-term parking in proximity to key destinations such as the Long Island Aquarium.
- Parking demand is extremely high in the summer months (April through October) and very low in winter months (November through March), which makes justifying investing in additional supply challenging as it will only be used half of the year.
- Parking occupancy data is not collected for off-street facilities, making it difficult to understand demand patterns and alter policies in response to demand.
- None of the private or public employers interviewed implemented transportation benefits programs such as subsidized bus passes, carshare membership, bike lockers or other incentives encouraging employees to use alternative modes, nor were they aware of other employers that did.

On-street parking on Main Street in Riverhead circa 1950s

Future Parking Demand

Based on growth projections provided by Riverhead, upcoming development plans, and current parking utilization, a parking projection through 2029 was completed and is presented in **Figure 12.**

Figure 12: Projected Parking Demand



The red line in **Figure 12** represents the estimated system wide parking demand growth within the Study Area under existing conditions, including on- and off-street, public and private demand. This assumes that no changes are made to parking policies, no demand alterations are made due to emerging transportation technologies, and no additional efforts are made to encourage alternative transportation modes. The dotted gray line represents the supply of on- and off-street facilities overseen by the Parking District. The dotted black line represents the supply of on- and off-street publicly and privately-owned parking facilities.

The primary source of increased parking demand within the Study Area is associated with incoming residential developments including the Riverhead Lofts and Old Sears Building development. A full list of assumptions for the model produced above is provided in the Appendix.

Overall, this indicates that Parking District facilities alone do not have the capacity to accommodate the demand of all employees, customers, visitors, and residents in Riverhead's downtown. However, the supply of public and private facilities can comfortably accommodate system-wide demand in both the short- and long-term, indicating that there are opportunities to pursue shared parking programs, policies, and/or pursue transportation demand management strategies that optimize the existing parking footprint while reducing long-term demand.

Key Findings

1. The Parking District oversees 55% of the Study Area's on- and off-street parking assets. Between on- and off-street parking facilities, the Parking District manages and monitors the majority of the downtown's parking. One of the largest hurdles in other downtowns and districts is obtaining consensus to unify decisions from various stakeholders that own individual lots. While there are several privately-owned surface lots, having control over the majority of the parking supply presents the Parking District with a tremendous opportunity to share parking, manage demand, and modify regulations on a system-wide level to optimize their parking footprint and make more effective decisions long-term.

2. There is a wide range of parking demand, with limited variation in timed regulations. While the overall utilization rate of the Downtown area was 56%, there was a wide range of occupancy rates in individual facilities and street segments: ranging from 8% and 95%. However, with the exception of Lot V on Main Street and Peconic Avenue, all off-street parking assets have the same time restriction (2-hours), and on-street parking assets located in or near commercial land uses have the same 2-hour time restriction. Some parking spaces or lots in the Downtown area are more popular than others, and the designations of these spaces should be managed in a way to balance demand systemwide.

3. During the peak demand period of publicly available spaces, over 600 private spaces were empty. Three of the 12 parking facilities owned by the Parking District exceeded their functional capacity (Lots I, K, and L) while the overall demand of these public facilities was 72%. During this same time period, the utilization of private lots was 33%, with over 623 vacant spaces. While it is important for these businesses to have spaces available for their patrons, this wide gap in demand indicates that there are opportunities to share parking during peak demand periods to more evenly distribute demand throughout the Downtown area.

4. There is a lack of alternative transportation options available in the Downtown area, and a negative perception associated with those that exist. Although Riverhead has a train station and bus stops within the Downtown area, frequency is sporadic. Similarly, there is no continuous bike lane in the Downtown area and many sidewalks are narrow and cracked in some locations. With limited infrastructure and service, people are less likely to perceive these options as viable alternatives, encouraging them to drive when coming to Downtown Riverhead and running each of their errands. Residents of Suffolk and Nassau County are reportedly the most common visitors of Riverhead and primarily drive day-to-day, but it is important to offer them options to access amenities within the Downtown area to create more of a "Park Once" environment which reduces parking demand and encourages cross shopping.

5. Parking enforcement staff is limited. Parking enforcement is currently under the purview of the Riverhead Police Department and completed by foot officers, in addition to a wide array of tasks, including merchant relations, littering, crime enforcement and general safety. With this large number of tasks, it is easy for parking enforcement to be infrequent and inconsistent. Stakeholders did not indicate parking enforcement as Riverhead's prime parking issue, but the infrequency was noted—and as the demand for parking continues to increase—dedicated enforcement staff will likely become necessary. Additionally, no parking enforcement representative is a member of the Parking District Advisory Board. Parking enforcement officers and managers monitor parking demand and violation patterns each day and could provide the board with crucial insights into key issues and guide policies in the future.

6. On-street parking demand did not exceed 58% but was not available in key locations. While the peak period of on-street demand was 58% overall, several street segments including Griffing Avenue and Main Street were full throughout the day, while nearby on-street parking was unused. This indicates that the Downtown area has the capacity to pursue management strategies that increase turnover along high demand areas and encourage drivers to park in low demand areas.

7. Approximately 287 dwelling units are primed to be constructed in the next five years, which could result in a parking demand issues if no action is taken. Riverhead has been experiencing an influx of residential development in its Downtown area, some of which is being constructed on existing parking facilities: reducing supply while generating demand. However, these developments are not required to construct their own additional parking if they are members of the Parking District. The Parking District can accommodate additional parkers in remote facilities, however the surface lots located in proximity to these developments are in the core area and should be prioritized for short-term customers and visitors. Without additional parking management initiatives, demand issues are likely to continue to occur in these core surface lots.

Parking plays a critical role in the overall development patterns and future growth of any community. As such, it is critical to prioritize parking management when planning for future mobility and construction developments. The following recommendations seek to increase mobility and quality of life of Riverhead residents and visitors alike through implementing the following goals:

1.) Prioritize spaces for customers and visitors in centrally located facilities.
2.) Update enforcement efforts to better monitor and manage parking demand.
3.) Establish regulations for incoming developments to prepare for increased residential parking demand.
4.) Enhance alternative transportation amenities to reduce parking demand.

Each of the recommendations are presented below and followed by action items that will be further assessed and prioritized by the Parking District and stakeholders.

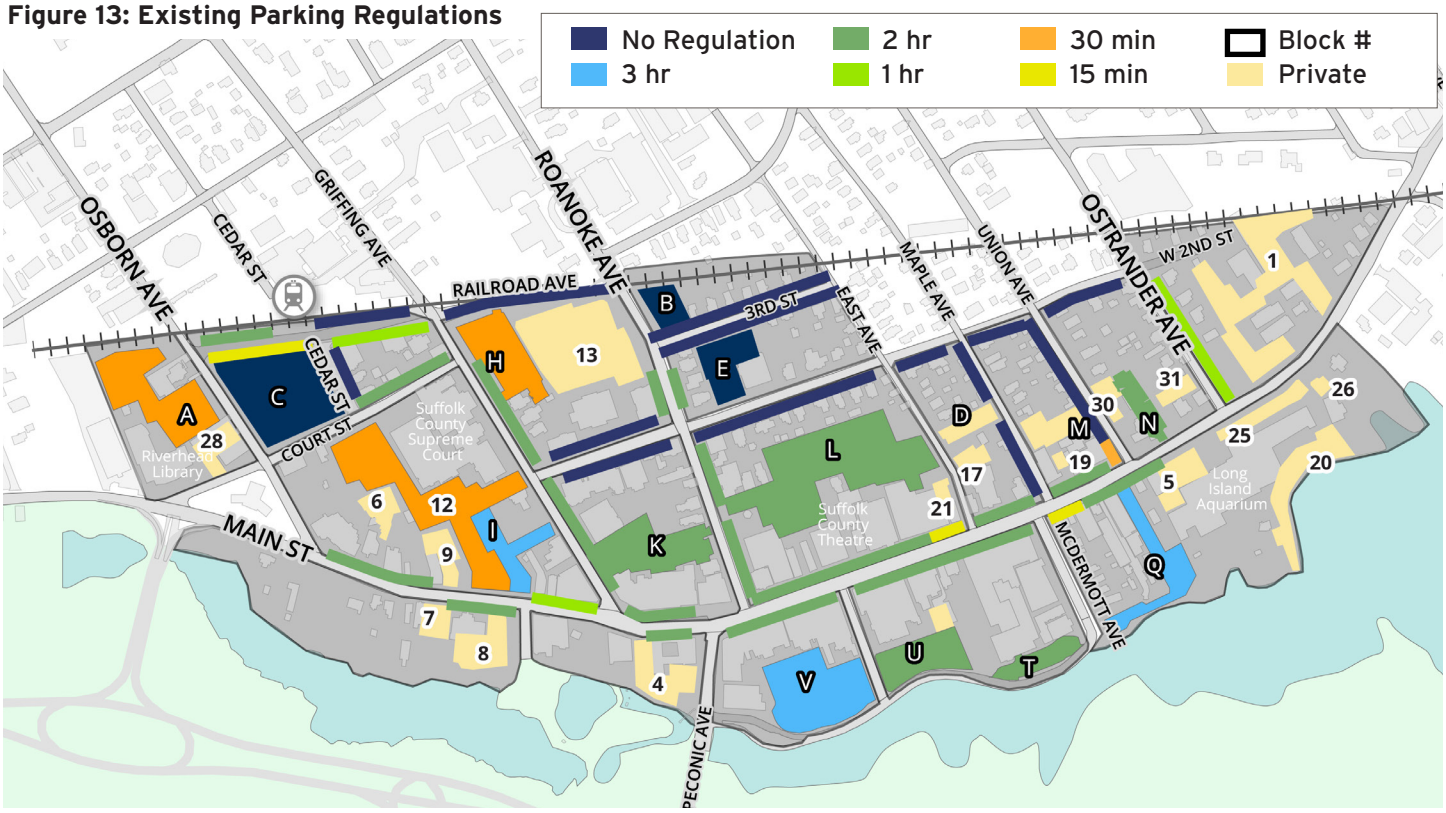
B RECOMMENDATIONS

1. Verify and update parking designations within the Town's zoning code. While the overall utilization rate of public and private parking facilities within the study area did not exceed 58%, centrally located on- and off-street parking assets were full and could not be accessed by customers--the intended user. Providing incoming visitors and customers with convenient access to the Downtown's businesses and services is critical to continued economic growth. Parking management strategies and polices need to optimize the Parking District's existing assets by prioritizing high-demand, centrally located facilities for short-term customers, and encouraging longer-term parkers, like employees and familiar visitors, to park in low-demand, outer lots. Figure 1 shows the existing parking demand system-wide, by facility.

Action Items:

A. Alter timed signage regulations to disperse demand throughout the Downtown area. Utilization studies showed that there was a wide range of occupancy for individual facilities and street segments: ranging from 55% to 95% utilized. With the majority of the facilities having a 2-hour time limit, as seen in **Figure 13**, the existing time limits of these facilities do not necessarily reflect their demand.

Figure 13: Existing Parking Regulations

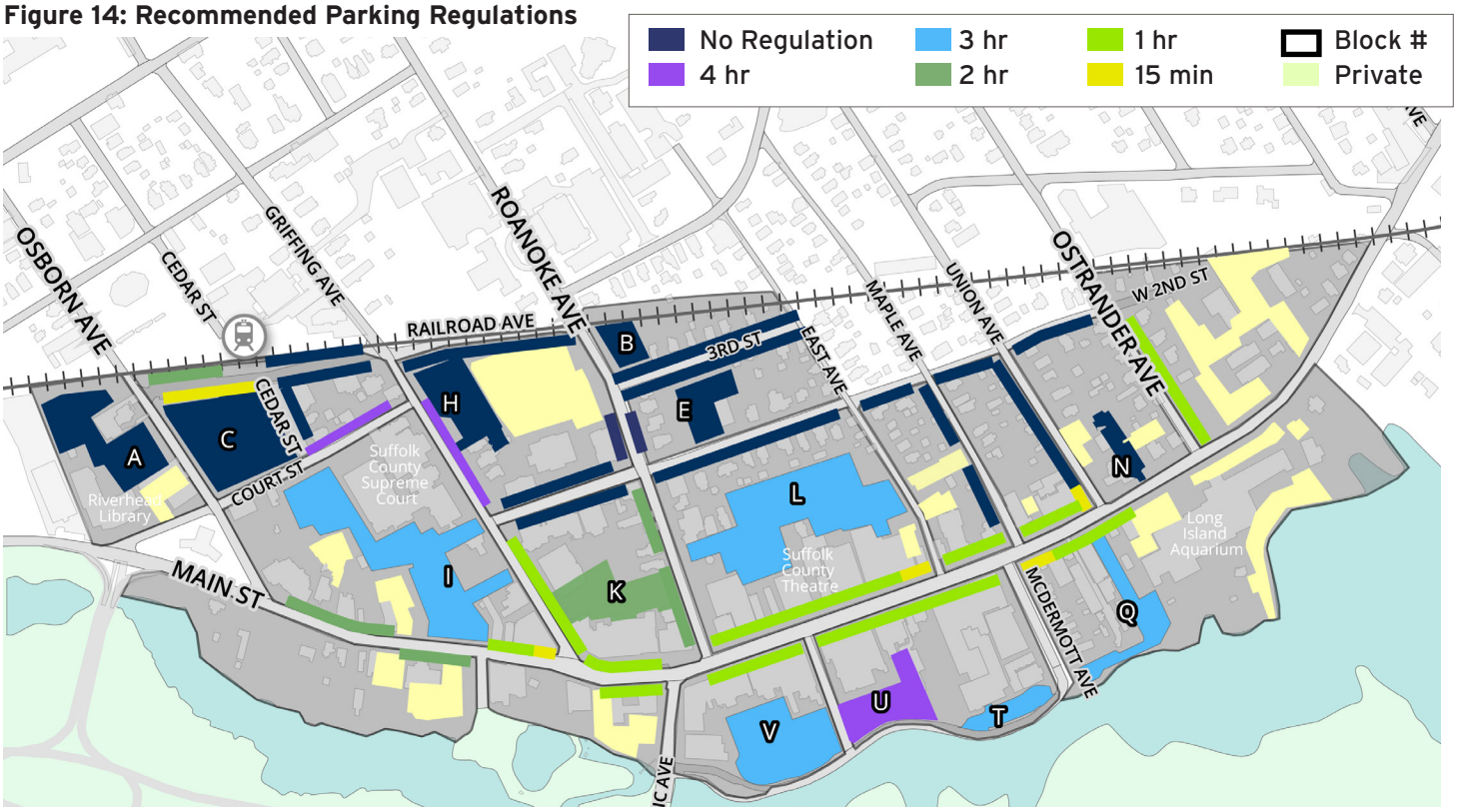


To disperse demand throughout the system as a whole, it is recommended that centrally located, high utilization facilities along Main Street designated as 2-hour timed signage, and to extend the time limit of outer lots and on-street spaces to 3 or 4 hour parking, as shown in **Figure 14**. Extending the time limits in these outer facilities aims to encourage employees and other long-term parkers to locate in these facilities, while creating availability for short-term visitors and customers.

While it is recommended that the timed signage in the centrally located parking facilities be reduced to allow for increased turnover, it is also recommended that the signage along outer lying facilities be elongated to encourage long-term customers or employees to park there. For example, the Lots B, E, and H are all within a block of key services and businesses that employees or long term businesses would be able to park in to free up space for short term shoppers and customers.

Key short-term parking areas that should be targeted for more turnover include Main Street between Griffing Avenue and Union Avenue and Lot K. Underutilized facilities that should be used to encourage long-term parkers to locate in them include Lot B, C, H, D, E, and on-street parking along 3rd Street and Railroad Avenue.

Figure 14: Recommended Parking Regulations



It should also be noted that the Parking District has developed a series of proposed time regulations which can be seen in the Appendix. Given that these proposed regulations differ from those presented in Figure 3, if the Town adopts the recommendations of the Parking District Committee as set forth in the Appendix, it is recommended that they be adopted as a temporary pilot program and reassessed at the pilot's conclusion to determine each regulations long-term viability. It is recommended that the pilot program take place for a minimum of six (6) months, during which time the Parking District attain the following data points:

- Collect parking enforcement violations
- Conduct a parking utilization survey during the peak demand period prior to and during the pilot program
- Distribute a survey to merchants within the Parking District after the pilot has been completed
- Record any crash data available prior to and during the pilot program

After the 6-month time period, the Town board will assess these data points and make any alterations or changes necessary in achieving their goals to increase accessibility and improve the parking users experience.

It should be noted that increased, consistent, and reliable enforcement is a critical piece of this process. Without enforcement, none of the recommended or proposed parking regulations will be effective, leading drivers to park in any location they prefer for great lengths of time. Increased enforcement regulations are discussed further in recommendation 2B.

Examples of parking signage and wayfinding

B. Establish unified signage program. The Town recently completed a parking signage program to update the consistency and quality of the signs placed in parking facilities within the District. To further these efforts, it is recommended that the District establish a unified signage and wayfinding program, with the following stipulations:

a. Define a color associated with timed signage.

i. 2 hour: Yellow
ii. 3 hour: Green
iii. 4 hour: Blue
iv. Unrestricted: White (or no color)

b. Define wayfinding signs along Main Street and major entrance points to usher incoming visitors to large lots, as shown in ***Figure 15****.*

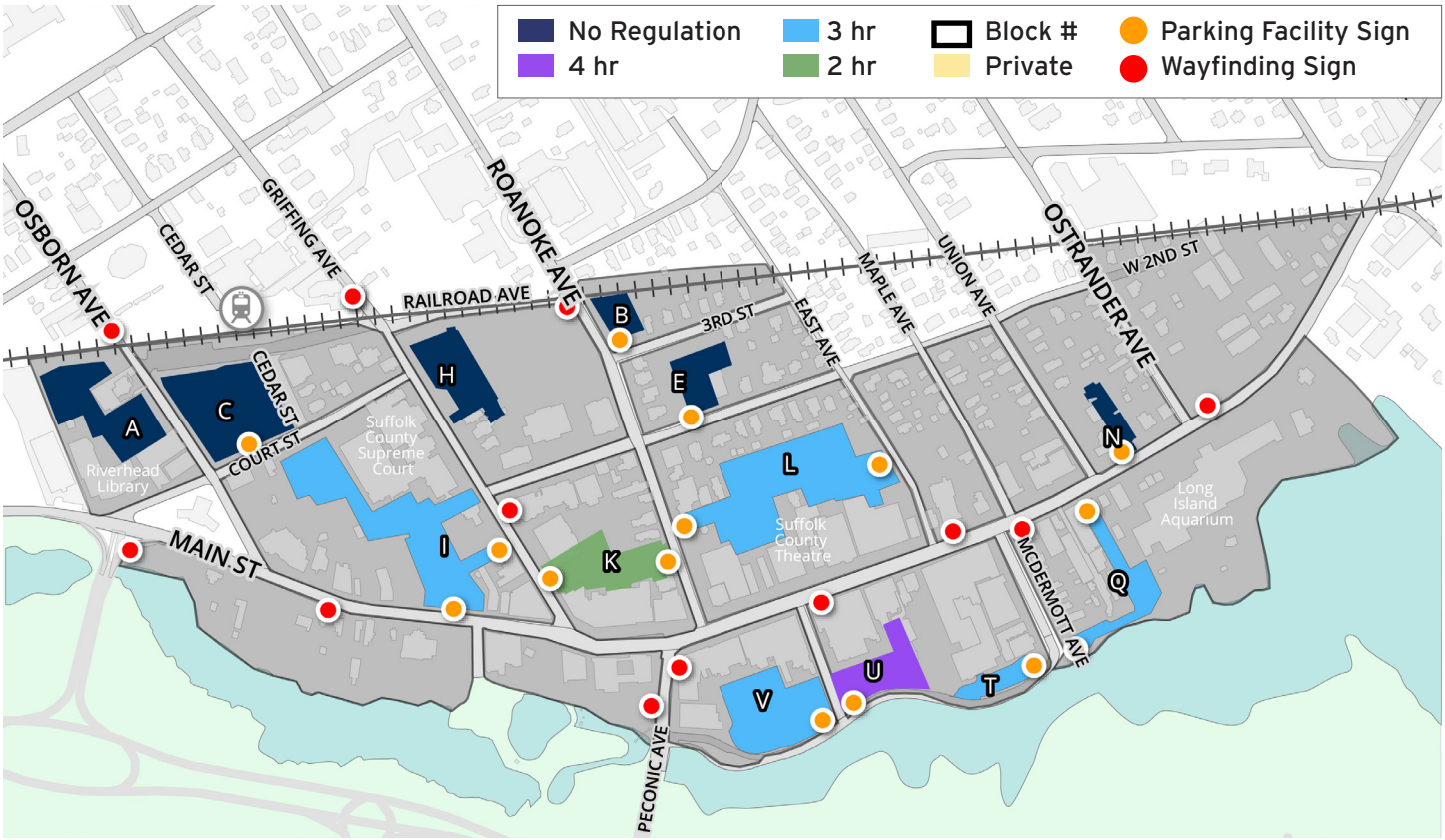
c. Place the following content on parking facility signs:

i. Name of facility
ii. Color and time limit
iii. Hours of enforcement
iv. Parking District or Town of Riverhead logo.

d. Place the following content on wayfinding signage:

i. General parking symbol.
ii. Parking District or Town of Riverhead logo.
iii. Arrow pointing to the location of nearby facilities.
iv. Number of spaces (optional)

Figure 15: Proposed Parking Colors and Wayfinding/Signage Locations



C. Pilot employee and residential permit program. Employees and residents have both been identified as frequently abusing parking in the Downtown's centrally located facilities. One of the most effective strategies to shift long-term parkers away from the core area is to establish a permit program in which registered vehicle and are assigned to park in specific lots at times when they are underutilized. Establishing a parking permit program has been shown as an effective strategy to free up spaces in high-demand locations for customers and encourage long-term parkers to use under-utilized parking facilities.

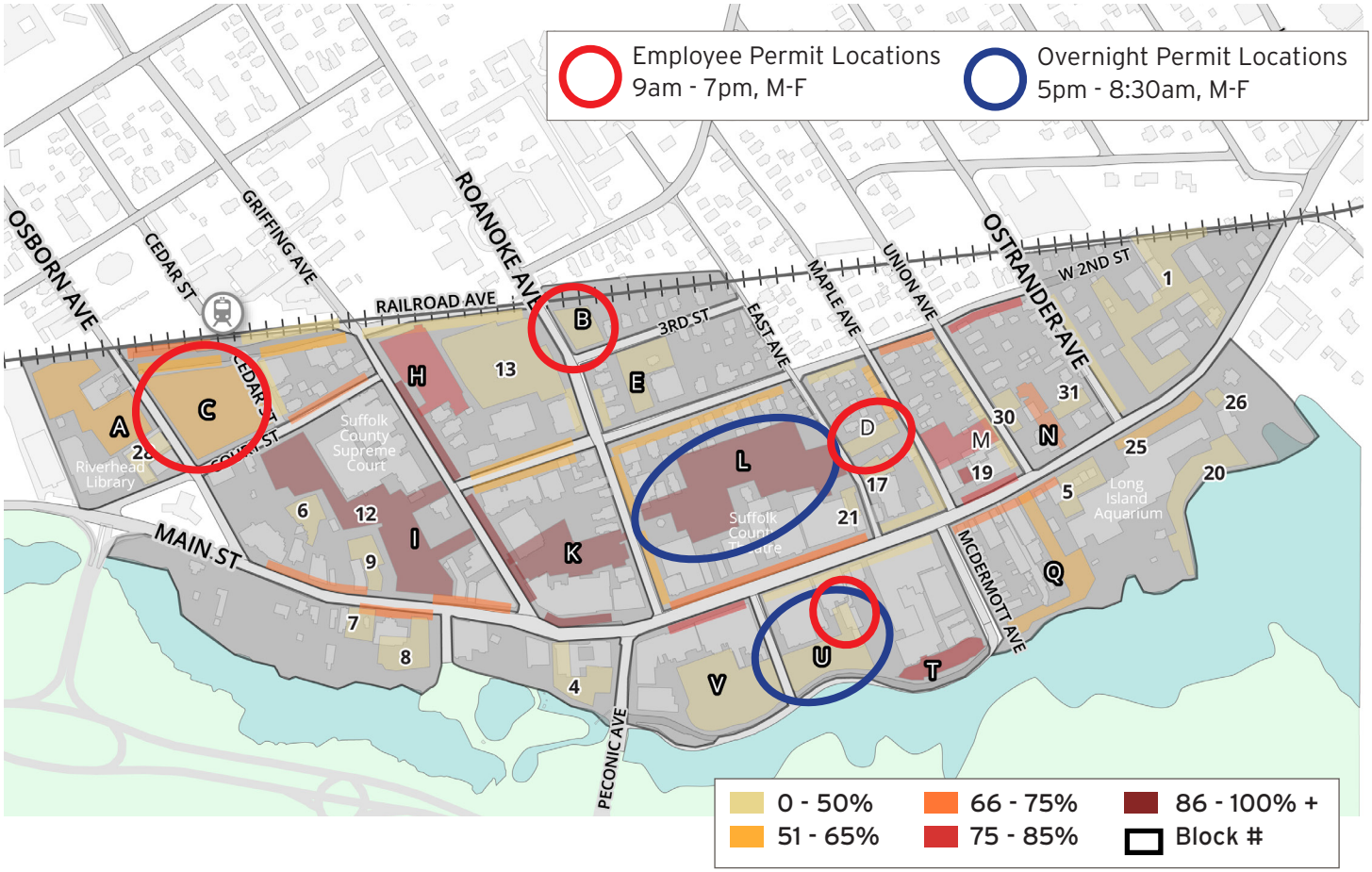
1. Overnight Permit Program. With the peak parking demand period in Riverhead being 10:00am, the majority of the Parking District's lots have available space for residents to park overnight. To manage and monitor the success of this program, it is recommended that Riverhead establish an overnight permit program in which residents are assigned to park in specific parking facilities during nonpeak demand hours. Lots V and L both displayed low parking demand (below 40%) during the 6pm hour, making these facilities ideal candidates for an overnight permit program in which permit holders may parking in these facilities between the hours of 6pm to 8:30am, Monday through Friday; and 4pm through 11am Saturday and Sunday. If and when Lots V and L become filled beyond 85% with visitor/customer parking during the evening hours (6pm through 11pm), it is recommended that the location of the overnight permit program be relocated to lots that are underutilized (below 50% during evening hours).

2. Employee Permit Program. An employee parking program encourages staff to parking in parking facilities along the periphery of Riverhead's downtown. Lots C, B, D, and E each displayed a low demand rate throughout the day and are therefore recommended to be designated as locations for an employee parking permit program, as seen in **Figure 15**. Lastly, it is recommended that a portion (10% to 20%) of the parking in lot U be dedicated to employees who may work on the eastern portion of Downtown Riverhead. However, if and when this lot increases in utilization, employee's should be moved to more underutilized parking facilities (such as A, C, and B). Employee permit parking hours are recommended to be 9:00am through 7:00pm Monday through Sunday.

Since there is a strong perception that these lots are unsafe—particularly at night—it will be crucial to provide permit holders with a reliable means of getting to and from these facilities if employees should be leaving during the evening hours. Action item 4c recommends to "offer a discounted rideshare to serve as a guaranteed ride home for employees who do not drive" providing permit holders with a safe means of getting to their vehicle if they feel uncomfortable walking during specific times. Similarly, action item 4d recommends to "create and promote shuttle services to connect remote parking facilities to Downtown" with a stop at Lot C.

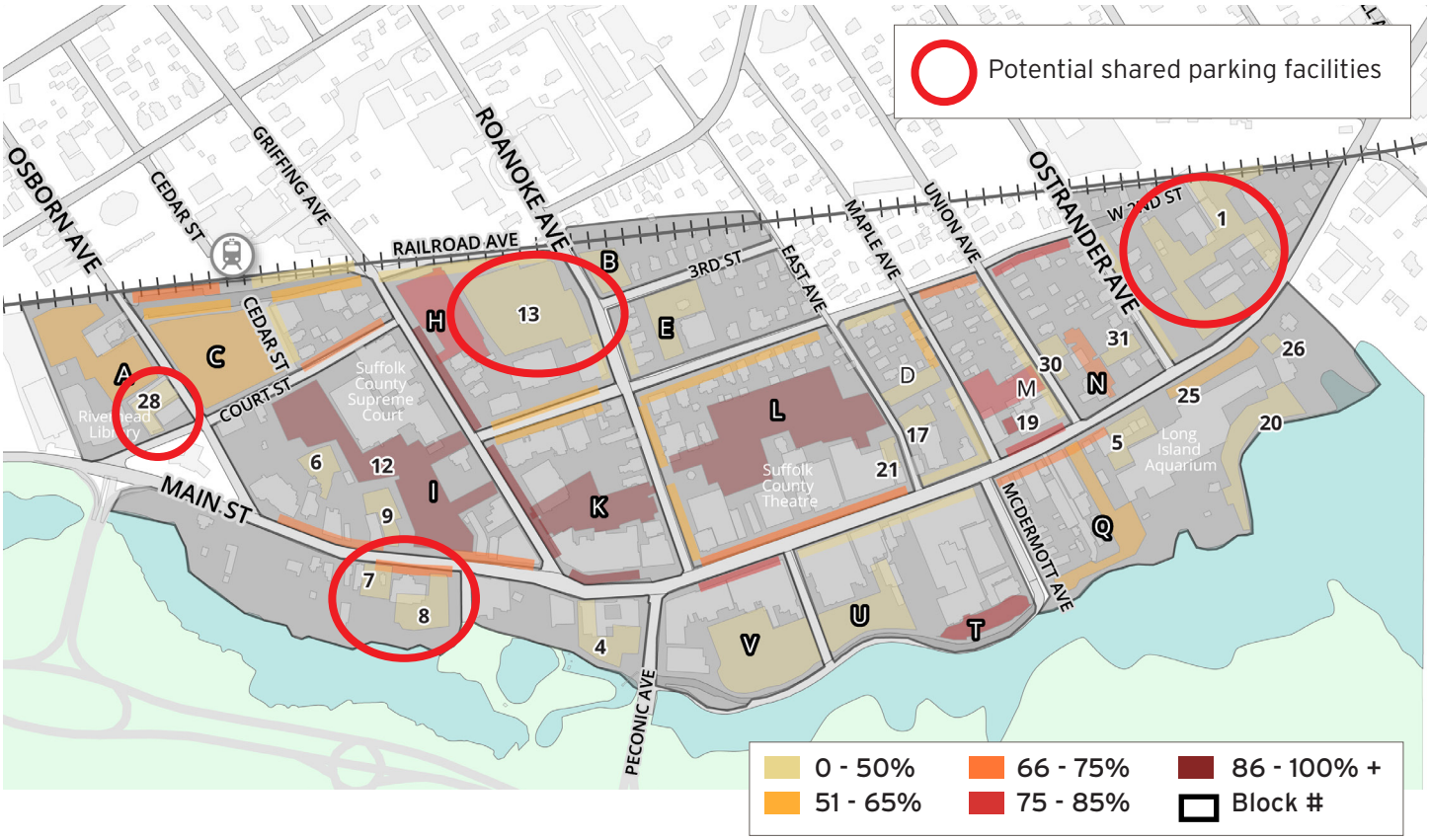
Key to managing a permit program is executing effective enforcement procedures to prevent parking abuse, as further discussed in recommendations 2B. Accordingly, it is recommended that each permit holder be required to provide their license plate number to the Town and have enforcement officer ticket vehicles exceeding their designated time limit: 10:00am for overnight permit holders and 8:00pm for employee permit holders. If a vehicle has been parked beyond this amount of time, enforcement officers should ticket the vehicle with a fine of $50 for the first two offenses and $100 for each subsequent offense, restarting each year. Money gained from this program could be placed toward the construction of a shared parking facility or efforts to reduce demand. It is recommended that each of these programs be instated as a pilot for a six month to one year time period, after which point the Parking District will assess the success and viability of the program, make any changes necessary, and re-institute, alter, or terminate the program.

Figure 16: Proposed Permit Program Facilities

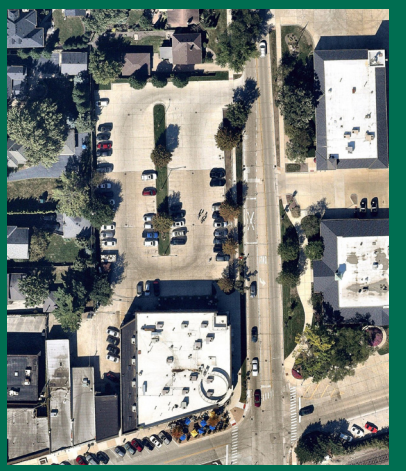


D. Pursue shared parking agreements with owners of large, low-demand facilities. While several of Riverhead's parking facilities exceeded their functional capacity, nearby employer-owned facilities remained unused. Reserving spaces for each individual business increases the amount of land used for parking, encourages sprawled development, and creates an unwalkable community. Sharing the parking supply among different land uses is best practice as it optimizes the parking footprint by efficiently allocating the demand during peak periods. And with several large facilities in Downtown Riverhead remaining underutilized, there is an opportunity to enter into lease agreements to make a portion of them publicly available. Larger, underutilized parking facilities to target for shared parking are shown in **Figure 17**.

Figure 17: Proposed Permit Program Facilities



CASE STUDY: Western Springs, IL. Western Springs is located 18 miles west of the City of Chicago, along a major Metra commuter rail line with a large portion of its population parking and commuting into downtown Chicago each day. Accordingly, there is a high demand for parking during weekday business hours. To better manage spillover parking, the Village rents a portion of its privately-owned assets to commuters during workday hours and offers the spaces to incoming customers and visitors during evening hours (6pm-5am). These spaces cost more than Metra spaces in neighboring communities, but are in a safe and conveniently located lot; there is currently a waitlist in the Village to lease these spaces.



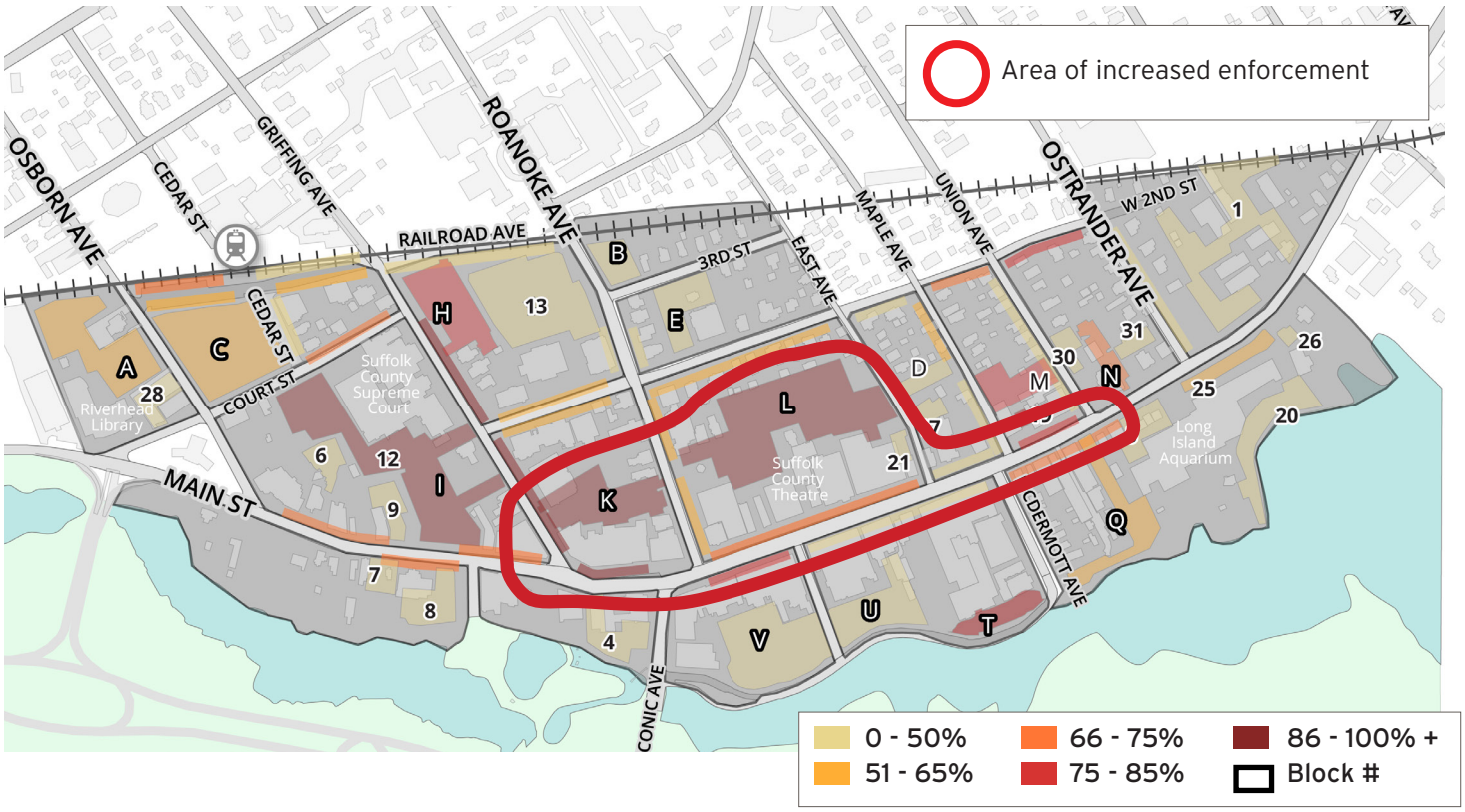
2. Update enforcement efforts to better monitor and manage parking demand. Parking enforcement is the primary tool a community can use to implement and monitor its parking decisions, making the execution of parking enforcement pivotal to any parking management plan. And with an abundance of enforcement strategies and technologies available today, enforcement has the power to increase revenue, enhance the amount and quality of data, and improve the user experience.

Action Items:

A. Deploy increased enforcement efforts. Riverhead currently enforces on- and off-street parking between the hours of 9:00am and 6:00pm Monday through Sunday. While this timing generally captures the peak hours of demand in the downtown area, there are a number of bars, restaurants, and nightlife activities that take place within the Parking District. And when spaces in proximity to these facilities are not monitored, they are likely to be occupied by long-term parkers or employees, as opposed to customers. To better monitor parking abuse that could occur in these areas, it is recommended that Riverhead extend the hours of enforcement to 8:30pm in key areas: Lots I, K, L and Main Street between Griffing Avenue and Union Avenue, as seen in **Figure 18**. This will create availability in centrally located, high demand parking facilities while encouraging long-term parkers to locate in low demand, outer lots. Recognizing that the demand for these nightlife activities may not occur year-round, the extended enforcement may only be needed during the peak season (May through September).

B. Hire enforcement staff to exclusively monitor and manage parking demand in the downtown area. On- and off-street parking enforcement is overseen by the Police Department and performed by three foot patrol officers who also perform other policing responsibilities including monitoring the Town's parks, streets, quality of life, alleys, merchant relations, and other general policing duties. With this large number of tasks,

Figure 18: Proposed Area for Increased Enforcement



enforcement is more likely to go unmonitored when other issues occur. For this reason, it is recommended that Riverhead designate a staff member exclusively to monitor parking enforcement efforts, particularly in the Parking District area. This staff member would oversee enforcement staffing and routing; record and store parking demand data; and attend Parking District meetings to present demand patterns which will provide valuable insight when making future parking management decisions.

C. Upgrade enforcement technology. Parking violations are part of Riverhead's town code making it a requirement that paper tickets be distributed. This is typically completed by through the enforcment officer leaving a physicaly ticket on the vehicle, which is then stored digitally in a third-party system managed by FBS (Finance and Banking Solutions). While this system is aligned with Town code requirements, there are several parking technology solutions that can increase revenue, enhance the amount and quality of data collected, and improve the user experience. It is recommended that Riverhead pursue a digital enforcement system that is managed, implemented, and monitored by the designated parking enforcement officer.

One of the key benefits of implementing a digitally based system is that it can be used to collect and visualize parking utilization data, which is vital when determining enforcement routes, duration periods, and staffing volumes. Updated enforcement technology will allow Riverhead to optimize their existing parking system and better understand long-term parking needs.

3. Establish parking policies and regulations that prepare for an increase in residential parking demand and guide development patterns in the future. The most common concern voiced during stakeholder interviews was the increased parking demand associated with incoming residential developments in Riverhead's Downtown area. Several of these developments are not constructing additional parking for their tenants and relying on the Parking District's facilities to accommodate their tenants parking throughout the day and/or overnight. Although the centrally located parking facilities are full and would not be able to accommodate additional parkers during business hours, the system-wide peak did not exceed 58%. Meaning, that constructing additional parking at this time is not necessary and, instead, strategies to optimize the existing footprint should be pursued. It is also in the best interest of the Parking District to encourage developers not to construct a large amount of their own private parking, but rather pool their resources together to better manage their existing parking assets in the short-term and construct additional shared parking in the long-term. This will ensure that the Parking District maintains control of the majority of the Downtown's parking assets, making it easier to influence development patterns and land use decisions over time.

Additionally, Riverhead was awarded grant funding from the New York State Regional Economic Development Council to redevelop and pursue transit-oriented development (TOD) in the area surrounding the Riverhead Long Island Rail Road station. This presents the Parking District with a unique opportunity to revitalize the Downtown area, attract new residents, and shape development to be more mixed-use, walkable, and vibrant.

A. Require a Transportation Demand Management (TDM) study by incoming developments. TDM strategies are key to reducing the demand for parking and increasing the use of alternative transportation modes. While Riverhead is dominated by car use, enforcing TDM measures will provide more people with more options when traveling, making driving an option as opposed to a necessity. TDM requirements for incoming developments might include improved bus stops, train station enhancements, pedestrian/bicycle amenities, discounted transit passes for employees, or rideshare credits for residents. There are a wide variety of TDM options available, and requiring the completion of a study, as well as enforcement of a TDM plan, would work towards implementing an effective combination of strategies to reduce the parking demand for each.

B. Monitor systemwide demand on a bi-annual basis. With increased development, parking behavior in Riverhead may be undergoing some dramatic changes as well. Accordingly, it is essential for the Parking District to closely monitor the demand patterns as the recommendations of this report are implemented and as increased development occurs. Bi-annual utilization counts of private and public lots (both on and off-street) should be performed each season (summer and winter). If the systemwide demand should exceed 75% on a regular basis, then the Parking District can pursue means of gaining additional funding for parking supply, as specified in recommendation 3D.

C. Consider establishing a parking minimum and maximum requirement for residential developments with a fee-in-lieu of parking policy if the parking district on- and off-street demand exceeds 70% with a payment in lieu of parking. If development continues to grow and parking demand issues persist in the Downtown area, establishing parking minimums for incoming developments can be a powerful tool to increase supply when paired with the right combination of polices to prevent excess parking from being constructed. Establishing minimum parking requirements would ensure that incoming residential developments would not solely rely on the Parking District's facilities for their tenants; while establishing a maximum would ensure that excessive parking is not built and that the Downtown's dense, walkable character is maintained.

Table 3: Proposed Parking Requirements

	Minimum	Maximum
Studio/ 1 bedroom	**0.50**	**1.00**
2-bedroom/ Multifamily	**1.00**	**1.25**

For studio/1 bedrooms, an appropriate minimum parking requirement would be 0.50 spaces per dwelling unit with a maximum of 1.00 spaces per dwelling unit; for multi-family residential, an appropriate minimum parking requirement would be 1.00 spaces per dwelling unit with a maximum of 1.25 spaces per dwelling unit, as presented in Table 3.

If parking minimums are implemented in downtown Riverhead, it would also be required that the additional spaces be shared with public users during the day, and that their regulations be overseen by the Parking District.

Congruent with this recommendation is the implementation of a payment in-lieu of parking policy. Under a fee-in-lieu, a developer is given the choice to opt out of providing the minimum amount of parking required in substitution for a payment given to a governing entity (in this case the Parking District). These funds can then be used towards alternative transportation initiatives, reducing parking demand, creating additional shared parking supply, or upgrading existing parking enforcement technology. The rate of the in-lieu fee varies from city to city. While some entities set fees-in-lieu on a case-by-case basis, most set a uniform rate for all incoming development. Fee-in-lieu rates do not cover the full cost of providing a public parking space but aim to be high enough to cover most of the cost of parking and low enough to attract development. Considering these factors, it is recommended that a uniform fee-in-lieu rate be used, based on the cost to construct a surface parking space in Riverhead. While the average national rate to construct and operate a surface lot is approximately $5,000 - $15,000 per space, it is recommended that the fee-in-lieu of parking be between $10,000 to $12,500 per space.

D. Pursue TOD surrounding the Riverhead station to revitalize the area and improve connections to the rest of Downtown. Transit-oriented development (TOD) is typically defined as compact, higher-density, mixed-use development in proximity of a transit station. Within a TOD, a resident has the ability to walk, bike or take transit to work, and meet a combination of lifestyle needs within a short walk of home. When communities add TOD, they become less reliant on automobiles and the benefits accrue at multiple levels including connecting households to jobs, increasing ridership/frequency of train service, reducing vehicle miles traveled/greenhouse gases, and attracting more development. As previously mentioned, Riverhead was awarded grant money to identify strategies to facilitate this type of develop and revitalize the area as a whole.

As seen in **Figure 19,** It is recommended that the parking footprint within a ¼ mile (a five-minute walk) of the Riverhead station be decreased or maintained, and that the land surrounding the train station be prioritized for mixed, active land uses associated with TOD. Ideally, the parking footprint would be reduced and a single parking structure would be constructed on a portion of Lot C, with retail development on the bottom floor. This structure would replace the parking supply that may have been lost due to infill development throughout the Parking District, commuter parking associated with Lot C, and create a safe and convenient parking facility for employees and residents to park long-term. Key to this recommendation is establishing safe and convenient pedestrian connections to the train station, as well as the surrounding parking facilities. This will further encourage a "park-once" community as drivers will feel more comfortable walking a greater distance from their vehicle to their destination.

Figure 19: Proposed pricing structure

4. Improve alternative transportation

Although Riverhead employees, visitors, and residents have access to a variety of transportation options besides their private automobile, existing policies and parking rates make driving the most convenient means of transportation. While the monthly price of parking in Riverhead is free, a bus pass costs $2.25 one-way, or $90 per month; and the train is $10 to $25 per day, or $120 to $500 per month. The cost and convenience of alternative modes enables more people to drive and park when traveling to and within Downtown Riverhead. The following recommendations aim to reduce parking demand through enhancing alternative modes.

A. Provide employees and/or residents with discounted transit passes. The presence of the Riverhead train station and multiple bus stops within the Parking District presents a major opportunity to encourage transit use. It is recommended that Riverhead work with major employers and residential building owners to initiate transportation benefit programs. These programs would offer employees a free (or discounted) Busway pass, train pass, carshare membership, and/or subsidies for bikers. This could also include the execution of a parking cash-out program in which commuters are offered the (approximate) cash equivalent of what the business or private entity would pay for the construction and upkeep of a parking space in exchange for the employee's agreement not to drive themselves alone when traveling to and from work. Forms of compensation vary between yearly, monthly, or daily payments, depending on the parking system and pricing structure. Potential major employers these programs could include Riverhead staff, the Riverhead Library, People's United Bank, and the Suffolk County Court.

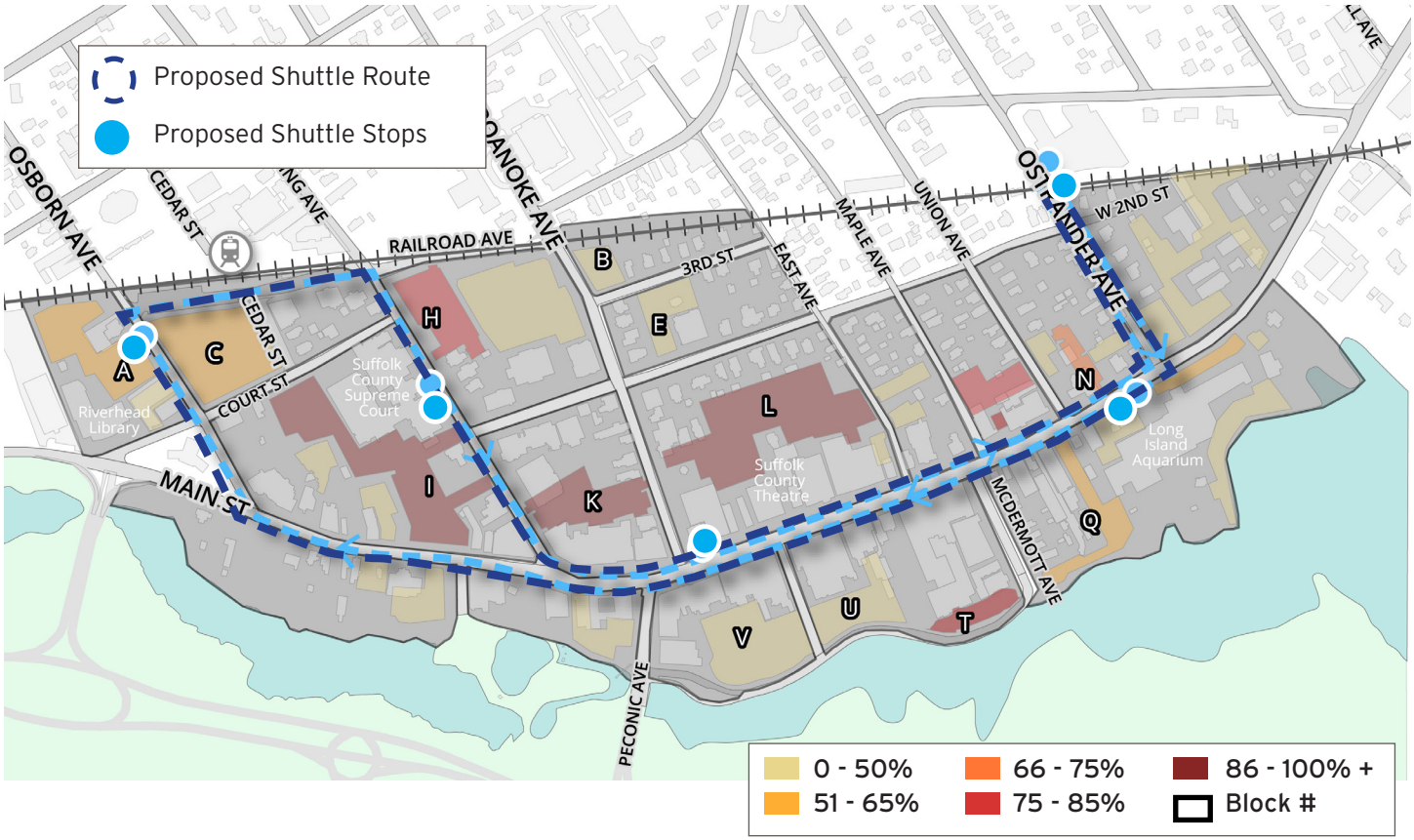
CASE STUDY: Boulder, CO. In 1990, the City of Bounder introduced a program in which businesses were able to provide free transit "ECO Passes" to their employees, for $40 per employee per year. This program included a guaranteed ride home via taxi if they had to work late or in an emergency. During the first year of the program, the City provided an additional incentive to participate by discounting companies by 25% the first year they participated in the program. Each company was also encouraged to choose a representative to act as an Employee Transportation Coordinator, who acted as liaison between the Go Boulder program and the workplace, distributing all communications and encouraging employees to choose alternative modes of transportation. Boulder saw a 6% shift in the percentage of daily trips from single-occupant vehicles to other modes after four years of implementing the program, with pedestrian trips increasing by 3.5%, bicycle trips increasing by 2.2%, and transit trips increasing by 1.7% .

B. Enhance pedestrian/bicycle facilities and parking connections. Downtown Riverhead is a quaint and walkable area. However, the bicycle infrastructure is not strong, with limited pedestrian facilities and one bike lane along McDermott Avenue. There are also limited landscaping and pedestrian amenities within and adjacent to Riverhead's parking facilities, making people uncomfortable and less likely to walk from their vehicle to their destination. Accordingly, it is recommended that Riverhead pursue pedestrian and bicycle enhancements to encourage the use of active transportation modes and encourage people that do park to walk to multiple destinations while using the same space. In the future, it is recommended that a complete streets policy is adopted on Main Street.

C. Offer a discounted rideshare to serve as a guaranteed ride home for employees who do not drive. As ridesharing services, such as Lyft and Uber continue to gain popularity, some universities and cities are establishing partnerships with these companies to encourage employees not to drive and park when commuting. This ranges from providing discounts to users who hail a ride within a specific boundary, to allowing each employee a specific number of vouchers to serve as an "emergency ride home". Riverhead could benefit from establishing these types of partnerships as the majority of employees and visitors have used, or are familiar with, these ridesharing services already. It is recommended that this program be implemented by the Town for their employees and used as a model for developers and employers in the future.

D. Create and promote shuttle services to connect remote parking facilities to Downtown. While the utilization of the centrally located parking facilities are high, other parking facilities along the periphery of the Downtown area remain underutilized throughout the day. Some of these facilities are owned/operated by the Parking District (lot A and C), while others are privately owned and could be used as remote parking for employees or other long-term parkers (lot 28 and lot 13). It is recommended that Riverhead coordinate with the owners of these facilities to identify opportunities for shared parking via shuttle or trolley. Not only would establishing an internal shuttle optimize the parking footprint by dispersing demand throughout the Parking District, it would also help to create a "park once" downtown by providing patrons who parked on one side of the downtown with a convenient means of traveling to and from the other side. And with the presence of the Aquarium shuttle on Ostrander Avenue, there is an opportunity for the Parking District to partner with the Aquarium to expand services to the remainder of the Downtown area. A potential route is shown in **Figure 20**.

Figure 20: Proposed pricing structure



C IMPLEMENTATION MATRIX

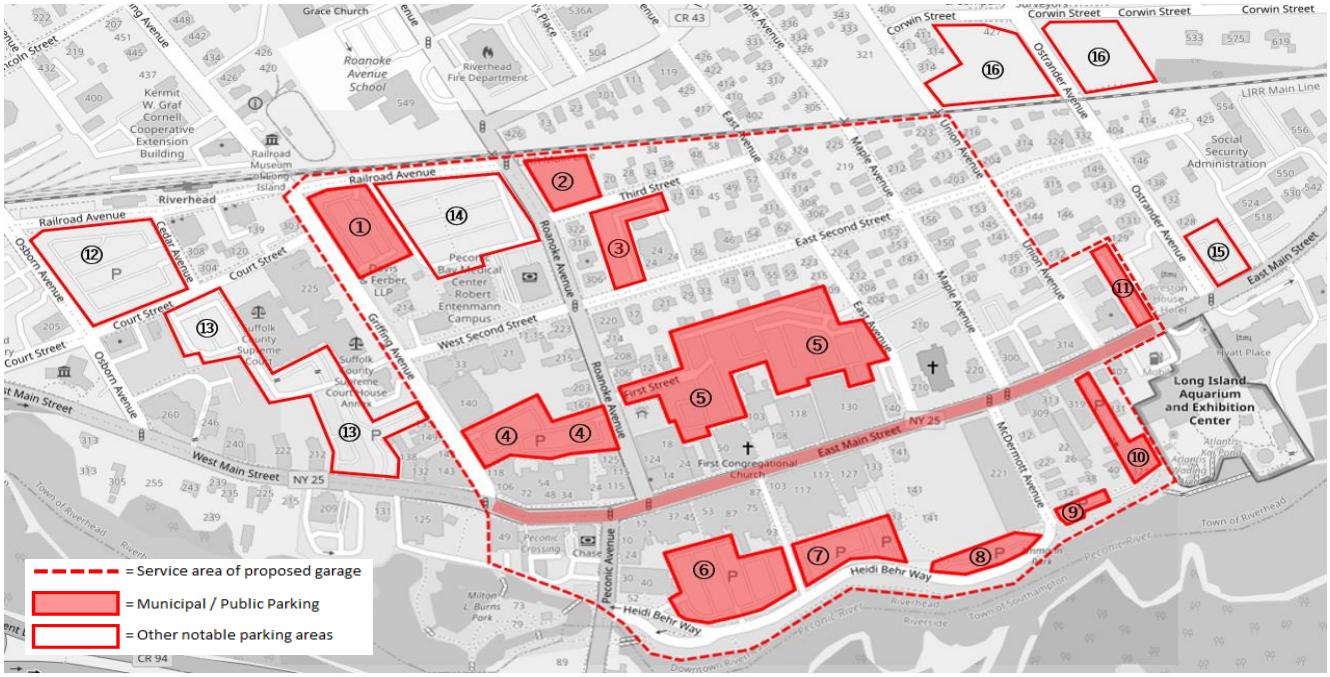
Recommendation	Phasing			Level of complexity (1=easy 5=difficult)	Cost ($ - $$$$)	Partners involve	Next steps
	0-18 mnth	18 mnth-3 yrs	3+ years				
1. Prioritize spaces for customers and visitors in centrally located facilities.							
A. Alter timed signage regulations to disperse demand throughout the Downtown area	X			3	$	Parking District	Get approval from the Parking District, develop communications strategy to ensure everyone is aware.
B. Establish unified signage program	X	X		2	$$	Parking District	Finalize time restrictions associated with each facility and sign content, get approval from Parking District to install.
C. Pilot employee and residential permit program	X			3	$$	Parking District	Finalize facility locations, install temporary signage for employee and residential permits.
D. Pursue shared parking agreements with owners of large, low-demand facilities		X	X	5	$	Parking District, selected businesses	Identify lots to target for shared parking, approach owners and enter into agreement.
2. Update enforcement efforts to better monitor and manage parking demand							
A. Hire enforcement staff to exclusively monitor and manage parking demand in the downtown area.	X			3	$$	Parking District, Police Department	Determine cost and budget constraints of the Parking District, identify staff members to exclusively monitor parking demand in the downtown area.
B. Deploy increased enforcement efforts in central downtown core	X			2	$	Parking District, Police Department	Finalize location of increased enforcement, determine cost and budget constraints of the Parking District.
C. Upgrade enforcement technology	X	X		3	$$	Parking District, Police Department, Town Council	Approach potential vendors and trail enforcement software/hardware.
3. Establish parking policies and regulations that prepare for an increase in residential parking demand and guide development patterns in the future.							
A. Require a TDM study for incoming developments		X	X	4	$	Parking District, City Commission	Identify TDM programs to be included and prioritized, draft language to be included in the code.
B. Monitor systemwide demand on a bi-annual basis	X			2	$$	Parking District, City Commission	Designate money in the budget towards utilization counts, determine appropriate times in which parking demand is typically higher. Identify staff to perform parking counts.
C. Consider establishing a minimum and maximum requirement for residential developments through a fee-in-lieu of parking policy if the systemwide demand consistently exceeds 75%		X	X	5	$	Parking District, City Commission	Verify that parking demand has consistently exceeded 75%, verify that shared parking and overnight permit opportunities have been exhausted, begin to draft language in the Town's zoning code.
D. Pursue TOD surrounding the Riverhead stations to revitalize the area and improve connections to the Downtown area.			X	5	$	Parking District, City Commission	Begin to identify key land uses for the site and potential development scenarios.
4. Improve alternative transportation modes							
A. Enhance pedestrian/bicycle facilities and parking connections.	X			2	$$$	Parking District, Planning Department	Coordinate potential connection projects with the planning department and determine funding opportunities.
B. Provide employees and/or residents with discounted transit passes.			X	4	$$	Parking District, Suffolk County Transit, major employers	Meet with Suffolk County Transit to determine cost, gage interest of major employers, determine potential revenue that could be designated for this use.
C. Offer a discounted rideshare credit to serve as a guaranteed ride home for employees who do not drive.		X		3	$$	Parking District, major employers, Town Council	Approach rideshare vendors including Lyft and Uber to gage interest, determine potential revenue that could be designated for this use.
D. Create and promote shuttle services to connect remote parking facilities to key destinations Downtown.		X		4	$$$$	Parking District, major employers including representatives from the Long Island Aquarium, and Suffolk Theatre	Set up meeting to discuss potential route and frequency.

Appendix: projection model assumptions

1. Current parking ratio: 0 (no parking required additional parking in Parking District)
2. Parking demand generated ratio: 1.0 (1 space per bedroom)
3. Population growth: 0.46%
    a. Based on Riverhead population growth between 2016 (33,628) and 2017 (33,783)
4. Assumes for additional 67 spaces in 2019 associated with restriping of the 1st Street Lot
5. The Town provided the following upcoming development data
    a. Riverhead Lofts.
        i. Units: 117
        ii. Spaces: 55
        iii. Completion date: 2019
    b. Old Sears Building
        i. Units: 170
        ii. Spaces: 85
        iii. Completion date: 2022

PARKING PROGRAM SIZING MODEL
1st Street Parking Garage
Riverhead, NY

DRAFT



			Typical Weekday				Summer Saturday	
Line	Description	See Note	10am	12:30pm	3pm	6pm	3pm	7pm
a	Number of Vehicles Parked	1	520	584	546	548	557	819
b	Available Spaces (Existing)	2	1131	1131	1131	1131	1131	1131
c	Existing Surplus or (Deficit)		611	547	585	583	574	312
d	Number of Vehicles Parked	3	520	584	546	548	557	819
e	Available Spaces (Proposed)	4	604	604	604	604	604	604
f	Surplus or (Deficit)	4	84	20	58	56	47	(215)
g	Surplus or (Deficit) - After Loss of Lots 1, 5 and 7	5	84	20	58	56	47	(215)
h	Impact 1: Loss of Ostrander Lots	6		(182)			(164)	(8)
i	Impact 2: Loss of Hotel Lot	6, 7		(23)			(62)	(58)
j	Impact 3: Spillover Demand From Proposed Local Redevelopment	8		(54)			(75)	(157)
k	Projected Surplus or (Deficit)			(239)			(254)	(438)
l	Design Factor (15% Addition)	9						(66)
m	RECOMMENDED PARKING CAPACITY TARGET - Lot ⑤							504

Notes

1 Peak recording of counts conducted on 11/12/22, 11/17/22, 8/19/23 and 8/23/23 in Lots ① thru ⑪ + Main Street
2 Lots ① thru ⑪ + Main Street = 1131 spaces
3 Line "a" restated
4 After loss of Lots ①, ⑤ and ⑦
5 Line "f" restated
6 Based on counts of 8/19/2023 (Saturday) and 8/23/2023 (Wednesday)
7 It is assumed all Hotel cars will be valet-parked in new parking garage
8 203-213 E. Main; 103-105 E. Main; 118 E. Main and 12 McDermot
9 Safety Factor to enable "Practical" Utilization of parking facilties

LEVEL G ASSOCIATES

30 August 2023

Mr. Matt Wexler
National Development Council
633 Third Avenue, Suite 19J
New York, New York 10017

RE: Due Diligence Geotechnical Investigation Study
First Street Parking Lot Redevelopment
Riverhead, Suffolk County, NY
Langan Project No. 101061401

Dear Mr. Wexler:

At your request, we have completed our due diligence Geotechnical Investigation for the proposed First Street Parking Lot Redevelopment in Riverhead, Suffolk County, New York. The purposes of this study were to: 1) research and review available site information, 2) perform a limited geotechnical investigation consisting of drilling borings and installing a permanent groundwater level observation well, and 3) provide preliminary geotechnical considerations and recommendations for the proposed site development.

A final investigation consisting of borings, test pits, CPTs, and laboratory testing will be required in order to provide final recommendations for design and construction. We recommend that this investigation be performed subsequent to finalizing the Conceptual Site Plan.

BACKGROUND

Existing Conditions

The approximate 3-acre site is located in Riverhead, Suffolk County, New York; see Figures 1 and 2. The overall project site is bounded by the following:

- Residential houses and commercial buildings to the north.
- East Avenue, residential houses, and the Riverhead United Methodist Church to the east.
- Commercial buildings and East Main Street to the south. The Peconic River is located further to the south.
- Roanoke Ave, commercial buildings, and an adjacent parking lot to the west.

Currently, the site is a paved asphalt parking lot with landscape islands.

At the time of this report, a topographic survey was not available for our review. Based on existing site grades measured by our field engineer using a survey-grade GPS unit during our field work, grades at the site are relatively flat and generally range from approximate el 18.5 to el 21.5.

See Appendix A for select general site photographs.

PROPOSED DEVELOPMENT

Based on conversations with the Project Team, we understand the following regarding the site development:

- A parking garage will be constructed within the northern portion of the project site (north of the First Street).
- The parking garage is anticipated to have approximately 350 to 500 spaces and will likely be 3 to 4 levels. Based on our conversations, we understand that a below-grade level is currently not being contemplated.
- The remainder of the site will be an on-grade parking lot. We expect that the current parking lot will remain unchanged in the areas surrounding the new parking garage.

At the time of our investigation and report, a concept site plan was not available for review. In addition, structural loading information for the proposed garage was not available for our review. Once it becomes available, we should review the structural loading information for the garage so that we may evaluate and modify, if necessary, the recommendations provided herein

REVIEW OF AVAILABLE INFORMATION

We reviewed available historic aerial photographs, historic topographic maps, Sanborn maps, soil survey data, regional geologic information, and the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the site vicinity. Pertinent information obtained from the above documents is summarized in the following paragraphs.

Historic Aerial Photographs

We reviewed historical aerial photographs dated 1938 through 2019; see Appendix B.

- Historic aerial photographs dated from 1938 to 1947 show the site is mainly occupied by residential houses and a road (First Street) that traverses the project site in an east-west direction.
- Historic aerial photographs dated from 1957 to 1966 show the eastern portion of the site to be gradually converted to a parking lot. Historic aerial photographs dated from 1970 to 1985 show all of the former residential houses to be completely demolished and the entire site to be a parking lot. In these photographs, First Street still traverses the site and connects Roanoke Avenue and East Avenue.

- Historic aerial photographs dated from 1994 to 2019 show the parking lot to be reconfigured and similar to today.

Historic Topographic Maps

We reviewed available historic United States Geological Survey (USGS) Topographic Maps dated 1903 through 2019; see Appendix C.

- Topographic maps dated from 1903 to 1947 depict a road (First Street) running in an east-west direction across the site. Residential houses are shown on both sides of the road. The elevations at the site are shown to range from approximate el 15 to el 20 (Mean Sea Level, MSL) and typically sloping downward from north to south.
- The topographic maps dated 1956 to 2019 no longer depict buildings within the project site. In all maps except 2013, First Street is still depicted running in an east-west direction across the site.

Sanborn Maps

We reviewed available historic Sanborn Maps dated 1885 through 1969; see Appendix D.

- Sanborn maps dated 1885 to 1947 show the project site is mainly occupied by 1- to 2-story brick/masonry residential buildings (no basements), sheds/garages associated with the houses, and a 60-foot-wide street (known as Cottage Place and then First Street).
- The Sanborn map dated 1969 shows that all buildings on the project site have been demolished and parking lots have been constructed. First Street is still shown to exist.

Soil Survey Data

We reviewed the United States Department of Agriculture (USDA) Natural Resources Conservation Service soil survey map for Suffolk County, New York; see Figure 3. A brief description of the soil types within the site vicinity is provided below:

- *Cut and Fill Land (CuB):* These areas consist of gently sloping material that has been cut and filled. The Hydrologic Soil Group of this soil type is unranked.
- *Urban land (UR):* These areas typically consist of a surface covered by pavement, concrete, buildings, and other structures. The Hydrologic Soil Group of this soil type is unranked.

Regional Geology

We reviewed the "Surficial Geology Map of New York, Lower Hudson Sheet" published by University of the State of New York, the State Education Department; see Figure 4. According to this map, the soil within the site vicinity consists of Outwash Sand and Gravel (og). These soils generally consist of fine to coarse gravel with sand from proglacial fluvial depositions.

We also reviewed the "Geologic Map of New York, Lower Hudson Sheet" published by University of the State of New York, the State Education Department; see Figure 5. According to this map, the site is underlain by the Monmouth Group, Matawan Group, and Magothy Formation (Km), which consist of silty clay, glauconitic sandy clay, sand, and gravel.

Bedrock is expected to be very deep.

Flood Map

We reviewed the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Number 36103C0466H dated 25 September 2009; see Figure 6. According to this map, the site lies outside the 100-year and 500-year floodplains. The closest area within the 100-year floodplain is located to the south of East Main Street along the Peconic River having a base flood elevation of el 7 to el 8 (NAVD 88).

Nearby Langan Project

We reviewed documents (i.e. geotechnical engineering reports and structural drawings for a proposed residential building and parking garage) of a nearby project site that Langan had previously been engaged to review. The proposed residential building site is located closer to the Peconic River to the south of the First Street Parking Lot project site. A summary of pertinent information obtained from these documents is provided below:

- Based on findings from borings drilled at the nearby site, the subsurface conditions generally consist of fill overlying loose to medium dense sand to the termination depths of the borings. A relatively thin layer of peat was encountered beneath the fill in one of the borings.
- Groundwater was encountered at depths ranging from approximately 3.5 to 5.5 feet below existing grades, corresponding to approximate el 0.5 to el -1.
- Based on the structural foundation drawing, a 50-ton pile was proposed to support the proposed building foundations and slab.

SUBSURFACE INVESTIGATION FOR THIS STUDY

The due diligence geotechnical field investigation performed by Langan consisted of the following:

- Drilling three (3) borings (identified as LB-1 through LB-3).
- Installing one (1) permanent groundwater level observation well adjacent to boring LB-2.
- Performed a geophysical survey to investigate select portions of the site for subsurface anomalies.

See Figure 2 for approximate location of work.

The field work associated with our investigation was completed under the full-time inspection by a field engineer from our office under the direct supervision of our Project Professional Engineer. Our field engineer marked out the boring and well locations using a survey-grade GPS unit, maintained logs of the explorations, classified encountered soil, and obtained representative material samples.

Permission to access the site was obtained from the National Development Council and the Town of Riverhead prior to performing our work. The One-Call utility mark-out request was performed by our subcontracted drilling contractor prior to any drilling activities. In addition, a private utility company was used to mark out detectable utilities within the immediate vicinity of the proposed boring/well locations.

Borings

The borings were drilled by Eastern Environmental Solutions, Inc. on 2 and 3 August 2023 using a Geoprobe 7822 DT drill rig. The borings were advanced to depths ranging from approximately 37 to 77 feet below existing grades using mud rotary techniques. A standard 2-inch-outer-diameter split spoon sampler was used to obtain disturbed samples of the underlying soil strata. The Standard Penetration Test (SPT)[1] was accomplished as part of the sampling procedure (in accordance with ASTM D1586), and the SPT results were recorded by our inspecting engineer. As part of the SPT test, an *automatic hammer* was used to advance the split spoon into the soil. Continuous SPT soil samples were obtained for the first 12 feet and every 5-foot interval thereafter.

Groundwater levels were recorded when first encountered within each boring. The borings were grouted upon completion.

[1] The Standard Penetration Test (SPT) is a measure of the soil density and consistency. The SPT N-value is defined as the number of blows required to drive a 2-inch O.D. split-barrel sampler 12 inches, after an initial penetration of 6 inches using a 140-pound automatic hammer falling freely for 30 inches.

The individual boring logs are provided in Appendix E.

Permanent Groundwater Level Observation Well

The permanent groundwater level observation well was installed by Eastern Environmental Solutions, Inc. on 3 August 2023 in a borehole adjacent to boring LB-2. The well was drilled to a depth of approximately 25 feet below existing grades and consisted of 2-inch-diameter (solid and screened) PVC pipes, sand backfill, and a flush-mounted cover to match the existing grades.

Groundwater levels within the groundwater level observation well were measured during our field investigation.

Laboratory Testing

Soil samples from the geotechnical investigation were visually examined in the field and classifications were confirmed by re-examination in our Parsippany, New Jersey offices and selected soil samples were sent to a specialty testing laboratory for Grain Size Distribution.

The results of the geotechnical testing are provided in Appendix F.

Geophysical Survey

The geophysical survey was performed by NOVA Geophysical Engineering Services within select portions of the asphalt paved parking lots to locate existing utilities and scan for possible buried obstructions (including former foundations and USTs). The geophysical survey was performed using electromagnetic (EM) scanning and ground penetrating radar (GPR) methods.

The geophysical survey report prepared by NOVA is provided in Appendix G.

SUBSURFACE CONDITONS

Based on the borings performed for this study, the site subsurface conditions beneath the surficial materials consisted of fill overlying sand. The following sections describe the encountered strata and observed groundwater conditions.

An automatic hammer was utilized for the borings performed for this study. The SPT N values obtained during our investigation have been converted to N_{60}-values by utilizing a conversion formula and estimated hammer efficiency.

Surface Materials

An approximate 4- to 6-inch-thick layer of asphalt was encountered at the surface of the borings.

All borings were performed within the existing paved areas. Please note that landscaped areas exist within the site and are expected to consist of a surface layer of topsoil.

Fill

A fill layer typically consisting of yellowish brown to orangish brown to dark grayish brown to black fine to coarse sand with varying amounts of silt, fine gravel, and miscellaneous debris (asphalt, concrete, glass, and wood) was encountered beneath the asphalt in all borings.

The fill thickness was found to range from approximately 2 to 3 feet.

Sand

Light brown to light orangish brown to brown to light gray to gray fine to coarse sand with varying amounts of silt and fine gravel was encountered beneath the fill in all borings.

The upper portion of the sand was typically found to be loose to medium dense as evidenced by SPT N_{60}-values ranging from 7 to 46 blows/foot (average SPT N_{60}-value of 17 blows/foot).

At a depth of approximately 55 to 65 feet below existing grades, the density of the sand was found to increase. The lower sand was found to be dense as evidenced by SPT N_{60}-values ranging from 30 to 48 blows/foot (average SPT N_{60}-value of 42 blows/foot).

Based on laboratory testing, the sand had a fines content ranging from approximately 0.5% to 2.5%.

All borings were terminated within the sand stratum.

Groundwater

Groundwater was first encountered within all borings at depths ranging from approximately 15 to 20 feet below existing grades, corresponding to approximate el 0.6 to el 5.7. The groundwater level within the borings was inferred based on the moisture content of the samples retrieved during SPT sampling and is not as reliable as results obtained from the monitoring well.

Subsequent to developing the groundwater level observation well on 3 August 2023, the groundwater level was measured to stabilize at approximately 16.5 feet below existing grades, corresponding to approximate el 4.1.

The groundwater levels are expected to fluctuate based on weather, seasonal conditions, and construction activity. In addition, the groundwater levels are expected to be affected by the tide of the nearby Peconic River.

GEOPHYSICAL SURVEY FINDINGS

According to the results of the geophysical survey, subsurface anomalies were detected at several locations throughout the site. These anomalies were primarily observed within areas where residential houses previously existed and are indicative of buried structures (potentially old foundation remnants).

PRELIMINARY GEOTECHNICAL CONSIDERATIONS

Based on a review of available information, we have identified the following geotechnical considerations for development at the project site:

- **Site Demolition and Site Preparation:** Any miscellaneous surface trash, debris, or other unsuitable materials should be removed from the site. In existing vegetated areas, clearing and grubbing of all trees (including removal of any associated roots systems) and vegetation designated for removal should be performed.

  Existing asphalt should be completely stripped within the designated areas of the project site. The existing asphalt designated for removal can be milled and stockpiled for reuse as pavement subbase in any new pavement areas or disposed off-site.

  Any active existing utilities that are encountered in the proposed parking garage footprint area should be re-routed. Utilities designated for removal should be completely removed within the proposed garage footprint. In proposed pavement and landscape areas, existing utilities can be either removed or abandoned in place by completely filling with flowable fill.

  After performing the site preparation work and prior to placing compacted fill to raise site grades, all site soil within the proposed development area should be proofrolled with 3 overlapping coverages of a vibratory roller having a minimum static drum weight of 5 tons. Prior to constructing finished surfaces (building slabs, asphalt pavement, and concrete pavement), we also recommend that the subbase be proofrolled using a fully loaded tri-axle dump truck in the presence of a qualified geotechnical engineer. Soft areas identified during proofrolling should be excavated and replaced with approved, compacted fill.

- **Reuse of Existing Soils:** At this time, we anticipate that the on-site soils can be reused as compacted fill to raise grades or backfill foundation and utility excavations. We typically recommend that oversized material (i.e. greater than 6 inches) be removed from the fill. The use of larger aggregate should only be done as approved by a qualified geotechnical engineer based on inspection of conditions encountered during construction.

  In addition, the existing fill was found to only contain trace amounts of miscellaneous debris (asphalt, concrete, glass, wood). Due to the site history, selective screening of the existing fill may be necessary to remove buried unsuitable soils and larger pieces of deleterious debris. This deleterious materials separated by screening should be disposed off-site.

- **Reuse of Asphalt Millings:** The existing asphalt designated for removal can be milled/broken and stockpiled for reuse as pavement subbase in proposed pavement areas (if necessary). Removed asphalt that will be reused should be broken into a well-graded mixture with pieces having dimensions less than 2 inches in any direction. The Contractor should provide adequate dust control during the milling process. The reuse of asphalt millings at the site should also be reviewed and approved by the project environmental consultant, prior to such reuse.

  We recommend that the asphalt millings not be reused as "general" fill or to backfill excavations.

- **Buried Obstructions:** Based on historic information, residential houses were previously present on the north and south sides of First Street. Remnants of the foundations for the former houses likely still exist. Several subsurface anomalies were found in our geophysical survey that indicate buried obstructions may be encountered during construction of foundations.

  We recommend that buried foundations be completely removed beneath the proposed parking garage footprint (where encountered).

- **Imported Fill:** Imported fill should consist of a relatively well graded mixture of sand and gravel with not more than 15 percent (by weight) finer than the No. 200 sieve and a maximum particle size of 4 inches. The use of any imported fill containing a higher percentage of fines or larger aggregate size would need to be evaluated by a qualified geotechnical engineer during construction.

  Suitable fill should be free of organics and other deleterious materials. Any approved imported fill should contain no contamination in exceedance of the applicable New York State DEC standards. In addition, the fill material should not originate from any site subject to federal or state environmental regulatory requirements for site remediation or

permitting of hazardous or petroleum waste or material including but not limited to underground storage tanks, state hazardous waste sites, brownfield sites, New York City 'E' designated sites, national priority list sites, state voluntary cleanup, or landfill sites. The Contractor should provide documentation of compliance prior to delivery of any fill to the site.

- **Groundwater Control During Construction:** Based on anticipated grading, excavations for the proposed building foundations and site utilities are anticipated to be above the measured groundwater levels. However, groundwater seepage during periods of wet weather and perched water encountered during excavation work should be expected and can be controlled using conventional submersible pumps in conjunction with gravel sumps.

- **Foundation Support:** We recommend the following foundation options be considered for support of the proposed parking garage:

    1) Shallow Foundations and Slab-On-Grade Construction
    2) Deep Foundations and Structural Slab Construction

  The Design Team and Contractor should consider economic, vibration, noise, and schedule impacts associated with each option when selecting the foundation support system.

- **Shallow Foundations:** The proposed parking garage can be supported on shallow foundations.

  – Shallow Foundation Design: The proposed parking garage can be supported on shallow foundations bearing on proofrolled native soils. At this time, we recommend that the existing fill soils be removed beneath the proposed footings. The new building footings can be designed using a maximum allowable bearing pressure of 2.5 to 3 kips/ft^2.

    To improve the bearing support for the parking garage due to the anticipated heavy loads associated with a 3- to 4-level garage, ground improvement can be performed beneath the foundations. Subsequent to ground improvement, we anticipate that the new building footings can be designed using an allowable bearing pressure of 5 kips/ft^2.

  – Ground Improvement: We recommend that the ground improvement consist of installing vibratory stone columns (VSCs). The VSCs are constructed by drilling a specially designed mandrel completely through the fill and loose sandy soils and into the underlying denser soil, then backfilling the excavated shaft with

compacted lifts of crushed stone. The VSC method displaces the soil during stone column installation rather than creating an augered hole, as when installing traditional Compacted Stone Columns, by utilizing a specialized vibratory probe. The cavity associated with the VSC is created by a specially designed mandrel that is pushed and vibrated into the ground to a specific depth. Stone is placed into the cavity as the mandrel is withdrawn. The mandrel also acts as a tamper to compact the stone in approximately one-foot-thick lifts.

Obstructions and sporadically dense soils are expected to be encountered within the fill and upper sandy soils. Pre-drilling or excavation of obstructions in the fill should be performed as necessary to facilitate installation of VSCs.

At this time, we anticipate that the VSC lengths will typically range from approximately 30 to 35 feet.

- **Deep Foundations:** As an alternative to supporting the structure on shallow foundations, deep foundations consisting of driven or drilled piles can be considered to support the proposed parking garage. We recommend that the deep foundations consist of either driven timber piles or tapertube piles. However, if noise and vibration are a concern, Auger Cast in Place (ACIP) drilled piles should be considered instead of driven piles.

  The following is brief description of the different deep foundation options:

  – Timber Piles: We recommend that 12-inch-diameter timber piles (minimum 8-inch-diameter tip) be considered as a deep foundation option. We anticipate that the timber piles would be driven to approximately 30 to 35 feet and provide an allowable compression capacity of 25 to 30 tons.

    The timber piles should be of Pacific Coast Douglas fir or Southern Yellow Pine and should conform to ASTM D25. All piles should be driven in one piece. Splices should not be permitted. Piles shall be preserved in accordance with specifications of the American Wood Preservers Associations (AWPA). The timber piles should be driven using a hammer having a minimum rated energy of 15,000 foot-lbs to a final driving criteria as determined by the Engineering News Formula.

    If required, timber piles can be outfitted with special connections to provide uplift capacity.

  – Tapertube Piles: We recommend that 14-inch O.D. x 0.25 inch wall thickness pipe pile fitted with 8-inch x 14-inch x 15 foot long tapered tip section be considered as a deep foundation option. We anticipate that the tapertube piles would be driven to approximately 70 to 75 feet and provide an allowable compression capacity of 50 tons.

The pipe pile should have a minimum yield strength of 50,000 lb/in^2. Subsequent to driving, the pile should be filled with concrete having a 28-day compressive strength of 4,000 lb/in^2.

Tapertube piles should have a protective conical point at the tip. The tapered sections should also have an adequate wall thickness to minimize potential damage during driving.

– ACIP Drilled Piles: We recommend that 12-inch-diameter Auger Cast in Place (ACIP) piles with a rebar cage be considered as a deep foundation option. We anticipate that the ACIP piles would be drilled to approximately 50 to 65 feet and provide an allowable compression capacity of 50 to 75 tons.

ACIP Piles are installed by first drilling a plugged hollow-stem, continuous-flight auger or drill tool into the ground at a certain rate to a predetermined depth or resistance. During auger or drill tool penetration, some soil is removed by the auger flights, and additional soil is compacted against the sidewalls of the drill hole. After the desired depth or resistance is reached, concrete or grout is pumped into the hollow stem to tremie fill the drill hole. Subsequently, the auger is withdrawn while concrete or grout is continuously pumped under pressure throughout the auger or drill tool withdrawal. After the concrete or grout placement is completed and the auger is removed, steel reinforcement is inserted or vibrated down into the fresh concrete or grout mixture and supported at the surface until curing is complete.

– Pile Load Testing: Index pile installation and full-scale pile load tests are necessary to confirm the final pile capacities and lengths prior to the start of construction. Index piles should be driven or drilled at locations selected by the Geotechnical Engineer and should be the same in every respect to the production piles. All pile load tests should be performed in accordance with requirements of the 2020 New York State Building Code.

- **Slab Support:**

- If shallow foundations are utilized, the garage ground floor slab can be a conventional slab-on-grade bearing on proofrolled/compacted soil subgrade areas. Ground improvement is not anticipated to be necessary beneath the ground floor slab. Slab areas should be proofrolled and any soft, loose, or unsuitable soils identified by the inspecting geotechnical engineer should be removed and replaced with approved, compacted fill. A 6-inch-thick layer of processed aggregate should be provided beneath the ground floor slab. The floor slab can be designed using a modulus of subgrade reaction of 150 lbs/in^3.

- A pile-supported structural slab should be used in building areas where pile foundations are utilized.

- At this time, we expect that a vapor barrier will not be required beneath the parking garage ground floor slab (subject to approval by the Architect and Owner). However, we recommend that a minimum 10-mil vapor retarder be utilized beneath the mechanical room or any areas that require special floor coverings (i.e. tile, carpeting) and are humidity controlled areas.

- **Estimated Garage Structure Settlement:**

  - For structures supported on shallow foundations, we estimate the total settlement for the proposed parking garage to be less than 1 inch and differential settlement of adjacent structure columns to be less than ¾ inch.

  - For pile supported structures, we estimate the total and differential settlement for the proposed parking garage to be less than ½ inch.

- **Seismic and Liquefaction Evaluation:** Based on the 2020 New York State Building Code, ASCE 7-16, and corrected SPT N_{60}-values obtained during this study, the proposed site building structures should be designed using the following parameters:

  – Site Class = D
  – Maximum Considered Earthquake Ground Motions:
    - 0.2 Second Spectral Response Acceleration, %g: S_s = 17.1
    - 1.0 Second Spectral Response Acceleration, %g: S_1 = 4.9

  The above ground motions should be adjusted for site class "D" effects using coefficients Fa = 1.6 and Fv = 2.4.

  Based the corrected SPT N_{60}-values and analyzing the liquefaction potential using Seismic Site Class D, liquefaction is considered to be unlikely. However, due to the relative density of the sand, we recommend that the seismic site class and liquefaction potential be further evaluated by performing additional borings and cone penetration tests (CPTs) during the final geotechnical investigation.

- **Protection of Adjacent Buildings and Utilities:** The proposed development will be constructed adjacent to existing structures, roadways, and utilities. Construction should be performed so as not adversely impact these existing structures, roadways, and utilities.

  We recommend that a pre-construction conditions documentation of adjacent buildings and roadways be performed prior to the start of work. At a minimum, the documentation

should consist of video tape documentation of the inspected areas, supplemented by photographs and sketches as appropriate. The documentation would serve as a qualitative document of the conditions of the existing structure prior to the start of work.

During demolition and construction, we recommend that construction induced vibrations be monitored with seismographs strategically placed along the existing buildings so that the Contractor can keep themself informed regarding the impacts, if any, of their work on adjacent structure. The monitoring described herein should not replace the Contractor's responsibility to perform this work in a manner so as to not adversely impact or cause loss of support to adjacent structures. The Contractor should perform any survey or other additional monitoring they deem necessary to adequately inform themself regarding the impacts of their work on the adjacent buildings.

At this time, we recommend that the peak particle velocity measured at the adjacent buildings not exceed 1 inch/second. This is a preliminary criterion that should be monitored and confirmed by the behavior of adjacent structures. Monitoring of the vibrations should be performed continuously during the demolition and construction work hours.

- **Environmental Aspects:** Any environmental issues identified at the site should be considered with respect to impacts on the geotechnical aspects of the work as described in this report and together with recommendations regarding on-site soil material re-use, construction dewatering, and off-site disposal of materials and groundwater.

ADDITIONAL INVESTIGATION

Once the development concept plans for the site are finalized, a final investigation consisting of borings, test pits, CPTs, and laboratory testing will be required in order to provide final recommendations for design and construction.

CLOSURE

The Contractor is responsible for construction quality control, which includes satisfactorily constructing the foundation system and any associated temporary works to achieve the design intent while not adversely impacting or causing loss of support to neighboring property, structures, utilities, roadways, etc.

This letter report presents our preliminary recommendations regarding the geotechnical aspects of design and construction for the proposed First Street Parking Lot Redevelopment located on Riverhead, Suffolk County, New York. This report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability, or groundwater fluctuations.

The information provided herein is preliminary. Final recommendations will be provided upon completing a final geotechnical investigation.

The conclusions and recommendations provided in this report result from our interpretation of the geotechnical conditions existing at the site inferred from a limited number of borings, as well as site information provided to our firm. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Actual subsurface conditions may vary. Langan reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Recommendations provided are dependent upon one another and no recommendation should be followed independent of the others. Our report, conclusions, and interpretations should not be construed as a warranty of the subsurface conditions.

Environmental issues (such as permitting or potentially contaminated soil and groundwater) are outside the scope of this study and should be addressed in a separate evaluation.

We thank you for allowing us to assist you on this project. If you have any questions regarding this report, please call.

Sincerely,
Langan Engineering, Environmental, Surveying, Landscape Architecture, and Geology, DPC

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cc: Daniel Marsh III / National Development Council
Dawn Thomas / Town of Riverhead
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