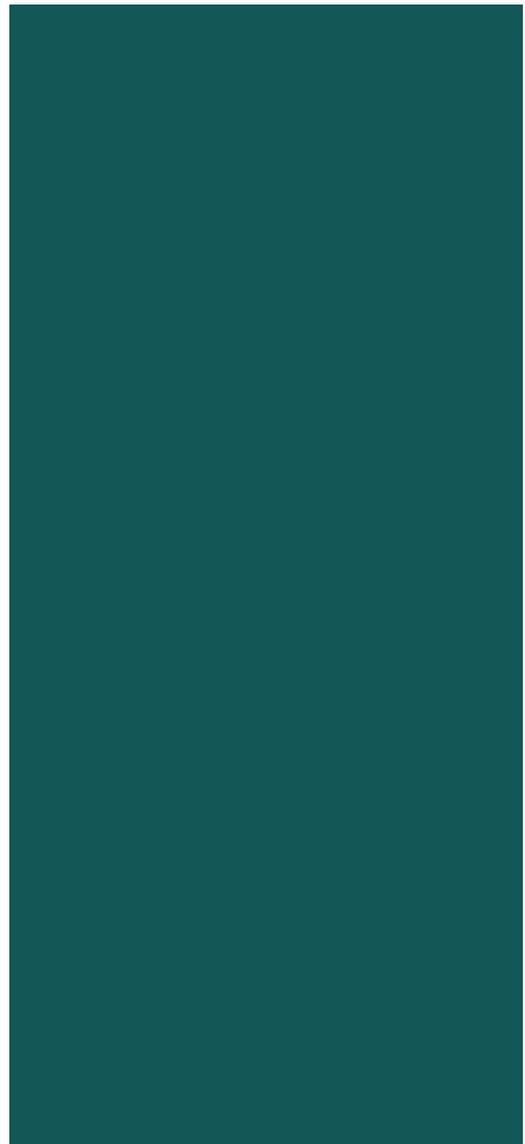


PlanBTV Transportation Study

Final Report

October 2011

DATA ■ ANALYSIS ■ SOLUTIONS



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EXECUTIVE SUMMARY

In the fall of 2010, Burlington's Planning and Zoning Department received a Sustainable Communities Challenge Planning Grant providing a unique opportunity to invest in the future and advance Burlington's place as one of America's most livable and sustainable communities. Burlington struggles to address complex urban challenges in a small, under-resourced New England community with big ideas and even bigger ideals.

This planning grant makes possible PlanBTV, which will refine broad city-wide goals for sustainable development into focused, actionable, area-specific strategies to ensure the vitality of the central core of our community and enable us to achieve our community vision. The intent is to identify, understand, and address current barriers to the creation of new infill development.



PlanBTV Goals/Desired Planning Outcomes

PlanBTV will provide recommendations, tools, and strategies that will help achieve the following goals and outcomes:

- Maintain Burlington as a regional population and economic center that offers meaningful jobs at livable wages and a diverse housing stock that serves all incomes, while encouraging the continued growth of the city's commercial the tax base.
- Promote urban development measures that facilitate economically competitive, environmentally sound, socially responsible, and aesthetically-pleasing land-use combinations and urban design elements.
- Emphasize the importance of preserving historic and cultural features and architecture, and encouraging high-quality building design to complement the existing fabric.
- Strengthen the linkages between the Downtown, Downtown Waterfront, and surrounding neighborhoods, including the Hill institutions (University of Vermont, Champlain College, and Fletcher Allen Health Care).
- Promote a mix of land uses including the need for affordable/workforce housing, both local and world class businesses, entertainment and culture, live/work spaces, etc.
- Provide a focused sustainable transportation and accessibility system within the context of the existing street network and emphasizing alternatives to the single occupancy vehicle (SOV). This should build upon the Complete Streets system and Street Design Guidelines already included in the adopted Citywide Transportation Plan.
- Provide a comprehensive parking allocation and management system that meets visitor, business, and resident needs consistent with the goal of increasing public transit and reducing dependence on the single-passenger automobile.
- Provide the quality and capacity of public infrastructure, including pedestrian, bicycle, parking, and/or transit-related facilities, necessary to support new or expanded commercial and residential development.
- Strengthen Burlington's leadership position in clean energy and climate action planning by enabling broad-based community participation in the identification, quantification, visualization, and decision-making related to the energy and greenhouse gas impacts.
- Provide the foundation for the development of a Form Based Code for the Downtown and Downtown Waterfront to guide and regulate future development in a coherent and consistent manner centered on urban form, design, and performance.

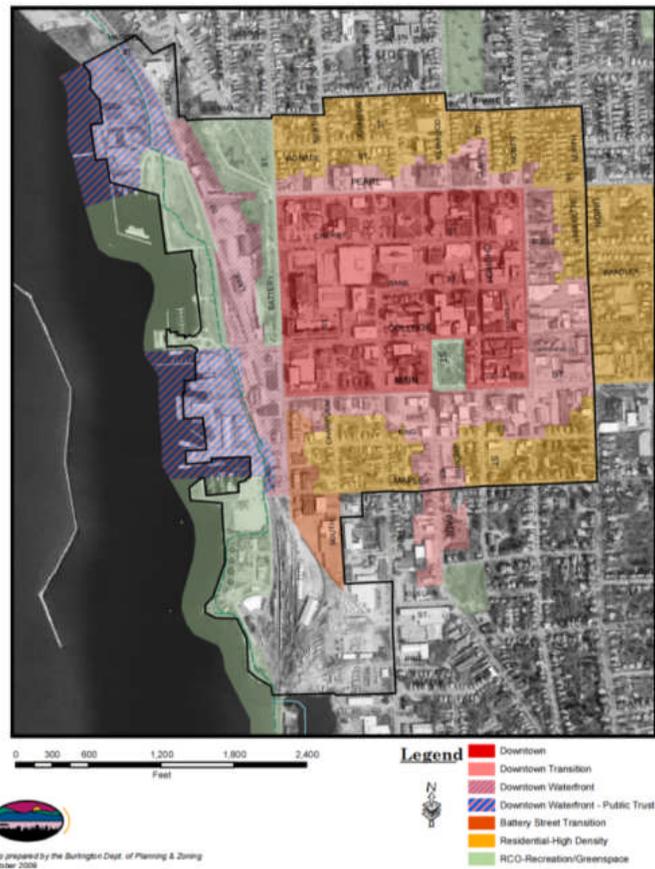
PlanBTV Transportation Study

The central goal of PlanBTV is to identify, understand, and address current barriers to new infill development. This Transportation Study for PlanBTV addresses parking and circulation and involves the following elements:

- Synthesis of Prior Plans and Studies
- Existing and Future Circulation
- Existing and Future Parking
- Parking Ordinance and Policy Review
- Involvement and Participation of Local Planning and Development Stakeholders
- Recommendations for Overcoming Transportation and Parking Barriers to Infill Development

The study area is shown in Figure 13. Rather than serve as a stand-alone plan, this report and the information, analysis, and recommendations provided in it are intended to inform the upcoming master planning and form-based code development phases of PlanBTV.

Figure 1: Study Area and Land Use Zoning



1.1 Synthesis of Prior Plans and Studies

The Synthesis of Previous Plans and Studies reviews documents which have brought Burlington to its current state and established the future vision for the City. Major themes from these plans include the need to **develop a seamless transportation system that provides high bicycle and pedestrian connectivity and convenient, reliable, and comfortable transit**. Other major take-aways from these documents are **improving access to parking**; that is, improving parking efficiency, traffic circulation, and the users' experience (and consequently economic vitality); and the need for improved **parking management**, such as wayfinding improvements and implementation of 'smart signs' that convey real-time parking information. Another common recommendation is for the development of a **multimodal transportation center**. CCTA identifies this as its "most needed facility investment" in its 2010 Transit Development Plan. A multimodal transportation center is critical in advancing improvements in the overall system. Expanding transit system routes (in terms of frequencies, service hours, and geography) is also a priority.

Plans which have special significance to PlanBTV include the **Waterfront South Access Study**, which developed alternatives for access and circulation to promote economic development in the southern portion of Burlington's Waterfront. The plan identifies various forms of a new grid street network to increase frontage and property access, remove truck traffic from neighborhoods, facilitate multimodal movements, and develop economic potential while accommodating the railyard.



In addition, construction plans for recommendations of the **Waterfront North Access Project** are currently in development, including:

- Re-alignment of northern Lake Street and the bike path, including pedestrian amenities, stormwater improvements, undergrounding of utilities, street lighting, landscaping, and parking, which will support adjacent development opportunities.
- Continued investigation of improvements to Depot Street to make it a bicycle/pedestrian only route and development of a stairway extending from Sherman Street to the Waterfront. These improvements will address public safety; enhance waterfront access from the Old North End, and upgrade stormwater, utilities and street lighting.
- Other concepts identified in the 2009 scoping study such as north-south transit along the Waterfront, in-slope parking, and funicular require additional study. With respect to the parking and funicular, the City should pursue partnerships with private property owners.

The **Burlington Transportation Plan** (BTP) assumes the role of the transportation element of the Municipal Development Plan. One of the most significant aspects of the 2011 Transportation Plan is its adoption of a Complete Streets strategy to accommodate all users. The Plan suggests different classifications for City Streets (e.g., Complete, Transit, Bicycle, Slow, State Truck Route, and Neighborhood) and provides guidelines for each type. Within the PlanBTV study area (Figure 15), the majority of the streets are “Slow Streets,” while Battery St. and Winooski Ave are “Complete Streets” that include transit, bicycles, and pedestrians. Pearl, Main, and St. Paul Streets are to be “Transit Streets” that prioritize efficient transit movement.

Finally, implementing the comprehensive recommendations of the 2008 **Burlington Wayfinding Plan** is expected to address several issues, such as pedestrian connectivity and parking management. One of the primary targets for the Wayfinding Plan was parking garage identification and information.

Figure 2: Burlington Transportation Plan Adopted Street System



1.2 Circulation

This section provides an overview of existing and future circulation conditions, including street design guidelines, transit and carsharing, traffic volumes, and bicycle and pedestrian circulation.

1.2.1.1 Arriving in Burlington

Figure 22 shows the proportions of traffic (Average Annual Daily Traffic or AADT) at each of Burlington's six entry points. US 2/Williston Road is by far the largest gateway, followed by the Winooski Bridge, VT 127 & North Avenue (combined), and US 7/Shelburne Road. These splits differ from CCTA ridership: in Figure 23, the number of riders is shown for all CCTA routes entering at that point on an average weekday. The majority of riders enter Burlington from the northeast gateway at the Winooski Bridge. The North Avenue and US 2/Williston Road routes are the next largest, while ridership from the south is split between Pine Street and Shelburne Road.

Figure 3: 2007 Traffic Volumes (AADT) for Burlington's Entry Points (source: CCRPC)

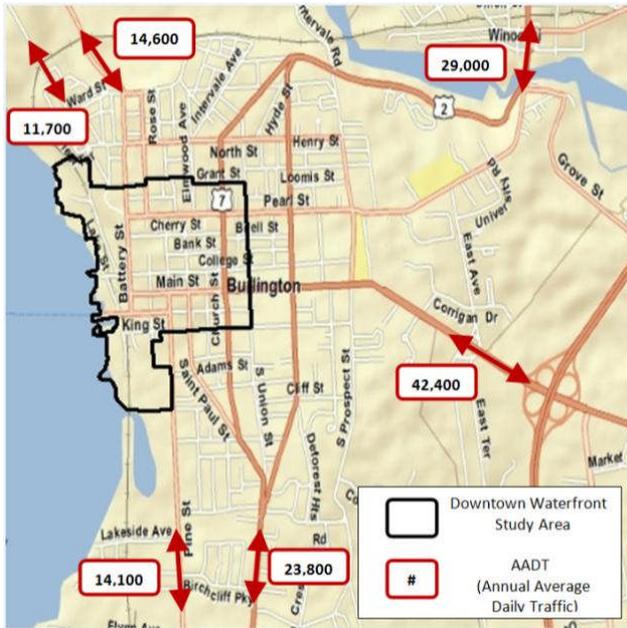
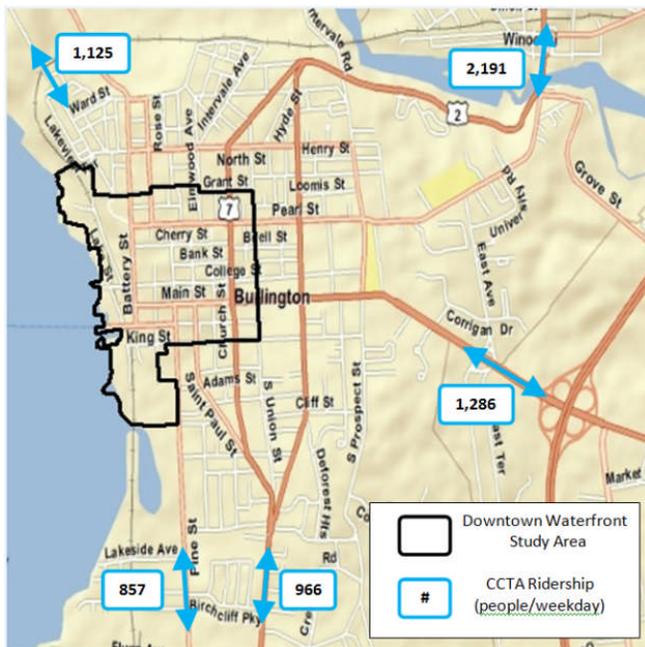


Figure 4: CCTA Average Weekday Ridership by Entry Corridor (source: CCTA 2010 Transit Development Plan)



1.2.1.2 Transit

The CCRPC Metropolitan Transportation Plan notes that approximately 40% of peak hour-person trips begin and end in Burlington, South Burlington, and Winooski. Therefore, improving transit service between these three areas may help to address the high volumes on Main Street, Pearl Street, and Pine Street (Figure 26). Although inter-regional services such as the LINK Express routes are needed and are very successful, focus on shorter, more local transit service has been suggested in previous plans and studies. Past recommendations to improve the transit system have included expanding system convenience, particularly by increasing service hours and frequencies on the major corridors that serve the City: North Ave, Colchester Ave/Pearl Street (VT 15), Williston Road/Main Street (US 2), and Shelburne Road (US 7). These routes have the highest ridership in the CCTA system. Looking forward, the College Street Shuttle is repeatedly identified as the model of how transit in Burlington should operate: high-frequency, convenient, user-friendly, and easy to understand.

Based on the Synthesis of Previous Plans and Studies (Section 2.0), two prerequisites to addressing transit service gaps are 1) developing a multimodal transportation center and 2) reforming the transit funding framework to provide the adequate support and resources. The current funding framework is based on property taxes of the towns that are members of CCTA. Reforming this framework so that transit is funded by a dedicated transportation source such as a fuel tax, parking revenues, or driver's licenses/vehicle registration fees, are alternative funding possibilities.

1.2.1.3 Single Occupancy Vehicles

Burlington aims to create a "park once" situation for drivers to the Downtown and Waterfront areas: one in which it is more convenient and pleasant to park their vehicle once and walk to multiple destinations rather than drive to locations that are a few blocks apart. Figure 26 shows the volumes on the roadways within and approaching the study area: Main and Battery Streets carry the most traffic, followed by Pearl, Pine, and St. Paul Streets and North Avenue. The CCRPC MTP notes that the regional transportation demand model predicts significant congestion by 2025 along most of North Avenue. Whether these streets will be able to accommodate these volumes under the Complete Street Guidelines suggested in the Burlington Transportation Plan will need to be determined in case-by-case analyses.

1.2.1.4 Bicycles and Pedestrians

The Downtown and Waterfront areas are quite walk-able, with a comprehensive system of sidewalks, crosswalks, and pedestrian signals. There are blocks where the streetscape is much more attractive and inviting to pedestrians. For example, it is generally considered that walking past pedestrian-scale storefronts and residences (such as on College Street) is more inviting than continuous stretches of undifferentiated exterior walls in evidence in some downtown locations. For bicycles, one of

Figure 5: 2007 Average Annual Daily Traffic (AADT)(source: CCRPC)



the most significant east-west barriers is the hill from the Waterfront to Downtown. In addition, bicycle facilities are mostly north-south rather than east-west.

1.2.2 Future Circulation

The future circulation analysis component of this study has been performed using the Chittenden County Travel Demand Model. This model represents daily traffic (AADT) and has been calibrated to 2005 traffic conditions. RSG has developed this model for the CCMPO. The CCMPO uses this model for a variety of transportation planning purposes, including for projecting future year land use and transportation activity.

For the PlanBTV Transportation Study, the CCMPO model was run to 2040, assuming region-wide land use of 1% annual in population and employment. From this “CCMPO 2040 Base Case”, a new “Burlington Downtown-Waterfront 2040 Base Case” was developed for this analysis incorporating specific future growth within the study area provided by the Department of Planning and Zoning.

The model was run using the new Burlington Downtown-Waterfront 2040 land use to obtain traffic volumes and volume-to-capacity ratios for six arterial roadways²:

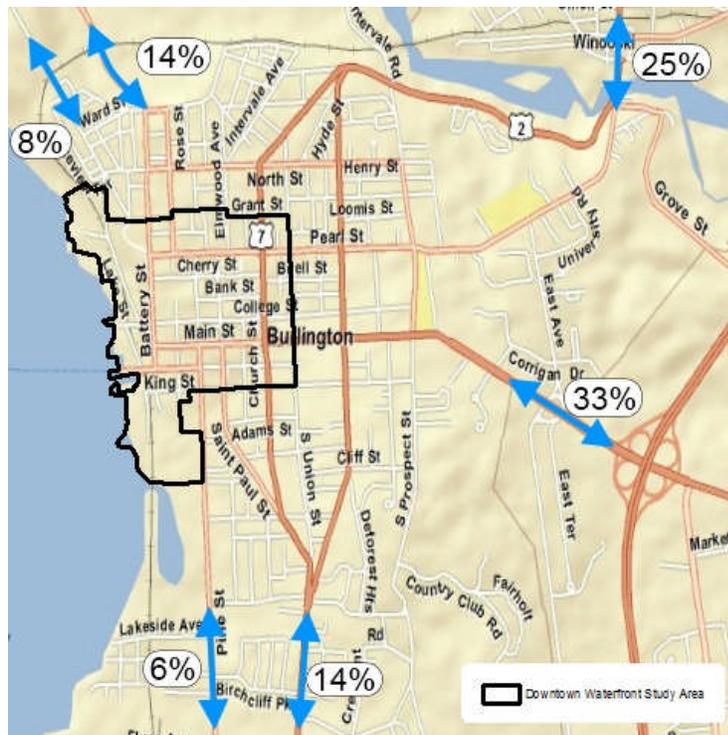
1. VT127
2. North Avenue
3. US7/Shelburne Road
4. Pine Street
5. Main Street/US2
6. Colchester Avenue/Riverside Avenue

Figure 28 shows the source (or origin) of external traffic destined for locations within the study area.

The model was run to test circulation results for two scenarios, as follows:

1. **Scenario 1** includes three Park and Ride lots (Exit 14—1200 spaces, Exit 16—800 spaces, South End Transit Center—1000 spaces) as recommended in the 2011 CCMPO Park&Ride Plan. This scenario also includes increasing CCTA service frequencies to 15 minutes for the six routes serving the study area.
2. **Scenario 2** models a “balanced” land use scenario within the core study area, seeking to increase the amount of housing relative to jobs, as consistent with the Burlington Legacy vision.

Figure 6: Source of External Traffic Destined for the Study Area¹



¹ The data in Figure 28 are from the CCMPO Travel Demand Model and represent projected 2040 travel conditions.

² Note that the v/c ratios reported are for roadway segments and not for intersections. Intersection v/c ratios are generally higher than roadway segment v/c ratios due to the presence of conflicting traffic. The roadway segment v/c ratios are best understood in comparison across the 3 alternative scenarios.



Table 6 summarizes the jobs and households located within the study area for each model scenario. For comparison purposes, the land uses assumed by the 2010 and 2040 CCMPO models are provided. Note that Scenario 1, which models higher CCTA bus frequency and implementation of the three intercept parking facilities, uses the 2040 BDW Base land use assumptions.

Table 1: Land Use Assumptions from the CCMPO Travel Demand Model for the Downtown-Waterfront Study Area

	Jobs	Households	Jobs per household
2010 CCMPO	12959	2535	5.11
2040 CCMPO	14579	3502	4.16
2040 BDW Base	19780	4225	4.68
2040 BDW 'Balanced'	14579	4858	3.00

The amount of new housing depicted in the 2040 BDW “Balanced” scenario represents a 91% increase in housing within the study area. This points to the need for substantially increasing allowable residential densities within the study area to achieve the land use vision expressed in the Burlington Legacy project. Specific zoning amendments will be necessary to facilitate increased residential densities.

For both scenarios and for both times of day, arterial link volumes are either equal to or less than the base case. Volume-to-capacity ratios are reduced as a result. Of the two scenarios, the “balanced” land use scenario, which concentrates significantly more residential development within the study area, is more effective at reducing arterial congestion. This point is reinforced by Figure 29 which depicts the downtown Burlington street network and shows the relative change in travel time between the 2040 Base Case and Scenario 1 (left) and Scenario 2 (right). The green highlighting indicates streets where delays are reduced >10% relative to the base case; red indicates areas where delays are increased >10% relative to the base case; and, no change indicates similar travel time performance between the base case and the scenario.

These figures indicate that both scenarios are effective at relieving congestion in the study area, but that Scenario 2 is significantly more effective since a much larger amount of trip making can be made with non-automobile modes due to the higher concentration of residents in the downtown.

Figure 7: Comparison of 2040 Base Case Travel Times with Scenario 1 and Scenario 2 Travel Times



This is a compelling result that supports the Burlington Legacy Vision and reinforces the policy value of encouraging housing investment within the study area. Other initiatives within this project point to parking policies designed to encourage investment in downtown housing. Combined – the lower parking requirements and the positive travel time results – show that policies to encourage housing development in the downtown are synergistic.

1.3 Parking

In Burlington, the Department of Public Works manages the public parking supply, including parking meters and revenue collection. Public Works subcontracts enforcement to the Police Department. In 1999, the Church Street Marketplace Charter established a Downtown Improvement District (which is roughly encompassed by this study area). An annual tax levied on nonresidential properties within the District funds a parking program which provides two hours of free parking in any designated municipally or privately owned or operated off-street parking facility within the District.

This section describes existing and future conditions.

1.3.1 Existing Parking Conditions

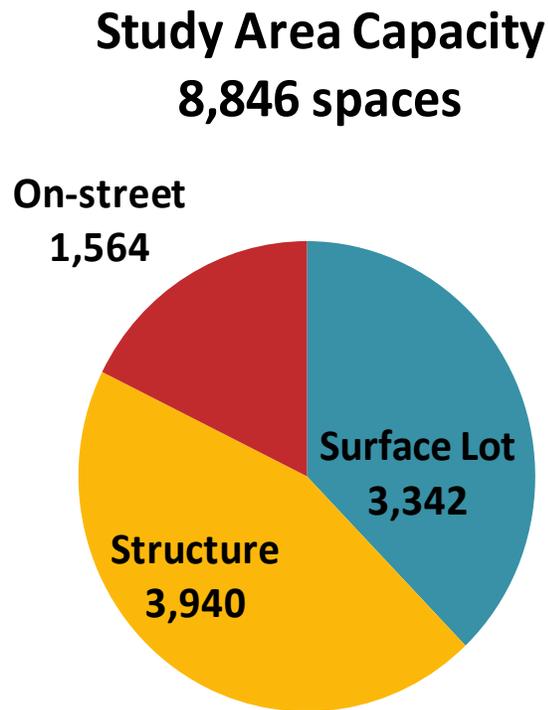
This section summarizes parking capacity and operations, occupancy, and ownership and use.

1.3.1.1 Parking Capacity and Operations

As shown in Figure 31, there are 8,846 parking spaces within the study area. The City’s three downtown parking structures and the Burlington Town Center garage (privately owned but open to public parking) are able to offer the first two hours of parking for free thanks to the Downtown Improvement District. The majority of parking (not including leased or monthly permit parking) costs an average of \$1/hour; three facilities charge somewhat more or less.

Burlington’s parking revenue funds many non-parking programs. The Department of Public Works Traffic Division provided information as to the amounts and sources of revenue (totaling approximately \$8.3M) and the programs that they in turn fund (totaling approximately \$8.3M). If parking were self-funded (and the airport facility were removed from the picture), it would have a surplus of \$780,000 to pay for parking improvements. However, programs such as the signage, flower planting, and school crossing guard programs would need to find other funding sources.

Figure 8: Parking Capacity in the Study Area by Type



1.3.1.2 Occupancy

Parking counts were performed in summer 2011 following the methodology of the 2003 Downtown Burlington Parking Study. The counts confirmed that the peak parking occupancy occurs between 1:00 and 3:00PM on Friday afternoon, when it is likely that weekend visitors are entering Burlington and overlapping with downtown employees who are still at work.

An occupancy of 85% is suggested as the level at which parking supply is used most efficiently because parking spaces are being used but there are still enough spaces empty to allow for turnover.¹ As shown in Figure 37, the total occupancy of the study area during the peak period was 65%, well below the 85% optimum. However, there are specific facilities and locations within the study area that are used more than others. The data are generally consistent with the patterns identified in the 2003 parking study, except that occupancies in 2011 were slightly lower.

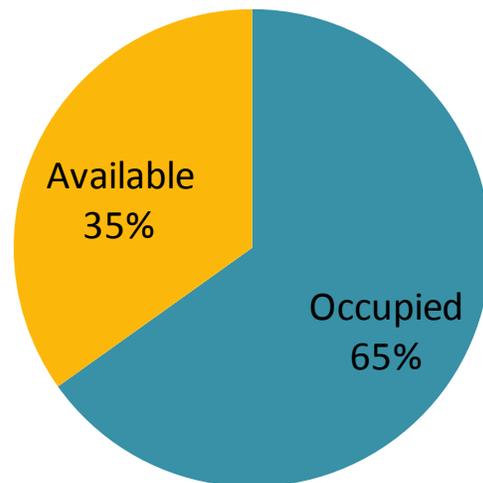
Figure 40 shows that on-street spaces are more occupied than garages and lots in Zones 2, 3, 4, and 9. This, combined with the highly visible conflicts that develop when the Marketplace garage (Zone 2) fills up, creates a strong perception that there is a shortage of parking. However, there are 988 empty parking spaces in the lots and structures of these zones at the same time;²

429 of these empty spaces are in Zone 2. Empty spaces are distributed throughout the zones (as opposed to a few specific facilities that are underutilized); however, since many are restricted to private property users and/or are difficult to find, they are underutilized.

This analysis suggests an opportunity for shifting parking demand to underutilized facilities such as the Lakeview garage (66% occupied), through improved user information (advertising 2-hours free parking in garages, as well as smart signs indicating available spaces three blocks away) and/or pricing (for example, installing parking meters with variable pricing technology to charge more during the peak period for parking adjacent to the Marketplace compared to a block or two away).

Figure 9: Total Parking Occupancy in the Study Area during the Friday 1-3PM Peak Period

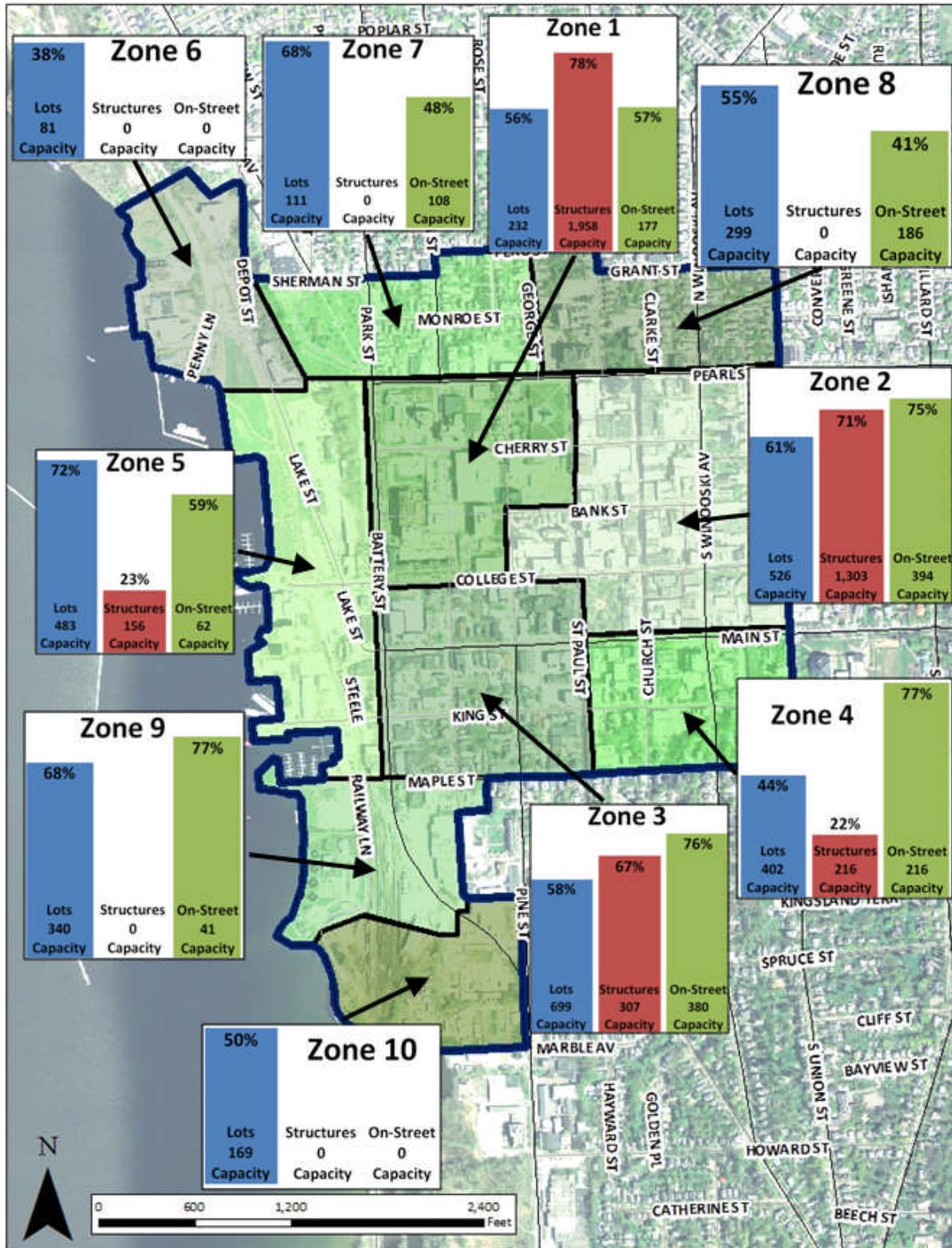
Study Area Capacity: 8,846 spaces
Total Occupancy during Peak Period



¹ Donald Shoup (2005), *The High Cost of Free Parking*, Planners Press (www.planning.org).

² This includes empty spaces in privately owned facilities that are only available to that property's affiliates. Shared parking arrangements, which would allow more people to use these facilities, would make more efficient use of the existing parking supply.

Figure 10: Zone Occupancy by Type of Parking



1.3.1.3 Facility Ownership and Use

As in the 2003 parking study, facilities were considered in light of ownership and use:

- Public/Public lots and structures are owned by the City and open to the public.
- Private/Private facilities are privately owned and are open only to the owners' clients and/or employees.
- Private/Public lots and structures are privately owned, but open to the general public.

In addition, there are facilities that are Private/Private during business hours, but open to the public at other times. For example, Main Street Landing's surface lot on the Waterfront is permit-only for tenants Monday through Friday until 6PM; at other times the general public can park there for a fee. This example presents a valuable opportunity for sharing parking: efficiency can be improved by sharing parking among uses during off-peak or non-operating hours.

Figure 11: Surface Lot and Structure Parking Capacity by Ownership/Use

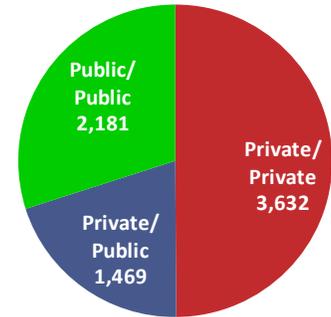
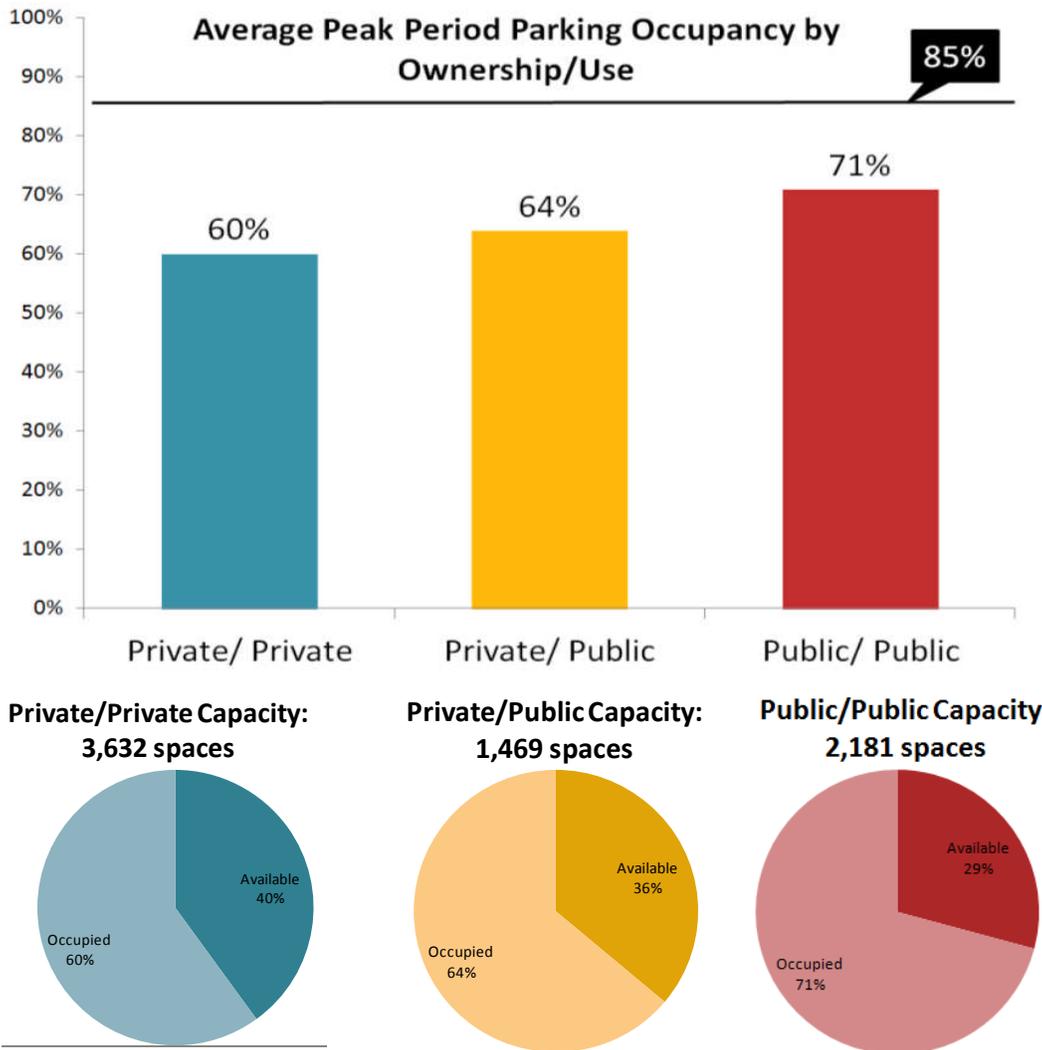


Figure 12: Peak Period Parking Occupancy by Ownership/Use



1.3.2 Future Parking Conditions

An analysis of the future parking supply necessary to support 2040 land use within the study area has been conducted for the same scenarios as the future circulation analysis, Section 3.2:

- 1) the 2040 Base Case (business as usual)(19,780 total jobs and 4,225 total residences in the study area) ;
- 2) Transportation Improvements (3 new park&ride/intercept facilities and increased CCTA frequencies) (19,780 total jobs and 4,225 total residences in the study area); and,
- 3) Balanced Land Use (addressing the jobs/housing imbalance by increasing the amount of housing relative to jobs) (14,579 total jobs and 4,858 total residences in the study area).

The jobs and household estimates provided in Table 12 have been converted into gross square footage based on housing and commercial square foot estimates developed for existing conditions. To maintain an 85% parking occupancy rate, the analysis shows that a ratio of 0.83 parking spaces per 1,000 square feet of commercial building area is necessary. Parking requirements for residential uses are tied to the current zoning requirements of one parking space per dwelling unit.

Table 12 shows the results of this analysis. As the study area is currently under a surplus parking condition (peak occupancy is 65%), the study area can accommodate the additional growth to increase utilization to the 85% occupancy rate. However, under the assumptions of high job growth projected for the Burlington Downtown-Waterfront (BDW) Base Case, where employment in the study area increases from a little under 13,000 jobs in 2010 to nearly 20,000 by 2040, an increased requirement of over 3,000 parking spaces is projected. This amounts to a 34% increase in parking supply within the study area. This projection assumes the continuation of current parking requirements for residential dwellings of one space per residential unit.

Scenario 2, the balanced land use scenario, projects an increase of over 1,600 jobs and 2,300 housing units in the study area. Under this more balanced land use projection, an additional requirement of 1,654 parking spaces are projected as necessary (a 19% increase over existing supply). As with the Base Case, this projection assumes continuation of current parking requirements for residential dwellings of one space per unit. These findings are summarized in Table 12.

Table 2: 2040 Jobs, Households, Commercial and Housing Square Footage, and Parking Supply within the Study Area

	2040 BDW Base	2040 Balanced Land Use
Jobs	19,780	14,579
Households	4,225	4,858
SF in Commercial (est.)	9,268,222	6,831,214
SF in Housing (est.)	6,441,435	7,406,507
BDW Parking Supply at 85% Occupancy	11,880	10,500
Net Change from Existing (8846)	3,034	1,654

Incorporating parking reduction factors, as described in Section 5.0, would be consistent with the overall goals and objectives of concentrated downtown development. Assuming that parking reduction factors, implemented over the planning horizon to 2040, would reduce the parking requirement for residential units from 1 space per unit to 0.5 spaces per unit, parking supply within the study area would only need to increase by approximately 500 spaces above the current supply (a 6% increase). Note that further reductions in residential parking requirements to as low as 0.33 per unit may be possible. Hence, the foregoing analysis projects a more conservative future condition where parking requirements are



reduced gradually as other supporting travel demand management measures are co-implemented. Table 13 shows the results of this analysis compared with the results from Table 12.

Table 3: Jobs, Households, Commercial and Housing Square Footage, and Parking Supply within the Study Area, Showing the Impact of Parking Reduction Policies for Residential Development

	2040 BDW Base	2040 Balanced Land Use	2040 Balanced Land Use with Parking Reduction Policies
Jobs	19,780	14,579	14,579
Households	4,225	4,858	4,858
SF in Commercial (est.)	9,268,222	6,831,214	6,831,214
SF in Housing (est.)	6,441,435	7,406,507	7,406,507
BDW Parking Supply at 85% Occupancy	11,880	10,500	9,338
Net Change from Existing (8846)	3,034	1,654	492

1.4 Parking Ordinance and Policy Review

The city of Burlington, Vermont has strategic planning objectives that include more compact development, reduced motor vehicle travel and shifts to alternative modes, and more affordable development. Current parking policies contradict many of these objectives. Various policy reforms which result in more efficient use of parking facilities and reduce parking supply requirements can better align parking decisions with strategic planning objectives.

Burlington currently imposes conventional minimum parking regulations and provides modest incentives and support to businesses and residents to more efficiently manage parking. The minimum parking regulations are often significantly higher than needed, particularly in areas with compact and mixed development, and multi-modal transport systems (good walking, cycling and public transit). These generous and inflexible standards tend to contradict many planning objectives, including efforts to reduce drunk driving, encourage urban infill, reduce vehicle traffic, and increase development affordability. The City reduces parking requirements in the Downtown and Shared Use districts, but even there parking requirements are often excessive and contradictory.

These regulations reflect an old parking planning paradigm, which assumes that parking should generally be abundant and free, and parking management need only be implemented in special conditions where increasingly parking supply is infeasible. A new parking planning paradigm favors reduced and more flexible parking requirements with more emphasis on parking management strategies.

There are more than a dozen parking management strategies that may be appropriate in downtown Burlington. Some are already being implemented (such as transit access, walkability, and off-site parking), but could be applied more. Although individually their benefits may appear modest, typically reducing parking requirements at a particular location by just 5-15%, their impacts are cumulative and synergistic (total impacts are often greater than the sum of individual impacts), so an integrated parking management program can often reduce the number of parking spaces needed to provide a given level of service by 20% to 40%, and often higher if implemented with other transport and land use policy reforms. This can provide substantial savings and benefits, making parking management the most cost-effective solution to many problems.

1.4.1 Parking Management Strategies

The following management strategies should be pursued in Burlington:

1. *Reduced and more flexible parking requirement.* Significantly reduce minimum parking requirements, particularly in central areas (downtown and nearby neighborhoods, and other major commercial centers). Incorporate standard adjustment factors by which minimum parking requirements are reduced for specific demographic, geographic and management factors. The existing conditions assessment of this report suggests that parking occupancies are generally lower than the recommended 85% level, so the parking supply is not being used as efficiently as it could be. Therefore existing facilities should be managed more efficiently rather than building additional parking that will not be optimally used.
2. *Improve user information.* Providing convenient information to travelers on their parking supply and pricing options (such as real time information on the location and price of available parking spaces), and travel options (such as how to use public transit) allows travelers to choose alternative parking locations and transport options. The existing conditions assessment and stakeholder input indicate that finding parking is difficult, which speaks to the need for better user information to improve parking efficiency.
3. *Public-private partnership (PPP).* A PPP could provide parking brokerage services (facilitating sharing of parking facilities among downtown businesses) and provide other parking and transportation management services. Currently, the lack of a single entity to organize and facilitate transportation and parking demand management programs and strategies prevents Burlington from realizing a more efficient and seamless transportation system. A PPP would organize services such as Guaranteed Ride Home Programs, bicycling and walking incentives, transit pass subsidies, parking brokerage and shared parking facilitation, and parking system data collection and management. The PPP could be funded by a parking enterprise fund, as described below.
4. *Shared parking.* As much as possible, parking facilities should serve multiple destinations, particularly downtown and other mixed-use activity centers. This means encouraging use of on-street (curb) parking and shared off-street parking facilities in place of individual, dedicated off-street parking facilities at each destination. Shared parking would be facilitated by a PPP and would improve the utilization and efficiency of existing facilities that are less than 85% occupied during peak periods, reducing the need to build new parking.
5. *Parking enterprise fund.* This fund would generate revenue for parking demand management and operations management of existing facilities. The fund would be paid into as an alternative to building parking supply on private parcels. In contrast to in-lieu fees, this enterprise fund would be assured to be reinvested into the system. The enterprise fund would be used to pay for improvements such as parking wayfinding, meter upgrades, data collection, and parking demand management programs and services.

1.5 Parking & Transportation Issues and Opportunities

To inform this section, we met with developers to gain an understanding of their experiences with development in Burlington and the barriers that they encounter. Based on these meetings, the synthesis of prior plans & studies, the existing conditions assessment, and the review of the current parking ordinance, the following issues and ideas have been identified.

1.5.1 Parking

1. *Issue:* Data collection shows that **parking is not being used optimally**; that is, even during the peak period, most parking facilities (with the exception of on-street and the Marketplace garage) are less than 85% occupied. **However, it is very difficult to find parking** due to a lack of wayfinding and user information. Therefore, existing parking should be managed to improve efficiency before building additional parking capacity.



2. *Issue:* Since parking can be very difficult to find, visitors and customers get frustrated with Burlington before they even get out of their vehicle. The **parking experience needs to be improved**, as this is the first impression of Burlington that visitors and customers will have.
3. *Issue:* Currently, cost and the availability of space for **parking determines redevelopment potential**. Therefore, one of the reasons that infill development is not taking place at the rate at which the City would like is because the requirements to provide parking make many projects infeasible from the developers' point of view. How can parking be managed and regulated so that it is not a barrier to infill development? What regulatory and management strategies can be implemented to provide alternatives to increasing parking capacity?
4. *Opportunity:* Being **pro-active in parking management**, for example, deploying new meter technologies, working with private property owners and developers to share parking, collecting data and surveying users, developing and administering demand management programs, etc., will help to improve efficiency. Public Works is in the process of improving **parking payment systems/meters and wayfinding**. This will enable management strategies that involve pricing, such as variable/peak period pricing, and improve user information. Wayfinding will reduce congestion resulting from drivers circulating as they hunt for a parking space. In addition, there are many great ideas and strategies to manage parking, but these initiatives need a home in order to be implemented. A **public/private partnership** to organize these efforts and to manage daily operations of the parking supply is needed.
5. *Issue:* **Lack of ongoing parking data collection**. Specifically, utilization (including turnover), user groups, and any spillover parking issues should be monitored so that operational issues can be identified and addressed. For example, parking leases could be moved to underutilized facilities if occupancy data were more readily available. Particularly because parking demand fluctuates depending on time of day, week, and year, ongoing data collection (such as a parking census) is needed to indicate parking trends and management gaps. As the saying goes, "you can't manage what you don't measure."
6. *Opportunity:* **If additional parking were needed in the future, where could it be built? How could it be paid for?** Does the current distribution of parking support Downtown and Waterfront destinations; is parking located where it is needed now and in the future? New parking would likely take 5-10 years to develop. Therefore, optimizing efficiency and use of the existing parking supply as a resource is necessary to minimize the need for new parking.

1.5.2 Circulation and Connectivity

1. *Opportunity:* There is an opportunity to develop **a seamless transportation system**, particularly through improvements to transit and to bicycle/pedestrian connectivity. The quality of existing transportation alternatives is not adequate to attract choice users and reduce parking and transportation demand.
2. *Opportunity:* Developing Park&Ride facilities to **intercept traffic entering the core**. Creating off-site parking connected to downtown via high-frequency shuttle will reduce parking demand and congestion in the core.
3. *Opportunity:* Improvements to **bicycle and pedestrian connectivity** (particularly Downtown to Waterfront, and north-south and east-west bicycle connections).
4. *Opportunity:* Improving **walkability**: even though physical infrastructure may be in place, the experience is not pleasant enough to attract pedestrians (e.g. College Street vs. Cherry Street).
5. *Opportunity:* To improve parking efficiency, enhanced **traveler information** such as signs, maps, websites, and GPS, should be integrated to indicate parking availability relative to popular destinations. Improvements to **wayfinding**, including real-time parking information, are currently underway by the City.

1.5.3 Land Use

1. *Opportunity:* **Downtown's function as a 'neighborhood'** needs to be maintained; it cannot serve visitors only, it needs to include services for residents and employees.
2. *Issue:* **Jobs/housing balance:** land use in the study area is heavily imbalanced toward jobs. Significant advantages are generated when jobs and housing are in better balance. Incentives to construct downtown housing, including reduction in parking requirements and enabling the unbundling of parking from housing, would help reduce barriers to infill housing development. Community input has specifically suggested a shortage of mid-level/"workforce" housing.

1.6 Recommendations

This section presents regulatory, organizational, and infrastructure recommendations to overcome parking and transportation barriers to infill development. This study has indicated that parking is underutilized because available spaces are hard to find and many spaces are restricted to private property owners and their clients. The study has also shown that addressing the jobs/housing imbalance in Burlington is estimated to more positively impact congestion and parking demand than transportation improvements alone. The recommendations focus on ways to improve parking efficiency to effectively utilize existing parking capacity, reduce parking demand, and stave off the need to build additional parking until existing resources are shown to be utilized to their fullest capacity.

1.6.1 Regulatory Recommendations

- **The primary recommendation of this study is to focus on residential development in the study area.** Not only does addressing the housing-jobs imbalance¹ in Burlington help to reduce congestion and parking demand by allowing more employees to walk, bike, or take transit to work, but there are also several tools to manage the parking demand associated with residential development. Section 4.4.1 (d) 1.B. of the Comprehensive Development Ordinance limits residential use in the Downtown and Downtown Waterfront Districts to 50% of the gross floor area of a site; this limit should be eliminated and the residential/non-residential mix of uses determined by the market.
- **Facilitate and encourage shared parking.** Because much of the existing parking supply in Burlington is restricted to private property owners and their clients, making existing parking accessible to more people is critical to increasing efficiency. The strategy is to use existing parking more intensively (for more hours of the day) rather than building new parking.
- **Parking requirements should be more flexible for developers if they incorporate demand offsetting elements** such as: being located near carshare pods; including vehicle limitation covenants or unbundled parking for residential developments; arranging shared parking.
- **Consider creating a parking enterprise fund.** The enterprise fund would be used to pay for improvements such as parking wayfinding, meter upgrades, data collection, and parking demand management programs and services.

1.6.2 Organizational Recommendations

City staff and developers have agreed (in meetings for this study) that **the public and private sectors have their strengths and weaknesses and should work together through a public-private partnership (PPP) for an optimal result.** Currently, the lack of a single entity to organize and facilitate transportation and parking demand management programs and strategies prevents Burlington from realizing a more efficient and seamless transportation system. The PPP would manage parking and

¹ As noted in the Burlington Municipal Development Plan, the CCMPO Metropolitan Transportation Plan, the CEDO Economic Development Plan, and others.



provide a single point of contact to **organize and coordinate the multitude of parking facilities and operate the parking supply as one system**. The PPP could be funded by a parking enterprise fund as described above. Among its functions would be:

- **Broker parking arrangements and negotiate shared parking.**
- **Provide a home for Transportation Demand Management (TDM) programs.** It is important to keep in mind that TDM **solutions are not all-or-nothing**. Implementing an employee commute reduction program does not mean that employees can never drive into Burlington ever again- even switching to an alternative mode just one day per week would be a 20% reduction in demand. **Flexibility can and should be built into solutions.**
- Data collection and **developing/maintaining a parking database** is important to being able to plan and manage the parking supply effectively. The PPP would collect and maintain data to inform how, where, and when parking is used in order to support daily operations and management decisions, and to plan for future use.
- Parking is hard to find and much of the existing parking supply in Burlington is restricted to private property owners and their clients. The result is underutilized parking: this study and the 2003 Downtown Burlington Parking Study indicate that peak period occupancies do not typically meet the suggested 85% target for maximum efficiency. (Although specific facilities such as the Marketplace garage do reach capacity, there is available capacity at nearby sites such as Town Center, College Street, and Lakeview.) **Parking efficiency needs to be improved through traveler information, wayfinding, marketing, data collection, technology updates, and other management strategies to guide people to the unused parking.** As the manager of daily operations, the PPP would be responsible for this critical part of the parking system. Improvements to wayfinding (including electronic parking signs) are currently underway by the City of Burlington.

1.6.3 Infrastructure Recommendations

The first priority put forward by this study is to improve efficiency in the management, operation, and utilization of existing parking facilities; still, the future parking analysis estimates that about 500 additional spaces would be needed by 2040 given the assumed parking requirement adjustments. Therefore, a critical question to be answered is: **If new, additional parking capacity were needed, where, when, and how could it be built?** While the recent CCRPC Park & Ride Plan has identified intercept facilities (Exit 14, South End Transit Center, I-189 & Shelburne Road), other studies¹ have identified potential locations for new parking within the study area. Options that have been identified over the years include:

- the lot on the southwest corner of Main and St. Paul Street: currently occupied by TD Bank;
- the “Superblock” on the northeast corner of Main Street and South Winooski Avenue;
- a parking garage built into the slope on the west side of Battery Street between Cherry and Pearl Streets;
- a garage on the existing surface lot west of Vermont Wine Merchants and northeast of the railyard;

Staff agree that the timeline for new structured parking would be at least 5 to 10 years and would likely require a public-private partnership to develop.

¹ Waterfront North (2009) and Waterfront South (2010) Access Studies.

1.0 INTRODUCTION

The development of a land use and development plan for Burlington's Downtown and Waterfront has been a long-standing action-item in the City Municipal Development Plan since at least 1996. While many other planning efforts involving the Downtown or Waterfront have taken place over the years, none have been as comprehensive in scope and strategic in design.

In the fall of 2010, Burlington's Planning and Zoning Department received a Sustainable Communities Challenge Planning Grant providing a unique opportunity to invest in the future and advance Burlington's place as one of America's most livable and sustainable communities. Burlington struggles to address complex urban challenges in a small, under-resourced New England community with big ideas and even bigger ideals.

The plan, known as PlanBTV, will refine broad city-wide goals for sustainable development into focused, actionable, area-specific strategies to ensure the vitality of the central core of our community and enable us to achieve our community vision. The planning process will place an emphasis on ways to promote and improve mixed uses and quality urban design, affordable and workforce housing, transportation and parking management, and the quality and capacity of public infrastructure. The intent is to identify, understand, and address current barriers to the creation of new infill development.



The planning process, and the transportation study in particular, will help to address many questions regarding the future of Burlington's Downtown and Waterfront, including:

- How to balance mitigation of traffic congestion and parking demand with desires for expanded public transit?
- How to leverage future downtown development to facilitate and support expanded public transit service and vice-versa?
- What public investments can we make that improve lake quality, reduce stormwater overflows, save energy, improve traffic flow and safety?
- How to encourage and support more "green" building and development?
- How to grow smarter and use our compact mixed-use urban form as a tool to reduce greenhouse gas emissions?

1.1 PlanBTV Goals/Desired Planning Outcomes

PlanBTV will provide recommendations, tools, and strategies that will help achieve the following goals and outcomes:

- Maintain Burlington as a regional population and economic center that offers meaningful jobs at livable wages and a diverse housing stock that serves all incomes, while encouraging the continued growth of the city's commercial the tax base.
- Promote urban development measures that facilitate economically competitive, environmentally sound, socially responsible, and aesthetically-pleasing land-use combinations and urban design elements.
- Emphasize the importance of preserving historic and cultural features and architecture, and encouraging high-quality building design to complement the existing fabric.

- Strengthen the linkages between the Downtown, Downtown Waterfront, and surrounding neighborhoods, including the Hill institutions (University of Vermont, Champlain College, and Fletcher Allen Health Care).
- Promote a mix of land uses including the need for affordable/workforce housing, both local and world class businesses, entertainment and culture, live/work spaces, etc.
- Provide a focused sustainable transportation and accessibility system within the context of the existing street network and emphasizing alternatives to the single occupancy vehicle (SOV). This should build upon the Complete Streets system and Street Design Guidelines already included in the adopted Citywide Transportation Plan.
- Provide a comprehensive parking allocation and management system that meets visitor, business, and resident needs consistent with the goal of increasing public transit and reducing dependence on the single-passenger automobile.
- Provide the quality and capacity of public infrastructure, including pedestrian, bicycle, parking, and/or transit-related facilities, necessary to support new or expanded commercial and residential development.
- Strengthen Burlington’s leadership position in clean energy and climate action planning by enabling broad-based community participation in the identification, quantification, visualization, and decision-making related to the energy and greenhouse gas impacts.
- Provide the foundation for the development of a Form Based Code for the Downtown and Downtown Waterfront to guide and regulate future development in a coherent and consistent manner centered on urban form, design, and performance.

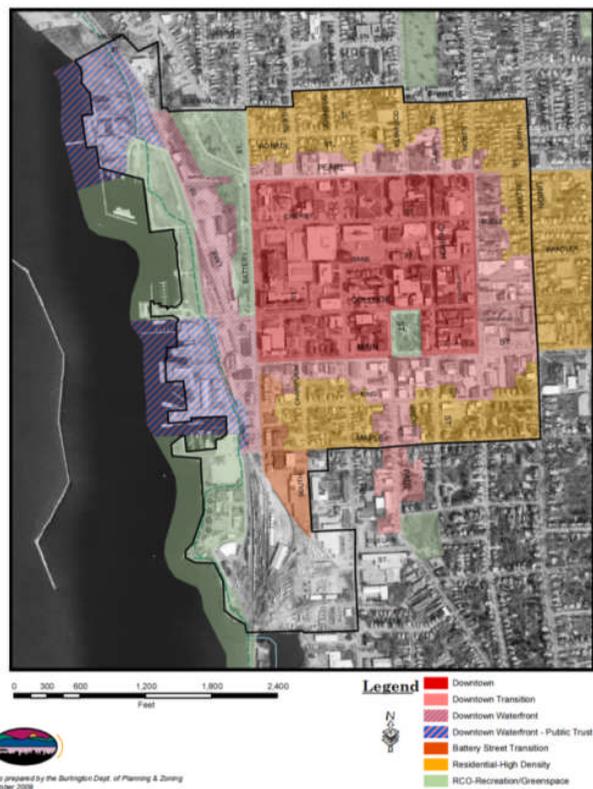
1.2 PlanBTV Transportation Study

The central goal of PlanBTV is to identify, understand, and address current barriers to new infill development. This Transportation Study for PlanBTV addresses parking and circulation and involves the following elements:

- Synthesis of Prior Plans and Studies
- Existing and Future Circulation
- Existing and Future Parking
- Parking Ordinance and Policy Review
- Involvement and Participation of Local Planning and Development Stakeholders
- Recommendations for Overcoming Transportation and Parking Barriers to Infill Development

The study area is shown in Figure 13. Rather than serve as a stand-alone plan, this report and the information, analysis, and recommendations provided in it are intended to inform the upcoming master planning and form-based code development phases of PlanBTV.

Figure 13: Study Area and Land Use Zoning



2.0 PRIOR PLANS AND STUDIES

This section summarizes the Synthesis of Previous Plans and Studies which is included in Appendix A. The City has sponsored many parking and circulation studies over the past 10 years. Combined with studies conducted by other entities, such as the Chittenden County Regional Planning Commission (CCRPC, the former Chittenden County Metropolitan Planning Organization/CCMPO), Hill Institutions and the private sector, there is an invaluable storehouse of information upon which PlanBTV can draw.

2.1 City-wide Themes

The visions and goals set forth by almost all of the plans focus on quality of life, sustainability, environmental health, access to multimodal transportation, and developing economic potential.

- **Quality of life** pertains to residents' everyday life in their neighborhoods.
- **Sustainability** usually refers to establishing a way of life that does not rely so heavily on so many resources as to someday become infeasible.
- As described in these documents, **environmental health** usually involves reducing fossil fuel consumption, Greenhouse Gas emissions (GHG), the City's carbon footprint, and/or vehicle miles traveled (VMT).
- Fostering a **multimodal transportation system** (particularly transit, bicycle, and pedestrian modes) and expanding access to it is a goal of a majority of the plans.
- **Developing economic potential**, such as strengthening the regional economy or maintaining Burlington's role as the center of the county economy, was the most frequently established goal.

Nearly all the documents called for an investment in new and/or existing infrastructure, showing a focus on developing the physical framework that supports the area's economy, quality of life, environmental health, sustainability, and transportation system. Limited new infrastructure (such as the Southern Connector/Champlain Parkway) was noted, but maintaining what is already in place was emphasized and shows a sense of fiscal responsibility.

The common theme expressed in the reviewed plans and studies is the need to **develop a seamless transportation system that provides high bicycle and pedestrian connectivity and convenient, reliable, and comfortable transit** that will increase ridership by improving access and attracting choice riders. This focus will help to achieve another widely noted strategy, reducing the number of private vehicles that enter Burlington.

Improving access to parking could be viewed as a strategy that would encourage driving in the City. But the strategy as described in the documents is more about improving parking efficiency, traffic circulation, and the users' experience (and consequently economic vitality). One example of a parking access improvement is clear, consistent wayfinding that includes real-time information to reduce VMT from vehicles on the hunt for a parking space. The strategy remains open enough to allow for different actions and solutions to be developed. Likewise, emphasizing Waterfront parking on the east side of Battery Street preserves the Waterfront area from becoming automobile-dominated and encourages travelers to use alternative modes. Actions to pursue this strategy include parking management systems, wayfinding, construction of parking structures, strengthening pedestrian connections across Battery Street, and others.

Intensifying land use and the diversity of uses to make the most of limited space was another common theme of the documents. Burlington's Municipal Development Plan (MDP) encourages following a **growth center/compact development pattern** with high-density growth and mixed use development, promoting public transit, walking and biking as the preferred forms of transportation. The Plan notes

that many properties in Burlington are underdeveloped¹ and could be used more intensely with multiple uses, taller buildings, and smaller setbacks. Surface parking is a specific example of redeveloping properties for more intensive use and making the most efficient and effective use of space.

The dominant theme learned from the document review was the need for **housing** in Burlington. An imbalance between housing and job growth hinders the economy while leading to unsustainable land use patterns and transportation systems. Increasing housing will strengthen Burlington's role as the regional growth center and the viability of the transportation system. The CCRPC's Metropolitan Transportation Plan (MTP) 2025 notes that housing demand created in the 1990s has not been satisfied in the County and that over the MTP's 25-year planning horizon, a 61% increase (or demand for an additional 35,700 units) is expected (~2% annual growth in demand; note that more recent trends suggest the ambitious growth rates anticipated earlier in the 2000 - 2010 decade have slowed and that annual growth rates for housing are now between 1 and 1.5%). The MTP stresses that improvements to the transportation system's performance hinge on establishing a land use pattern of concentrated development centers: **"the success of future transportation system investments...is dependent upon achieving the development pattern" of 45% of housing and 45% of employment within the Metropolitan Areas** (which include all of Burlington)." (CCRPC MTP 2025 Chapter 5) Under Burlington's current zoning, there is minimal residential use, and of this, there are only two high density residential parcels. Section 4.4.1 (d) 1.B. of the Comprehensive Development Ordinance limits residential use in the Downtown and Downtown Waterfront Districts to 50% of the gross floor area of a site.

Another common theme from the document review was the need for improved **parking management**, such as wayfinding improvements and implementation of 'smart signs' that convey real-time parking information. There is a strong need to implement a system that maximizes the efficiency of existing parking facilities rather than increase capacity. Implementing the 2008 Wayfinding Plan and related initiatives (such as developing a Downtown transportation management association (TMA)) have been suggested in previous documents to help accomplish the deployment of a parking management system. However, capacity increases in the form of Park&Ride and intercept facilities are recommended as they intercept vehicles before they enter the core. Specifically, facilities to the south (South End Transit Center); east (Exit 14/behind the Sheraton); and north (VT 127) of the City have significant momentum and are included in the 2011 CCRPC Park&Ride Plan.

Two elements are established by previous plans as the basis for achieving a seamless multimodal transportation system in Burlington and the region: 1) a strong transit system, and 2) facilitating bicycle and pedestrian access and connectivity.

Transit system improvements recommended by previous plans involve updating existing services to resemble the College Street Shuttle, as well as designing new routes. The College Street route's high-frequency (15-minute), free fare, and easy-to-use convenience and comfort has a positive image and attracts high ridership, including choice riders. Many plans cite the Shuttle as the standard to which other CCTA routes should be raised. Another common recommendation is for the development of a **multimodal transportation center**. CCTA identifies this as its "most needed facility investment" in its 2010 Transit Development Plan. A multimodal transportation center is critical in advancing improvements in the overall system. Expanding transit system routes (in terms of frequencies, service hours, and geography) is also a priority. Several of the documents recognize that transit funding is in need of reform in order to implement any improvements.

A non-CCTA transit action recommended in several documents is the re-introduction of passenger rail. The 1998 Waterfront Revitalization Plan suggested that it may be challenging to reconcile this initiative with efforts to relocate the railyard from the southern part of the BTV study area. The Waterfront Revitalization Plan notes that:

¹ "Underdeveloped" refers to those parcels that are developed at less than 50 percent of the average of the existing or allowable density in the zoning district.



While the City encourages the expansion of passenger rail, the railyard is a potential obstacle to development of the Waterfront as a publicly accessible community resource.

By moving the railyard off the Waterfront, truck traffic through residential neighborhoods would be eliminated. Noise would be dramatically reduced. There would be a positive impact on Burlington's south end neighborhoods. The storage and handling of hazardous materials would be eliminated. Relocation of the railyard would provide an opportunity to create mixed use development on those lands.

On the other hand, relocation of the Vermont Railway yard off the waterfront could possibly mean the loss of rail infrastructure in the City and would further sanitize the Waterfront from its industrial heritage. The movement of goods by rail is far more sustainable, efficient, economical and environmentally responsible than trucking. Future opportunities to transfer goods for manufacturing and public use by rail should not be discarded without careful consideration. (page 26)

2.2 Plans Specific to the PlanBTV Study Area

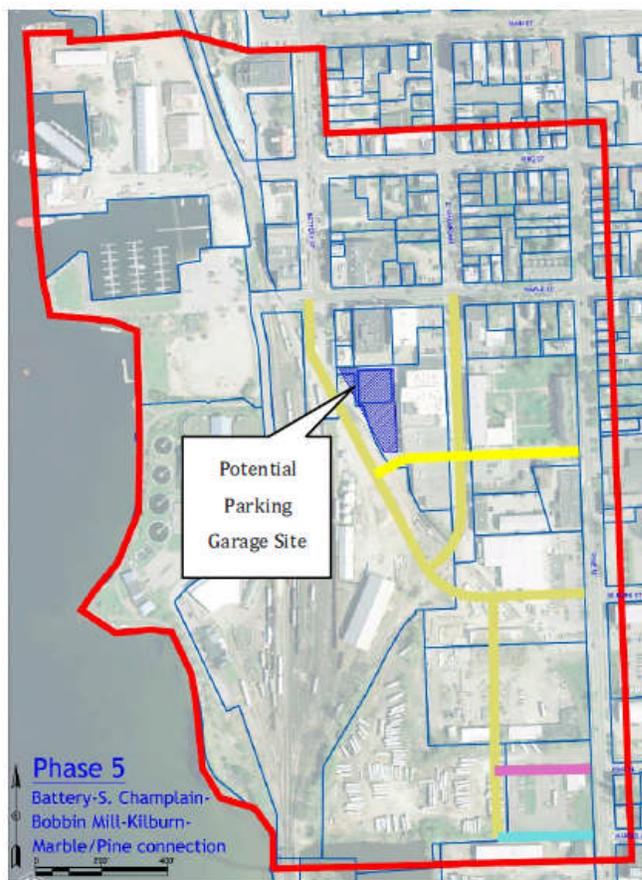
The **Waterfront South Access Study** developed alternatives for access and circulation to promote economic development in the southern portion of Burlington's Waterfront. The plan identifies various forms of a new grid street network to increase frontage and property access, remove truck traffic from neighborhoods, facilitate multimodal movements, and develop economic potential while accommodating the railyard. The study area, bound by Lake Champlain, Main and King Streets, Pine Street, and the Barge Canal, is shown in Figure 14.

The transportation analysis from this plan estimates that the street grid system outperforms the no build/base case in terms of travel time and intersection Level of Service (LOS), especially at the four-way stop at the Pine-Maple intersection. The project was estimated to cost \$13M to \$13.3M to construct.

Connections between the Waterfront and Downtown have been recommended in several documents. Most recently, the purpose of the **Waterfront North Access Project** is:

"To enhance travel access to and on the Waterfront and to improve connections to the remainder of Downtown with the goal of creating jobs and enhancing economic

Figure 14: Waterfront South Study Area and Proposed Grid Street Alignment (broad yellow, pink, and turquoise lines depict proposed streets)



*vitality. It is part of an ongoing effort to put in place public infrastructure to reclaim Burlington's formerly industrial downtown waterfront in a manner that both drives the regional economy and enriches quality of life by enhancing public access to and enjoyment of the Lake Champlain shoreline."*¹

The Waterfront North Access Project is needed to:

- Improve pedestrian crossings of city streets while maintaining adequate traffic flow.
- Facilitate pedestrian travel down to the Waterfront from the heights, including improving access to Depot Street.
- Improve stormwater management along northern Lake Street.
- Promote access to the Moran site; provide for future access to the Urban Reserve.
- Develop north-south travel alternative to Lake Street.

As a result of the public process and review by the Waterfront Marketplace Downtown (WMD) advisory group; Planning Commission; Public Works Commission; and Transportation, Energy, & Utilities Commission, the following recommendations were made:

1. Pursue a Phase 1 project consisting of:

- Re-alignment of northern Lake Street and the bike path, including pedestrian amenities, stormwater improvements, undergrounding of utilities, street lighting, landscaping, and parking, which will support adjacent development opportunities. (Recent plans show approximately 170 new parking spaces at the redeveloped Moran Plant.)
- Stormwater upgrades to Lake Street that do not preclude future north/south transit opportunities.

2. Plan to address the following during future phases:

- Signal timing improvements and hardware upgrades to Battery Street.
- Continued investigation of improvements to Depot Street to make it a bicycle/pedestrian only route and development of a stairway extending from Sherman Street to the Waterfront. These improvements will address public safety; enhance waterfront access from the Old North End, and upgrade stormwater, utilities and street lighting.
- North-south transit and Waterfront parking should be investigated and a plan developed.
- A pedestrian bridge from Depot Street to the parking near the Moran building should be considered as part of the next phase of Moran.
- Additional improvements to Battery Street require further investigation to determine impact on levels of service to all modes.
- Other concepts identified in the 2009 scoping study such as north-south transit, in-slope parking, and funicular require additional study. With respect to the parking and funicular, the City should pursue partnerships with private property owners.

Construction plans for Phase 1 of the Waterfront North projects are currently in development.

The ***Burlington Transportation Plan*** (BTP) assumes the role of the transportation element of the Municipal Development Plan. The plan recognizes that the Downtown, Waterfront, and Hill are major job centers, while the enterprise zone (Pine Street Corridor, enterprise zone south of Waterfront, and industrial areas between Home and Flynn Avenues) may be future centers of growth for the City. During development of the Plan, transportation concerns expressed by businesses in the Downtown and Waterfront areas were parking availability, congestion, and wayfinding.

¹ CEDO project website: http://www.cedoburlington.org/waterfront/waterfront_access_north_project.htm



One of the most significant aspects of the 2011 Transportation Plan is its adoption of a Complete Streets strategy to accommodate all users. The Plan suggests different classifications for City Streets (e.g., Complete, Transit, Bicycle, Slow, State Truck Route, and Neighborhood) and provides guidelines for each type. Within the PlanBTV study area (Figure 15), the majority of the streets are “Slow Streets,” while Battery St. and Winooski Ave are “Complete Streets” that include transit, bicycles, and pedestrians as shown in Figure 16. Pearl, Main, and St. Paul Streets are to be “Transit Streets” that prioritize efficient transit movement.

Figure 15: Burlington Transportation Plan Adopted Street System



The BTP establishes the first priority for transportation as maintenance of the current system, followed by the implementation of funded capital projects, including improving:

- access to Waterfront North and updates to Depot Street
- Waterfront South access through the railyard (addressed in the Waterfront South Access Project)
- side streets off Church Street Marketplace
- wayfinding
- the Burlington bike path

Projects to be developed include:

- the Downtown Transit Center
- South End Transit Center
- Southern Connector/Champlain Parkway
- bicycle connection to Winooski
- implementation of the North-South Bicycle Plan

Figure 16: Guidelines for a Complete Street (Burlington Transportation Plan 2011)



The Plan establishes the following policies to support:

- a Downtown TMA
- passenger rail to Burlington
- alternative funding sources for public transit
- carsharing
- changing zoning parking requirements to allow impact fees or payment-in-lieu options.

The BTP proposes three parking pricing pilot programs to influence use and spread demand to underutilized areas, encourage transportation alternatives, and increase parking revenue. The first pilot program is targeted at on-street spaces in the Downtown and replaces existing parking meters in high demand areas with variable pricing meters that accept credit cards. Meters would remain in effect into the evening rather than ending at 6PM as they currently do.

The second pilot program would focus on the Waterfront and would charge for parking throughout the year rather than only seasonally. The last pilot would expand the residential permit program to address on-street spaces in neighborhoods and would sell a limited number of non-residential permits for daily parking.

The BTP notes that the City has a 'no net loss' parking policy, so that spaces lost to redevelopment must be replaced somewhere. Options for adding parking supply include expanding the Marketplace garage, or adding on-street spaces by converting streets to one-way. Parking has also been considered at the TD Bank site and the "super block." Relocation of the Cherry Street bus terminal would also provide additional capacity. The Plan re-affirms the preference to avoid adding parking on the Waterfront. The



BTP supports development intercept parking facilities at the future South End Transit Center and at Exit 14.

A major factor in strengthening connections throughout Burlington is wayfinding. In some documents, wayfinding was considered to be even a greater issue than parking. Implementing the comprehensive recommendations of the 2008 *Burlington Wayfinding Plan* is expected to address several issues, such as pedestrian connectivity and parking management. The Wayfinding Plan includes an implementation schedule of sign types and locations, complete with graphic standards for consistency. Some basic repairs have been completed as of October 2011, but the real-time data parking signs have not been installed.

Figure 17: Parking Garage Signs (Wayfinding Plan Presentation, page 20)

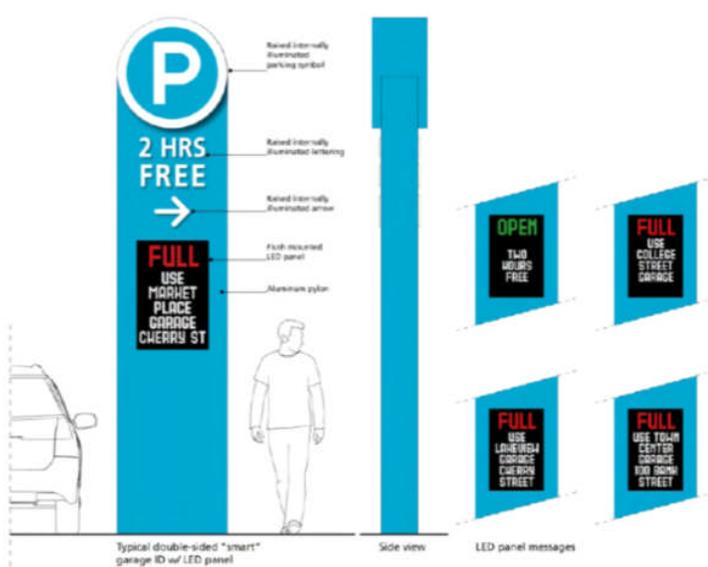
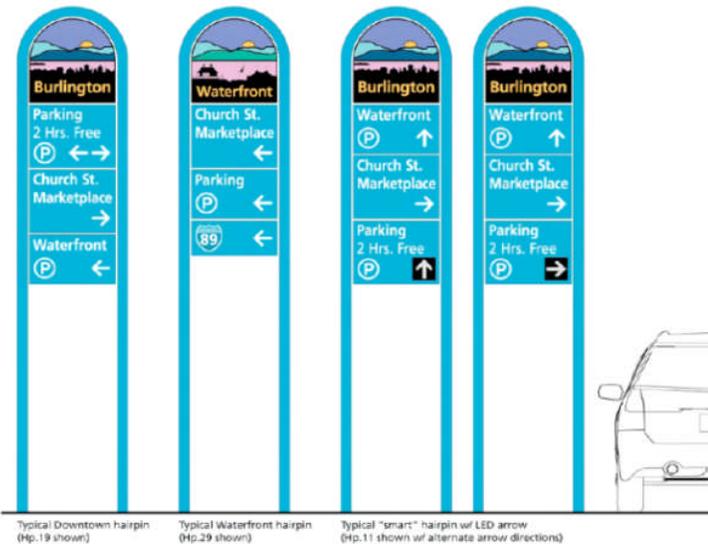


Figure 18: Updated Hairpins (Wayfinding Plan Presentation, page 18)



The Wayfinding Plan inventoried the existing wayfinding system in the City and found it to be in serious disrepair. Sign clutter, missing signs, inconsistency, inadequate placement, confusing messaging, and worn/faded/broken/vandalized/damaged signs are throughout the City. The Plan recommended

replacing signs in disrepair on the Waterfront, Church Street Marketplace, and parking; updating graphics standards; budgeting for future sign replacements; and developing maintenance standards and allocating funds for annual maintenance.

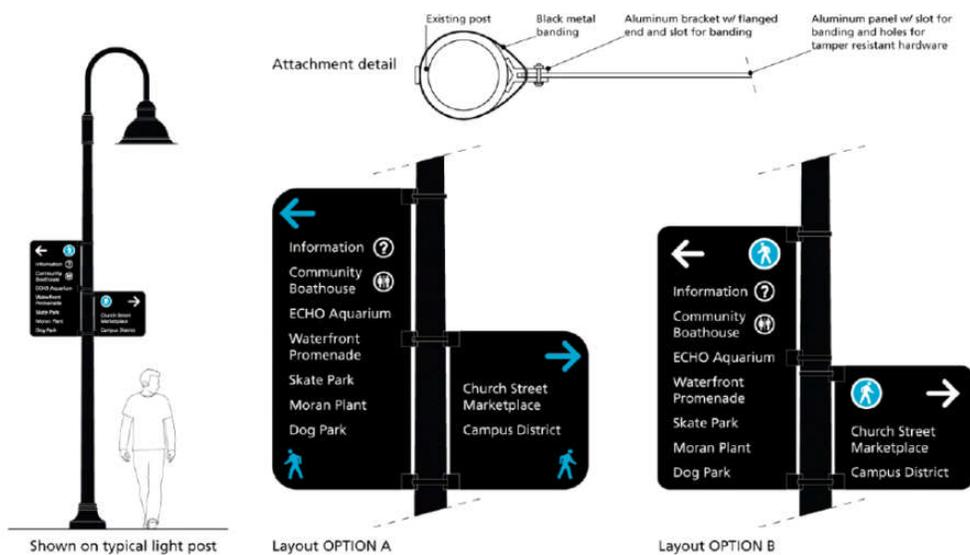
One of the primary targets for the Wayfinding Plan was parking garage identification and information. As shown in Figure 17, signs could incorporate real-time information. Figure 18 shows that real-time data can be applied to LED arrows to indicate to drivers the direction of available parking, rather than getting to a parking garage and finding it full and having to circulate looking for parking. Figure 19 shows the application of the signs.

Figure 19: Parking Garage Signage (Wayfinding Plan Presentation, page 22)



A pedestrian wayfinding system was also a top priority (Figure 20).

Figure 20: Pedestrian Wayfinding (Wayfinding Plan Presentation, page 19)



2.3 Status of Projects Identified in the Reviewed Documents

Some of the ideas identified by documents reviewed for this Synthesis are currently in development or under consideration. Table 4 summarizes the status of these projects.

Table 4: Summary of Project Status

Type	Project	Status
Regulatory	Changing the number of parking spaces required by the zoning ordinance from a minimum to a maximum	Section 8.1.9 of the Ordinance establishes a maximum (125% of the minimum required for the Neighborhood Parking District).
	Changing zoning parking requirements to allow impact fees or payment-in-lieu options	Under discussion
Organizational	Downtown Transportation Management Association	Under discussion for City employees
	Develop carsharing	Complete: CarShare Vermont
Infrastructure	Wayfinding improvements, including 'smart signs'	Hairpin signs (some with 'smart sign' components) are being installed/replaced
	Parking meter upgrade: replace existing parking meters in high demand areas with variable pricing meters that accept credit cards	Bid documents being prepared
	Multimodal Transportation Center	Sites are being evaluated
	Transit improvements	
	- Smaller vehicles operating on residential streets.	In planning
	- Energy-efficient vehicles that are quiet and clean.	Bus procurement in planning
	- Shorter headways between major destinations.	In planning
	- Longer service hours to serve off-shift workers.	In planning
	- Clean, informative, and safe shelters.	New shelters are being installed
	- Explore alternative funding sources and programming techniques for CCTA.	identified as an action item in the 2010 CCTA Transit Development Plan
	South End Transit Center	Identified in 2011 Chittenden County Park-and-Ride & Intercept Facility Plan; Phase 1 in development
	Exit 14 Intercept Lot	Identified in 2011 Chittenden County Park-and-Ride & Intercept Facility Plan; project is being scoped
	Reintroduction of passenger rail	Regional discussion
	Pedestrian alignments from Battery Street to the Waterfront, extending from Sherman Street, Battery Park, Pearl Street, midblock between Pearl and Cherry, and Cherry Street	Sherman Street staircase extension to Moran Plant and bicycle/pedestrian improvements to Depot Street are in design; extensions from other points involve traversing private property and are therefore considered long-term alternatives. Funicular and in-slope parking are under consideration as long-term alternatives.
	North-south transit on Waterfront	Long-term alternatives under discussion
	Potential for parking garage northeast of railyard, behind Maglianeros and VT Wine Merchants	Address in future planning of Waterfront South
	Southern Connector	Final permitting stage; construction could begin by 2013.
	Bicycle connection to Winooski	Main Street Bridge currently being assessed
	Implementation of North-South Bicycle Plan	Phased implementation under development
	Charge for Waterfront parking throughout the year rather than only seasonally	In progress, dependent on parking meter upgrade (see above)
Expand residential permit program to address on-street spaces in neighborhoods; sell a limited number of non-residential permits for daily parking.	Under consideration, needs planning	
Signal timing improvements and hardware upgrades to Battery Street to improve pedestrian access to Waterfront	In capital work plan	
Lake Champlain Transportation Company/Pecor Property-concept for hotel/conference center, marina, and significant amount of parking	Conceptual planning	
Re-alignment of northern Lake Street and the bike path, including pedestrian amenities, stormwater improvements, undergrounding of utilities, street lighting, landscaping, and parking, which will support adjacent development opportunities.	In design	

3.0 CIRCULATION

This section provides an overview of existing and future circulation conditions, including street design guidelines, transit and carsharing, traffic volumes, and bicycle and pedestrian circulation.

3.1 Existing Circulation

This section summarizes circulation highlights from the complete Existing Conditions Assessment (Appendix B).

As detailed in Figure 15 above, the Burlington Transportation Plan sets forth a system of Complete, Transit, Bicycle, Slow, and Pedestrian Streets for the City, along with recommended Street Design Guidelines. Within the PlanBTV study area, the majority of the streets are “Slow Streets,” while Battery St. and Winooski Ave are “Complete Streets” that include transit, bicycles, and pedestrians. Pearl, Main, and St. Paul Streets are to be “Transit Streets” that prioritize efficient transit movement. The actual extent to which all of the elements contained in the proposed design guidelines can be applied to individual corridors will need to be evaluated on a case-by-case basis to best determine how to accommodate all modes while maintaining efficient circulation.

3.1.1 Arriving in Burlington

Figure 21 shows that the drive alone mode share (according to 2000 Census data for commuting to work) for Burlington is 12% lower than Chittenden County’s. Walking is 10% higher in Burlington and transit use is double that for Chittenden County. Figure 22 shows the proportions of traffic (Average Annual Daily Traffic or AADT) at each of Burlington’s six entry points. US 2/Williston Road is by far the largest gateway, followed by the Winooski Bridge, VT 127 & North Avenue (combined), and US 7/Shelburne Road. These splits differ from CCTA ridership: in Figure 23, the number of riders is shown for all CCTA routes entering at that point on an average weekday. The majority of riders enter Burlington from the northeast gateway at the Winooski Bridge. The North Avenue and US 2/Williston Road routes are the next largest, while ridership from the south is split between Pine Street and Shelburne Road.

Figure 21: Mode Splits (source: 2000 Census)

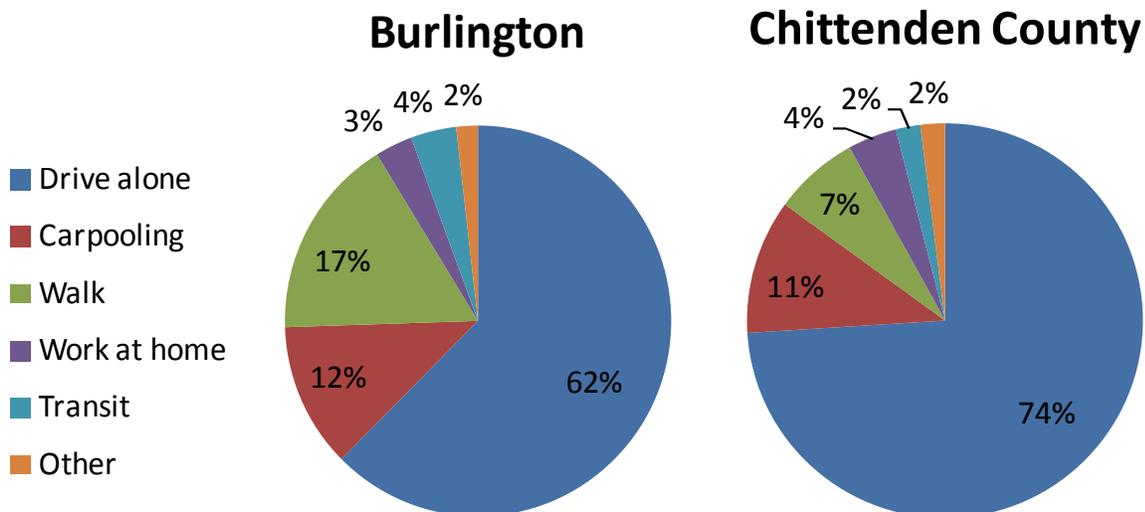


Figure 22: 2007 Traffic Volumes (AADT) for Burlington's Entry Points (source: CCRPC)

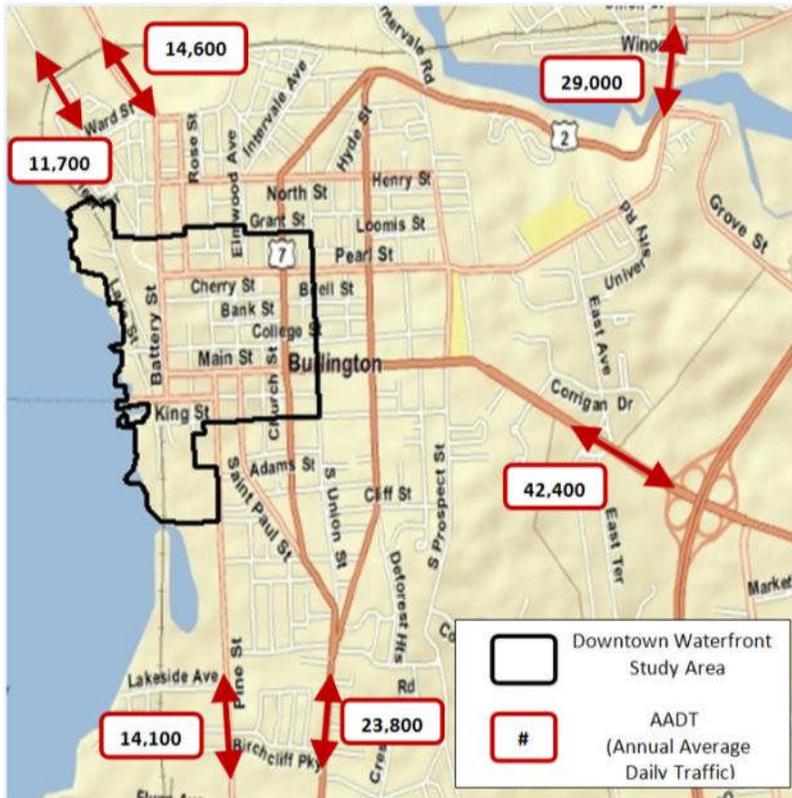
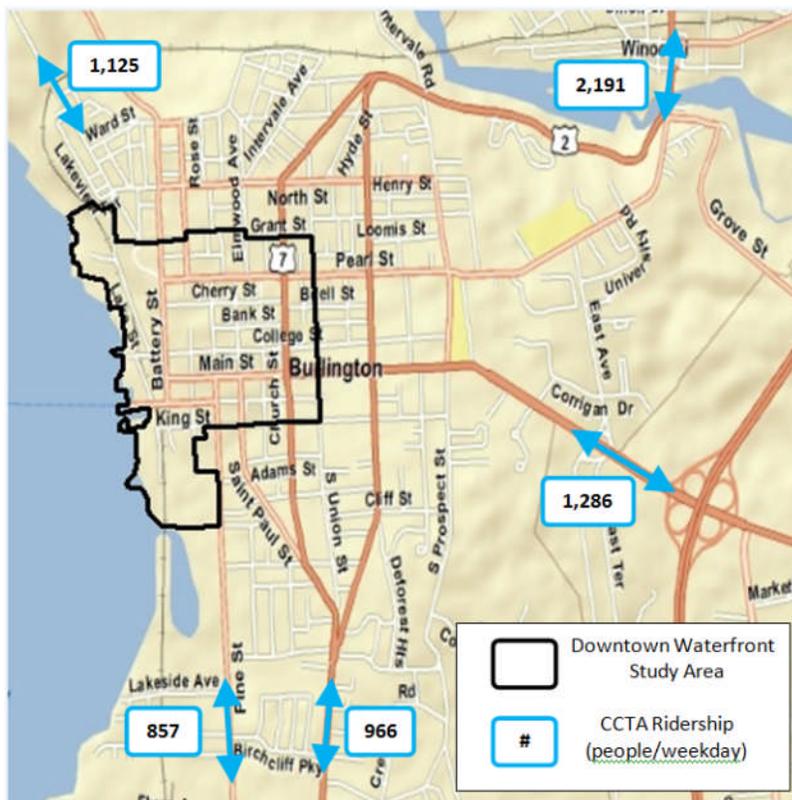
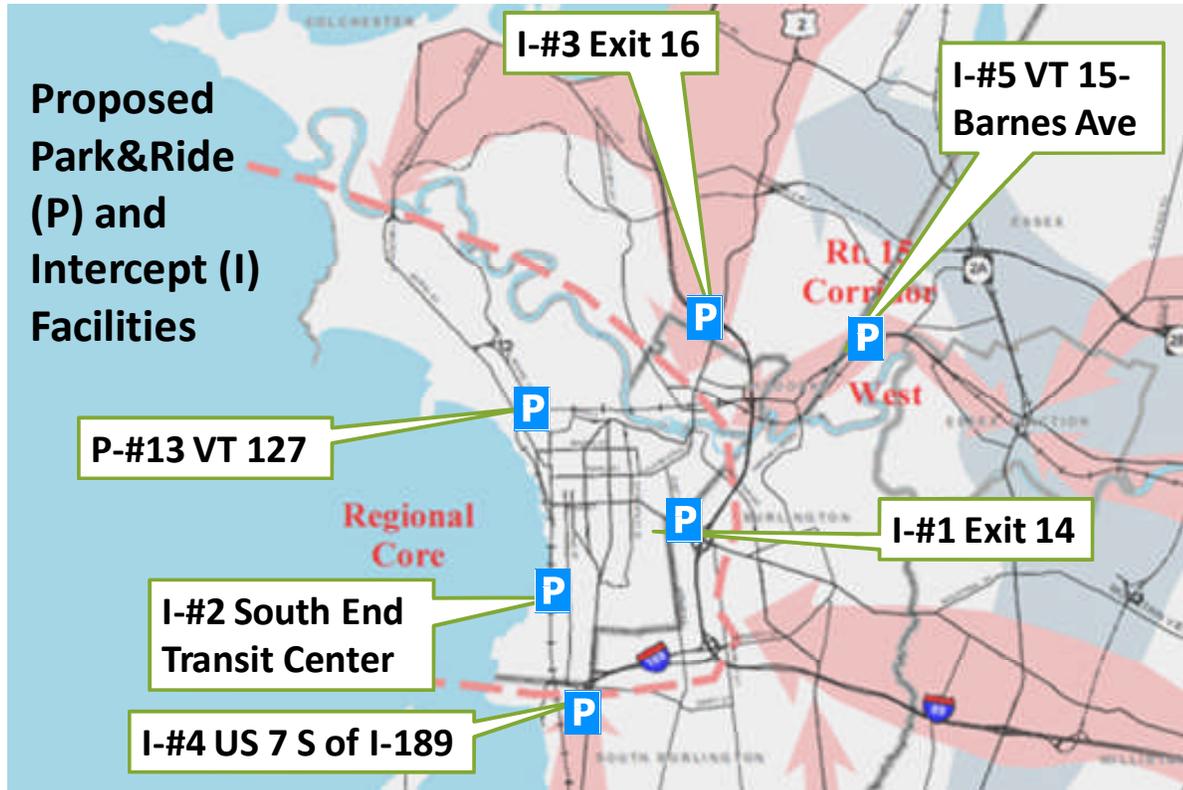


Figure 23: CCTA Average Weekday Ridership by Entry Corridor (source: CCTA 2010 Transit Development Plan)



The 2011 CCRPC Park & Ride Plan proposes park & ride and intercept facilities to create additional off-site parking for Burlington as shown in Figure 24. Some of these facilities (such as Exit 14) would be well-served by shuttle to connect to Downtown. The locations shown here are strategically selected to intercept traffic from the major gateways to Burlington.

Figure 24: Regional Corridors Entering Burlington: 2011 CCRPC Park & Ride Plan Proposals (# is priority assigned by Plan)



3.1.2 Transit

The CCRPC Metropolitan Transportation Plan notes that approximately 40% of peak hour-person trips begin and end in Burlington, South Burlington, and Winooski. Therefore, improving transit service (Figure 25) between these three areas may help to address the high volumes on Main Street, Pearl Street, and Pine Street (Figure 26). Although inter-regional services such as the LINK Express routes are needed and are very successful, focus on shorter, more local transit service has been suggested in previous plans and studies. Past recommendations to improve the transit system have included expanding system convenience, particularly by increasing service hours and frequencies on the major corridors that serve the City: North Ave, Colchester Ave/Pearl Street (VT 15), Williston Road/Main Street (US 2), and Shelburne Road (US 7). Table 5 shows that these routes have the highest ridership in the CCTA system. Looking forward, the College Street Shuttle is repeatedly identified as the model of how transit in Burlington should operate: high-frequency, convenient, user-friendly, and easy to understand.

Additionally, a carsharing organization has started in Burlington, with vehicles located as shown in Figure 25. These vehicles provide an alternative to car ownership by enabling access to vehicles when transit, walking, or bicycling are not feasible trip options. One example of how they can be used is that an employee can take transit to work, but use a carshare vehicle for any necessary trips in the middle of the day, thereby eliminating a roundtrip commute by single occupancy vehicle.



Figure 25: CCTA Transit Service and CarShare Vermont Pods

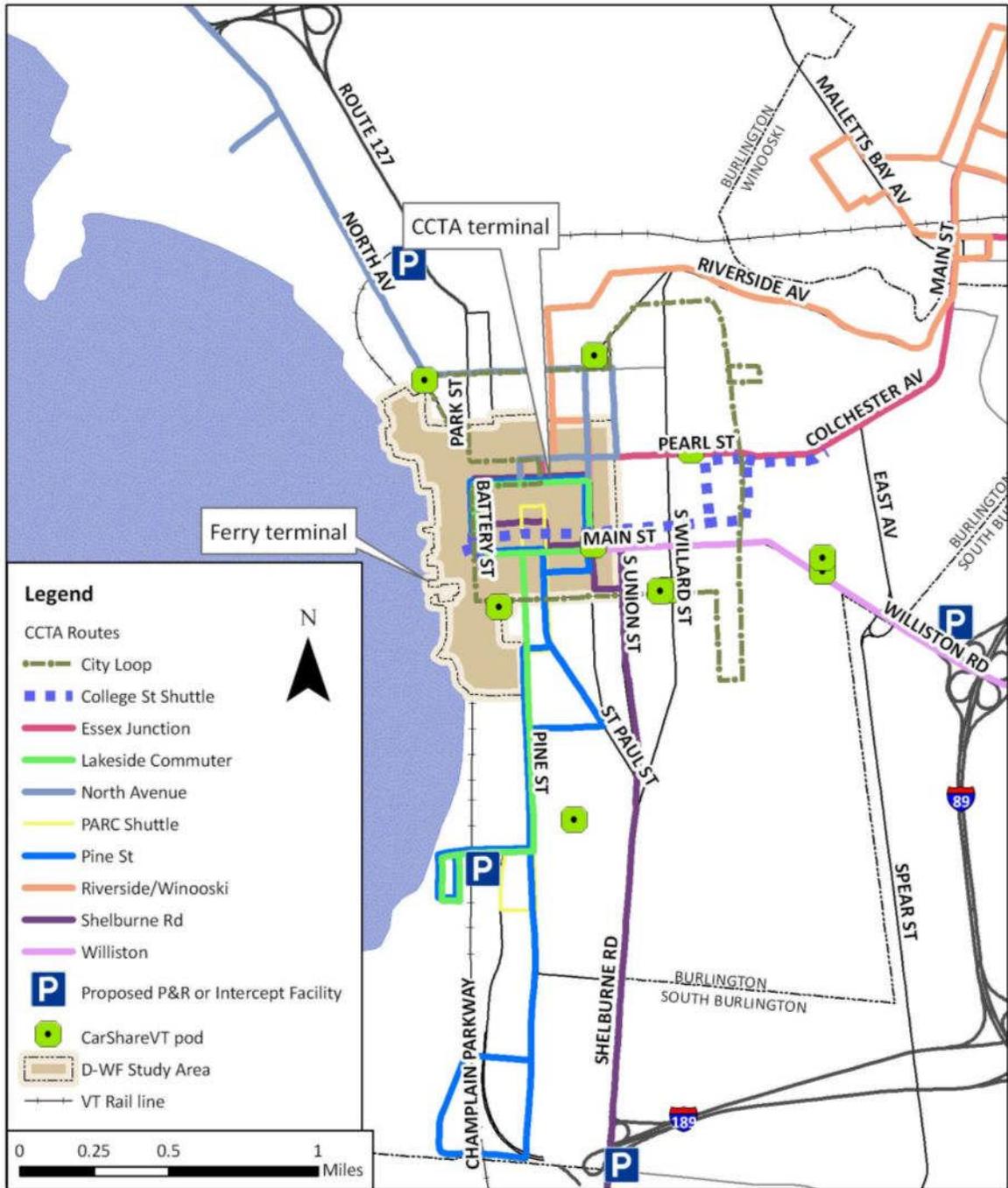


Table 5: CCTA Route Ridership (source: 2010 CCTA Transit Development Plan)

Bus Route	Average Weekday Ridership
#1 - Williston	1,286
#2 - Essex Junction	1,573
#5 - PineStreet	439
#6 - Shelburne Road	876
#7 - North Avenue	1,125
#8 - City Loop	346
#9 - Riverside/ Winooski	501
#11-College Street Shuttle	702
#13 - PARC Shuttle	100
#56 - Milton Commuter	41
#76 - Middlebury LINK	90
#86 - Montpelier LINK	295
#96 - St. Albans LINK	76

Based on the Synthesis of Previous Plans and Studies (Section 2.0), two prerequisites to addressing transit service gaps are 1) developing a multimodal transportation center and 2) reforming the transit funding framework to provide the adequate support and resources. The current funding framework is based on property taxes of the towns that are members of CCTA. Reforming this framework so that transit is funded by a dedicated transportation source such as a fuel tax, parking revenues, or driver’s licenses/vehicle registration fees, are alternative funding possibilities.

3.1.3 Single Occupancy Vehicles

Burlington aims to create a “park once” situation for drivers to the Downtown and Waterfront areas: one in which it is more convenient and pleasant to park their vehicle once and walk to multiple destinations rather than drive to locations that are a few blocks apart. Figure 26 shows the volumes on the roadways within and approaching the study area: Main and Battery Streets carry the most traffic, followed by Pearl, Pine, and St. Paul Streets and North Avenue.

The CCRPC MTP notes that the regional transportation demand model predicts significant congestion by 2025 along most of North Avenue. Whether these streets will be able to accommodate these volumes under the Complete Street Guidelines suggested in the Burlington Transportation Plan will need to be determined in case-by-case analyses.

Figure 26: 2007 Average Annual Daily Traffic (AADT)(source: CCRPC)



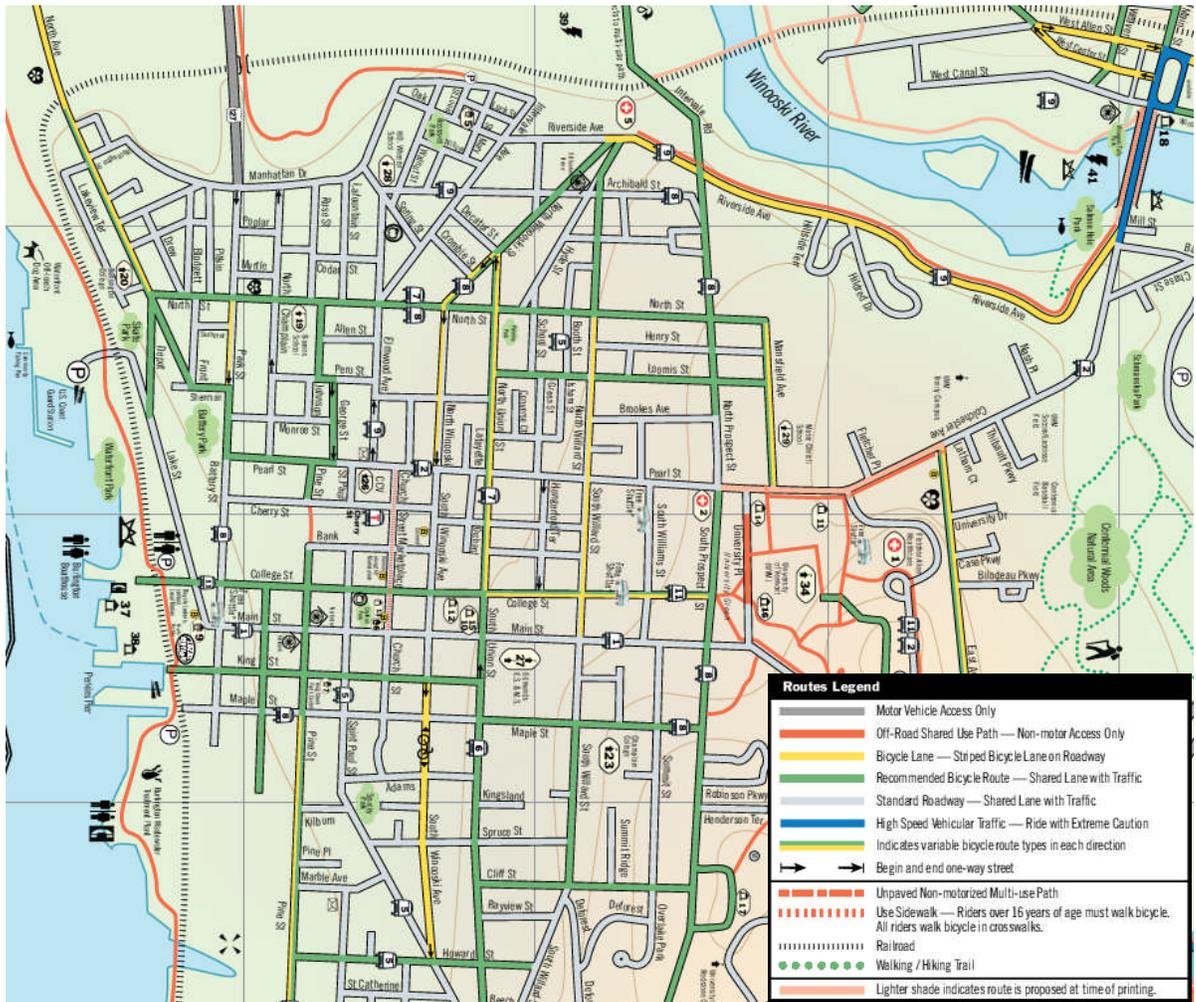
3.1.4 Bicycles and Pedestrians

The Downtown and Waterfront areas are quite walk-able, with a comprehensive system of sidewalks, crosswalks, and pedestrian signals. There are blocks where the streetscape is much more attractive and inviting to pedestrians. For example, it is generally considered that walking past pedestrian-scale storefronts and residences (such as on College Street) is more inviting than continuous stretches of undifferentiated exterior walls in evidence in some downtown locations.

For bicycles, one of the most significant east-west barriers is the hill from the Waterfront to Downtown. In addition, bicycle facilities are mostly north-south rather than east-west.

Bicycle and pedestrian system gaps within the study area (Figure 27) focus more in terms of north-south and (particularly for this study) east-west movement. Streetscape improvements to lower Church Street and St. Paul Street have been constructed in Summer 2011 to expand the pedestrian orientation of the Church Street Marketplace to these adjacent north-south blocks. Improvements to Pearl Street are now under construction to improve parking and bicycle access in particular. While the presence of sidewalks in the study area is comprehensive, the streetscaping needed to *attract* pedestrians to these blocks is lacking.

Figure 27: Bicycle-Pedestrian System



While Battery Street and its western slope have long been identified as the major disconnects between the Downtown and Waterfront, addressing streetscaping and pedestrian wayfinding (in progress along with other City-wide wayfinding improvements) on east-west blocks may be a shorter-term and easier-to-implement improvement to make the Downtown-Waterfront connection. The Waterfront North Scoping Study identified potential alignments for addressing the lack of an east-west connection on the west side of Battery Street:

- Near term: develop a stairway at Sherman St. Stairway and make improvements to Depot Street to enhance its function as a bicycle-pedestrian corridor.
- Longer term: investigate building a parking structure into slope (would include staircase/elevator), stairway streets, and/or a funicular.

Appendix B describes other gaps in the bicycle network, including:

- Champlain, Pine, & St. Paul Streets are all cut off by Burlington Town Center
- Winooski Avenue is difficult for bicyclists
- There is no east-west connection south of Maple Street between Island Line and Pine Street

Burlington has put significant effort into providing bicycle parking, adding them on main roads and bicycle routes, reclaiming on-street parking spaces for large, artistic bicycle racks, and locating them near the bike path, in parking garages and surface lots, and other popular destinations.

3.2 Future Circulation

The future circulation analysis component of this study has been performed using the Chittenden County Travel Demand Model. This model represents daily traffic (AADT) and has been calibrated to 2005 traffic conditions. RSG has developed this model for the CCMPO. The CCMPO uses this model for a variety of transportation planning purposes, including for projecting future year land use and transportation activity.

For the PlanBTV Transportation Study, the CCMPO model was run to 2040, assuming region-wide land use of 1% annual in population and employment. From this “CCMPO 2040 Base Case”, a new “Burlington Downtown-Waterfront 2040 Base Case” was developed for this analysis incorporating specific future growth within the study area provided by the Department of Planning and Zoning.

The model was run using the new Burlington Downtown-Waterfront 2040 land use to obtain traffic volumes and volume-to-capacity ratios for six arterial roadways¹:

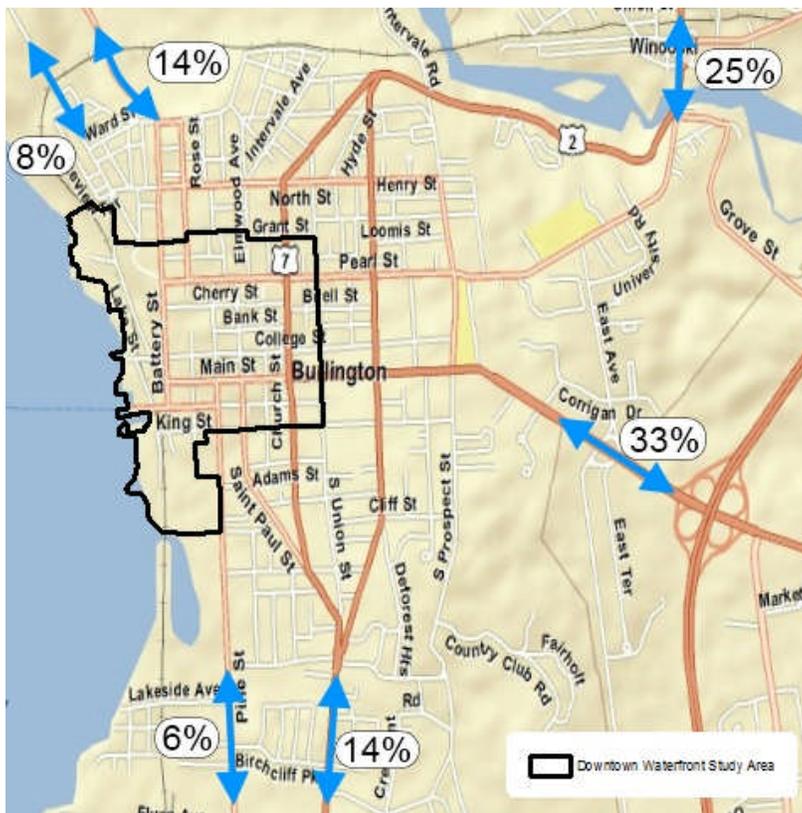
7. VT127
8. North Avenue
9. US7/Shelburne Road
10. Pine Street
11. Main Street/US2
12. Colchester Avenue/Riverside Avenue

Figure 28 shows the source (or origin) of external traffic destined for locations within the study area.

¹ Note that the v/c ratios reported are for roadway segments and not for intersections. Intersection v/c ratios are generally higher than roadway segment v/c ratios due to the presence of conflicting traffic. The roadway segment v/c ratios are best understood in comparison across the 3 alternative scenarios.



Figure 28: Source of External Traffic Destined for the Study Area¹



The model was run to test circulation results for two scenarios, as follows:

3. **Scenario 1** includes three Park and Ride lots (Exit 14—1200 spaces, Exit 16—800 spaces, South End Transit Center—1000 spaces) as recommended in the 2011 CCMPO Park&Ride Plan. This scenario also includes increasing CCTA service frequencies to 15 minutes for the six routes serving the study area.
4. **Scenario 2** models a “balanced” land use scenario within the core study area, seeking to increase the amount of housing relative to jobs, as consistent with the Burlington Legacy vision.

Table 6 summarizes the jobs and households located within the study area for each model scenario. For comparison purposes, the land uses assumed by the 2010 and 2040 CCMPO models are provided. Note that Scenario 1, which models higher CCTA bus frequency and implementation of the three intercept parking facilities, uses the 2040 BDW Base land use assumptions.

Table 6: Land Use Assumptions from the CCMPO Travel Demand Model for the Downtown-Waterfront Study Area

	Jobs	Households	Jobs per household
2010 CCMPO	12959	2535	5.11
2040 CCMPO	14579	3502	4.16
2040 BDW Base	19780	4225	4.68
2040 BDW 'Balanced'	14579	4858	3.00

¹ The data in Figure 28 are from the CCMPO Travel Demand Model and represent projected 2040 travel conditions.



The amount of new housing depicted in the 2040 BDW “Balanced” scenario represents a 91% increase in housing within the study area. This points to the need for substantially increasing allowable residential densities within the study area to achieve the land use vision expressed in the Burlington Legacy project. Specific zoning amendments will be necessary to facilitate increased residential densities.

Table 7 and Table 8 show the travel results for the 2040 Base Case and for the two Scenarios, for the AM and PM peak hours respectively (a comparison to existing 2010 conditions is provided in Appendix C). “v/c” or volume-to-capacity ratios compare roadway volumes to the amount of traffic that the roadway can handle (capacity); it is basically a measure of how much of the roadway is being used.

Table 7: AM Peak Hour Results for the 2040 Base, Scenario 1 (Intercept Lots) and Scenario 2 (Balanced Land Use)

AM Peak Hour Two-Way Link Volume.						
Scenario	Pine St.	Shelburne Rd.	Route 127	North Ave.	Williston Rd.	Main St.
Base	600	1300	1300	700	3500	2500
Intercept Lots	500	1200	1300	700	3200	2400
Balanced	500	1200	1100	700	3100	2300

AM Peak Hour v/c Ratio for Peak Direction.						
Scenario	Pine St.	Shelburne Rd.	Route 127	North Ave.	Williston Rd	Main St
Base	0.25	0.27	0.50	0.47	0.42	0.43
Intercept lots	0.27	0.23	0.47	0.44	0.36	0.39
Balanced	0.28	0.21	0.40	0.46	0.34	0.40

Table 8: PM Peak Hour Results for the 2040 Base, Scenario 1 (Intercept Lots) and Scenario 2 (Balanced Land Use)

PM Peak Hour Two-Way Link Volume.						
Scenario	Pine St.	Shelburne Rd.	Route 127	North Ave.	Williston Rd	Main St
Base	800	1800	1800	1000	4200	3200
Intercept Lots	700	1700	1800	1000	4000	3000
Balanced	600	1600	1700	900	3900	3000

PM Peak Hour v/c Ratio for Peak Direction.						
Scenario	Pine St.	Shelburne Rd.	Route 127	North Ave.	Williston Rd	Main St
Base	0.38	0.30	0.70	0.52	0.48	0.55
Intercept lots	0.30	0.28	0.67	0.51	0.43	0.51
Balanced	0.31	0.28	0.62	0.46	0.42	0.48

For both scenarios and for both times of day, arterial link volumes are either equal to or less than the base case. Volume-to-capacity ratios are reduced as a result. Of the two scenarios, the “balanced” land use scenario, which concentrates significantly more residential development within the study area, is more effective at reducing arterial congestion. This point is reinforced by Figure 29 which depicts the downtown Burlington street network and shows the relative change in travel time between the 2040 Base Case and Scenario 1 (left) and Scenario 2 (right). The green highlighting indicates streets where delays are reduced >10% relative to the base case; red indicates areas where delays are increased >10% relative to the base case; and, no change indicates similar travel time performance between the base case and the scenario.



These figures indicate that both scenarios are effective at relieving congestion in the study area, but that Scenario 2 is significantly more effective since a much larger amount of trip making can be made with non-automobile modes due to the higher concentration of residents in the downtown.

Figure 29: Comparison of 2040 Base Case Travel Times with Scenario 1 and Scenario 2 Travel Times



This is a compelling result that supports the Burlington Legacy Vision and reinforces the policy value of encouraging housing investment within the study area. Other initiatives within this project point to parking policies designed to encourage investment in downtown housing. Combined – the lower parking requirements and the positive travel time results – show that policies to encourage housing development in the downtown are synergistic.

4.0 PARKING

In Burlington, the Department of Public Works manages the public parking supply, including parking meters and revenue collection. Public Works subcontracts enforcement to the Police Department. In 1999, the Church Street Marketplace Charter established a Downtown Improvement District (which is roughly encompassed by this study area). An annual tax levied on nonresidential properties within the District funds a parking program which provides two hours of free parking in any designated municipally or privately owned or operated off-street parking facility within the District.

This section describes user groups and how they might utilize the parking supply, existing conditions, and future conditions.

4.1 User Groups

To determine effective improvements to the transportation system, the users and their needs must first be understood. Table 9 summarizes some of these groups in the Downtown and Waterfront areas and the differences in their parking and transportation demands. For example, if customers need daytime parking but residents only require overnight parking, both user groups can use the same parking facility. Opportunities such as this are called “temporal sharing.”



Table 9: User Groups in the Study Area

User Group	Priority	Parking Preference	Times Needed	Duration	Convenience	Easy to Find	Potential Arrangements to Maximize Utilization
Employees-office	3	On-site; covered; remote with incentives	Weekdays 8AM to 6PM	8+ hours	3	2	Off-site served with shuttle; near-site facilities temporarily shared with neighbors; limited on-site parking
Employees-retail	3	On-site; covered; remote with incentives	8AM to 9PM; 7 days/week	8+ hours	3	2	Off-site served with shuttle; near-site facilities temporarily shared with neighbors; limited on-site parking
Residents	3	On-site; covered; remote with incentives	Weekdays 6PM to 10AM, weekends	8+ hours	3	2	Off-site served with shuttle; near-site facilities temporarily shared with neighbors; on-site loading/unloading zones
Short-term visitors/clients (e.g. ~2 hours for meetings, errands, meals)	2	On-site, on-street	All times, 2-hours	~2 hours	1	1	On-site; on-street; publicly accessible garages and lots
Visitors (half to full day)	2	On-street, garage, lot	Weekends	half to full day	2	1	Off-site served with shuttle; on-street; publicly accessible garages and lots
Deliveries	1	On-street, lot	Weekdays 8AM to 6PM	~15 minutes	1	1	Continue on-street loading zones
ADA access	1	On-site, on-street	All-times	Any	1	1	Continue to designate spaces per ADA specifications

The Bureau of Labor Statistics Consumer Expenditure Survey provides data on vehicle ownership and shows that renters are less likely than homeowners to own at least one vehicle (Figure 30). This suggests that different strategies for managing resident parking demands are possible, such as unbundling parking from lease agreements and reducing Ordinance parking requirements for apartment buildings. The Survey also indicates that vehicle ownership varies with income, as shown in Table 10. This information can be useful when determining parking requirements for different housing markets.

Regardless of user group, parking needs to be safe and clean for all.

Figure 30: 2008-2009 Consumer Expenditure Survey Average Annual Expenditures and Characteristics: Vehicle Ownership

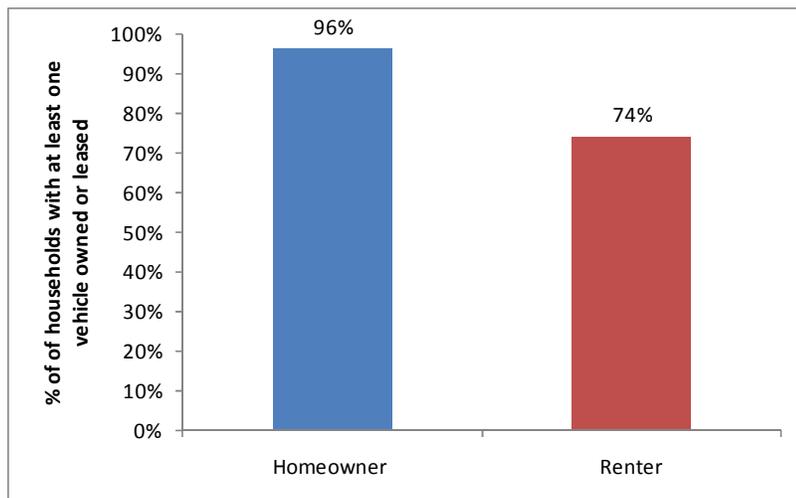


Table 10: Consumer Expenditure Survey: Vehicle Ownership by Income Level (2008-2009, Northeastern Region)

Income Level	Vehicle Ownership
\$19,999 or less	38-64%
\$20,000 to \$69,999	75-90%
\$70,000 or more	95%



4.2 Existing Parking Conditions

This section summarizes parking capacity and operations, occupancy, and ownership and use.

In 1996 RSG surveyed Downtown visitors at Burlington Town Center to understand their circulation patterns.¹ The study found that after parking their car, visitors typically walked to three different destinations, compared to the one trip per parked vehicle that would be found in more suburban, single mode areas. Increasing this 3 trips/parked vehicle result is in line with the goal identified in Section 2.0 of increasing parking efficiency; a strategy of encouraging people to “park once” would reduce the congestion associated with hunting for a parking space.

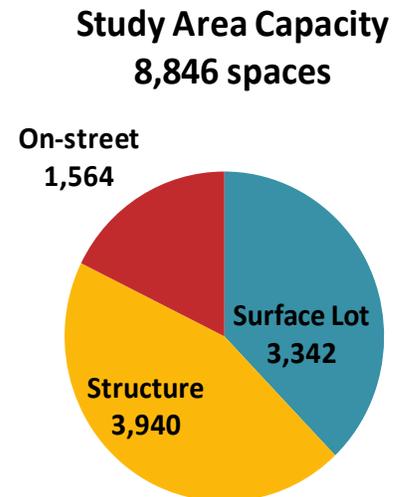
A June 2011 study on City employee commutes identified the lack of an organized “home” for transportation demand management programs as a barrier to increasing the use of alternative transportation. Similarly, the 2008 Downtown Burlington Employee Transportation Survey Report indicated that expanding incentives and raising awareness of alternative transportation options is needed. An opportunity exists to reduce transportation and parking demand by organizing and administering such programs for employers in the study area. Maintaining flexibility for users is critical to reducing transportation and parking demand: not only would participation be low in such programs if they do not accommodate daily schedule changes and needs, but the effectiveness of shifting modes will not be realized. Telecommuting options, CarShare Vermont memberships, occasional use parking permits, CCTA passes, access to bicycles, and a guaranteed ride home program are elements of building a flexible menu of options for commuters.

4.2.1 Parking Capacity and Operations

As shown in Figure 31, there are 8,846 parking spaces within the study area. Figure 32 compares the footprint of the 3,940 spaces (8.33 acres) in structures to the 3,342 spaces (27.34 acres) in surface lots. Parking structures are generally expected to have a 50-year lifespan. Appendix D summarizes the results of a preliminary visual assessment of the conditions of the City’s three garages. The Marketplace garage was constructed in 1976, the College Street garage in 1985, and the Lakeview garage in 2000.

The City’s three downtown parking structures and the Burlington Town Center garage (privately owned but open to public parking) are able to offer the first two hours of parking for free thanks to the Downtown Improvement District. Figure 33 shows the costs to park on-street along various blocks in the study area. Detailed parking costs are presented in Appendix D. The majority of parking (not including leased or monthly permit parking) costs an average of \$1/hour; three facilities charge somewhat more or less. Figure 34 shows that no correlation could be established between parking costs and occupancies; that is, less expensive facilities were not more occupied than more expensive ones.

Figure 31: Parking Capacity in the Study Area by Type



¹ 12/19/1996 RSG intercept survey at Burlington Square Mall (now Burlington Town Center).



Figure 32: Structures and Surface Lots

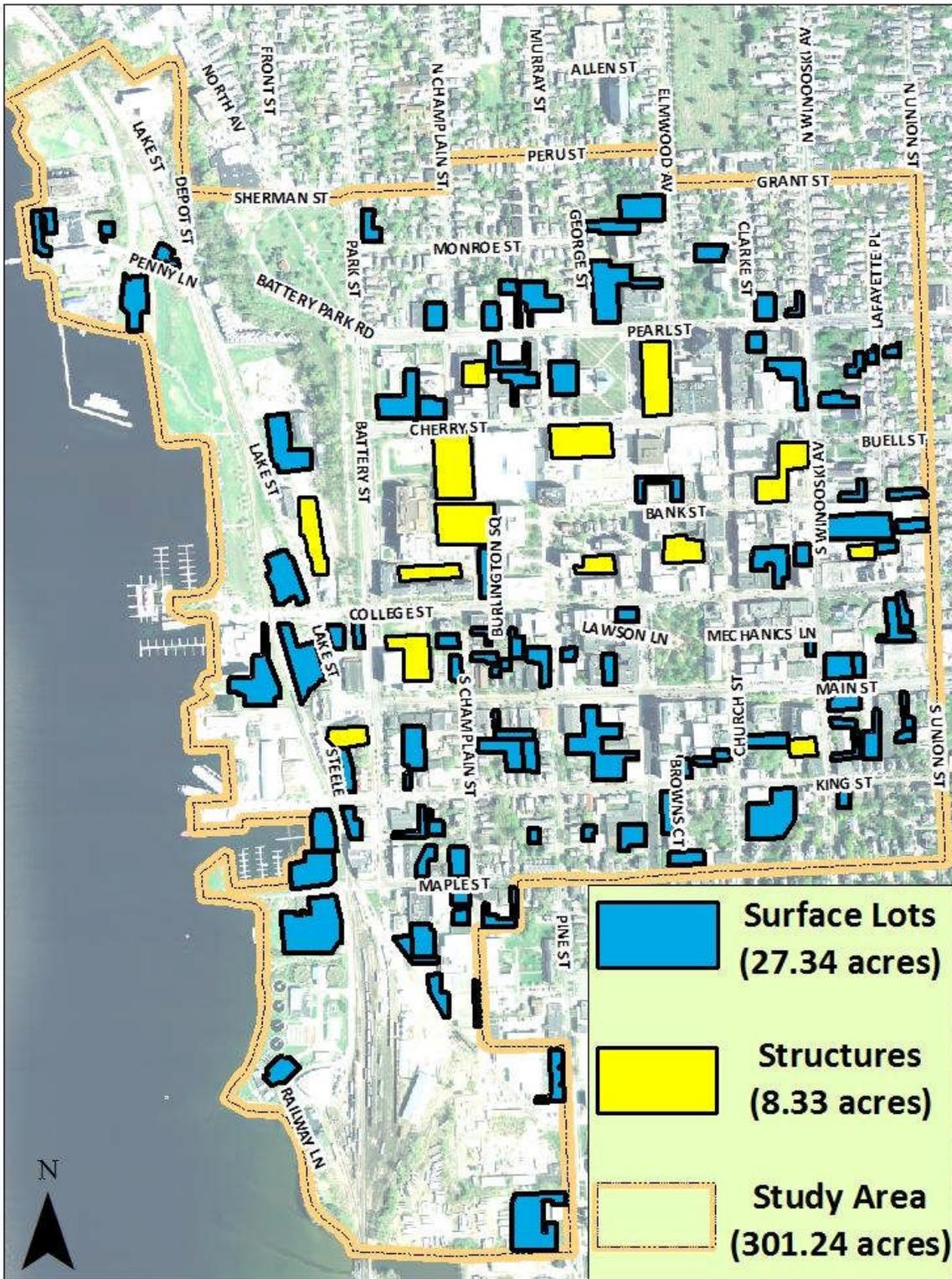


Figure 33: On-Street Parking Meter Costs

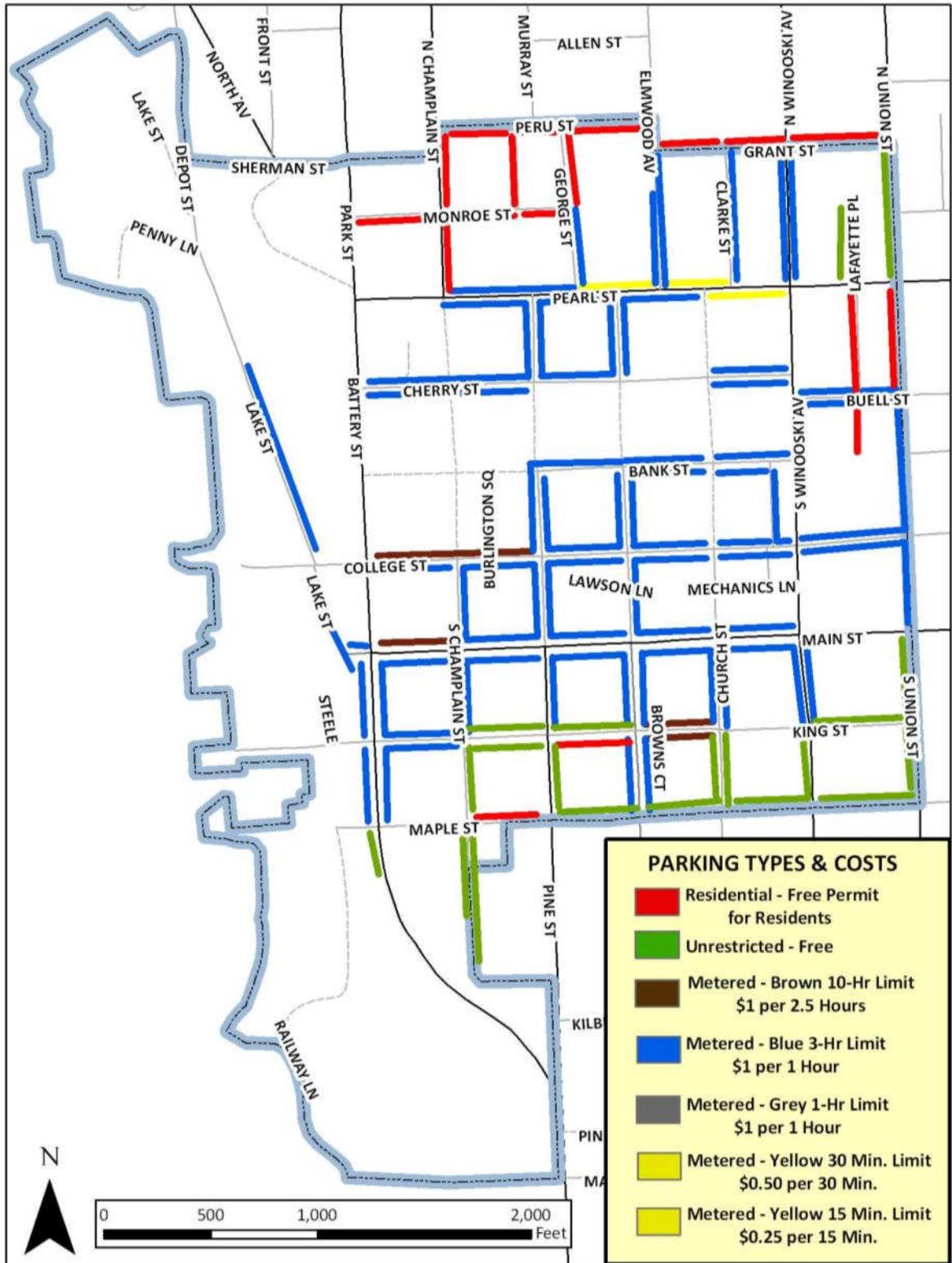
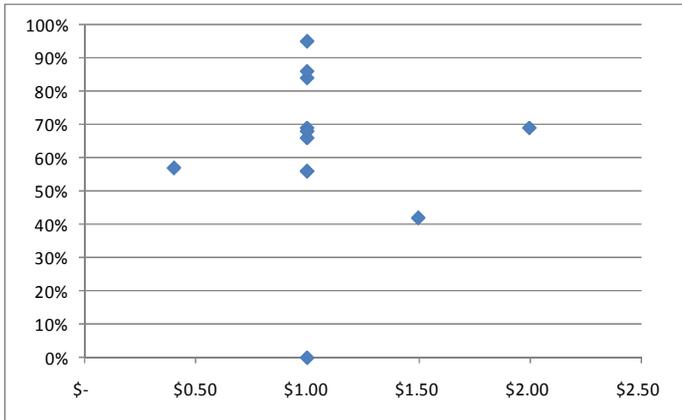


Figure 34: Occupancy versus Parking Costs in Hourly/Metered Surface Lots and Structures



Burlington’s parking revenue funds many non-parking programs. The Department of Public Works Traffic Division provided information as to the amounts and sources of revenue (Figure 35, totaling approximately \$8.3M) and the programs that they in turn fund (Figure 36, totaling approximately \$8.3M). Additional detail about these programs is provided below:

- Meters & Metered Lot Program: collection, meter maintenance & repairs, surface lot maintenance
- Meter Enforcement by Police Department
- Signage Program (Regulatory & Directional): responsible for all street name signs, all roadway regulatory signs, & parking signs
- Pavement Marking Program: responsible for all stop bars, crosswalks, parking space delineation, & long line road striping
- Flower Planting Program: plantings at traffic islands, lots, etc.
- Traffic Signal System Operations
- School Crossing Guard Program
- Operation of three downtown parking garages: operation, maintenance, capital and debt expenses
- Operating Expenses-Airport Facility
- Direct Revenue Payment to Airport

If parking were self-funded (and the airport facility were removed from the picture), it would have a surplus of \$780,000 to pay for parking improvements (Table 11). However, programs such as the signage, flower planting, and school crossing guard programs would need to find other funding sources.



Figure 35: Sources of Parking Revenue

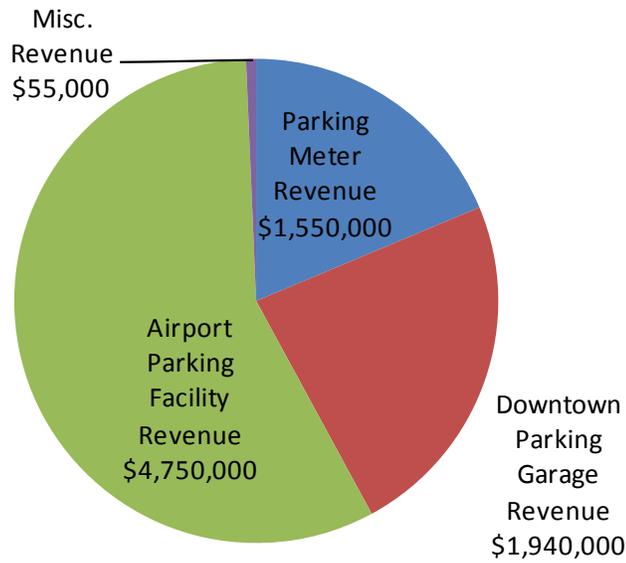


Figure 36: Parking Program Expenditures

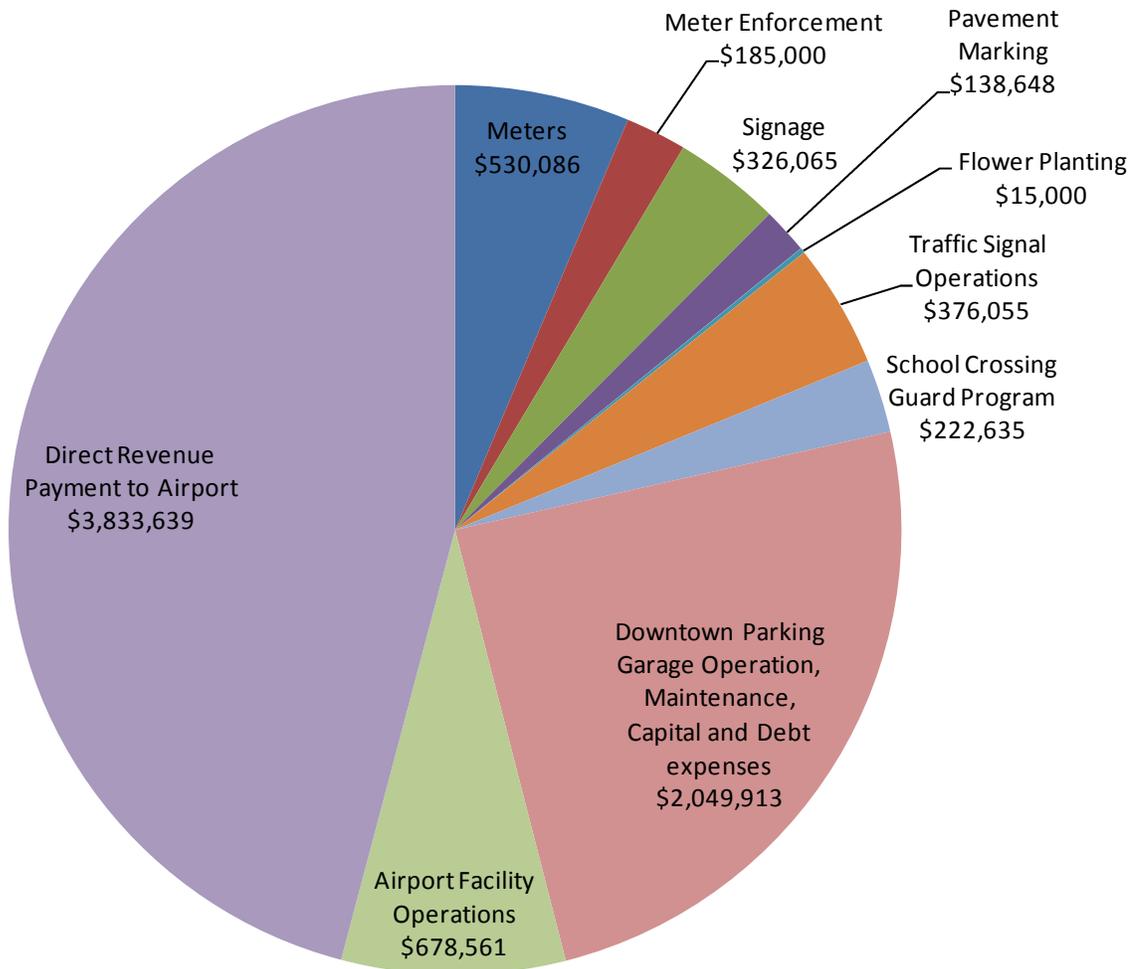


Table 11: Burlington Parking Revenue, Expenditures, and Net Difference

Revenue		Expenditures		Difference
Parking Meter Revenue	\$1,550,000	Meters	\$530,086	
Downtown Parking Garage Revenue	\$1,940,000	Meter Enforcement	\$185,000	
Misc. Revenue	\$55,000	Downtown Parking Garage Operation, Maintenance, Capital and Debt expenses	\$2,049,913	
Total \$3,545,000		Total \$2,764,999		\$780,001

4.2.2 Occupancy

Parking counts were performed in summer 2011 following the methodology of the 2003 Downtown Burlington Parking Study. The counts confirmed that the peak parking occupancy occurs between 1:00 and 3:00PM on Friday afternoon, when it is likely that weekend visitors are entering Burlington and overlapping with downtown employees who are still at work.

An occupancy of 85% is suggested as the level at which parking supply is used most efficiently because parking spaces are being used but there are still enough spaces empty to allow for turnover.¹ As shown in Figure 37, the total occupancy of the study area during the peak period was 65%, well below the 85% optimum. However, there are specific facilities and locations within the study area that are used more than others. Figure 38 shows the parking occupancies of the study area zones. On-street parking is used more intensively than structures (Figure 39) and parking in the northeast area of the Marketplace is more heavily used than in the Waterfront by the Coast Guard. The data are generally consistent with the patterns identified in the 2003 parking study, except that occupancies in 2011 were slightly lower.

Figure 40 shows that on-street spaces are more occupied than garages and lots in Zones 2, 3, 4, and 9. This, combined with the highly visible conflicts that develop when the Marketplace garage (Zone 2) fills up, creates a strong perception that there is a shortage of parking. However, there are 988 empty parking spaces in the lots and structures of these zones at the same time;² 429 of these empty spaces are in Zone 2. Empty spaces are distributed throughout the zones (as opposed to a few specific facilities that are underutilized); however, since many are restricted to private property users and/or are difficult to find, they are underutilized.

This analysis suggests an opportunity for shifting parking demand to underutilized facilities such as the Lakeview garage (66% occupied), through improved user information (advertising 2-hours free parking in garages, as well as smart signs indicating available spaces three blocks away) and/or pricing (for example, installing parking meters with variable pricing technology to charge more during the peak period for parking adjacent to the Marketplace compared to a block or two away).

¹ Donald Shoup (2005), *The High Cost of Free Parking*, Planners Press (www.planning.org).

² This includes empty spaces in privately owned facilities that are only available to that property's affiliates. Shared parking arrangements, which would allow more people to use these facilities, would make more efficient use of the existing parking supply.



Figure 37: Total Parking Occupancy in the Study Area during the Friday 1-3PM Peak Period

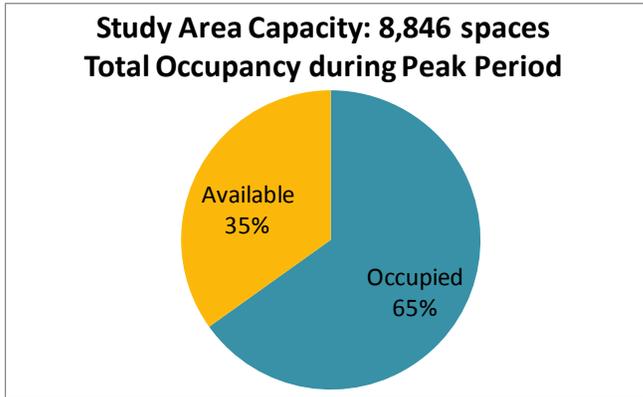


Figure 38: Peak Period Average Occupancy of Parking Zones

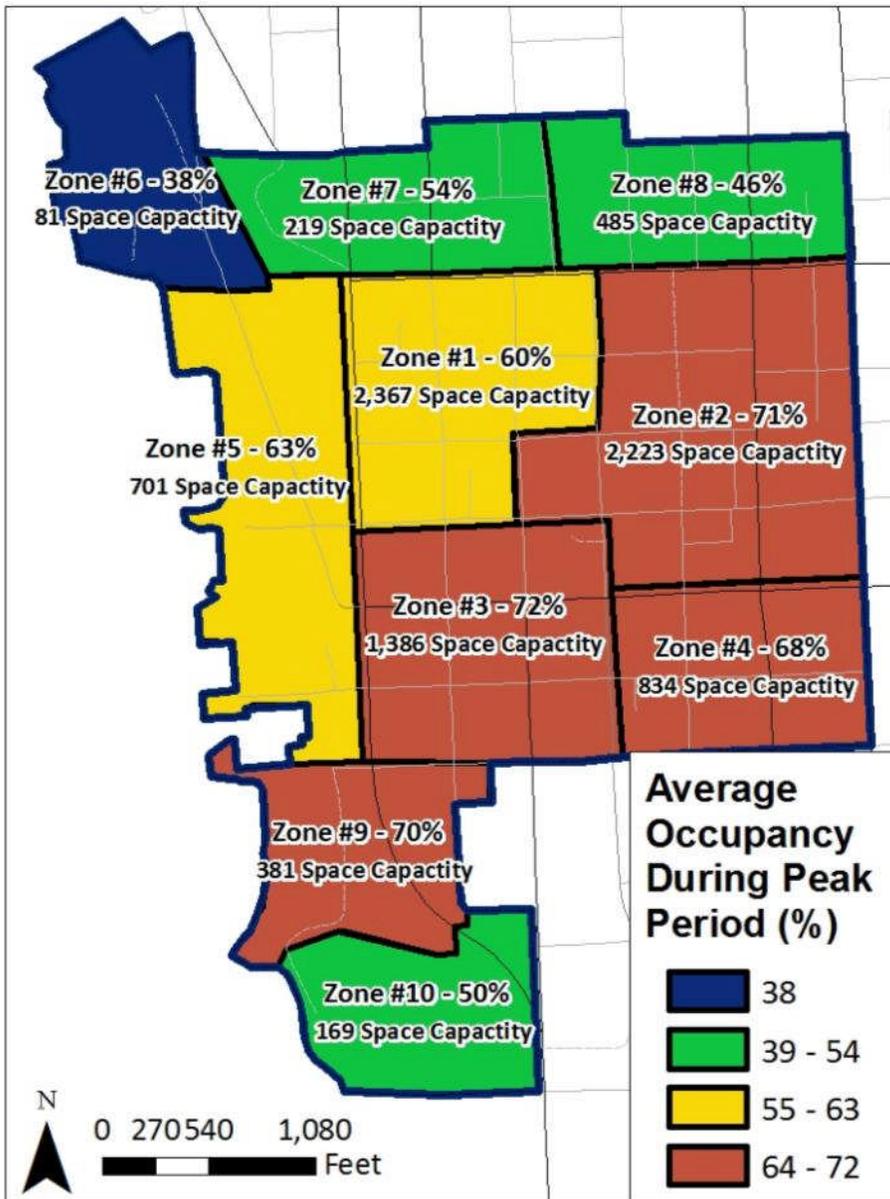
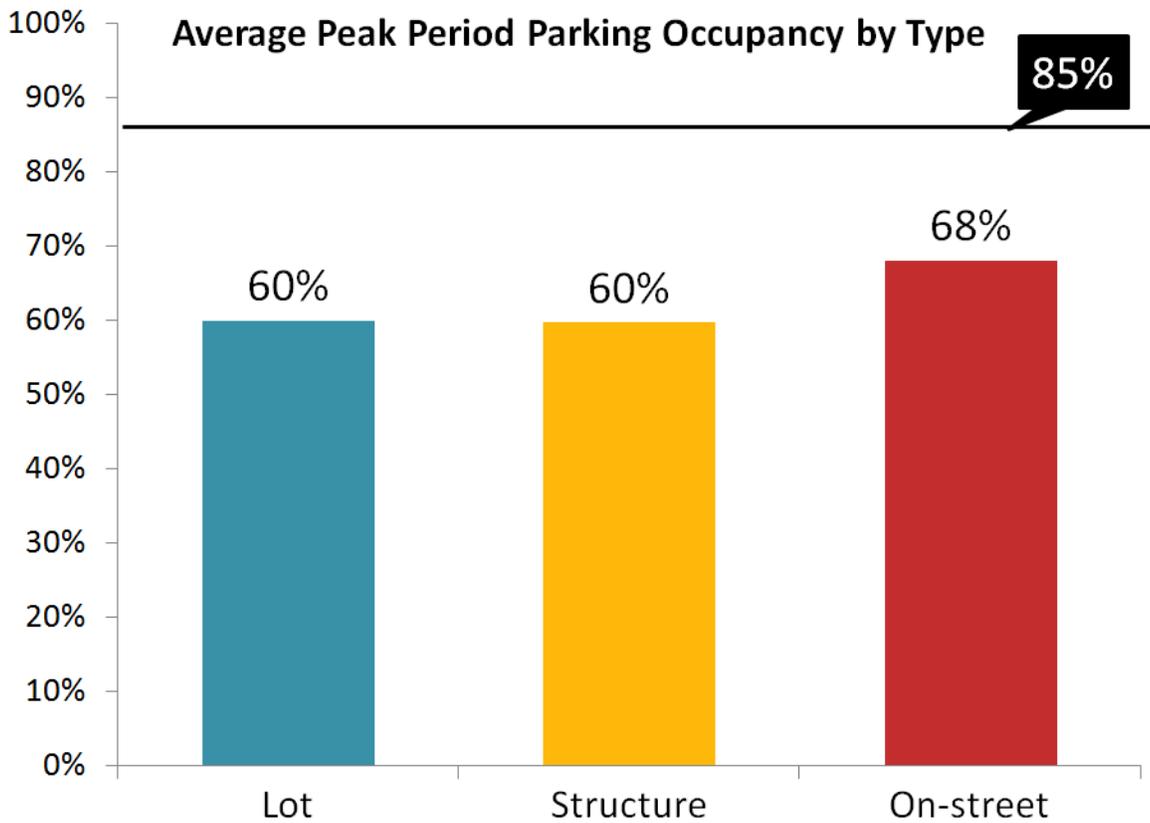
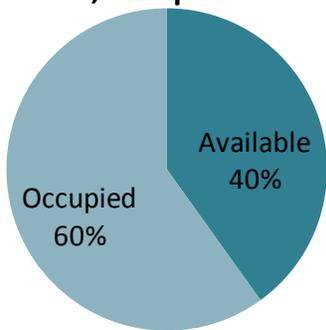


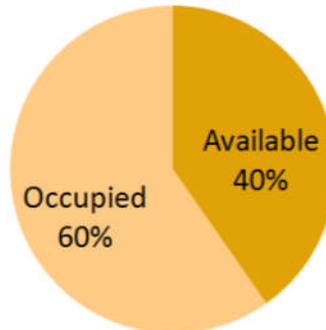
Figure 39: Peak Period Parking Occupancy by Type



Surface Lot Capacity:
3,342 spaces



Structure Capacity:
3,940 spaces



On-Street Capacity:
1,564 spaces

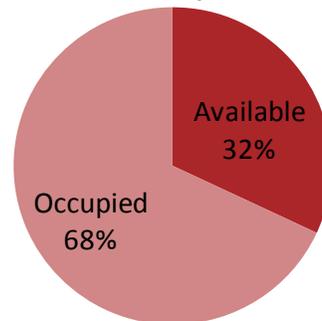
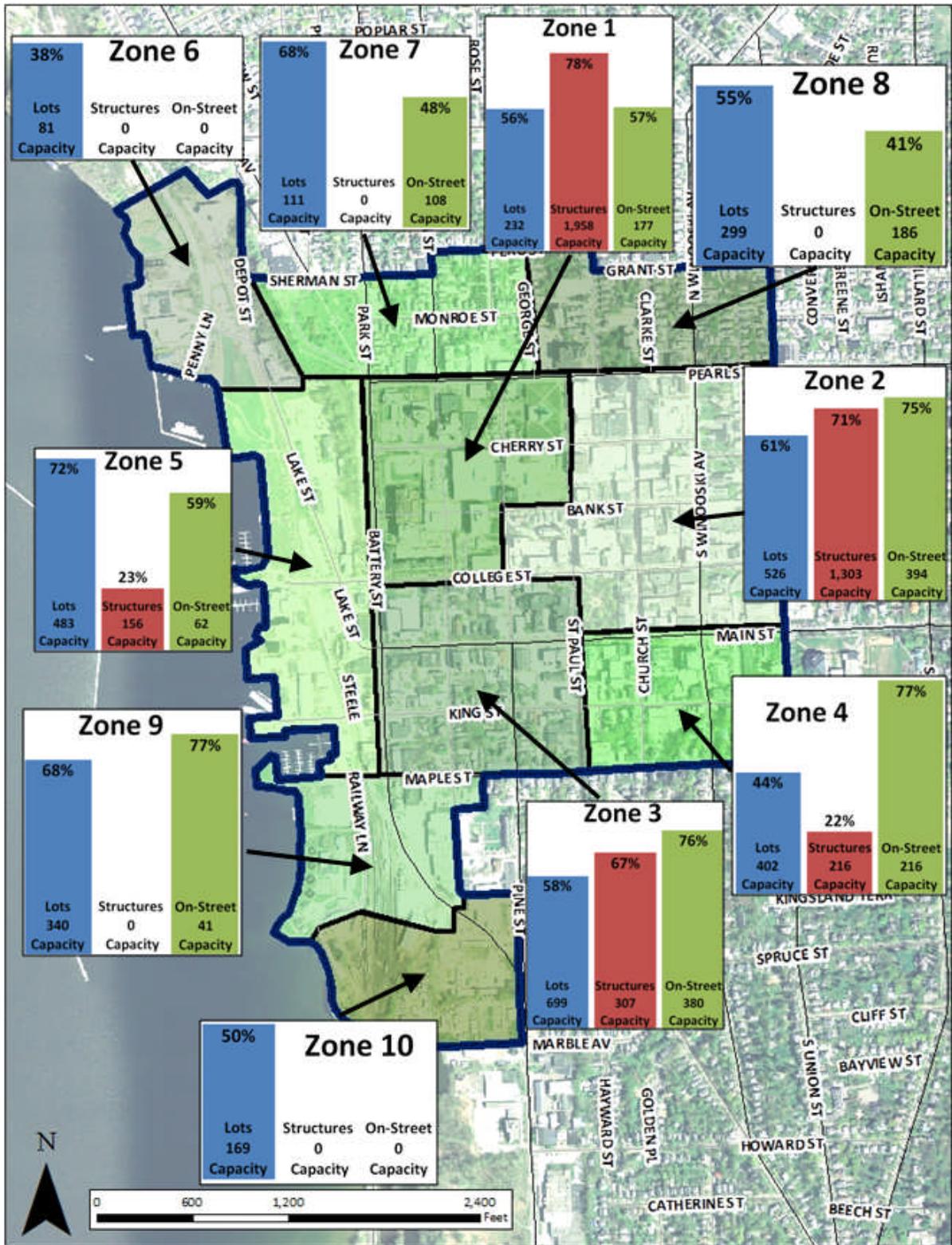


Figure 40: Zone Occupancy by Type of Parking



4.2.3 Facility Ownership and Use

As in the 2003 parking study, facilities were considered in light of ownership and use:

- Public/Public lots and structures are owned by the City and open to the public.
- Private/Private facilities are privately owned and are open only to the owners' clients and/or employees.
- Private/Public lots and structures are privately owned, but open to the general public.

In addition, there are facilities that are Private/Private during business hours, but open to the public at other times. For example, Main Street Landing's surface lot on the Waterfront is permit-only for tenants Monday through Friday until 6PM; at other times the general public can park there for a fee. This example presents a valuable opportunity for sharing parking: efficiency can be improved by sharing parking among uses during off-peak or non-operating hours.

To understand the current trends across ownership/use types, the study area's 7,282 lot and structure spaces (all off-street parking) are considered in Figure 41 and Figure 42. Figure 43 shows that during the peak period, the Private/Private facilities had the lowest occupancy at 60%, while Public/Public lots and structures had the highest occupancy at 71%. Three structures carry the majority of the parking demand as shown in Figure 44. The Marketplace garage was near capacity during the peak period.

Figure 41: Surface Lot and Structure Parking Capacity by Ownership/Use

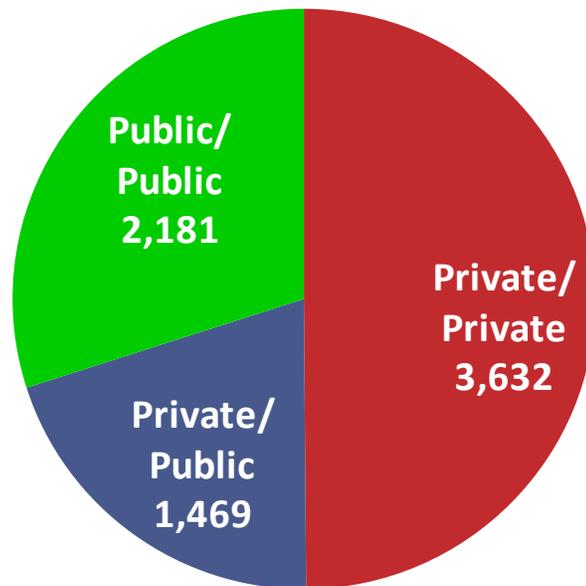


Figure 42: Surface Lots and Structured Parking by Ownership/Use

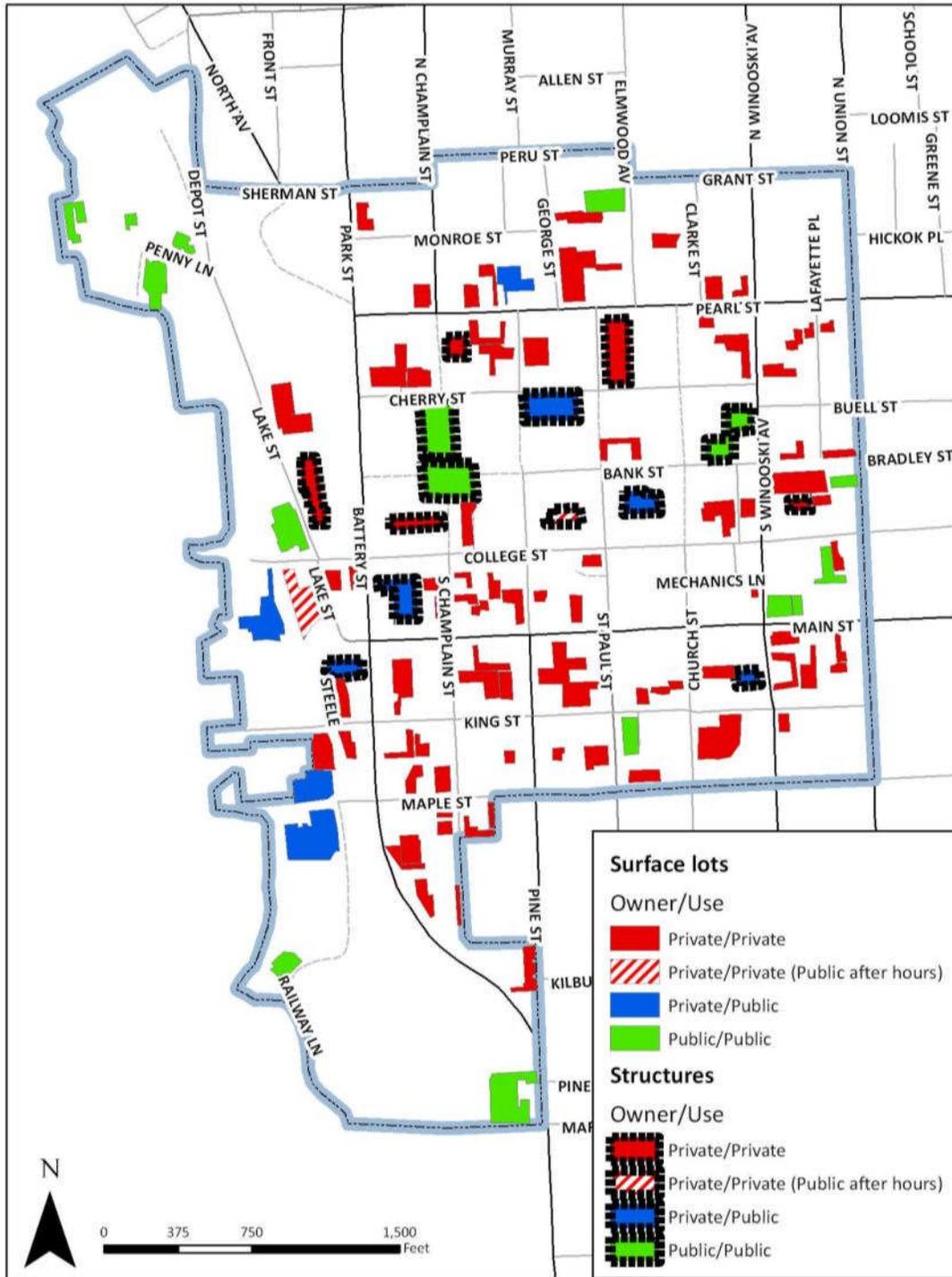


Figure 43: Peak Period Parking Occupancy by Ownership/Use

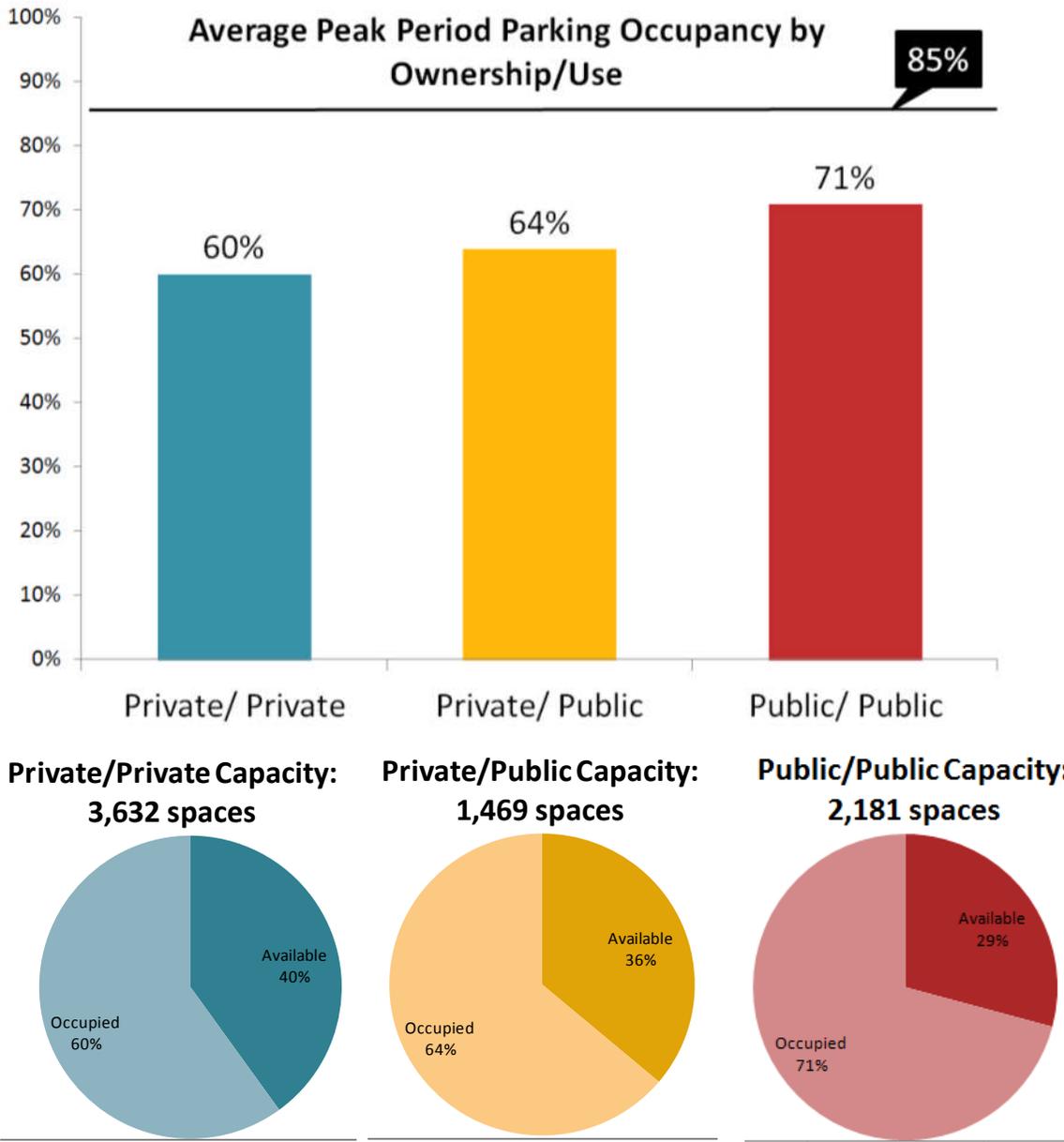
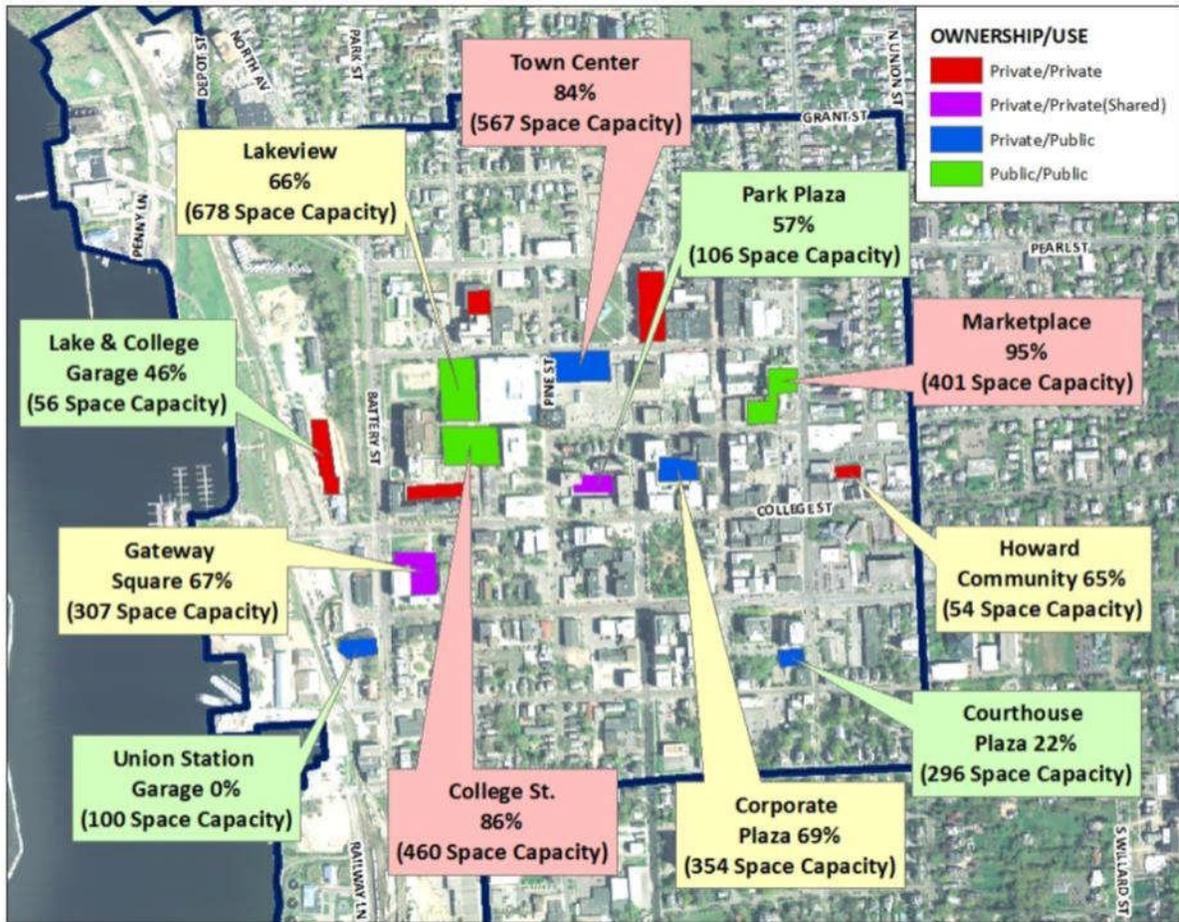


Figure 44: Structured Parking Occupancy and Ownership/Use Type



The 2011 data are generally consistent with the patterns identified in the 2003 parking study, except that the College Street garage is now significantly more occupied than the Lakeview garage. This may be because People’s United Bank (formerly Chittenden Bank) no longer has their employees park off-site at the Lakeside Avenue lot and take the PARC shuttle into downtown.

4.3 Future Parking Conditions

An analysis of the future parking supply necessary to support 2040 land use within the study area has been conducted for the same scenarios as the future circulation analysis, Section 3.2:

- 1) the 2040 Base Case (business as usual)(19,780 total jobs and 4,225 total residences in the study area) ;
- 2) Transportation Improvements (3 new park&ride/intercept facilities and increased CCTA frequencies) (19,780 total jobs and 4,225 total residences in the study area); and,
- 3) Balanced Land Use (addressing the jobs/housing imbalance by increasing the amount of housing relative to jobs) (14,579 total jobs and 4,858 total residences in the study area).

The jobs and household estimates provided in Table 12 have been converted into gross square footage based on housing and commercial square foot estimates developed for existing conditions. To maintain an 85% parking occupancy rate, the analysis shows that a ratio of 0.83 parking spaces per 1,000 square feet of commercial building area is necessary. Parking requirements for residential uses are tied to the current zoning requirements of one parking space per dwelling unit.



Table 12 shows the results of this analysis. As the study area is currently under a surplus parking condition (peak occupancy is 65%), the study area can accommodate the additional growth to increase utilization to the 85% occupancy rate. However, under the assumptions of high job growth projected for the Burlington Downtown-Waterfront Base Case, where employment in the study area increases from a little under 13,000 jobs in 2010 to nearly 20,000 by 2040, an increased requirement of over 3,000 parking spaces is projected. This amounts to a 34% increase in parking supply within the study area. This projection assumes the continuation of current parking requirements for residential dwellings of one space per residential unit.

Scenario 2, the balanced land use scenario, projects an increase of over 1,600 jobs and 2,300 housing units in the study area. Under this more balanced land use projection, an additional requirement of 1,654 parking spaces are projected as necessary (a 19% increase over existing supply). As with the Base Case, this projection assumes continuation of current parking requirements for residential dwellings of one space per unit. These findings are summarized in Table 12.

Table 12: 2040 Jobs, Households, Commercial and Housing Square Footage, and Parking Supply within the Study Area

	2040 BDW Base	2040 Balanced Land Use
Jobs	19,780	14,579
Households	4,225	4,858
SF in Commercial (est.)	9,268,222	6,831,214
SF in Housing (est.)	6,441,435	7,406,507
BDW Parking Supply at 85% Occupancy	11,880	10,500
Net Change from Existing (8846)	3,034	1,654

Incorporating parking reduction factors, as described in Section 5.0, would be consistent with the overall goals and objectives of concentrated downtown development. Assuming that parking reduction factors, implemented over the planning horizon to 2040, would reduce the parking requirement for residential units from 1 space per unit to 0.5 spaces per unit, parking supply within the study area would only need to increase by approximately 500 spaces above the current supply (a 6% increase). Note that further reductions in residential parking requirements to as low as 0.33 per unit may be possible. Hence, the foregoing analysis projects a more conservative future condition where parking requirements are reduced gradually as other supporting travel demand management measures are co-implemented. Table 13 shows the results of this analysis compared with the results from Table 12.

Table 13: Jobs, Households, Commercial and Housing Square Footage, and Parking Supply within the Study Area, Showing the Impact of Parking Reduction Policies for Residential Development

	2040 BDW Base	2040 Balanced Land Use	2040 Balanced Land Use with Parking Reduction Policies
Jobs	19,780	14,579	14,579
Households	4,225	4,858	4,858
SF in Commercial (est.)	9,268,222	6,831,214	6,831,214
SF in Housing (est.)	6,441,435	7,406,507	7,406,507
BDW Parking Supply at 85% Occupancy	11,880	10,500	9,338
Net Change from Existing (8846)	3,034	1,654	492



5.0 PARKING ORDINANCE AND POLICY REVIEW

Local and regional planning documents include various objectives that support or are supported by more efficient parking management, including commitments to:

- Encourage more compact, infill development and discourage sprawl. “The single most important factor to improving transportation system performance is to move toward a land use pattern based on concentrated development similar to that identified in the CCRPC Regional Plan”¹.
- Encourage automobile travel reductions and shift to alternative modes (walking, cycling, ridesharing, public transit, telework). “In 2030, every Burlington resident has access to a diverse, seamless, multi-modal transportation system to travel easily to jobs, businesses, and recreational and cultural activities. Increased public transit and alternative transportation provides local and regional travel that is safe, accessible, efficient, and environmentally sound. Transportation within, to, and from the city relies less on individual vehicles and integrates the automobile with rail, bus, shuttle, boat, air, pedestrian, and bike transport”².
- Encourage more efficient utilization of parking facilities³.
- Increase housing affordability and reduce development costs. “No issue poses a greater challenge to the quality of life in our neighborhoods than that of providing good, affordable housing for all Burlington residents”⁴.

Parking policies significantly affect land use development and travel activity. It is therefore important that parking policies be aligned with other strategic planning goals.

Parking planning is undergoing a *paradigm shift*, that is, a change in how problems are perceived and solutions evaluated. The old paradigm assumes that transportation means driving, that parking lots should almost never fill, that parking costs should be borne indirectly by governments and businesses, and that every destination should satisfy its own parking needs. The new paradigm strives to provide *optimal* parking supply and price. It assumes that transportation can include multiple modes. It considers too much supply as harmful as too little, and prices that are too low as harmful as those that are too high. The new paradigm strives to use parking facilities efficiently. It considers full lots to be acceptable, provided that additional parking is available nearby and any spillover problems are addressed. It favors charging parking facility costs to users and encouraging use of alternative modes.

The old paradigm places a heavy burden of proof on change and innovation. The new paradigm recognizes that conditions often change, and parking policies should be adjusted in response. Table 14 compares old and new parking paradigms.

The old parking paradigm can result in a self-reinforcing cycle of increased automobile dependency, which involves increased automobile ownership, more automobile-oriented transport planning, reduced travel options, more dispersed land use development, and increased parking supply, as illustrated in Figure 45. More efficient parking management can help break this cycle. It both supports and is supported by policies that encourage use of alternative modes and more compact land use development.

¹ CCMPO (2010), *Metropolitan Transportation Plan (MTP)*. Chittenden County Metropolitan Planning Organization (www.ccmppo.org), p.59; at www.ccmppo.org/MTP.

² Burlington (2009), *Legacy Project Action Plan*, City of Burlington (www.ci.burlington.vt.us), p.17; at <http://burlingtonlegacyproject.org>.

³ CCMPO (2010), *Metropolitan Transportation Plan (MTP)*. Chittenden County Metropolitan Planning Organization (www.ccmppo.org), p.68-69; at www.ccmppo.org/MTP.

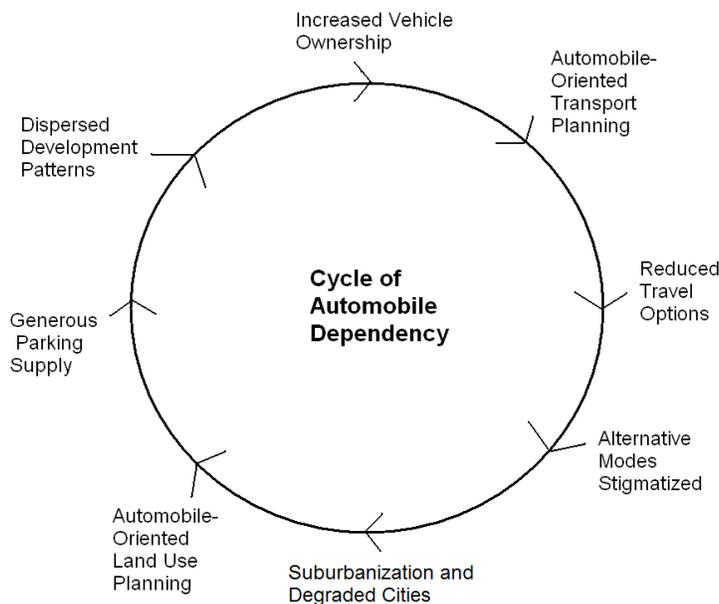
⁴ Burlington (2009), *Legacy Project Action Plan*, City of Burlington (www.ci.burlington.vt.us), p.22; at <http://burlingtonlegacyproject.org>.



Table 14: Old and New Parking Paradigms Compared

Old Parking Paradigm	New Parking Paradigm
Parking problem means inadequate parking supply.	There can be many types of parking problems, including inadequate or excessive supply, too low or high prices, inadequate user information, and inefficient management.
Transportation means driving.	Travelers may use various modes. Not everybody drives.
Abundant parking supply is always desirable.	Too much supply is as harmful as too little.
All parking demand should be satisfied on-site. Motorists should not be forced to walk to their cars.	Parking can often be provided off-site, allowing sharing of parking facilities among various destinations.
Parking should generally be provided free, funded indirectly, through rents and taxes.	As much as possible, users should pay directly for parking facilities.
Parking should be available on a first-come basis.	Parking should be regulated to encourage efficiency and favor high priority uses such as service vehicles, deliveries, customers, quick errands, and people with special needs.
Parking requirements should be applied rigidly, without exception or variation.	Parking requirements should reflect each particular situation, and should be applied flexibly.
Innovation faces a high burden of proof and should only be applied if widely accepted.	Innovations should be encouraged, since even unsuccessful experiments often provide useful information.
Parking management is a last resort, to be applied only if increasing supply is infeasible.	Parking management programs should be widely applied to prevent parking problems.
Land use dispersion (sprawl) is acceptable or even desirable.	Dispersed, automobile-dependent development can be harmful.

Figure 45: Cycle of Automobile Dependency



5.1 Defining Parking Problems

It is important to carefully define parking problems. For example, if people complain about a parking problem, it is important to determine the exact problem type, location and time. Table 15 below lists various parking problems and compares the impacts of increasing parking supply with management solutions. Increasing supply helps reduce parking congestion and spillover problems but increases most other problems. Management solutions tend to reduce most problems, providing a greater range of benefits and so are supported by more comprehensive planning.

Table 15: Comparing Increased Supply and Management Solutions

Problem	Increased Supply	Management Solutions
<i>Parking congestion.</i> Too many vehicles trying to use available parking facilities.	Positive. Increases number of available parking spaces.	Positive. Results in more efficient use of parking supply.
<i>Spillover.</i> Problems from motorists parking where they are not wanted.	Positive. Reduces incentive for motorists to use off-site spaces.	Mixed. Some management strategies increase spillover problems, others reduce them.
<i>Facility costs.</i> Increased development and operating costs for parking facilities.	Negative. Increases facility costs.	Positive. Reduces parking facility costs.
<i>Traffic congestion.</i> Too many vehicles for existing road capacity.	Negative. Generous, free parking increases vehicle use.	Positive. Many management strategies reduce vehicle use.
<i>Inequity.</i> Distribution of costs, including cost burdens on people who do not use parking facilities.	Negative. Forces non-drivers to pay for parking they do not use.	Positive. Reduces costs borne by non-drivers and improves accessibility options.
<i>Tax costs.</i> Tax burden required to subsidize parking facilities.	Negative. Often involves public subsidy of parking.	Positive. Reduces the need to subsidize parking facilities.
<i>Environmental impacts.</i> Loss of greenspace, stormwater management costs, air pollution, unattractive landscapes.	Negative. Increases the total amount of land paved for parking, and increases total vehicle ownership and use.	Positive. Reduces total parking requirements and vehicle use.
<i>Sprawl.</i> Encouraging dispersed, urban fringe development, and discouraging multi-modal, urban infill development.	Negative. Discourages infill and encourages more dispersed, urban fringe, automobile-oriented development.	Positive. Encourages smart growth development patterns.

5.2 Determining Optimal Parking Supply

Various approaches and assumptions can be used to determine the number of parking spaces that are considered optimal in a particular situation, and therefore the methods that should be used to establish minimum parking requirements and evaluate parking variants.

- Motorists want abundant, convenient and preferably free parking; they generally assume that more is better.
- Businesses want an adequate supply of parking for customers and employees, at minimal cost.



- According to economic theory, optimal parking supply is the amount that motorists would willingly purchase if they have adequate options (different travel modes, parking facilities and payment options), and pay directly to finance the facilities.
- Local governments often assume that optimal parking supply is whatever is recommended by professional organizations, such as the Institute of Transportation Engineers, or whatever is adopted by neighboring jurisdictions.

Efficiency-based standards size parking facilities for optimal utilization. This means that most parking lots will often be filled, provided that management strategies can insure user convenience and address any problems. For example, a store's parking lot can be sized to fill during the weekly peak, provided that overflow parking is available nearby, motorists have information about available parking options, and regulations are adequately enforced to address any spillover problems. Efficiency-based standards take into account geographic, demographic and management factors that affect parking demand, and to reflect strategic planning objectives such as a desire for more compact development or reduced automobile traffic.

Because it is not possible to predict exact parking demand and management program effectiveness, efficiency-based standards rely on *contingency-based planning*, which means that planners identify solutions that can be deployed if needed in the future. For example, if a new building is predicted to need 60 to 100 parking spaces, the conventional approach is to supply either the middle value (80 spaces), or the maximum value (100 spaces). With contingency-based planning, the lower-bound value (60 spaces) is initially supplied, conditions are monitored, and various strategies are identified for implementation if needed. This may include banking land for additional parking supply and various parking management programs. This allows planners to use lower parking standards with the confidence that any resulting problems can be easily solved.

Eliminating parking requirements does not eliminate parking supply, it simply allows property owners to supply the amount they consider appropriate in their specific circumstances, rather than a generic amount required by the city. The main reason that cities impose generous parking requirements is to avoid unwanted spillover impacts (motorists causing parking congestion in nearby areas). Significantly reduced or eliminated minimum parking requirements may therefore require better parking management and enforcement to address spillover problems.

5.3 Parking Facility Costs

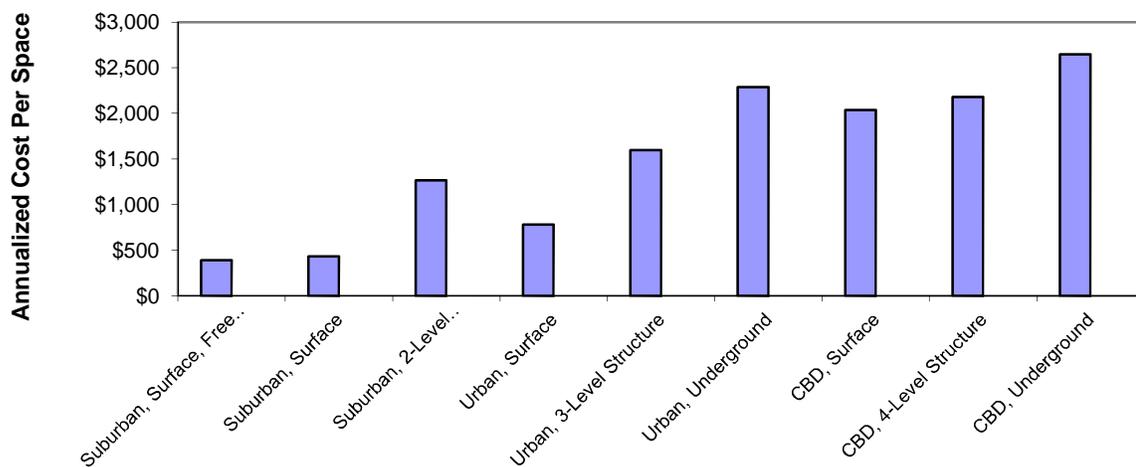
Parking management can provide substantial savings compared with expanding parking supply. Parking facility costs include land, construction and operations and maintenance (O&M), plus indirect costs, such as increased stormwater management costs. Table 16 and Figure 46 illustrate examples of these costs of various types of parking facilities. This varies from about \$400 per space if otherwise unused land is available, and construction and operating costs are minimal, to more than \$2,250 for structured parking with attendants.



Table 16: Typical Parking Facility Financial Costs¹

Type of Facility	Land	Construction	O & M	Total Costs
	Per Space	Per Space	Annual, Per Space	Annual, Per Space
Suburban, Surface, Free Land	\$0	\$2,000	\$200	\$389
Suburban, Surface	\$455	\$2,000	\$200	\$432
Suburban, 2-Level Structure	\$227	\$10,000	\$300	\$1,265
Urban, Surface	\$2,083	\$3,000	\$300	\$780
Urban, 3-Level Structure	\$694	\$12,000	\$400	\$1,598
Urban, Underground ²	\$0	\$20,000	\$400	\$2,288
CBD, Surface	\$15,385	\$3,000	\$300	\$2,035
CBD, 4-Level Structure	\$3,846	\$15,000	\$400	\$2,179
CBD, Underground	\$0	\$25,000	\$500	\$2,645

Figure 46: Typical Parking Facility Financial Costs³



Parking costs are often considered “sunk” (already paid and unrecoverable), but at various times most parking facilities have opportunity costs, for example, to avoid the need to expand parking facilities to accommodate increased demand, or to allow the land to be used for other purposes. As a result, more efficient parking management can often provide substantial savings and benefits, provided that municipal regulations allow parking supply to be reduced.

5.4 Current Ordinance

Like most North American cities, the City of Burlington has various ordinances concerning parking supply and use. The Comprehensive Development Ordinance, Version 9.1.10, Table 8.1.8-1, specifies the number of parking spaces required for various land uses in three districts: Neighborhood, Shared Use and Downtown. Figure 47 illustrates a small portion of the City’s minimum parking ordinance. The current parking requirements apply lower ratios to some land uses if located in the Shared and Downtown districts, reflecting geographic factors such as increased density and mix, and transport options. However, this approach is crude and incomplete:

¹ Todd Litman (2009), “Parking Costs,” *Transportation Cost and Benefit Analysis*, Victoria Transport Policy Institute (www.vtpi.org/tca).

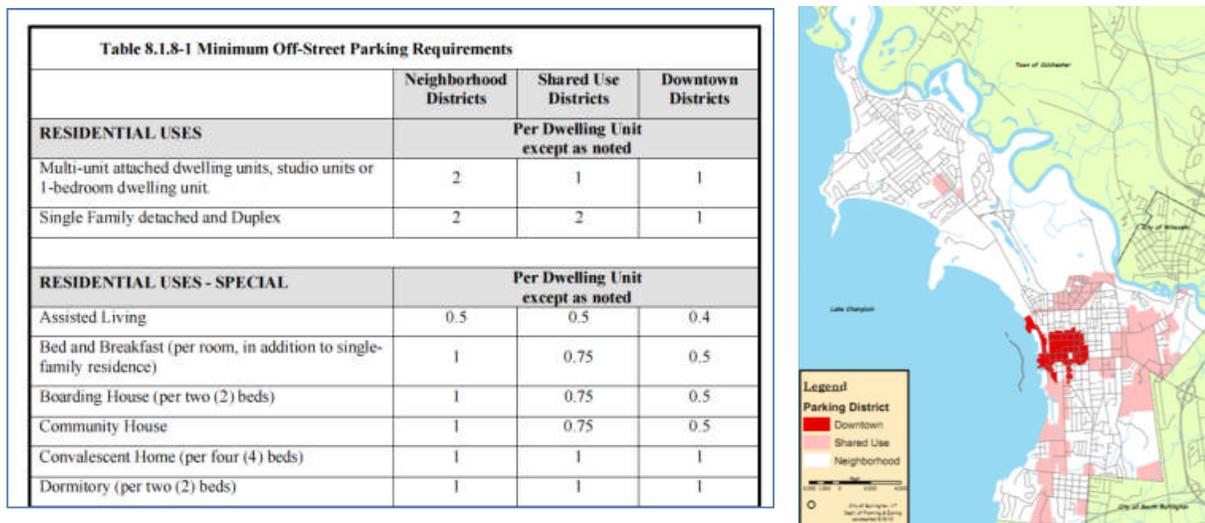
² Experience with local Burlington projects has shown underground parking costs of approximately \$35,000 per space.

³ Todd Litman (2009), “Parking Costs,” *Transportation Cost and Benefit Analysis*, Victoria Transport Policy Institute (www.vtpi.org/tca).



- In some cases (Convalescent Homes, Daycare, General Office) there are no differences between districts.
- In some cases (Dry Cleaning Service, Food Processing, Manufacturing) there are only a small differences between districts.
- In some cases (Film Studio, Lumber Yard, Office-Medical, Dental) there are large differences between districts (Neighborhood requirements are often three times higher than Downtown).
- In many cases the Downtown District has no minimum parking requirement. These are typically retail and businesses (Bar/Tavern, Beauty/Barber Shop, Bicycle Sales/Repair, and Billiard Parlor), recognizing that many downtown customers and employees arrive without a car, or use nearby on-street or public off-street parking. However, it is unclear why other types of land uses with similar customer/client and employee profiles (Convenience Store, Museum, Salon/Spa) are required to provide off-street parking.

Figure 47: Existing Parking Requirements¹



In general, these are within the normal range of North American parking requirements but are often higher than needed and contradict other planning objectives. For example:

- Neighborhood bars and taverns have relatively high parking requirements (4 spaces per 1,000 square feet). These can often be significantly reduced since many patrons walk to them, and this parking can often be shared with other nearby uses that have different peak periods.
- Boarding house occupants tend to be low income so it is unlikely that they really need one parking space per 2-4 beds. This discourages affordable housing development, and redevelopment of existing boarding houses.
- Most communities want to increase affordable housing supply, particularly in central areas, and many apartment residents own no vehicles. The requirement for all multi-family housing units, including single bedroom and studio apartments to have 2 parking spaces if located in Neighborhood districts or one parking space if in Shared or Downtown districts seems excessive. It

¹ Burlington (2008, Amended 2010), "Article 8: Parking," *Comprehensive Development Ordinance, Version 9.1.10*, City of Burlington (www.ci.burlington.vt.us); at www.ci.burlington.vt.us/planning/zoning/cdo/docs/article_08_parking.pdf.



discourages affordable housing development, and redevelopment of existing multi-family housing, and is unfair to residents who own no cars.

- The requirement for 2 parking spaces per 1,000 square feet of office space applies equally in all districts. This is likely to be excessive in Downtown locations. It discourages businesses from implementing parking and transport management strategies since this may result in costly parking spaces being unoccupied, and can significantly constrain downtown commercial development.
- The requirement for 0.75 parking spaces per hotel or motel room in the Shared and Downtown districts assumes that most (75%) of visitors arrive by car, and that all parking demands will be met on-site. This appears high for a multi-modal district, and contradicts efforts to encourage concentrated downtown accommodations.
- The generous parking requirements for grocery and general merchandise stores, and health clubs, discourage development of neighborhood commercial services.
- The ordinance states that, “Any waiver granted shall not exceed fifty percent (50%) of the required number of parking spaces...” This restriction seems excessive since effective parking management often reduces demand by more than half.

The methods used to establish these minimum parking requirements often incorporate features that tend to bias the values upward. They are based on the 85th demand curve, 85% occupancy rates, and the tenth annual design day, meaning that 85 out of 100 individual sites will have 15% unoccupied parking spaces even during the tenth busiest day of the year. They are based on parking demand surveys published in the *ITE Parking Generation Report* that were mostly performed in suburban areas where parking is unpriced and there are few alternatives to driving¹. The resulting values are often much higher than actually needed in most locations, resulting in economically excessive supply². Such regulations reflect the assumptions that most residents and visitors will travel by automobile, that most parking should be supplied on-site, and that parking facility costs are modest and should be subsidized. According to this perspective, parking management is a special solution that is only applied in a few situations where meeting conventional parking requirements is infeasible.

Table 17 illustrates various adjustment factors that can be applied to conventional minimum parking regulations so they more accurately match parking supply with actual demand in a particular situation. These reduced and more flexible parking requirements both support and are supported by more efficient parking management. Such adjustment factors can be implemented in various ways: they can be incorporated into parking ordinances, implemented administratively by planning agencies, or used as guidelines when city councils approve parking variances. The parking requirements in Burlington’s Downtown and Shared Use parking districts reflect some but not all of these adjustment factors.

To evaluate the acceptability of reduced and more flexible parking requirements and increased emphasis on parking management decisions-makers should consider the following questions:

- What are expectable performance standards? For example, how far should motorists be expected to walk between vehicles and destinations, and how much should motorists be charged for?
- How severe is the problem if motorists cannot always find an unoccupied on-site parking space?

¹ ITE (2005), *Parking Generation*, Institute of Transportation Engineers (www.ite.org).

² Matthew R. Cuddy (2007), *A Practical Method For Developing Context-Sensitive Residential Parking Standards*, Dissertation, Rutgers University (www.rutgers.edu); at http://transportation.northwestern.edu/news/2007/Cuddy_dissertation_final_cv.pdf; Wesley E. Marshall and Norman W. Garrick (2006), *Parking at Mixed-Use Centers in Small Cities*, *Transportation Research Record 1977*, Transportation Research Board (www.trb.org); www.darien.org/communitymatters/blog/archives/ParkingstudyfromUConn.doc; also see, 'Place First' Parking Plans (www.planetizen.com/node/34152).



- Who is responsible for solving parking problems, and who should bear parking facility costs?

Table 17: Parking Requirement Adjustment Factors

Factor	Description	Typical Adjustments
Geographic Location	Vehicle ownership and use rates in an area.	Adjust parking requirements to reflect variations identified in census and travel survey data.
Residential Density	Number of residents or housing units per acre/hectare.	Reduce requirements 1% for each resident per acre (e.g. 15% where at 15 residents per acre and 30% at 30 res. per acre).
Employment Density	Number of employees per acre.	Reduce requirements 10-15% in areas with 50 or more employees per gross acre.
Land Use Mix	Range of land uses located within convenient walking distance.	Reduce requirements 5-10% in mixed-use developments. Additional reductions with shared parking.
Transit Accessibility	Nearby transit service frequency and quality.	Reduce requirements 10% within ¼ mile of frequent bus service, and 20% within ¼ mile of a rail transit station.
Carsharing	Whether carsharing vehicles are located nearby.	Reduce residential requirements 5-10% if carsharing vehicles are located nearby, or 4-8 spaces for each carshare vehicle.
Walkability	Walking environment quality.	Reduce requirements 5-15% in walkable communities, and more if walkability allow more shared and off-site parking.
Demo-graphics	Age and physical ability of residents or commuters.	Reduce requirements 20-40% for housing for young (under 30) elderly (over 65) or disabled people.
Income	Average income of residents or commuters.	Reduce requirements 10-20% for the 20% lowest income households, and 20-30% for the lowest 10%.
Housing Tenure	Whether housing are owned or rented.	Reduce requirements 20-40% for rental versus owner occupied housing.
Pricing	Parking that is priced, unbundled or cashed out.	Reduce requirements 10-30% for cost-recovery pricing (i.e. parking priced to pay the full cost of parking facilities).
Unbundling Parking	Parking sold or rented separately from building space.	Unbundling parking typically reduces vehicle ownership and parking demand 10-20%.
Parking & Mobility Mangt.	Parking and mobility management programs implemented at a site.	Reduce requirements 10-40% at worksites with effective parking and mobility management programs.
Design Hour	Number of allowable annual hours a parking facility may fill.	Reduce requirements 10-20% if a 10 th annual design hour is replaced by a 30 th annual peak hour. Requires overflow plan.
Contingency -Based Planning	Supply fewer spaces and implement additional strategies if needed.	Reduce requirements 10-30%, and more if a comprehensive parking management program is implemented.



Table 18 describes various parking management strategies and the typical reductions in the number of parking spaces needed to maintain a particular level of performance in a specific situation. Not all are appropriate in every situation and their impacts can vary significantly depending on specific conditions. An integrated parking management strategy can often reduce parking requirements by 20-40%, and even more if implemented with complementary transport and land use policies, such as public transit improvements and more compact development.

Table 18: Parking Management Strategies

Strategy	Description	Typical Reductions
Shared parking	Parking spaces serve multiple users or destinations, including sharing rather than assigning reserved spaces to users, and sharing facilities among multiple destinations	20%
Parking regulations	Regulations that favor higher-value uses such as service vehicles, deliveries, customers, quick errands, and people with special needs.	20%
More accurate and flexible standards	Parking standards are adjusted to reflect demand in a particular situation taking into account geographic, demographic and management factors	20%
Parking maximums	Establish maximum parking standards	20%
Remote parking	Provide off-site or urban fringe parking facilities and encourage their use	20%
Smart growth	Encourage more compact, mixed, multi-modal development, which encourages sharing of parking facilities and use of alternative modes	20%
Walking & cycling improvements	Improve walking and cycling conditions to expand the range of destinations serviced by a parking facility and reduce vehicle trips	10%
Increase capacity of existing facilities	Increase parking supply by using otherwise wasted space, smaller stalls, car stackers and valet parking	10%
Mobility management	Encourage more efficient travel patterns, including changes in mode, timing, destination and vehicle trip frequency	20%
Parking pricing	Charge motorists directly for using parking facilities, with efficient prices that are higher during peak times and locations	20%
Improve pricing methods	Use better charging techniques to make pricing more convenient and cost effective	NA
Financial incentives	Provide financial incentives to shift mode, such as parking cash-out and transit benefits, often as an alternative to parking subsidies	20%
Unbundle parking	Rent or sell parking facilities separately from building space	20%
Bicycle facilities	Provide bicycle storage and changing facilities	10%
Improve user information	Provide convenient and accurate information on parking availability and price, using maps, signs, brochures and electronic communication	10%
Improve enforcement	Insure that parking regulation enforcement is efficient and considerate	NA
Transportation management assoc.	Establish member-controlled organizations that provide transport and parking management services in a particular area	NA
Overflow plans	Establish plans to deal with periods of peak parking demand	NA
Address spillover problems	Use management, enforcement and pricing to address spillover problems, such as undesirable use of nearby parking facilities	NA
Parking facility design & operations	Improved parking facility design and operations to help solve problems and achieve parking management objectives	NA



Many buildings in Downtown Burlington have features that reduce on-site parking demands:

- They have good walking, cycling and public transit, and so tend to attract customers/clients and employees who rely on alternative modes.
- They serve tourists and people with disabilities, who often use alternative modes.
- They serve downtown employees who, if they drive, often park at their worksite and walk to shopping.
- Many businesses have lower-wage employees.
- They do not involve carrying heavy loads (such as would be required at a lumber yard).
- They offer many off-site parking options, including on-street and public off-street parking.
- Providing off-street parking is costly, so businesses have a strong incentive to implement parking management strategies as an alternative to expanding supply.

For these reasons it makes sense that Downtown District parking requirements should generally be about a third of those in Neighborhood Districts. However there is some uncertainty, so the amount that parking requirements should be reduced depends, in part, on the perceived risks and willingness to implement responsive policies if needed. If spillover parking is totally unacceptable and the city is unwilling to implement new on-street parking regulations and enforcement to address such problems, then high minimum parking requirements should continue. If some spillover parking, or some increase in parking regulation and enforcement activities are accepted, then much lower or eliminated parking requirements are appropriate. Note that this does not mean that off-street parking will not be provided, it simply allows the developer to decide how much to provide based on market demands.

Based on these factors, the following land use categories seem to have significantly excessive Downtown District parking requirements:

- | | | |
|-----------------------------|-----------------------------------|--------------------------------------|
| ▪ Multi-unit dwelling units | ▪ Convention Center | ▪ Office – General |
| ▪ Assisted Living | ▪ Courthouse | ▪ Taxi Operations Center |
| ▪ Bed and Breakfast | ▪ Daycare – Small | ▪ Printing Plant |
| ▪ Boarding House | ▪ Distribution Center | ▪ Radio & TV Studio |
| ▪ Community House | ▪ Dry Cleaning Plant and Services | ▪ Recording Studio |
| ▪ Convalescent Home | ▪ Food Processing | ▪ Research Lab |
| ▪ Group Home | ▪ Hospitals | ▪ Salon/Spa |
| ▪ Historic Inn | ▪ Hotel/Motel | ▪ Primary and Post-Secondary Schools |
| ▪ Sorority & Fraternity | ▪ Machine Shop/Woodworking Shop | ▪ Warehouse |
| ▪ Adult Day Care | ▪ Manufacturing | ▪ Warehouse – Retail |
| ▪ Bakery – Retail | ▪ Marina (per berth) | ▪ Wholesale Sales |
| ▪ Bank, Credit Union | ▪ Museum | ▪ Place of Worship |

Even these reductions are only a start. Additional reductions are often justified if a location has additional features that reduce parking demands, such as a lower-priced apartment building, a condominium with unbundled parking and on-site carsharing vehicles, or a business with a strong commute trip reduction program. It is good public policy to reward such policies with additional reductions in parking requirements, since they provide additional benefits.



For example, this analysis indicates that in the Downtown District, parking requirements for General Office uses should be a third of those in Neighborhood Districts, or 0.66 spaces per 1,000 square feet (sf) of interior space. However, if an employer implemented a commute trip reduction program with subsidized transit passes, this could be reduced another 20%, to 0.53 spaces per 1,000 sf. Table 19 illustrates these adjustments applied to three land use categories, based on reduction factors in Table 17 and Table 18. This type of analysis could be applied to the other land uses identified as having excessive parking requirements above.

Table 19: Parking Requirement Adjustment Factors

Land Use Category	Existing Requirement	Recommended for Downtown	Additional Potential Adjustment Factors
Multi-family Residential	1 per housing unit	0.33 (due to higher density and mix, improved travel options, and unbundled parking).	Lower income (reduce requirements 10-20% for the 20% lowest income households). Carsharing (reduce requirements 5-10% if carshare vehicles are nearby)
General Office	2 per 1,000 sq ft.	0.66 (due to higher density and mix, and improved travel options)	Commute trip reduction programs (reduce requirements 5-10% if based on persuasion, or 10-30% if the include significant financial incentives).
Dry Cleaning Service	2 per 1,000 sq ft.	0.66 (due to higher density and mix, and improved travel options)	Commute trip reduction programs (reduce requirements 5-10% if based on persuasion, or 10-30% if the include significant financial incentives). Shared off-site (reduce requirements another 20% if the business has arranges for employees to use an offsite parking lot, for example, at a nearby church).

5.5 Parking Management Strategies

The following management strategies should be pursued in Burlington:

6. *Reduced and more flexible parking requirement.* Significantly reduce minimum parking requirements, particularly in central areas (downtown and nearby neighborhoods, and other major commercial centers). Incorporate standard adjustment factors by which minimum parking requirements are reduced for specific demographic, geographic and management factors, as in Table 17 of this report. The existing conditions assessment of this report suggests that parking occupancies are generally lower than the recommended 85% level, so the parking supply is not being used as efficiently as it could be. Therefore existing facilities should be managed more efficiently rather than building additional parking that will not be optimally used.
7. *Improve user information.* Providing convenient information to travelers on their parking supply and pricing options (such as real time information on the location and price of available parking spaces), and travel options (such as how to use public transit) allows travelers to choose alternative parking locations and transport options. The existing conditions assessment and stakeholder input indicate that finding parking is difficult, which speaks to the need for better user information to improve parking efficiency.



8. *Public-private partnership (PPP)*. A PPP could provide parking brokerage services (facilitating sharing of parking facilities among downtown businesses) and provide other parking and transportation management services. Currently, the lack of a single entity to organize and facilitate transportation and parking demand management programs and strategies prevents Burlington from realizing a more efficient and seamless transportation system. A PPP would organize services such as Guaranteed Ride Home Programs, bicycling and walking incentives, transit pass subsidies, parking brokerage and shared parking facilitation, and parking system data collection and management. The PPP could be funded by a parking enterprise fund, as described below.
9. *Shared parking*. As much as possible, parking facilities should serve multiple destinations, particularly downtown and other mixed-use activity centers. This means encouraging use of on-street (curb) parking and shared off-street parking facilities in place of individual, dedicated off-street parking facilities at each destination. Shared parking would be facilitated by a PPP and would improve the utilization and efficiency of existing facilities that are less than 85% occupied during peak periods, reducing the need to build new parking.
10. *Parking enterprise fund*. This fund would generate revenue for parking demand management and operations management of existing facilities. The fund would be paid into as an alternative to building parking supply on private parcels. In contrast to in-lieu fees, this enterprise fund would be assured to be reinvested into the system. The enterprise fund would be used to pay for improvements such as parking wayfinding, meter upgrades, data collection, and parking demand management programs and services.

It would also be worthwhile to pursue the following parking management strategies:

- *Efficient parking regulations*. Implement regulations that control parking duration and use to favor higher value users, such as delivery vehicles, people with disabilities, and customers.
- *Efficient parking pricing with improved pricing methods*. Both on-street and off-street parking facilities can be priced to favor higher priority trips, encourage efficient use of parking facilities and encourage use of alternative modes (particularly by employees).
- *Financial incentives*. Efficient parking pricing, parking unbundling (renting parking spaces separately from building space), parking cash out (allowing travelers who are offered a subsidized parking space the option of choosing the cash equivalent if they use an alternative mode), and transit subsidies can encourage more efficient use of parking facilities.
- *Commute trip reduction programs*. Encourage or require employers (particularly larger city center employers) to implement commute trip reduction programs.
- *Walking and cycling improvements*. Improving area walkability expands the range of parking facilities that serve a destination, substitutes for some automobile trips directly, and supports public transit use.
- *Bicycle facilities*. Appropriate bicycle parking and clothes changing facilities can encourage shifts from automobile to bicycle travel.
- *Off-site parking with overflow parking plans*. This means, for example, that a business indicates where customers and employees should park when the on-site lot is full, and have a plan to address peak periods, such as busy shopping days and special events.
- *Improve enforcement*. It may be appropriate to improve parking regulation enforcement practices, including enforcement that is more responsive and courteous to motorists.
- *Parking facility design and operations*. Improve parking facility design and operations including more attractive lots and structures, improved safety and security, better maintenance, etc.



5.6 Ordinance Review Conclusions

The city of Burlington, Vermont has strategic planning objectives that include more compact development, reduced motor vehicle travel and shifts to alternative modes, and more affordable development. Current parking policies contradict many of these objectives. Various policy reforms which result in more efficient use of parking facilities and reduce parking supply requirements can better align parking decisions with strategic planning objectives.

Burlington currently imposes conventional minimum parking regulations and provides modest incentives and support to businesses and residents to more efficiently manage parking. The minimum parking regulations are often significantly higher than needed, particularly in areas with compact and mixed development, and multi-modal transport systems (good walking, cycling and public transit). These generous and inflexible standards tend to contradict many planning objectives, including efforts to reduce drunk driving, encourage urban infill, reduce vehicle traffic, and increase development affordability. The City reduces parking requirements in the Downtown and Shared Use districts, but even there parking requirements are often excessive and contradictory.

These regulations reflect the old parking planning paradigm, which assumes that parking should generally be abundant and free, and parking management need only be implemented in special conditions where increasingly parking supply is infeasible. A new parking planning paradigm favors reduced and more flexible parking requirements with more emphasis on parking management strategies.

There are more than a dozen parking management strategies that may be appropriate in downtown Burlington. Some are already being implemented (such as transit access, walkability, and off-site parking), but could be applied more. Although individually their benefits may appear modest, typically reducing parking requirements at a particular location by just 5-15%, their impacts are cumulative and synergistic (total impacts are often greater than the sum of individual impacts), so an integrated parking management program can often reduce the number of parking spaces needed to provide a given level of service by 20% to 40%, and often higher if implemented with other transport and land use policy reforms. This can provide substantial savings and benefits, making parking management the most cost-effective solution to many problems.

6.0 PARKING & TRANSPORTATION ISSUES AND OPPORTUNITIES

To inform this section, we met with developers to gain an understanding of their experiences with development in Burlington and the barriers that they encounter. Notes from these meetings are included in Appendix E. Based on these meetings, the synthesis of prior plans & studies, the existing conditions assessment, and the review of the current parking ordinance, the following issues and ideas have been identified.

6.1 Parking

7. *Issue:* Data collection shows that **parking is not being used optimally**; that is, even during the peak period, most parking facilities (with the exception of on-street and the Marketplace garage) are less than 85% occupied. **However, it is very difficult to find parking** due to a lack of wayfinding and user information. Therefore, existing parking should be managed to improve efficiency before building additional parking capacity.
8. *Issue:* Since parking can be very difficult to find, visitors and customers get frustrated with Burlington before they even get out of their vehicle. The **parking experience needs to be improved**, as this is the first impression of Burlington that visitors and customers will have.
9. *Issue:* Currently, cost and the availability of space for **parking determines redevelopment potential**. Therefore, one of the reasons that infill development is not taking place at the rate at which the City would like is because the requirements to provide parking make many projects



infeasible from the developers' point of view. How can parking be managed and regulated so that it is not a barrier to infill development? What regulatory and management strategies can be implemented to provide alternatives to increasing parking capacity?

10. *Opportunity:* Being **pro-active in parking management**, for example, deploying new meter technologies, working with private property owners and developers to share parking, collecting data and surveying users, developing and administering demand management programs, etc., will help to improve efficiency. Public Works is in the process of improving **parking payment systems/meters and wayfinding**. This will enable management strategies that involve pricing, such as variable/peak period pricing, and improve user information. Wayfinding will reduce congestion resulting from drivers circulating as they hunt for a parking space. In addition, there are many great ideas and strategies to manage parking, but these initiatives need a home in order to be implemented. A **public/private partnership** to organize these efforts and to manage daily operations of the parking supply is needed.
11. *Issue:* **Lack of ongoing parking data collection**. Specifically, utilization (including turnover), user groups, and any spillover parking issues should be monitored so that operational issues can be identified and addressed. For example, parking leases could be moved to underutilized facilities if occupancy data were more readily available. Particularly because parking demand fluctuates depending on time of day, week, and year, ongoing data collection (such as a parking census) is needed to indicate parking trends and management gaps. As the saying goes, "you can't manage what you don't measure."
12. *Opportunity:* **If additional parking were needed in the future, where could it be built? How could it be paid for?** Does the current distribution of parking support Downtown and Waterfront destinations; is parking located where it is needed now and in the future? New parking would likely take 5-10 years to develop. Therefore, optimizing efficiency and use of the existing parking supply as a resource is necessary to minimize the need for new parking.

6.2 Circulation and Connectivity

6. *Opportunity:* There is an opportunity to develop a **seamless transportation system**, particularly through improvements to transit and to bicycle/pedestrian connectivity. The quality of existing transportation alternatives is not adequate to attract choice users and reduce parking and transportation demand.
7. *Opportunity:* Developing Park&Ride facilities to **intercept traffic entering the core**. Creating off-site parking connected to downtown via high-frequency shuttle will reduce parking demand and congestion in the core.
8. *Opportunity:* Improvements to **bicycle and pedestrian connectivity** (particularly Downtown to Waterfront, and north-south and east-west bicycle connections).
9. *Opportunity:* Improving **walkability**: even though physical infrastructure may be in place, the experience is not pleasant enough to attract pedestrians (e.g. College Street vs. Cherry Street).
10. *Opportunity:* To improve parking efficiency, enhanced **traveler information** such as signs, maps, websites, and GPS, should be integrated to indicate parking availability relative to popular destinations. Improvements to **wayfinding**, including real-time parking information, are currently underway by the City.

6.3 Land Use

3. *Opportunity:* **Downtown's function as a 'neighborhood'** needs to be maintained; it cannot serve visitors only, it needs to include services for residents and employees.



4. **Issue: Jobs/housing balance:** land use in the study area is heavily imbalanced toward jobs. Significant advantages are generated when jobs and housing are in better balance. Incentives to construct downtown housing, including reduction in parking requirements and enabling the unbundling of parking from housing, would help reduce barriers to infill housing development. Community input has specifically suggested a shortage of mid-level/"workforce" housing.

7.0 RECOMMENDATIONS

This section presents regulatory, organizational, and infrastructure recommendations to overcome parking and transportation barriers to infill development. This study has indicated that parking is underutilized because available spaces are hard to find and many spaces are restricted to private property owners and their clients. The study has also shown that addressing the jobs/housing imbalance in Burlington is estimated to more positively impact congestion and parking demand than transportation improvements alone. The recommendations focus on ways to improve parking efficiency to effectively utilize existing parking capacity, reduce parking demand, and stave off the need to build additional parking until existing resources are shown to be utilized to their fullest capacity.

7.1 Regulatory Recommendations

- **The primary recommendation of this study is to focus on residential development in the study area.** Not only does addressing the housing-jobs imbalance¹ in Burlington help to reduce congestion and parking demand by allowing more employees to walk, bike, or take transit to work, but there are also several tools to manage the parking demand associated with residential development. Section 4.4.1 (d) 1.B. of the Comprehensive Development Ordinance limits residential use in the Downtown and Downtown Waterfront Districts to 50% of the gross floor area of a site; this limit should be eliminated and the residential/non-residential mix of uses determined by the market.

Residential parking incentives and waivers appear to be the most workable from the standpoint of developers. Reducing parking needs for residential construction will lower construction costs and incentivize this type of investment. Some overnight residential parking can be satisfied in city or private parking garages. Unbundling parking from housing is attractive to developers and prospective residents who may not need (or want to pay for) a parking space. Some residents may be open to parking their car parked remotely if they only need it on weekends or for special trips. Vehicle limitation covenants, either in lease agreements or through homeowner associations, can also reduce the parking associated with residential uses.

- **Facilitate and encourage shared parking.** Because much of the existing parking supply in Burlington is restricted to private property owners and their clients, making existing parking accessible to more people is critical to increasing efficiency. The strategy is to use existing parking more intensively (for more hours of the day) rather than building new parking. As much as possible, parking facilities should serve multiple destinations, particularly in downtown and other mixed-use activity centers. This means encouraging use of on-street (curb) parking and shared off-street parking facilities in place of individual, dedicated off-street parking facilities at each destination. The City of Charlotte, NC, is pursuing a public-private system of shared parking facilities, recognizing that "a well-organized system of parking, regardless of ownership, can result in better utilization of existing facilities and reduce the perceived need for additional parking....An important benefit is avoidance of an oversupply of parking that could compete with a growing transit system."² While shared parking would likely be facilitated by a public-private partnership (described below), municipal policy can encourage shared parking in the following ways:

¹ As noted in the Burlington Municipal Development Plan, the CCMPO Metropolitan Transportation Plan, the CEDO Economic Development Plan, and others.

² Kimbler, J. "Real-Time Parking Wayfinding System" in the *Institute of Transportation Engineers (ITE) Journal*, December 2010.



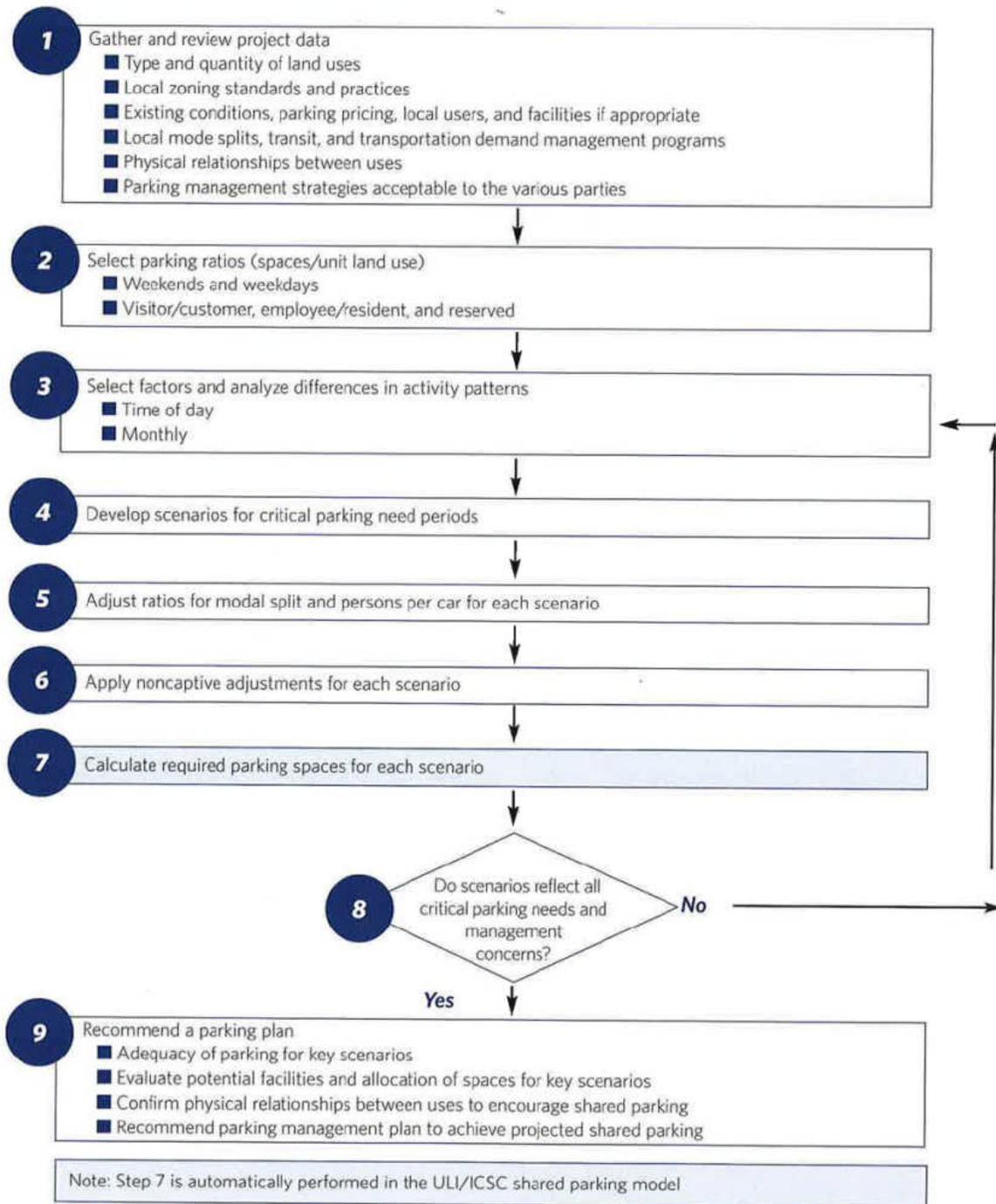
- Efficiently manage on-street parking with regulations and pricing to insure that it serves the greatest number of destinations. (That is, encouraging people to “park once” and walk to several points of interest rather than drive to them.)
- Establish standard procedures by which property owners are allowed to reduce their parking supply by sharing facilities. This should require minimum effort so it is feasible for smaller properties (e.g., a business that only needs less than ten parking spaces). For example, parking used 9AM to 5PM for an office can be used after hours for nearby restaurants.
- Work with business associations or through a public-private partnership (described below) to establish parking facility matching and brokerage services, which help individual businesses identify opportunities to share parking facilities. The service would also help to address barriers to shared parking, such as:
 - Unauthorized use of spaces: consider restricting access/use by charging fees, gating the access, using electronic access cards, etc..
 - How to share maintenance costs: consider pro-rating costs depending on parking use.
 - Marketability of a development with “less parking:” if sharing arrangements have been established, there should be access to as much parking as there would be if the site had its own dedicated facility.¹
- **Parking requirements should be more flexible for developers if they incorporate demand offsetting elements** such as: being located near carshare pods; including vehicle limitation covenants or unbundled parking for residential developments; arranging shared parking (a methodology for determining the amount of parking appropriate for a shared facility is shown in Figure 48). Table 17 above presents adjustment factors that can be applied to parking requirements.

Minimum parking requirements are an appropriate regulatory measure in downtowns with limited space and where market forces will prevent an oversupply of parking- provided that the minimums are not too high. Minimum parking requirements help to address chronic spillover parking. However, as noted, minimum parking rates tend to be overly conservative and should be flexible to address overflow when it happens rather than accommodating it the majority of the time. In addition, parking demand rates in urban neighborhoods that are walkable, bikeable, and transit-accessible tend to be lower than in suburban and rural areas. Maximum parking restrictions are more appropriate in suburban and rural areas where land is less expensive. Maximum restrictions may make parking in urban areas scarce, with the potential for changing travel behavior and shifting mode splits away from single-occupancy vehicles since parking is expensive and difficult to find.

¹ See page 15 of the US Environmental Protection Agency’s “Parking Alternatives: Making Way for Urban Infill and Brownfield Redevelopment,” 1999, which specifically addresses planner and developer concerns such as the marketability of developments with less parking, land use changes, and addressing unauthorized parking and maintenance.



Figure 48: Urban Land Institute Shared Parking Methodology¹



¹ ULI, *Shared Parking*, 2005. Page 8.



- **Consider creating a parking enterprise fund.** This fund would generate revenue for parking demand management and operations of existing facilities. The fund would be paid into as an alternative to building parking supply on private parcels. In contrast to in-lieu fees, an enterprise fund would be assured to be reinvested into the transportation system. The enterprise fund would be used to pay for improvements such as parking wayfinding, meter upgrades, data collection, and parking demand management programs and services. In-lieu of fees (which developers pay in lieu of providing the parking spaces required by local zoning ordinance and which are used to finance public parking to replace the parking that would have been provided by the development project) have been considered, but often these funds end up unused because the construction of a new parking structure is either too expensive or parking demand has been lowered by management strategies and the additional parking is unneeded. A parking enterprise fund, which would be paid into on an ongoing basis rather than as a one-time in-lieu of fee at the time of development, would focus on operations and demand management strategies that would improve the efficiency of existing parking resources. Portsmouth, New Hampshire is pursuing such a fund to manage their parking. The parking enterprise fund in Austin, Texas invests in public garage operations, transit, trails, sidewalks, and bike paths. Orlando, Florida's enterprise fund focuses on downtown revitalization, pedestrian projects, and clean, safe, affordable, accessible parking. Newport, Rhode Island uses enterprise fund programs to support its revenue-generating properties such as the harbor facilities, visitor's center, and boat launches. Other cities with parking enterprise funds include Santa Ana, California and Greenville, South Carolina.
- One low-hanging fruit to improve efficiency is to **prioritize specific parkers** such as delivery vehicles, disabled access, loading/unloading zones, 15-minute parking for short errands, and other high turnover uses.

7.2 Organizational Recommendations

Organizationally, one of two situations could be adopted. Either a public-private partnership could be developed to manage parking, or the City of Burlington could assume responsibility for parking as a municipally provided service (such as water, sewer) and eliminate parking regulations altogether, such as Portsmouth, New Hampshire is doing. While the latter option simplifies management in some ways, both City staff and developers have agreed (in meetings for this study) that **the public and private sectors have their strengths and weaknesses and should work together through a public-private partnership (PPP) for an optimal result.** Currently, the lack of a single entity to organize and facilitate transportation and parking demand management programs and strategies prevents Burlington from realizing a more efficient and seamless transportation system.

In Burlington, the PPP would manage parking and provide a single point of contact to **organize and coordinate the multitude of parking facilities and operate the parking supply as one system.** The organization could be an independent authority, a City department, part of an improvement district, or operate under another type of framework. The PPP could be funded by a parking enterprise fund as described above. Among its functions would be:

- **Broker parking arrangements and negotiate shared parking.** The PPP would match potential partners and negotiate sharing arrangements, as well as manage opportunities for remote parking.
- **Provide a home for Transportation Demand Management (TDM) programs.** Previous studies have shown that lack of marketing and/or administrative challenges have prevented commuters from taking advantage of incentives for using alternative transportation or being aware of their options. It is important to keep in mind that TDM **solutions are not all-or-nothing.** Implementing an employee commute reduction program does not mean that employees can never drive into Burlington ever again—even switching to an alternative mode just one day per week would be a 20% reduction in demand. **Flexibility can and should be built into solutions.** For example, providing 3-day/week parking permits (that is, where you can park your car 3 days each week and use alternative transportation the other 2 days) instead of annual permits helps to avoid an “all-you-can-eat” syndrome in which people drive every day just because they can.



TDM programs and services offered by the PPP could include:

- Guaranteed Ride Home Program for employees
 - Carpool/vanpool matching services for employees
 - Employee transit subsidies
 - Incentives for alternative transportation, such as discounts on bicycles or biking gear, parking cash-out, or coupons to Marketplace merchants.
- Parking is hard to find and much of the existing parking supply in Burlington is restricted to private property owners and their clients. The result is underutilized parking: this study and the 2003 Downtown Burlington Parking Study indicate that peak period occupancies do not typically meet the suggested 85% target for maximum efficiency. (Although specific facilities such as the Marketplace garage do reach capacity, there is available capacity at nearby sites such as Town Center, College Street, and Lakeview.) **Parking efficiency needs to be improved through traveler information, wayfinding, marketing, data collection, technology updates, and other management strategies to guide people to the unused parking.** As the manager of daily operations, the PPP would be responsible for this critical part of the parking system. For example, this analysis suggests an opportunity for shifting parking demand to underutilized facilities such as the Lakeview garage (66% occupied), through improved user information (advertising 2-hours free parking in garages, as well as smart signs indicating where available spaces are) and/or pricing (for example, installing parking meters with variable pricing technology to charge more during the peak period for parking adjacent to the Marketplace compared to a block or two away). Improvements to wayfinding (including electronic parking signs) are currently underway by the City of Burlington.

As an example, the City of Charlotte, NC has determined that pursuing a parking wayfinding system will help to unify their fragmented parking system, make parking easier for users, improve efficiency and utilization of existing parking resources, and provide a more cost-effective alternative than building new parking. Their goal is to present the parking system as a single, unified system that appears seamless. This approach is expected to benefit private stakeholders: “Benefits to owners and operators should include higher revenues from increased utilization, the potential for subsidies by the collaborative to expand operating hours (and, ultimately, generate new revenue), and financial and infrastructure support for new technology costs.”¹

- Data collection and **developing/maintaining a parking database** is important to being able to plan and manage the parking supply effectively. The PPP would collect and maintain data to inform how, where, and when parking is used in order to support daily operations and management decisions, and to plan for future use. While this study collected several hours of data to understand parking trends, the collection occurred during the summer when parking patterns are likely different than at other times of the year in Burlington (particularly at the Waterfront). To avoid any bias in planning, a more robust database should be developed. If a parking census is not regularly conducted, utilization (specifically, under-utilization) cannot be assessed to identify efficiency gaps and estimate the need for additional supply.

The types of information that should be maintained in this database includes:

¹ Kimbler, J. “Real-Time Parking Wayfinding System” in the *Institute of Transportation Engineers (ITE) Journal*, December 2010.



Parking Supply Data

- Location
- On- or off-street
- Ownership
- Intended and allowed users
- Regulation
- Price

Parking Demand Data

- Occupancy rates at various times of day, week and year
- Average duration and turnover
- User types
- Violation rates
- Revenue (for priced parking)
- Complaints

Appendix F includes a Data Collection How-To Guide. This database will inform management issues and identify parking problems, including where parking occupancy rates exceed desired levels (typically 85% for short-term, 95% for commuter and residential), difficulty parking delivery and service vehicles, spillover parking (motorists occupying parking spaces intended for other users), and parking pricing that is considered difficult to use or unfair.

- From the database described above (specifically, parking turnover studies), the PPP can **determine parking prices**. This analysis can identify strategies for variable pricing and to encourage turnover as well. Pricing to shift users from highly occupied facilities to under-utilized ones can also be established. For example, prices can be set to shift demand from the Marketplace Garage, which is fully occupied during peak periods, to underutilized facilities such as the College Street and Lakeview Garages. Likewise, parking leases could be moved from the Marketplace to either College or Lakeview. Until more data are available to inform appropriate price levels, a pilot program raising on-street parking prices (with the intention of shifting parkers to underutilized garages) could be pursued.

Parking pricing is similar to regulations, in that it can be used to favor higher value users, but it provides an additional benefit: revenues that can be used to improve transportation services or help finance other municipal programs. However, care is needed to avoid the perception that the city's parking prices are excessive, inconvenient or unfair.

- **Develop strategies and opportunities specific to different user groups and their needs.** For example, short-term parking (such shopping, errands, meals, etc.) should be accommodated downtown (as opposed to remotely). Employees need longer-term parking (8-10 hours), as do some visitors. Employees can be further broken into office (M-F, 9-5) and retail/service (late night, dinner shift, etc.). Office space needs onsite parking to accommodate clients. Parking lease options can be developed accordingly to provide maximum flexibility for users. For example:¹
 - \$50/month for a M-F 8am-5pm lease
 - \$80/month for M-F 24 hours a day
 - \$100/month for 24/7

The PPP would be responsible for studying the various user groups and developing parking strategies accordingly.

- **Use holiday parking management strategies year-round.** The PPP would be in charge of **experimenting with new programs and strategies through pilot programs and trial runs** to determine the effectiveness of and public reception to creative strategies and innovations. For example, the Marketplace Commission is going to implement a trial valet parking program for the 2012 holidays.
- **Develop off-site parking connected to Downtown with a shuttle.** The PPP would manage this remote parking with lower prices than on-site parking (or it could be free) and make sure that it is served by a high-frequency, free shuttle. Implemented with support from TDM programs and enhanced traveler

¹ These lease amounts are only used as an example and are not recommended nor based on existing conditions.



information, a remote facility would accommodate longer-term parking such as residents who do not require their vehicle every day, or employees who park 8-10 hours on weekdays. Balancing this with a guaranteed ride home program, CarShare Vermont memberships and other tools to provide flexibility, as well as incentives such as parking cash out, would help to make this an effective strategy.

7.3 Infrastructure Recommendations

- The first priority put forward by this study is to improve efficiency in the management, operation, and utilization of existing parking facilities; still, the future parking analysis estimates that about 500 additional spaces would be needed by 2040 given the assumed parking requirement adjustments. Therefore, a critical question to be answered is: **If new, additional parking capacity were needed, where, when, and how could it be built?** While the recent CCRPC Park & Ride Plan has identified intercept facilities (Exit 14, South End Transit Center, I-189 & Shelburne Road), other studies¹ have identified potential locations for new parking within the study area. Options that have been identified over the years include:
 - the lot on the southwest corner of Main and St. Paul Street: currently occupied by TD Bank; assumed to have a capacity of 75-90 parking spaces;
 - the “Superblock” on the northeast corner of Main Street and South Winooski Avenue: likely to involve a parking structure; capacity unknown;
 - a parking garage built into the slope on the west side of Battery Street between Cherry and Pearl Streets; the 2009 Waterfront North Access Study estimated an in-slope, automated (necessary for the small footprint available) parking garage to cost approximately \$23M;
 - a garage on the existing surface lot west of Vermont Wine Merchants and northeast of the railyard; assuming 400 spaces and \$15k per space, a structure behind Vermont Wine Merchants could cost roughly \$6M.

Staff agree that the timeline for new structured parking would be at least 5 to 10 years and would likely require a public-private partnership to develop. Design elements to bear in mind during the development of a new parking structure include:

- Attractive design, with special care to insure that parking facilities integrate into the streetscape.
 - Where possible, parking structures should have ground-floor retail, or be wrapped with other types of buildings to avoid blank walls.
 - Design parking facilities to minimize crash risk. Manage access to insure safe driveways.
 - Establish high maintenance standards, particularly for lighting and signage.
- **Build less parking with a contingency plan for occasional overflow.** Many destinations can use off-site parking to serve a portion of their parking demands, particularly during peak periods. For example, a restaurant can arrange for employees to park during evenings at a nearby office building parking lot, and businesses can indicate to customers where they may park when the on-site lot is full, particularly during peak periods such as busy shopping days and special events. Rather than building for the parking peak demand, build for the average demand (or a portion of it) and have a plan in place for addressing overflow when it happens. These arrangements could be facilitated by a PPP.
 - The Burlington Department of Public Works will be upgrading parking meters in specific locations. These improvements will enable parking meters to accept credit cards as well as cash/coins; allow customers to pay by cell phone; transmit transaction, enforcement, and operational data wirelessly; and allow the DPW to program variable pricing. Each meter will serve multiple spaces and will be pay & display or pay-by-space. **Implementing updated parking management, data collection and enforcement technologies will be critical to maintaining the integrity of the parking supply.**

¹ Waterfront North (2009) and Waterfront South (2010) Access Studies.



- **Improve streetscaping between Downtown and the Waterfront to attract pedestrians, connect these areas, and encourage people to “park once.”** Extend the Marketplace improvements that are being applied to lower Church St. and St. Paul to east-west blocks.
- The Department of Public Works is responsible for the maintenance and operation of public parking. Improvements that were suggested during the course of this study are:
 - **Re-evaluating on-street No Parking zones.** There are some spaces that are designated ‘No Parking,’ but the original reasoning for this assignment is no longer applicable and parking could be reclaimed.
 - **Ensuring that on-street parking does not interfere with driveway sight distances.** There are locations where parked cars adjacent to driveways or accesses block visibility and create a hazardous situation.
 - **Enhancing the attractiveness of parking garages.** Stakeholder input has suggested improving lighting, customer service, stairway cleanliness, and wayfinding/traveler information when the Marketplace garage is full. Adding signage in French to alert users to the low vertical clearance would also be an improvement.
- Projects that have been identified by other plans would support alternative modes that would make them more attractive and encourage a mode shift. Among these are:
 - Developing a Multimodal Transportation Center in Burlington.
 - Reforming transit funding.
 - Expanding transit system convenience, particularly by increasing service hours and frequencies on the major corridors that serve the City: North Ave, Colchester Ave/Pearl Street (VT 15), Williston Road/Main Street (US 2), and Shelburne Road (US 7). Model improvements after the College Street Shuttle, which is frequently commended for its high-frequency, convenient, user-friendly, and easy to understand service.
 - Improving transit service between Burlington, South Burlington, and Winooski.
 - Developing a bicycle connection to Winooski.
 - Creating pedestrian alignments from Battery Street to the Waterfront, extending from Sherman Street, Battery Park, Pearl Street, midblock between Pearl and Cherry, and Cherry Street.



APPENDIX A-SYNTHESIS OF PREVIOUS PLANS AND STUDIES

This section synthesizes prior plans and studies, focusing on the key findings and recommendations of that work. The synthesis ensures that the most important aspects and contributions of these documents are carried forward. The City has sponsored many parking and circulation studies over the past 10 years. Combined with studies conducted by other entities, such as the Chittenden County Metropolitan Planning Organization (CCMPO), Hill Institutions and the private sector, there is an invaluable storehouse of information upon which PlanBTV can draw.

Virtually all of the City's transportation studies over the past 10 years sound a steady theme of a multimodal transportation system serving intensive, mixed use development. The need to support vibrant alternative transportation networks is stressed over and over again. Thus, the City has already made the decision to invest in alternative transportation to serve its land use vision. The goal of this synthesis is to identify the best policies and investments for advancing infill development. This section considers transportation and land use decisions and how they can promote and encourage economic development.

1.1 Synthesis Organization

During the project kick-off, a list of previous plans and studies to be reviewed for this task was finalized. Items encountered during the document review and that appeared significant were added:

Land Use and Development Plans and Studies

- CCRPC Regional Sustainability Project (in progress)
- Downtown & Waterfront Plan Build-Out Analysis (to be completed in June)
- Legacy Project (in progress)
- Climate Action Plan (in progress)
- Municipal Development Plan (a.k.a, City Plan) (2011)
- Burlington Wayfinding Plan (2008)
- Downtown Burlington Retail Observations (2008)
- Market and Transportation in Downtown Burlington (2006)
- CEDO Economic Development Plan (2005)
- Downtown Retail Feasibility Study (2002)
- Waterfront Revitalization Plan (1998)

Transportation Plans and Studies

- Chittenden County Park & Ride Plan (2011)
- CCTA Transit Development Plan (2010)
- Southern Connector/Champlain Parkway ROD (2010)
- CCMPO Regional Bicycle-Pedestrian Plan Update (2008)
- CCMPO MTP 2025 (2005)
- Pearl Street Streetscape Improvements (in progress)
- St Paul St and Lower Church St Construction Projects (2011)

- Waterfront North Access Project (in progress)
- Battery-Pearl Intersection (2011)
- Burlington Transportation Plan (2011)
- The Potential for Enhanced Transit Services in the City of Burlington (2010)
- Waterfront South Access Study (2010)
- Joint Institutional Parking Management Plan (2009)
- Burlington Parking Study Final Report (2003)
- Burlington North/South Bicycle & Pedestrian Route Study (2002)
- Burlington Waterfront Parking and Circulation Study (2001)

Major themes and commonalities from these documents are considered below. Directions established and actions recommended by the plans and studies are identified and consistent goals, strategies, and projects are discussed.

Reviews of the individual plans are attached at the end. The documents are organized by regional and Burlington-specific plans, and listed in chronological order.

1.2 Synthesis

This synthesis focuses on aspects of Chittenden County’s and Burlington’s transportation and land use documents that can influence economic development. Throughout the document review, common themes were identified to gain a sense of overarching directions that have been established for the region and Burlington.

Table 2 and Table 3 are provided as organizational tools to illustrate these common ideas. The repeated themes have been organized as goals, strategies, and actions. Identifying the goal category helps to identify the type of document (for example, whether it is a broad, visionary plan or a precise and detailed transportation study). Goals are discussed in Section 1.2.1. Strategies (Section 1.2.2 **Error! Reference source not found.**) identify policies and directions that are established by the document, while actions (Section 1.2.3 **Error! Reference source not found.**) are specific, recommended projects. Occasionally a theme is both a strategy and an action; for example, balancing housing with jobs can be viewed as a strategy and constructing new housing is an action. The status of ideas under consideration or in progress is summarized in Section 1.2.4. Section 1.2.5 notes performance measures so that planners can be aware of data needs to determine baseline conditions and future progress.

1.2.1 Goals

Common goals are illustrated in Table 2 to help establish commonality among the documents and to understand the focus of each.

The visions and goals set forth by almost all of the plans often focus on quality of life, sustainability, environmental health, access to multimodal transportation, and developing economic potential.

- **Quality of life** pertains to residents’ everyday life in their neighborhoods.
- **Sustainability** usually refers to establishing a way of life that does not rely so heavily on so many resources as to someday become infeasible.
- As described in these documents, **environmental health** usually involves reducing fossil fuel consumption, Greenhouse Gas emissions (GHG), the City’s carbon footprint, and/or vehicle miles traveled (VMT).



- Fostering a **multimodal transportation system** (particularly transit, bicycle, and pedestrian modes) and expanding access to it is a goal of a majority of the plans.
- **Developing economic potential**, such as strengthening the regional economy or maintaining Burlington's role as the center of the county economy, was the most frequently established goal.

Often, a goal such as sustainability or environmental health was a byproduct of another goal such as developing economic potential. Likewise, improving quality of life will attract business and strengthen the economy. Overlap among planning goals strengthens the directions established by the documents.

1.2.2 Strategies

Common strategies and policies (grouped in Table 2) are more specific than goals but are still broad enough to allow innovation in their implementation. Nearly all the documents called for an investment in new and/or existing infrastructure, showing a focus on developing the physical framework that supports the area's economy, quality of life, environmental health, sustainability, and transportation system. Limited new infrastructure (such as the Southern Connector/Champlain Parkway) was noted, but maintaining what is already in place was emphasized and shows a sense of fiscal responsibility.

Transportation strategies are dominated by the need to develop a seamless transportation system that provides high bicycle and pedestrian connectivity and convenient, reliable, and comfortable transit that will increase ridership by improving access and attracting choice riders. This focus will help to achieve another widely noted strategy, reducing the number of private vehicles that enter Burlington.

Improving access to parking could be viewed as a strategy that would encourage driving in the City. But the strategy as described in the documents is more about improving parking efficiency, traffic circulation, and the users' experience (and consequently economic vitality). One example of a parking access improvement is clear, consistent wayfinding that includes real-time information to reduce VMT from vehicles on the hunt for a parking space. The strategy remains open enough to allow for different actions and solutions to be developed. Likewise, emphasizing Waterfront parking on the east side of Battery Street preserves the Waterfront area from becoming automobile-dominated and encourages travelers to use alternative modes. Actions to pursue this strategy include parking management systems, wayfinding, construction of parking structures, strengthening pedestrian connections across Battery Street, and others.

Strategies that focus on the relationship between **land use development and the economy** are dominated by ways to attract and retain business. Plans noted that while small businesses would initially be attracted to Burlington, they often did not feel accommodated as they expanded and would move to more suburban environments in the region. A principle barrier to attracting and retaining businesses is parking difficulty. Easing the process to develop (or in most cases, redevelop) land for a business expansion and encouraging this development through financial incentives may help to retain businesses within the City. Also, intensifying land use and the diversity of uses needs to be accomplished to make the most of limited space. Burlington's Municipal Development Plan (MDP) encourages following a growth center/compact development pattern with high-density growth and mixed use development, promoting public transit, walking and biking as the preferred forms of transportation. The Plan notes that many properties in Burlington are underdeveloped¹ and could be used more intensely with multiple uses, taller buildings, and smaller setbacks. Surface parking is a specific example of redeveloping properties for more intensive use and making the most efficient and effective use of space. The 2011 buildout analysis of the Downtown-Waterfront Study area by Milone & MacBroom indicates that there is potential for an additional 18.2 million square feet of mixed-use, commercial development and 525 residential units (Table 1), although complete buildout of the study area is not necessarily possible or expected.

¹ "Underdeveloped" refers to those parcels that are developed at less than 50 percent of the average of the existing or allowable density in the zoning district.

Table 1: Summary of Existing Development and Buildout Potential (2011 Downtown & Waterfront Plan Land Use Inventory and Buildout Analysis of Downtown & Waterfront Area by Milone & MacBroom, Inc.)

	Existing	Buildout	Net
Mixed Use	7,947,396 sqft	26,056,033 sqft	18,163,640 sqft
Residential	2,398 units in study area, 1,305 of which are in residential zones	1,830 units	525 units

Under current zoning, there is minimal residential use, and of this, there are only two high density residential parcels. Increasing residential density has the greatest potential within the study area. Parcels with the greatest potential for mixed use development are mostly for shopping/business/trade, social/institutional, or mass assembly activities. At the time of the MDP's development in 2006, the retail vacancy rate of the Marketplace properties was 4%, and the upper-floors (mostly office space) had a vacancy rate of 17%. The Community and Economic Development Office (CEDO) indicated that there are 40,000 square feet of vacant space on the upper floors. (MDP page I-14)

The dominant theme learned from the document review was the need for **housing** in Burlington. An imbalance between housing and job growth hinders the economy while leading to unsustainable land use patterns and transportation systems. Increasing housing will strengthen Burlington's role as the regional growth center and the viability of the transportation system. The CCMPO's Metropolitan Transportation Plan (MTP) 2025 notes that housing demand created in the 1990s has not been satisfied in the County and that over the MTP's 25-year planning horizon, a 61% increase (or demand for an additional 35,700 units) is expected (~2% annual growth in demand; note that more recent trends suggest the ambitious growth rates anticipated earlier in the 2000 – 2010 decade have slowed and that annual growth rates for housing are now between 1 and 1.5%). The MTP stresses that improvements to the transportation system's performance hinge on establishing a land use pattern of concentrated development centers: **"the success of future transportation system investments...is dependent upon achieving the development pattern" of 45% of housing and 45% of employment within the Metropolitan Areas** (which include all of Burlington)." (CCMPO MTP 2025 Chapter 5)

A diversity of housing affordability is a critical aspect of increasing housing. Plans indicate that diverse housing is needed in the Downtown and Waterfront areas in particular. The Burlington MDP emphasizes that **Downtown's identity and function as a neighborhood must not be overlooked**. The Plan acknowledges that certain types of retail and services are needed to support residential uses, such as grocery stores, daycare, hardware stores, etc., so care must be taken to prevent the Downtown from becoming overly tourism-focused.



Table 2: Goal and Strategy Summary

		Land Use and Development Plans and Studies										Transportation Plans and Studies										Total							
		Regional					Burlington					Regional					Burlington												
		CCRPC Regional Sustainability Project	Downtown & Waterfront Plan Build-Out Analysis	Legacy Project	Climate Action Plan (CAP)	Burlington Wayfinding Plan	Downtown Burlington Retail Observations	Market and Transportation in Downtown Burlington	Municipal Development Plan (MDP)	CEDO Economic Development Plan	Retail Feasibility Study of the Downtown District	Waterfront Revitalization Plan	Chittenden County Park & Ride Plan	Chittenden County Transportation Authority (CCTA) Transit Development Plan	Southern Connector/Champlain Parkway Record of Decision	CCMPO Bicycle-Pedestrian Plan	Chittenden County Metropolitan Planning Organization (CCMPO) Metropolitan Transportation Plan (MTP) 2025	Pearl Street Streetscape Improvements	St Paul St and lower Church St construction projects	Waterfront North Access Project	Battery-Pearl Intersection		Burlington Transportation Plan	Joint Institutional Parking Management Plan	The Potential for Enhanced Transit Services in the City of Burlington	Waterfront South Access Study	Burlington Parking Study Final Report	Burlington North/South Bicycle & Pedestrian Route Study	Burlington Waterfront Parking and Circulation Study
Goal	Quality of life		X	X			X	X		X				X	X		X	X	X		X				X				13
	Sustainability		X	X			X			X	X	X		X	X					X	X					X			11
	Environmental health		X	X			X			X	X	X		X						X									8
	Access to multimodal transportation		X				X	X		X	X	X		X	X		X	X		X	X	X	X	X	X	X	X	X	16
	Develop economic potential					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	18
Strategy	Transportation	Decrease the number of private vehicles traveling into the core		X	X		X					X	X		X						X	X			X			9	
		Develop seamless transportation system with high bicycle and pedestrian connectivity and convenient and comfortable transit to increase ridership		X				X			X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
		Improve access to parking				X	X	X				X								X	X				X		X		7
		Emphasize Waterfront parking east of Battery Street				X					X								X					X			X		4
	Economic/ Development	Attract and retain businesses		X		X	X	X									X	X	X		X		X	X	X				11
		Increase housing and diversity of affordabilities to connect employees to jobs and reduce commuting distances		X		X	X	X		X				X									X						7
		Promote land use pattern of high-density, mixed use, compact development						X	X		X		X			X				X		X							7

1.2.3 Actions

Actions (Table 3) are grouped by economic/land development, parking, transit, and other.

Economic and Land Development

Implementing the strategy to increase housing both on the Waterfront and Downtown and redeveloping brownfields are actions that were repeatedly identified by the documents. CEDO's Brownfield Redevelopment and Vermont Downtown Programs illustrate ways to implement these initiatives by providing technical assistance and financial incentives.

Similarly, intensifying densities and uses and reforming permitting requirements are opportunities to be pursued. For example, the Burlington MDP presents options for revising permitting requirements for parking:

Techniques to lessen the demand for additional parking include removing parking minimums or changing the number of parking spaces required by the zoning ordinance from a minimum to a maximum - in effect limiting the number of parking spaces a developer can provide. The Parking and Mass-Transit Capital Fund must also be made a more attractive alternative to developers in lieu of building new parking spaces. Two other demand management approaches include a cash out of monthly parking where businesses providing parking to their employees offer the cash equivalent value of those spaces as an alternative, and creating a flexible payment medium that can be used at any facility, parking or transit, and subsidized by the private sector, to reduce the demand for high priced parking and lessen the expense to the user. (emphasis added; MDP page V-10)

Transportation

Parking management includes options such as wayfinding improvements and implementation of 'smart signs' that convey real-time parking information. There is a strong need to implement a system that maximizes the efficiency of existing parking facilities rather than increase capacity. Implementing the 2008 Wayfinding Plan and related initiatives (such as developing a Downtown TMA) will help to accomplish the deployment of a parking management system. However, capacity increases in the form of Park&Ride and intercept facilities are recommended as they intercept vehicles before they enter the core. Specifically, facilities to the south (South End Transit Center); east (Exit 14/behind the Sheraton); and north (VT 127) of the City have significant momentum.

Two elements are established as the basis for achieving a seamless multimodal transportation system in Burlington and the region: 1) a strong transit system, and 2) facilitating bicycle and pedestrian access and connectivity.

Transit system improvements involve updating existing services to resemble the College Street Shuttle, as well as designing new routes. The College Street route's high-frequency (15-minute), free fare, and easy-to-use convenience and comfort has a positive image and attracts high ridership, including choice riders. Many plans cite the Shuttle as the standard to which other CCTA routes should be raised. Another common recommendation is for the development of a **multimodal transportation center**. CCTA identifies this as its "most needed facility investment" in its 2010 Transit Development Plan. A multimodal transportation center is critical in advancing improvements in the overall system. Expanding transit system routes (in terms of frequencies, service hours, and geography) is also a priority. Several of the documents recognize that transit funding is in need of reform in order to implement any improvements.

A non-CCTA transit action is the re-introduction of passenger rail. The 1998 Waterfront Revitalization Plan suggested that it may be challenging to reconcile this initiative with efforts to relocate the railyard from the southern part of the BTV study area. The Waterfront Revitalization Plan notes that:



While the City encourages the expansion of passenger rail, the railyard is a potential obstacle to development of the Waterfront as a publicly accessible community resource.

By moving the railyard off the Waterfront, truck traffic through residential neighborhoods would be eliminated. Noise would be dramatically reduced. There would be a positive impact on Burlington's south end neighborhoods. The storage and handling of hazardous materials would be eliminated. Relocation of the railyard would provide an opportunity to create mixed use development on those lands.

On the other hand, relocation of the Vermont Railway yard off the waterfront could possibly mean the loss of rail infrastructure in the City and would further sanitize the Waterfront from its industrial heritage. The movement of goods by rail is far more sustainable, efficient, economical and environmentally responsible than trucking. Future opportunities to transfer goods for manufacturing and public use by rail should not be discarded without careful consideration. (page 26)

The Waterfront South Access Study examined the economic potential of the area and alternatives for increasing connectivity with the railyard in place. The study proposes a grid street network that would increase access, remove truck traffic from neighborhoods, facilitate multimodal movements, and develop economic potential while accommodating the railyard.

Other Actions

While not located within the BTV study area, the adjacent Pine Street corridor/enterprise zone to the south is recognized in this synthesis for its economic potential and the opportunity for stronger connections between the Downtown/Waterfront and this area. Figure 1 shows that the three areas are approximately equidistant to each other, yet Pine Street feels to be at a much greater distance from either the Waterfront or Downtown, because the connections do not align with the street grid and because of the industrial context. While the Waterfront South Access Study noted above considers this area and opportunities for the future, it should be expanded upon to examine connections among the Downtown-Waterfront-Pine Street Corridor.

Connections between the Waterfront and Downtown have been recommended in several documents. Most recently, the Waterfront North Access Scoping Study considered pedestrian alignments from Battery Street to the Waterfront, extending from Sherman Street, Battery Park, Pearl Street, midblock between Pearl and Cherry, and Cherry Street. Except for Sherman Street, extensions from these points involve traversing private property and are therefore considered long-term alternatives. However, Depot Street and a staircase from Sherman Street are being pursued as nearer term connections.

A major factor in strengthening connections is wayfinding. In some documents, wayfinding was considered to be even a greater issue than parking. Implementing the comprehensive recommendations of the 2008 Wayfinding Plan is expected to address several issues, such as pedestrian connectivity and parking management.

Table 3: Action Summary

Action		Land Use and Development Plans and Studies										Transportation Plans and Studies										Total							
		Regional	Burlington									Regional					Burlington												
		CCRPC Regional Sustainability Project	Downtown & Waterfront Plan Build-Out Analysis	Legacy Project	Climate Action Plan (CAP)	Burlington Wayfinding Plan	Downtown Burlington Retail Observations	Market and Transportation in Downtown Burlington	Municipal Development Plan (MDP)	CEDO Economic Development Plan	Retail Feasibility Study of the Downtown District	Waterfront Revitalization Plan	Chittenden County Park & Ride Plan	Chittenden County Transportation Authority (CCTA) Transit Development Plan	Southern Connector/Champlain Parkway Record of Decision	CCMPO Bicycle-Pedestrian Plan	Chittenden County Metropolitan Planning Organization (CCMPO) Metropolitan Transportation Plan (MTP) 2025	Pearl Street Streetscape Improvements	St Paul St and lower Church St construction projects	Waterfront North Access Project	Battery-Pearl intersection		Burlington Transportation Plan	Joint Institutional Parking Management Plan	The Potential for Enhanced Transit Services in the City of Burlington	Waterfront South Access Study	Burlington Parking Study Final Report	Burlington North/South Bicycle & Pedestrian Route Study	Burlington Waterfront Parking and Circulation Study
Economic/Development	Redevelop brownfields		X					X	X	X								X					X	X			X	7	
	Construct new housing in Downtown and/or Waterfront (include diversity of affordabilities)		X	X				X	X	X												X						6	
	Reform permitting (for example, zoning ordinance parking requirements) to support development and economic growth		X						X		X										X				X			5	
	More dense/intensive use, e.g. housing on second floors of Church Street buildings; parking under buildings								X	X	X											X		X				5	
	Parking	Implement a parking management system that combines real-time parking data with wayfinding					X	X	X		X								X		X				X			7	
		Establish Park&Rides/intercept parking		X	X				X	X	X		X			X					X	X	X		X			11	
	Transit	Develop and expand convenient, comfortable, high-frequency transit service to improve access and increase ridership		X	X			X	X	X	X		X	X		X			X		X		X	X	X			X	14
		Develop multimodal transportation center		X	X					X	X		X			X					X						X	7	
		Reform transit financing mechanisms to support service improvements and expansions		X	X				X	X			X								X							6	
Re-introduce passenger rail			X	X				X	X	X				X						X							7		

Table 4: Action Summary continued

		Land Use and Development Plans and Studies										Transportation Plans and Studies										Total						
		Regional					Burlington					Regional					Burlington											
		CCRPC Regional Sustainability Project	Downtown & Waterfront Plan Build-Out Analysis	Legacy Project	Climate Action Plan (CAP)	Burlington Wayfinding Plan	Downtown Burlington Retail Observations	Market and Transportation in Downtown Burlington	Municipal Development Plan (MDP)	CEDO Economic Development Plan	Retail Feasibility Study of the Downtown District	Waterfront Revitalization Plan	Chittenden County Park & Ride Plan	Chittenden County Transportation Authority (CCTA) Transit Development Plan	Southern Connector/Champlain Parkway Record of Decision	CCMPO Bicycle-Pedestrian Plan	Chittenden County Metropolitan Planning Organization (CCMPO) Metropolitan Transportation Plan (MTP) 2025	Pearl Street Streetscape Improvements	St Paul St and lower Church St construction projects	Waterfront North Access Project	Battery-Pearl intersection		Burlington Transportation Plan	Joint Institutional Parking Management Plan	The Potential for Enhanced Transit Services in the City of Burlington	Waterfront South Access Study	Burlington Parking Study Final Report	Burlington North/South Bicycle & Pedestrian Route Study
Action (continued)	Other				X	X				X										X								4
	Strengthen connections between Downtown and Waterfront				X	X	X			X				X				X		X					X	X		8
	Strengthen connections between Downtown/Waterfront and Pine Street Corridor									X	X			X	X							X	X					6
	Provide/improve bicycle and pedestrian access and connectivity			X	X					X		X	X	X	X	X	X	X	X	X	X	X	X		X	X		18
	Develop Downtown TMA								X						X					X				X				4
	Minimize truck impacts to neighborhoods								X					X										X				3

Table 5: Summary of Project Status

Type	Project	Status
Regulatory	Changing the number of parking spaces required by the zoning ordinance from a minimum to a maximum	Section 8.1.9 of the Ordinance establishes a maximum (125% of the minimum required for the Neighborhood Parking District).
	Changing zoning parking requirements to allow impact fees or payment-in-lieu options	Under discussion
Organizational	Downtown Transportation Management Association	Under discussion for City employees
	Develop carsharing	Complete: CarShare Vermont
Infrastructure	Wayfinding improvements, including 'smart signs'	Hairpin signs (some with 'smart sign' components) are being installed/replaced
	Parking meter upgrade: replace existing parking meters in high demand areas with variable pricing meters that accept credit cards	Bid documents being prepared
	Multimodal Transportation Center	Sites are being evaluated
	Transit improvements	
	- Smaller vehicles operating on residential streets.	In planning
	- Energy-efficient vehicles that are quiet and clean.	Bus procurement in planning
	- Shorter headways between major destinations.	In planning
	- Longer service hours to serve off-shift workers.	In planning
	- Clean, informative, and safe shelters.	New shelters are being installed
	- Explore alternative funding sources and programming techniques for CCTA.	Identified as an action item in the 2010 CCTA Transit Development Plan
	South End Transit Center	Identified in 2011 Chittenden County Park-and-Ride & Intercept Facility Plan; Phase 1 in development
	Exit 14 Intercept Lot	Identified in 2011 Chittenden County Park-and-Ride & Intercept Facility Plan; project is being scoped
	Reintroduction of passenger rail	Regional discussion
	Pedestrian alignments from Battery Street to the Waterfront, extending from Sherman Street, Battery Park, Pearl Street, midblock between Pearl and Cherry, and Cherry Street	Sherman Street staircase extension to Moran Plant and bicycle/pedestrian improvements to Depot Street are in design; extensions from other points involve traversing private property and are therefore considered long-term alternatives. Funicular and in-slope parking are under consideration as long-term alternatives.
	North-south transit on Waterfront	Long-term alternatives under discussion
	Potential for parking garage northeast of railyard, behind Maglianeros and VT Wine Merchants	Address in future planning of Waterfront South
	Southern Connector	Final permitting stage; construction could begin by 2013.
	Bicycle connection to Winooski	Main Street Bridge currently being assessed
	Implementation of North-South Bicycle Plan	Phased implementation under development
	Charge for Waterfront parking throughout the year rather than only seasonally	In progress, dependent on parking meter upgrade (see above)
Expand residential permit program to address on-street spaces in neighborhoods; sell a limited number of non-residential permits for daily parking.	Under consideration, needs planning	
Signal timing improvements and hardware upgrades to Battery Street to improve pedestrian access to Waterfront	In capital work plan	
Lake Champlain Transportation Company/Pecor Property-concept for hotel/conference center, marina, and significant amount of parking	Conceptual planning	
Re-alignment of northern Lake Street and the bike path, including pedestrian amenities, stormwater improvements, undergrounding of utilities, street lighting, landscaping, and parking, which will support adjacent development opportunities.	In design	

1.2.5 Performance Measures

In pursuit of the goals, strategies, and actions discussed above, it is worthwhile to acknowledge performance measures established by the Burlington Transportation Plan (Table 6 **Error! Reference source not found.**). PlanBTV will make an effort to collect data consistent with these measures as appropriate (for example, in determining Downtown on-street parking utilization).

Table 6: Performance Measures Established by the Burlington Transportation Plan

#	Transportation Element	Performance Measure
1	Complete Streets	Percent evaluated
2	Priority Transit System	Percent of weekly service hours achieved
3	Transit Ridership	Annual
4	Traffic Volumes into and out of the City	Vehicles per weekday/peak hour
5	Accumulation of Cars	Estimated for weekdays from traffic volumes – an indication of parking demand
6	Downtown/Waterfront Parking Spaces	Total public and private spaces
7	Downtown On-Street Parking Utilization	Peak times on weekdays
8	Parking Revenues	Annual City parking revenues from garages, surface lots, and on-street spaces
9	Maintenance Expense	Annual City budget as percent of needed maintenance budget – current spending is not keeping up with maintenance needs
10	Number of Burlington Employees Covered by TMAs	Total number in Transportation Management Associations including CATMA, a downtown TMA under discussion, and any other TMAs that might form
11	TMA Employee Mode Shares	Percent walking, biking, using transit, carpooling
12	Mode Shares for Students at Public Schools	Percent walking, biking, using transit, carpooling
13	Traffic Crashes	Reported crashes per year, segmented by injury vs. property damage only, and whether pedestrians and cyclists were involved
14	Energy Use/Greenhouse Gas Emissions	Estimated fuel consumption in City and by City residents by cars, trucks and buses.

1.0 LAND USE AND DEVELOPMENT PLANS AND STUDIES

1.1 Regional

1.1.1 CCRPC Regional Sustainability/ECOS Project (in progress)

Chittenden County is the recipient of a \$1 million grant from the US Housing and Urban Development (HUD) Sustainability Communities Project to plan and implement regional sustainable community development initiatives. The three-year project goes by the name ECOS (Environment Community Opportunity Sustainability) and kicked off in March 2011. It will provide the basis to update the Regional Plan, the CCMPO MTP, the Burlington Legacy Project Plan and the Regional Comprehensive Economic Development Strategy. The themes that the project will focus on include built environment, economy, energy and telecommunications, natural environment and resources, and social community.



1.2 Burlington

1.2.1 Land Use Inventory and Buildout Analysis of Downtown & Waterfront Area (2011)

As part of Activity 1 of the Downtown & Waterfront Plan, a buildout analysis was completed to understand development potential within the study area. As summarized in the table below, the analysis indicates that there is potential for an additional 18.2 million square feet of mixed-use, commercial development and 525 residential units (Table 7), although complete buildout of the study area is not necessarily possible or expected.

Table 7: Summary of Existing Development and Buildout Potential (2011 Downtown & Waterfront Plan Land Use Inventory and Buildout Analysis of Downtown & Waterfront Area by Milone & MacBroom, Inc.)

	Existing	Buildout	Net
Mixed Use	7,947,396 sqft	26,056,033 sqft	18,163,640 sqft
Residential	2,398 units in study area, 1,305 of which are in residential zones	1,830 units	525 units

Figure 2 shows that under current zoning, there is minimal residential use and that it is located on the northern and southern peripheries of the study area. Of these residential areas, there are only two high density residential parcels. Figure 3 compares existing conditions to the buildout, identifying which parcels have the most development potential. Increasing residential density has the greatest potential within the study area. Parcels with the greatest potential for mixed use development are mostly for shopping/business/trade, social/institutional, or mass assembly activities.

Figure 2: Buildout Potential Under Current Zoning (Milone & MacBroom)

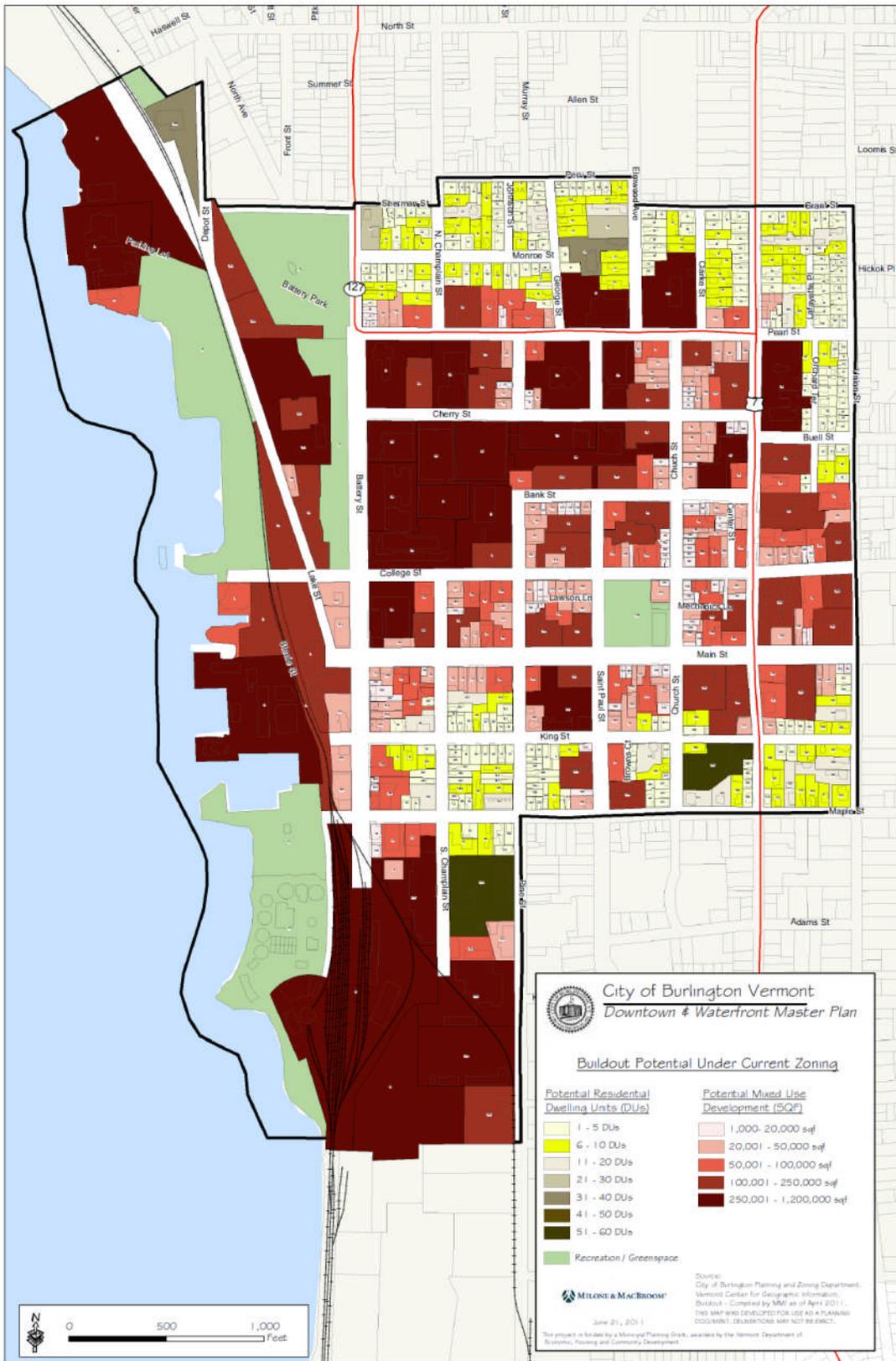
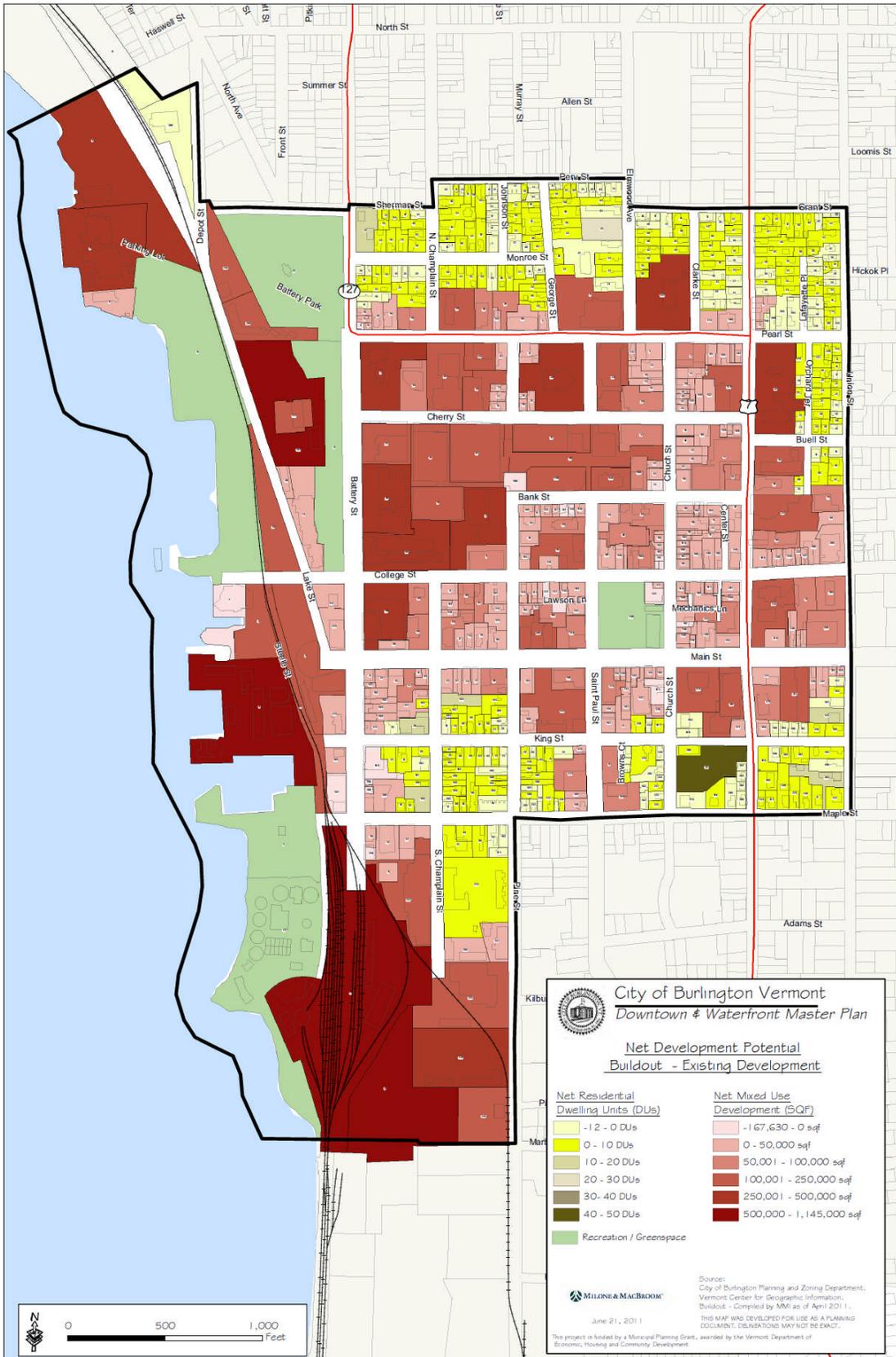


Figure 3: Net Development Potential (Milone & MacBroom)



1.2.2 Legacy Project (in progress)

The Legacy Project is the implementation of the 2000 Legacy Action Plan. The Legacy Action Plan establishes a 2030 vision for sustainability in Burlington and provides direction for achieving it. The Plan is framed around five themes: economy, neighborhoods, governance, youth and life skills, and environment:

- “maintaining Burlington as a regional population, government, cultural, and economic center with livable-wage jobs, full employment, social supports, and housing that matches job growth and family incomes.”
- improving quality of life in neighborhoods
- increasing participation in community decision-making
- providing youth with high-quality education and social supports, and lifelong learning opportunities for all
- preserving environmental health

Aspects of the Legacy Project that are relevant to the Downtown and Waterfront Plan are summarized in Table 8.



Table 8: Summary of Legacy Project Transportation Aspects

	Vision/Goals	Actions
Economy	<p>The downtown core will be a vital regional hub where essential goods and services are readily available to all. Well-trained workers will earn high wages while living and working right here in Burlington, commuting easily to their jobs using an affordable, accessible, and seamless public transportation system and bicycle- and pedestrian-friendly roads and sidewalks. Businesses will be eager to locate, form, and expand here.</p> <p><u>CREATING A VIBRANT URBAN CENTER</u> GOAL: In 2030, Burlington has absorbed the greater portion of the region’s population growth, expanding to as much as 65,000. The city is the center of culture, commerce, education, health care, and government. Housing and job growth have kept pace with the population.</p> <p><u>TRANSPORTATION</u> GOAL: In 2030, every Burlington resident has access to a diverse, seamless, multi-modal transportation system to travel easily to jobs, businesses, and recreational and cultural activities. Increased public transit and alternative transportation provides local and regional travel that is safe, accessible, efficient, and environmentally sound.</p> <p>Transportation within, to, and from the city relies less on individual vehicles and integrates the automobile with rail, bus, shuttle, boat, air, pedestrian, and bike transport.</p>	<p><u>CREATING A VIBRANT URBAN CENTER</u> Priority Actions:</p> <ul style="list-style-type: none"> ▪ Work with regional planners and neighboring communities to insure that Burlington is the primary growth center of the region, intended to prevent sprawl by absorbing a higher percentage of regional growth than any other community. ▪ Redevelop vacant former industrial areas known as “brownfields” to absorb significant commercial and/or mixed-use growth. ▪ Continue redevelopment of the waterfront as a mixed-use neighborhood accessible to all city residents for business, housing, cultural, and recreational needs. ▪ Maintain and expand the number of businesses that offer essential goods and services within the city, readily available to all residents. <p>Other Actions:</p> <ul style="list-style-type: none"> ▪ Invest in new and existing infrastructure to support additional growth. ▪ Reform permitting processes and other regulations to remove or revise standards that are inconsistent with controlled, sustainable growth. <p><u>TRANSPORTATION</u> Priority Actions:</p> <ul style="list-style-type: none"> ▪ Establish park-and-ride facilities with shuttles or other “people-mover” capabilities to the south, north, and east of downtown to reduce the number of automobiles travelling to the city center. ▪ Provide for safe bicycle and pedestrian traffic, both in the city center and in connecting neighborhoods to schools, businesses, recreation areas and a regional system. ▪ Ensure accessible routes throughout the city to residents who are mobility impaired. <p>Other Actions:</p> <ul style="list-style-type: none"> ▪ Develop a multi-modal transportation center. ▪ Implement local and regional rail service to Burlington. ▪ Increase investment in public transit to expand services locally and regionally, exploring a regional gas tax and other funding mechanisms. <p>Performance Measures</p> <ul style="list-style-type: none"> ▪ Local/state/federal dollars invested in bicycle/pedestrian corridors as a percentage of total transportation dollars invested ▪ Annual public transit ridership per capita ▪ Number of alternative-fueled vehicles in the municipal fleet and number of alternative fueling stations in the city
Neighborhood	<p>In 2030, Burlington’s development has enhanced the quality of life in neighborhoods that reflect the demographic diversity of the city as a whole. Development preserves neighborhood identity, minimizes traffic and noise, and provides ample open space. Neighbors feel safe on the streets...</p>	<ul style="list-style-type: none"> ▪ Construct new affordable housing ▪ Build additional on-campus student housing ▪ Redevelop “brownfields” for housing ▪ Revise zoning regulations
Environment		<p><u>Air Quality</u></p> <ul style="list-style-type: none"> ▪ Provide for safe bicycle and pedestrian access ▪ Promote and invest in nonpolluting transportation technologies ▪ Improve and protect air quality by minimizing the use of fossil-fueled vehicles in the urban core ▪ Provide financial incentives for businesses to reduce air pollution <p><u>Energy and Resource Conservation</u></p> <ul style="list-style-type: none"> ▪ Implement energy conservation measures

1.2.3 Climate Action Plan (CAP) (in progress)

The first CAP was adopted by the City in 2000 and was updated last year. The goal of the CAP is to reduce the City's 2007 greenhouse gas emissions (GHG) levels by 20% by 2020 and by 80% by 2050. The CAP supports the Legacy Plan (see Section 1.2.2) and its intent to sustain Burlington's quality of life through reducing GHG emissions, job creation, cost savings, public health improvements, and preservation and protection of environmental health.

The 2007 GHG emissions inventory indicated that transportation accounts for approximately 39% of the community-wide GHG emissions (Figure 4) and approximately 22% (8.0% vehicle fleet and 13.7% employee commute) of the City Government emissions (Figure 5).

Figure 4: CAP-Community-wide GHG Emissions Inventory 2007

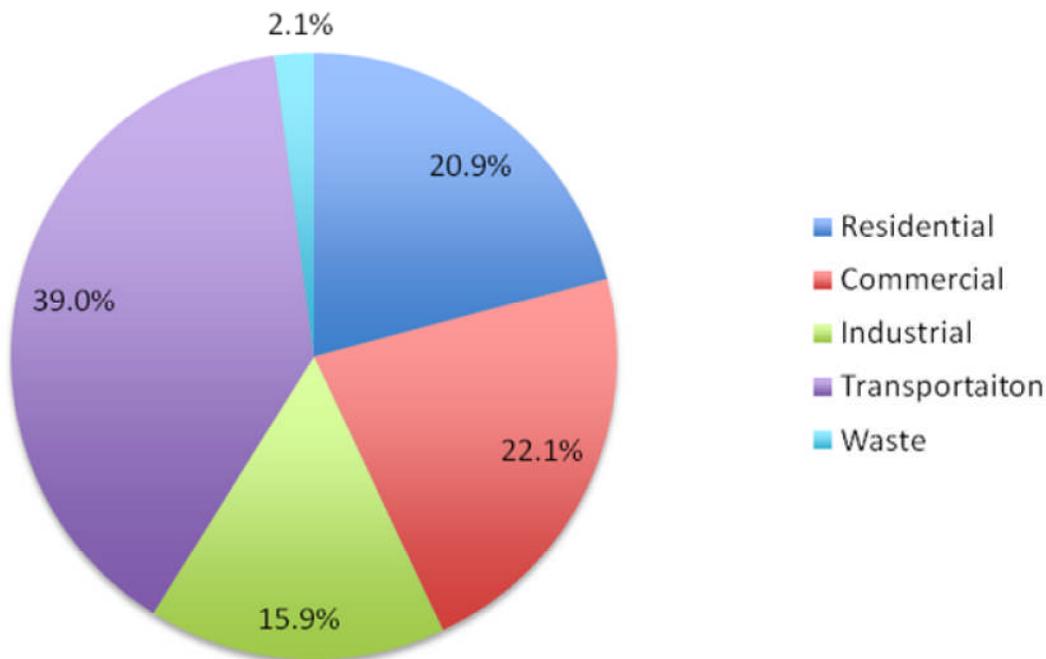
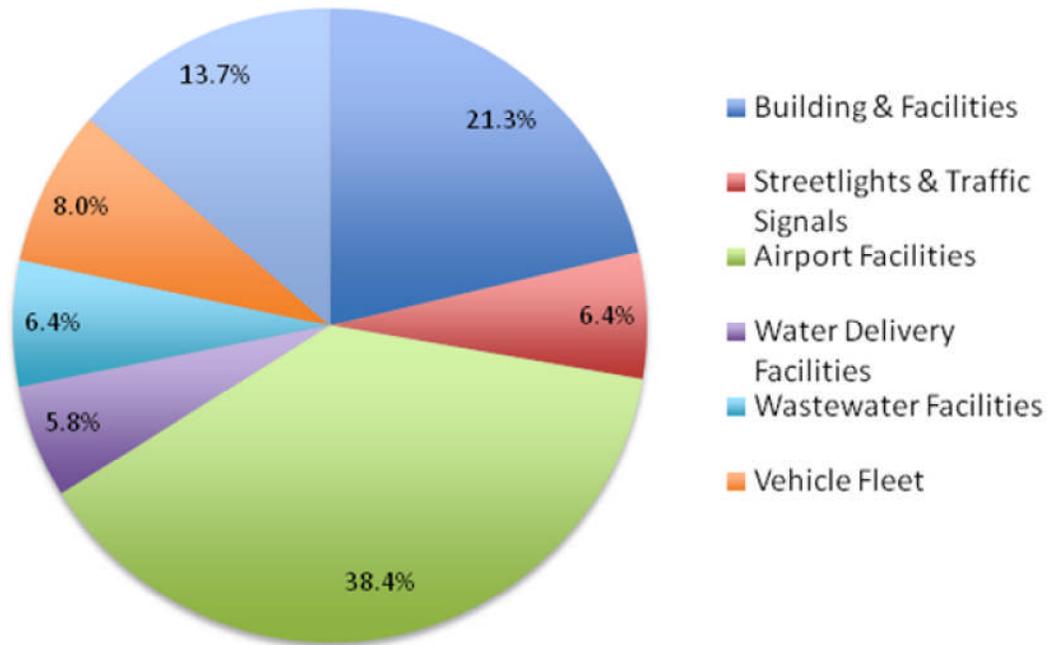
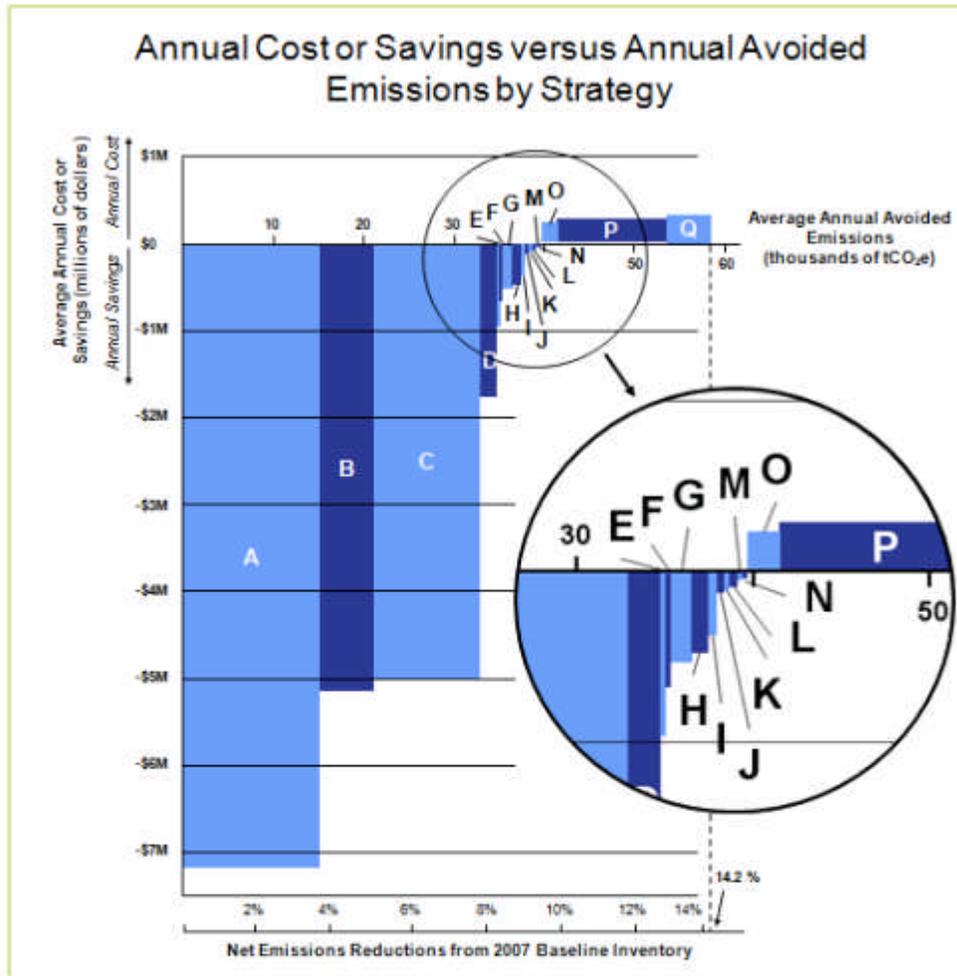


Figure 5: CAP-City Government GHG Emissions Inventory 2007



The plan update process involved a series of public meetings that resulted in over 200 GHG reduction strategies. A preliminary screening was performed on the 200+ strategies followed by a cost-carbon-benefit analysis to assess the cost effectiveness of each of the remaining 17 strategies. If all of the 17 strategies were implemented, a 14.2% GHG reduction from 2007 levels would be realized (Figure 6). The analysis indicated that 1) reducing community vehicle-miles-travelled (VMT); 2) implementing the Property Owners Win with Efficiency and Renewables (POWER) program; and 3) implementing a Burlington Electric Department (BED) advanced meter infrastructure (a.k.a. “smart meters”) program will account for more than half of the estimated carbon reductions and will save more than \$17 million annually. On a \$ per ton of avoided emissions basis (Figure 7), reducing government VMT ranked second and reducing community VMT was eighth. Retiring/replacing government vehicles and implementing a government alternative-commuting program were tenth and eleventh, respectively.

Figure 6: CAP-Cost-Carbon Abatement Curve



- A - Reduce community VMT.
- B - Implement POWER program.
- C - Implement BED AMI program.
- D - Require new commercial construction to follow Core Performance guidelines.
- E - Implement McNeil district heating project.
- F - Reduce government VMT.
- G - Implement government vehicle retirement and replacement program.
- H - Implement residential PAYT program.
- I - Implement "Solar on Schools."
- J - Implement BED "Renewable Energy Resource Rider" program.

- K - Implement government alternative-commuting program.
- L - Implement deep energy efficiency program in government buildings.
- M - Replace existing streetlights with LEDs.
- N - Require new residential construction to be VESH qualified.
- O - Implement residential organics collection program.
- P - Increase the UTC.
- Q - Implement a digester for organic waste.



visitors. Rail, transit, cycling, and walking are increasingly more competitive with the automobile as the dominant mode of choice. Burlington's residential streets will have been reclaimed as attractive public spaces, and a series of trails and paths provide access between neighborhoods and areas of protected open space. (page I-3)

- If we succeed, Burlington is part of a region that has been successful in balancing employment growth with that of housing, and finding equitable solutions to sharing the responsibility of providing affordable housing. In Burlington, all people have access to safe, decent, and affordable housing. Burlington's housing needs are being met through rehabilitation and conservation of the existing stock, and creative high density infill. (page I-3)

1.2.4.2 Land Use Plan

DOWNTOWN

The Downtown must remain an active and attractive place to visit, live, shop and work. Specifically for the Downtown, the Land Use Plan envisions:

... the downtown is a distinctly urban place serving as the historic core of the county's educational, economic, cultural, and governmental center. Downtown Burlington is a high density, mixed-use growth center that has blended the need for concentrated and efficient development with a respect for the city's architectural heritage and natural environment. Vacant and underutilized land and buildings have been adaptively reused for housing, shops, and offices. An integrated system of regional and local public transit, bicycle routes, and pedestrian paths are increasingly competitive with individual automobiles as the preferred mode of travel thus reducing the need for single-passenger automobiles. Downtown Burlington is also a neighborhood - offering housing for a range of income levels and household types, everyday services, and employment opportunities. (page I-1)

Specific to the Downtown Improvement District¹, the Land Use Plan notes that its functions as the region's cultural, financial, governmental, and commercial core must not overshadow the importance of residential uses in the downtown. Providing residential areas downtown reduces commute distances and consequently the auto mode share and parking demand. Furthermore, "Downtown housing must accommodate (in both affordability and type) all income groups in order to ensure a diversity of residents....Growth of housing in the downtown area should keep pace with growth in commercial development. The City encourages housing downtown by offering density bonuses for development that includes public benefits such as public parking and affordable housing. City ordinances ease parking requirements for mixed-use development that includes housing." (page I-10-11)

The Land Use Plan acknowledges that certain types of retail and services are needed to support residential uses, such as grocery stores, daycare, hardware stores, etc., so care must be taken to prevent the downtown from becoming overly tourism-focused. **The Downtown's identity and function as a neighborhood must not be overlooked.**

Within the Downtown Improvement District are the City Center District, the Church Street Marketplace, and the Urban Renewal District. The City Center is the central core of the Downtown and the Plan notes that there is potential for an additional 1-2 million square feet of development within that area. Supporting this development in a way that provides access via transit, bicycle, and walking is

¹The Downtown Improvement District was originally created in 1999, and later expanded in 2004. It was created as a special assessment district in part to levy a property-tax surcharge to pay for 2-hours of free parking throughout the downtown area. It is intended to define the portion of the downtown area where much of the City's future development and public investment is desired and will be concentrated, and is a designated "Downtown Development District" under the VT Downtown Program. The City's "Downtown Development District" designation will make various incentives such as state tax credits and loans available to facilitate continued redevelopment and reinvestment in the heart of the city.



recommended, particularly through a network of connecting mid-block pathways. Improving the connections between Church Street and the Waterfront is a primary goal.

At the time of the MDP's development in 2006, the retail vacancy rate of the Marketplace properties was 4%, and the upper-floors (mostly office space) had a vacancy rate of 17%. The Community and Economic Development Office (CEDO) indicates that there are 40,000 square feet of vacant space on the upper floors. CEDO and the Marketplace are working with property owners to convert these spaces into housing, which is a high priority for the City. (page I-14)

The City is seeking to have the Church Street Marketplace listed on the National Register of Historic Places, which would provide additional financial incentives to facilitate redevelopment and preservation of income producing historic buildings.

The northwest quadrant of the City Center District is part of the former Urban Renewal District and is the site of Macy's department store, the Marriott Courtyard hotel, condominiums, a municipal parking garage, the Vermont Superior Courthouse and Cathedral Square senior housing. The Land Use Plan suggests that "this area should be the site of intensive mixed-use development including housing, hotels, a small- to medium-sized meeting/convention center, and public exhibition space. The objective is to create a public attraction that helps to link the Church Street Marketplace and the Downtown Waterfront, and to make the most efficient use of the downtown's largest undeveloped site....Over the very long-term, the City may consider the feasibility of reintroducing one or more through streets within portions of the urban renewal area in order to ease the flow of traffic through downtown by improving north-south circulation." (page I-14-15)

WATERFRONT

The Downtown Waterfront is bounded by the Urban Reserve in the north and the Barge Canal in the south. The priorities for this area as defined by the MDP are to maximize economic vitality and public access. A mixed-use neighborhood of retail, office, housing, and public amenities, all at diverse levels of affordability, is envisioned. To preserve the park-like atmosphere and public access of the Waterfront, alternative transportation is encouraged to prevent the area from being overrun by automobiles. Projects such as the Lake Champlain Basin Science Center expansion and the Moran Plant redevelopment/Waterfront North are discussed in the Waterfront Revitalization Plan in Section 1.2.10. Plans for Burlington Harbor are described in the 2000 Burlington Harbor Management Plan and include expanding marina services and boater facilities. Moving boater services from the Boathouse to Perkins Pier and improving use of the Lake Champlain Transportation Company site are the main aspects of the plan. The area between the Coast Guard Station and the Moran Plant are to remain available for community lake access.

To achieve these visions, the Land Use Plan establishes the following policies that pertain to the Downtown and Waterfront areas:

- Conserve and strengthen residential neighborhoods.
- Encourage the adaptive reuse and historically sensitive redevelopment of underutilized sites and buildings.
- Encourage mixed-use development patterns, at a variety of urban densities.
- Strengthen the City Center District (CCD) with higher density, mixed-use development as part of the regional core while ensuring that it serves the needs of city residents, particularly those in adjacent neighborhoods.
- Target new and higher density development into the Downtown, Downtown Waterfront, Enterprise District, Institutional Core Campuses, and the Neighborhood Activity Centers.

- Encourage development of an active, urban waterfront that offers a mix of uses, is open to the public and linked with adjacent neighborhoods.
- Strengthen the Pine Street corridor for commercial - industrial development while minimizing adverse impacts on adjacent residential neighborhoods.
- Encourage light industry, the creative arts and technologies, and manufacturing and incubator space for new and emerging business in appropriate locations including the Pine Street corridor.

The Land Use Plan further encourages following a growth center/compact development pattern with high-density growth mixed use development, promoting public transit, walking and biking as the preferred forms of transportation. The Plan notes that many properties in Burlington are underdeveloped¹ and could be used more intensely with multiple uses, taller buildings, and smaller setbacks. Surface parking is a specific example of redeveloping properties for more intensive use and making the most efficient and effective use of space. A 2002 buildout analysis of the downtown area suggested that are an additional 3.5 million square feet (residential and nonresidential combined) of potential development within in the designated downtown development district.

Parking is considered a barrier to development. The Land Use Plan suggests placing parking within structures that include street-front retail or office space, or underground whenever the topography of the site makes it advantageous. Transportation system improvements to reduce automobile dependence are required to mitigate parking demands. The Plan encourages pursuing transit and commuter rail expansions. The College Street Shuttle is cited as an example standard to which transit can aspire.

The Plan recommends pursuing:

- **Collaboration with private development** to identify areas for future public parking;
- Creation of a **transportation management association** to coordinate and collaborate on transportation demand management programs and initiatives;
- Development patterns and densities that favor public transportation and an excellent transportation system that serves residents, businesses and cultural facilities by frequent, accessible and comfortable service;
- Pedestrian and bicycle routes throughout the area and into adjoining neighborhoods including well-marked and convenient pedestrian crossings and wide sidewalks; and,
- Amenities including pocket parks, street trees, flower boxes, street furniture, public art, bike parking, bus shelters, etc. (page I-12)

HOUSING ON THE WATERFRONT AND DOWNTOWN

The MDP's Housing Plan stresses the importance of housing in the Downtown and on the Waterfront:

...Although the Urban Renewal Policy of the 1960's removed nearly all housing downtown, there remain more than 550 units of housing downtown including 160 in two elderly housing projects, 10 single family-detached, and 106 apartments located above commercial space. Approximately 80 percent of the downtown housing is renter-occupied, and much of it is publicly assisted in one form or another.

Within the last five years, expensive market-rate housing has been built on and near the waterfront, and more is being considered. While the market is driving demand for the high range, and public subsidies are providing assistance for the lower-range, the middle-range is a gap that is not being adequately addressed. Housing models that serve the midrange income level (80-100% of area median) might include affordable apartments for young professionals, townhouses for new families, or condominiums for recent retirees.

¹ "Underdeveloped" refers to those parcels that are developed at less than 50 percent of the average of the existing or allowable density in the zoning district.



To sustain a vital downtown, City policy will encourage the further creation of housing throughout the Downtown Improvement District. This will include efforts to rehabilitate under-utilized buildings to provide housing on the upper floors, and redevelop vacant and under-utilized properties into higher density housing that, in some cases, can include mixed-uses.” (page IX-8)

Action Items recommended in the Housing Plan include:

- Monitor ratio of housing to commercial development growth within the City, and explore the creation of a linkage program for commercial development to ensure housing growth keeps pace.
- Develop housing on one or more of the following City-owned properties: Brown’s Court parking lot, Elmwood Avenue parking lot, and the Depot Street Triangle site.
- Support the creation of new rental and owner-occupied housing on every parcel of land in Burlington that is zoned for residential development at the number of units allowed by zoning. Identify buildable sites for eventual housing construction/conversion. (page IX-12)

PINE STREET CORRIDOR

The Pine Street Corridor is on the study area boundary of PlanBTV and is part of the Enterprise District. It has historically been and continues to be an industrial and commercial area that is important to the regional economy. Currently, much of the development in the area has involved adaptive reuse of old warehouses and factories for retail and commercial uses. However, the impacts of these uses (for example, truck traffic, parking) must be balanced with the adjacent residential areas on the east side of Pearl Street. In addition, developing more direct public access to the lake from this corridor is desired. The City envisions less through traffic in the corridor and future uses that are less transportation/trucking oriented, to be achieved through the construction of the Champlain Parkway/Southern Connector. However, the area’s industrial use serves an important role in the regional economy, so the Land Use Plan recommends evaluating this function and its location in light of citywide objectives and community development. For example, the railyard is a heavily industrial use of the area, yet it needs to remain in place if the goals of re-introducing and expanding commuter rail to Burlington are to be realized: “The City must first consider the long-term impact on its future commercial-industrial base before turning its back on this important piece of transportation infrastructure. If additional jobs are to be brought into the area, then there must be recognition of the housing demand that this will create and the impact on an already severe housing shortage. Finally, redevelopment of the railyards should keep in mind the recommendations of the Burlington Harbor Management Plan that designates this area for seasonal marina services.” (page I-23)

Related to the Pine Street Corridor is the Burlington Brownfields Program, which operates out of CEDO. This is an Environmental Protection Agency (EPA) program that facilitates redevelopment of properties with real or perceived contamination issues through the assessment of environmental risk, remediation planning, and relief from liability. CEDO manages the Brownfields program to help navigate the complexity of brownfield redevelopment projects. Past projects have included the VT Transit Bus Barns on the southwest corner of the Riverside/Winooski Avenue intersection, Waterfront Housing on the northwest corner of the Lake/Depot Street intersection, and currently the Moran Plant redevelopment. Therefore, opportunities to develop various parcels in the Pine Street Corridor could be facilitated through CEDO and the Brownfields Program.

1.2.4.3 Transportation System Plan

The Burlington Transportation Plan adopted in 2011 and described in Section 2.2.1 serves as the MDP’s transportation element.

As described in the 2006 MDP, the vision for the transportation system is:

...transportation functions as part of an interconnected system which offers a range of choices that are safe, affordable, efficient, and convenient for residents, employees, and visitors alike. As a result, rail, air, ferries,

transit, cycling, and walking are successfully competing with the automobile for the dominant mode of choice. Local and regional multimodal corridors and centers are maximizing our use of existing infrastructure, while eliminating congestion, preserving air quality, and conserving energy. Commuters, families, and employers are benefiting from a diverse array of transportation demand management strategies such as car- and van-pools, flexible work schedules, and telecommuting. Land use and transportation decisions are considered together, significantly reducing the need for individual automobiles and large parking facilities. Greater use of rail for freight has been embraced as an effective means of removing trucks from neighborhood streets. City streets are attractive public spaces, and function as part of a system of interconnecting streets. Circulation within the downtown, waterfront, neighborhood activity centers, and institutional campuses is predominantly oriented to the pedestrian. A series of trails and paths provide access between neighborhoods and areas of protected open space. (page V-1)

CIRCULATION

Recognizing the need to improve the efficiency and effectiveness of the existing transportation system rather than expending capacity, the MDP prioritizes 1) convenient access to downtown; 2) a built environment that promotes walking and biking; and 3) expanded use of public transportation. The MDP notes: "With no new highways contemplated beyond completion of the Southern Connector, increases in future capacity can only be realized through greater system efficiencies, a greater shift to alternative modes such as transit, and an emphasis on demand management strategies. Land use policies, educational programs that address the true cost of automobiles, and pricing strategies for parking will all be major influences on future automobile use." (page V-4-5)

PARKING

The MDP recommends considering a Downtown Transportation Management Association (TMA) to help plan parking supply while managing demand, particularly for major downtown employers. This would help to maximize effectiveness of existing parking inventory while reducing demand and encouraging use of transportation alternatives.

Regarding zoning, the MDP states:

Techniques to lessen the demand for additional parking include removing parking minimums or changing the number of parking spaces required by the zoning ordinance from a minimum to a maximum - in effect limiting the number of parking spaces a developer can provide. The Parking and Mass-Transit Capital Fund must also be made a more attractive alternative to developers in lieu of building new parking spaces. Two other demand management approaches include a cash out of monthly parking where businesses providing parking to their employees offer the cash equivalent value of those spaces as an alternative, and creating a flexible payment medium that can be used at any facility, parking or transit, and subsidized by the private sector, to reduce the demand for high priced parking and lessen the expense to the user. (emphasis added; page V-10)

The MDP cites that past studies have indicated that there is sufficient supply to meet development demand, but it may not be desirable because of cost or location.

TRANSPORTATION RECOMMENDATIONS

Among the Plan's recommendations are:

- Use the City's Official map to reserve sites for future parking;
- Use impact fees to fund future parking supply;
- Continue to utilize intercept lots and consider new locations, such as near the Heineburg Bridge in the New North End, and on Main Street/Williston Rd. towards the east;



- Improve connections between the neighborhoods and Downtown to the Waterfront: investigate ways to provide pedestrian access points to the Waterfront from areas north of College Street (that is, at the end of Cherry and Pearl Streets);
- Promote high-density development to improve quality and frequency of transit.
- Model transit system improvements and expansions on the College Street Shuttle, which has been exemplary in convenience; Burlington's goals for future bus service include:
 - Smaller vehicles operating on residential streets.
 - Energy-efficient vehicles that are quiet and clean.
 - Shorter headways between major destinations.
 - Longer service hours to serve off-shift workers.
 - Clean, informative, and safe shelters.
 - Explore alternative funding sources and programming techniques for CCTA.

The MDP had recommended maintaining regional inter-city bus service (to Boston, New York, and Montreal) close to downtown. However, the Greyhound terminal has moved from its location on Pine Street to Burlington International Airport. While farther from downtown, this location connects to the CCTA Cherry Street Terminal via CCTA Route #12: South Burlington Circulator, although the service is limited. Passengers can access Cherry Street more regularly by transferring from the #12 route to the #1: Williston/Essex route at University Mall. This trip does not represent a seamless, convenient intermodal connection that will attract choice riders.

Passenger rail is advocated by the MDP. The rail line would serve Burlington from the former Union Station, now Main Street Landing, at the bottom of Main Street on the Waterfront. The expansion of commuter rail service to Charlotte, Winooski/Essex Junction, and beyond is contemplated as an additional form of public transit to CCTA. In addition, the successful establishment of passenger rail is viewed as a way to reinforce freight movement in and through Burlington (and its economy) and reduce reliance on large trucks in the Downtown and Waterfront areas. A difficult balance appears to be needed to avoid the negative impacts of an industrial railyard on adjacent neighborhoods while maintaining rail's value to the local economy:

“Opportunities to continued use of rail for commercial goods movement, and the creation of intermodal connections for freight should be developed - but not at the expense of our neighborhoods and our industrial base. Currently the MPO is evaluating alternatives for locating a major rail facility within Chittenden County. This would likely remove much of the current freight traffic and transfer from Burlington. While it would be contrary to the priorities of this Plan to locate these types of facilities where they would unduly impact residential neighborhoods, some level of freight service and rail facilities should be maintained within the city in order to support existing and future commercial-industrial development. A balance must be struck between the increased use of rail vs. allowing more trucks on city streets. Burlington will work regionally, and with the railroads, to develop appropriate facilities to serve both the city and the region.”
(page V-19-20)

TRANSPORTATION ACTION ITEMS

- Change the minimum downtown parking requirement to a maximum.
- Promote the concept of location efficient mortgages with lending institutions.
- Work with CCTA to shorten headways of the existing routes-especially in the New North End.
- Continue and expand the College Street Shuttle connecting the university, hospital, downtown, and Waterfront.
- Work with CCTA to implement smaller, cleaner, and quieter vehicles on residential city streets. Pursue use of alternative fueled vehicles.

- Coordinate the use of downtown parking lots for off-peak nighttime parking.
- Develop Stairway Streets to link the Waterfront with the Downtown and adjacent neighborhoods.
- Develop one or more Transportation Management Association(s) to coordinate parking and Transportation Demand Management programs within the Downtown and Waterfront.
- Develop new Park&Ride lots at the periphery of the City, including near the Heineburg Bridge in the New North End, and on Williston Rd.

1.2.4.4 Economic Development Plan

ECONOMIC DEVELOPMENT VISION

The economic development vision for Burlington is:

.... Burlington continues to serve as the historic core of a regional population, educational, health care, commercial, cultural, and governmental center. Among the city's chief economic assets.... [is] a high quality of life, which is preserved and enhanced through the promotion of development that is compatible with the city's neighborhoods and natural environment. Burlington's economy is sustained by a diverse mixture of businesses including: neighborhood-oriented local businesses like grocery stores and doctor's offices in vibrant neighborhood centers; a medley of service, retail, financial and cultural enterprises throughout the downtown and waterfront; health care and academic institutions that offer the latest in intellectual, technological and scientific opportunities; food production joined with agricultural entrepreneurship in the Intervale; well-paying and high quality commercial enterprises in the south end; and a travel and tourism industry that caters to visitors interested in Burlington's heritage and the region's outdoor recreational amenities.... the city's economy continues to be sustained largely through a balance of self-employment, small business growth, and enterprise and institutional development. Burlington serves as an incubator for new business ventures, and enables established business to set down roots rather than move away....The city has developed a range of technical and financial incentives to retain, encourage, and support economic development, helping it to keep pace with growth in surrounding communities. Burlington's economy has become more self-reliant through significant increases in local ownership and control of businesses, reinvestment of local resources, a commitment to environmental quality, and an investment in people and infrastructure.... (page VI-1)

ECONOMIC DEVELOPMENT POLICIES

Economic development policies established by the MDP include:

- Nurture sustainable development to provide for the city and its residents over the long term.
- Promote and strengthen a mixed economy, and work actively to retain existing businesses and jobs.
- Promote and support locally owned and controlled small businesses including home occupations appropriate to the character of the neighborhood.
- Partner with the private, not-for-profit, and other government sectors to support existing businesses, attract future development, and conduct joint marketing.
- Invest in the necessary public improvements, particularly transportation, to strengthen the Downtown, both as a Regional Growth Center and as city neighborhood.
- Work with neighboring communities, regional agencies, and state government to promote land use and development policies that support Burlington's role as the Regional Growth Center.



- Support sustainable development activities in target areas of the city including the Enterprise Community, Neighborhood Activity Centers, the Pine Street Corridor, Downtown, and the Downtown Waterfront.

ECONOMIC DEVELOPMENT STRATEGIES

Five strategies are suggested to make Burlington's economy sustainable over time:

1. Creating new jobs
2. Jobs for all
3. Mixed use and mixed retail: diversification
- 4. Infrastructure investments**
5. Business retention and partnerships

The Economic Development Plan notes that approximately 59% of all employed city residents work in the city. Self-employment and home-based businesses have grown significantly over the past decade. These are very important trends as they relate to transportation needs and the opportunity for the city to promote concentrations of small businesses in neighborhood activity centers.

The MDP notes that in order to attract businesses to Burlington, transportation infrastructure (parking and public transit in particular) will need to be in place: "In many cases, investment in the necessary infrastructure to support future development must occur first in order to attract business growth and opportunities. Early investment demonstrates a commitment and willingness on the part of the City that business is welcome and will be supported. Of particular importance will be future investments in the City's transportation infrastructure and public transit systems, as well as telecommunications. Examples include better public transit and parking options to serves workers downtown, reserving some capacity to load and unload freight by rail, enabling high speed data and communication services that allow residents to work at home or serve technology-bases businesses, and creation of better energy systems and conservation programs." (page VI-7)

ECONOMIC DEVELOPMENT ACTION ITEMS

- Continue to work with its neighboring communities and regional planners to reinforce a compact settlement pattern with concentrations of jobs and services in growth centers.
- Establish plans for the renovation and adaptation of the Moran Generating Plant on the Downtown Waterfront.
- Develop additional conference and exhibition space within the Downtown.

1.2.5 Burlington Wayfinding Plan (2008)

This Plan inventoried the existing wayfinding system in the City and found it to be in serious disrepair. Sign clutter, missing signs, inconsistency, inadequate placement, confusing messaging, and worn/faded/broken/vandalized/damaged signs are throughout the City. The Plan recommended replacing signs in disrepair on the Waterfront, Church Street Marketplace, and parking; updating graphics standards; budgeting for future sign replacements; and developing maintenance standards and allocating funds for annual maintenance.

One of the primary targets for the Wayfinding Plan was parking garage identification and information. As shown in Figure 8, signs could incorporate real-time information. Figure 9 shows that real-time data can be applied to LED arrows to indicate to drivers the direction of available parking, rather than getting to a parking garage and finding it full and having to circulate looking for parking. Figure 10 shows the application of the signs.

Figure 8: Parking Garage Signs (Wayfinding Plan Presentation, page 20)

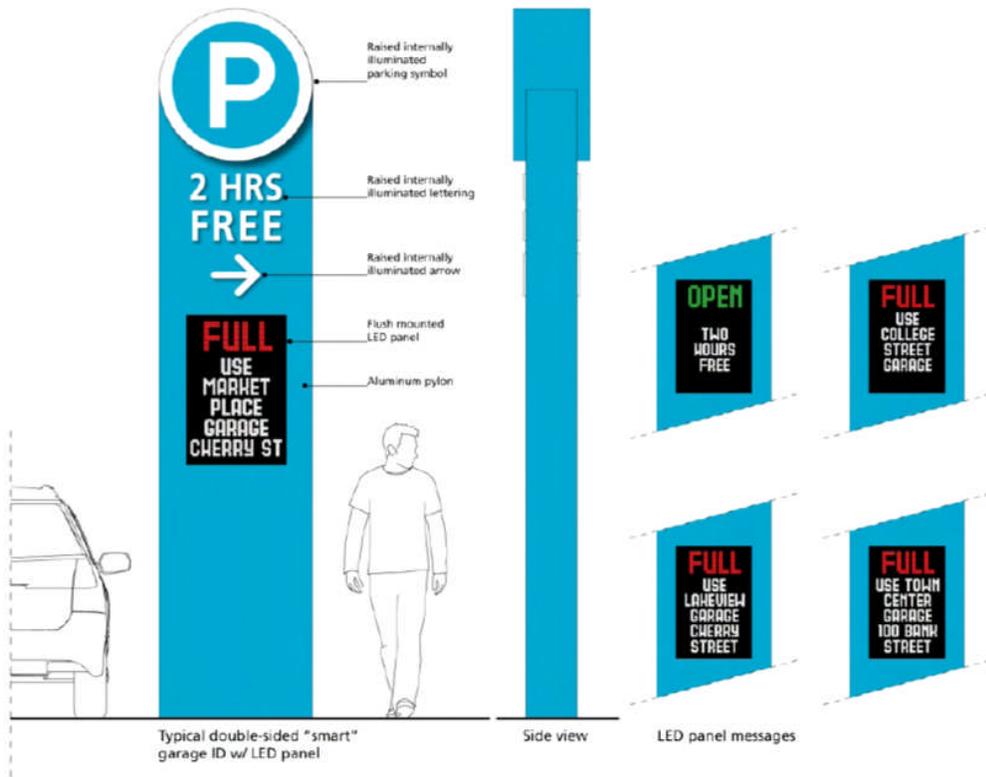


Figure 9: Updated Hairpins (Wayfinding Plan Presentation, page 18)

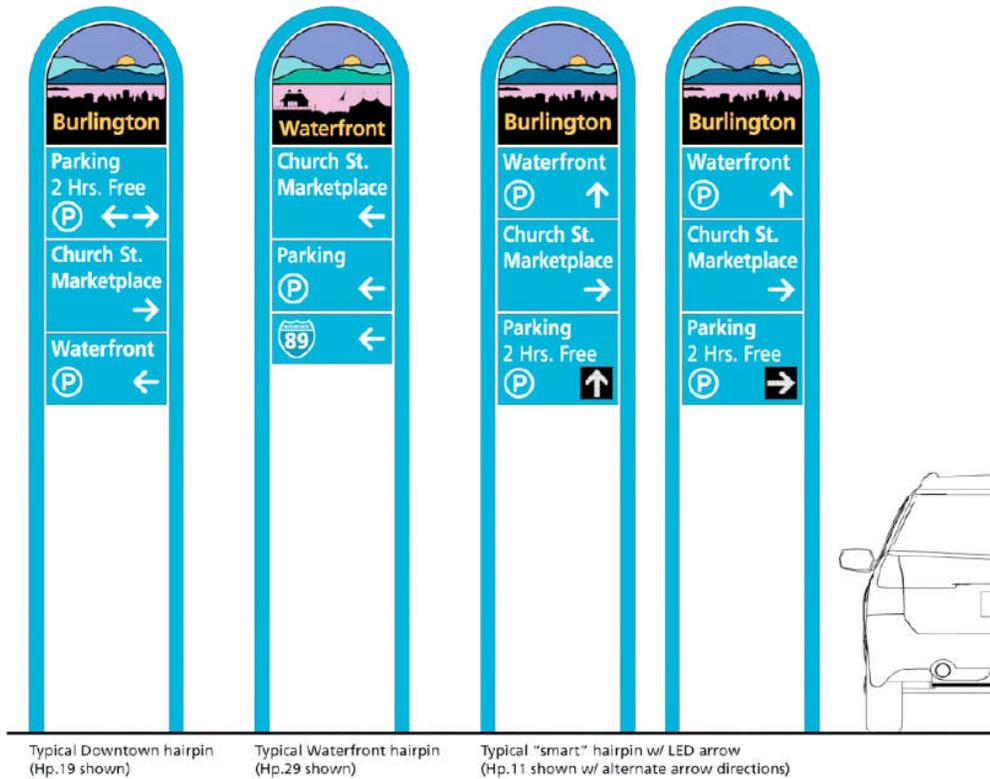
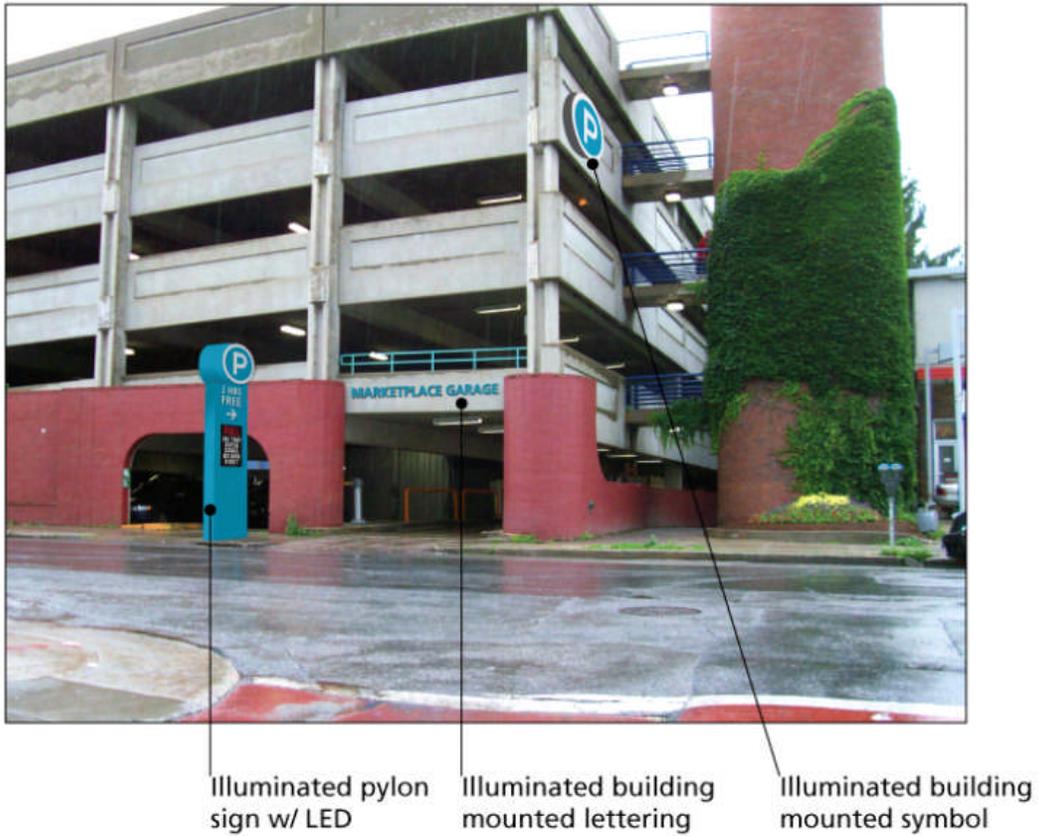
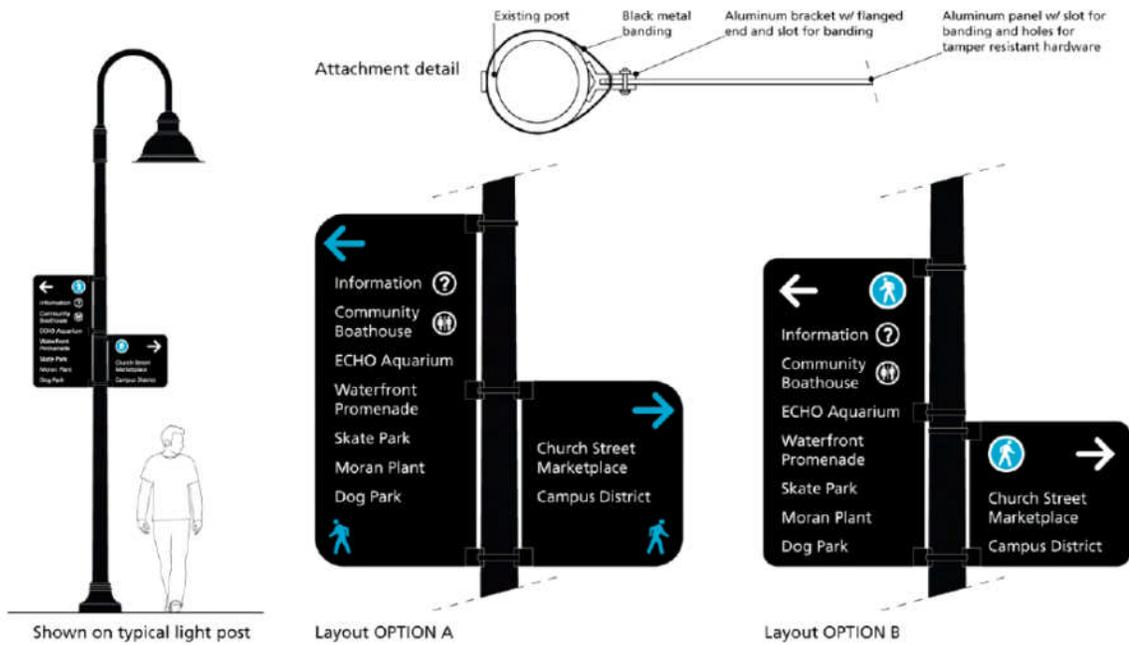


Figure 10: Parking Garage Signage (Wayfinding Plan Presentation, page 22)



A pedestrian wayfinding system was also a top priority (Figure 11).

Figure 11: Pedestrian Wayfinding (Wayfinding Plan Presentation, page 19)



The Wayfinding Plan includes an implementation schedule of sign types and locations, complete with graphic standards for consistency. Some basic repairs have been completed as of May 2011, but the real-time data parking signs have not been implemented.

1.2.6 Downtown Burlington Retail Observations (2008)

This paper assesses the Church Street Marketplace's strengths, weaknesses, and position in the regional retail environment. Among the weaknesses are:

- There is not a coordinated parking system that offers relatively inexpensive, well marked parking that is convenient.
- Safety – light levels are too low in several parks and some streets, creating at the very least a perception of unsafe circumstances.
- Infrastructure, including sidewalks, landscaping, street furniture, and lighting, is showing signs of wear and tear and lack of maintenance.
- There seems to be a lack of hotels and a commitment to the hospitality/tourism and convention industry.
- There is not a critical mass of museums and cultural facilities in downtown.
- There appears to be a lack of housing in the downtown, especially of units overlooking the waterfront and parks.

Many of the assessment's recommendations are already being pursued by the City (including the BTV Transportation Study):

- Undertake a retail needs analysis and market feasibility study to understand the retail position of downtown and the Church Street Marketplace in relationship to the region.
- Consider developing an office attraction and retention strategy and process, based on an understanding of the office market and the demand for new office space in the City and the region.
- Rehabilitate and replace deficient infrastructure as needed. Consider expanding Church Street Marketplace improvements to other sections of downtown.
- Undertake a parking demand/supply analysis and develop an overall parking management strategy for downtown.
- Encourage more residential development through incentives or leverage city owned properties for housing. Affordable and workforce housing should always be considered as part of any downtown housing strategy.

1.2.7 Market and Transportation in Downtown Burlington (2006)

The themes identified by this study include 1) the importance of, perceived deficiency of, and improvement opportunities for parking; 2) congestion into and out of Burlington; and 3) wayfinding, particularly for parking and circulation. The study also identifies market segments that are important to downtown businesses, each with varying travel patterns: downtown residents; downtown employees; tourists; regional shoppers; secondary market customers (who come downtown to visit a business and stay to shop or eat); and colleges. Like other plans, this study stresses the importance of strengthening connections between Downtown and the Waterfront, particularly at Bank St., Cherry St, Main St. and College St. This study takes the concept to a higher level by suggesting that the Church Street Marketplace concept (that is, expanding sidewalk space to accommodate more outdoor activity, such as café seating) be expanded to these areas. In addition, the study recognizes that the Pine Street Corridor is likely to be



an area of future growth and recommends strengthening the connection between Pine Street and Downtown.

The Flynn Theater in particular was identified as having special transportation needs, for parking, pedestrian access, and special event drop-off and pick-up (for example, school field trips to matinee performances).

Real-time parking information, as addressed in the 2008 update to the Burlington Wayfinding Plan, was also noted. The importance of pedestrians to downtown businesses was acknowledged, as well as bicycles. Wayfinding was seen as even more of a problem than parking. Parking is acknowledged to be adequate, but lacking management. Adding intercept parking to the east and to the north (much like the Lakeside parking facility) was suggested.

The study notes that transit seems to suffer from image problems, but consistent with other plans and studies, the College Street Shuttle was noted for exceptional performance and establishing a model of what transit should be.

Suggestions for using the transportation system to attract economic activity to Burlington included 1) developing a walking trail similar to Boston's Freedom Trail and 2) building on the bicycle system to attract outdoor, green industries.

1.2.8 CEDO Economic Development Plan (2005)

This CEDO plan describes constraints to economic development in Burlington as:

- Limited industrial land available for development. The City has been able to attract small businesses, but not retain them when they expand. The Plan recommends that the City support the redevelopment of older buildings into shared, low-cost incubator space; target vacant buildings for the expansion of existing small businesses; and finance and offer technical assistance programs to meet a range of business needs.
- Lack of intensity in terms of land use and density, resulting in a low job density. Parking structures must be considered. Redevelopment of brownfields is an important opportunity, as well as the rehabilitation of vacant upper stories of existing buildings. Infill development and growing up, not out, will help to fight sprawl.
- Unbalanced regional job growth and housing development. Affordable housing tends to be located in urban cores while job growth has been in suburban areas. Existing public transit services are not sufficient to connect jobs and housing.

The Plan notes that the greatest job growth in Burlington is in services, followed by government. Estimates based on the 2000 Census suggest that 53.5% of Burlington residents work within the City, suggesting that there are roughly 20,000 people who commute into the City to work. The City supports alternative transportation by advocating:

1. an expanded PARC shuttle system;
2. ride share and park & rides; and
3. commuter rail.

The Plan sets forth specific goals for the Downtown and Waterfront, describing projects that are underway.

DOWNTOWN

The Plan reaffirms other plans' goals of enhancing quality of life and building a diverse and vibrant downtown, noting that "the ability to enhance and maintain the vitality of the Burlington's downtown is a

core economic development strategy for the City.” (page 10) The Plan also supports the development of new housing and parking opportunities.

The Plan describes Downtown projects in 2005 as including:

- Updates to Church Street Marketplace
- Improvements to Cherry Street CCTA terminal
- Housing (approximately 99 units) and parking garage on BankNorth property bounded by Main, St. Paul, Pine, and King Streets (except for the BankNorth building); involves renovating the 15,000 sq. ft. Hines office building located on 161 St. Paul Street and the former Armory building on the corner of Main and Pine Street. (Some of this work has already been completed.)
- Multi-story housing (approximately 40 units) on the corner of College and Pine Streets;
- Mixed-use development on the corner of Battery and King Streets: commercial on the first floor with approximately 40 units of residential units on upper floors and a private underground parking facility.
- Redevelopment of the “Superblock”: including Memorial Auditorium (as part of the Recreation Center), the Midtown Motel, and the City owned surface parking lots.
- Construction of a new Federal Courthouse over the next decade.
- Renovations to the Chittenden County Courthouse at the corner of Church and Main Street.
- Redevelopment of state-owned facilities in Burlington.

WATERFRONT

The Plan’s goal for the Waterfront is to develop as a mixed use neighborhood of businesses, housing, and recreation to reflect its value as a cultural, recreational, social, and economic resource for the community.

The plan supports:

- Redevelopment of the Moran Plant.
- Development of the privately owned lands adjacent to Lake Street.
- Relocation of the Bike path between College Street and King Street.

The Plan describes Waterfront projects in 2005 as including:

- Redevelopment of Moran Plant.
- IDA infrastructure – Infrastructure for the entire area incorporated as the Interim Development Area (IDA) of the Urban Reserve needs to be undertaken.

Downtown and Waterfront programs and strategies described by the Plan include:

- Continuing to use tax increment financing (TIF) to assist in the development of Downtown, the Waterfront, and the City’s Enterprise Zone.
- Maintaining the College Street Shuttle and the valuable connection it provides.
- Maintaining the “Two Hours of Free Parking” policy.
- Continuing the Brownfield Redevelopment Program (business assistance for revitalizing contaminated property) and the Burlington Technical Assistance and Financing Program (business loan and technical assistance program, including a new energy efficiency program targeted to restaurants and food markets).
- Continuing to manage the Vermont Downtown Program for Burlington. The City’s comprehensive revitalization strategy for the Downtown District involves a long-term



commitment to enhancing economic opportunities, preserving historic buildings, and improving public space and infrastructure in the commercial district. Property owners and businesses within Burlington's Designated Downtown District are eligible for federal tax credits for rehabilitating buildings that are historic or built prior to 1936. A Federal Architectural and Transportation Barrier Removal Deduction is also available, as well as state tax credits for rehabilitating historic buildings in a designated downtown.

- Taking advantage of access to wage, rehabilitation, and other tax credits and deductions for which development in the Waterfront is eligible due to its location within the Designated Downtown District.

1.2.9 Retail Feasibility Study of the Downtown District (2002)

Downtown Burlington attracts a wide variety of customers to its retail center: local residents, tourists, daytime employees, students from the local institutions, and regional customers. The study estimates that 55% of sales are attributable to local residents, followed by 20% each to tourists and regional residents, and 5% to the daytime employees and students (combined). This information is significant to the BTV Transportation Study as it suggests the transportation modes that might be used by each group. For example, tourists are likely to arrive in a private vehicle or tour bus, while daytime employees and students may be on foot. Therefore, enhancing the transportation alternatives available to the largest segment, local residents, will be most effective at mitigating the transportation impacts of retail consumers. Furthermore, this audience remains in place and can be educated over time, rather than requiring re-education of transportation options as tourists or transient students might.

1.2.10 Waterfront Revitalization Plan (1998)

The Plan relates two important events that frame projects on the Waterfront. The first is a 1990 agreement between the City and Central Vermont Railway (CVR) in which the City acquired land from CVR for Waterfront Park, the Urban Reserve, the Interim Development Area, and the Naval Reserve building.

The second event that influences options for the Waterfront is the 1989 Public Trust Doctrine which determined that filled lands are a public trust and as such must be managed for the public good (Figure 12). For filled lands north of Maple Street, west of the railroad and south of the Urban Reserve, permitted uses include:

- governmental facilities such as water and sewer plants, coast guard and naval facilities, roads and accessory transportation facilities and parking services;
- indoor or outdoor parks and recreation uses and facilities including parks and open space, public marinas, water dependent uses, boating and related services;
- cultural activities including theaters, museums, art and cultural uses of the lake;
- freshwater and other environmental research activities; and
- services related and accessory to the uses permitted above, including restaurants, snack bars and retail uses.

Additional uses are permitted between Maple and Main Streets:

- inns with public space, including restaurant, restroom and retail use. Contingent upon restrooms in the inns being available to the public; upon 45 transient dock slips in Burlington Harbor continuing to be available and marked for convenient access; and, upon the availability, in perpetuity, of uninterrupted public access along the shoreline of Lake Champlain from Maple to Main Streets.
- public markets.

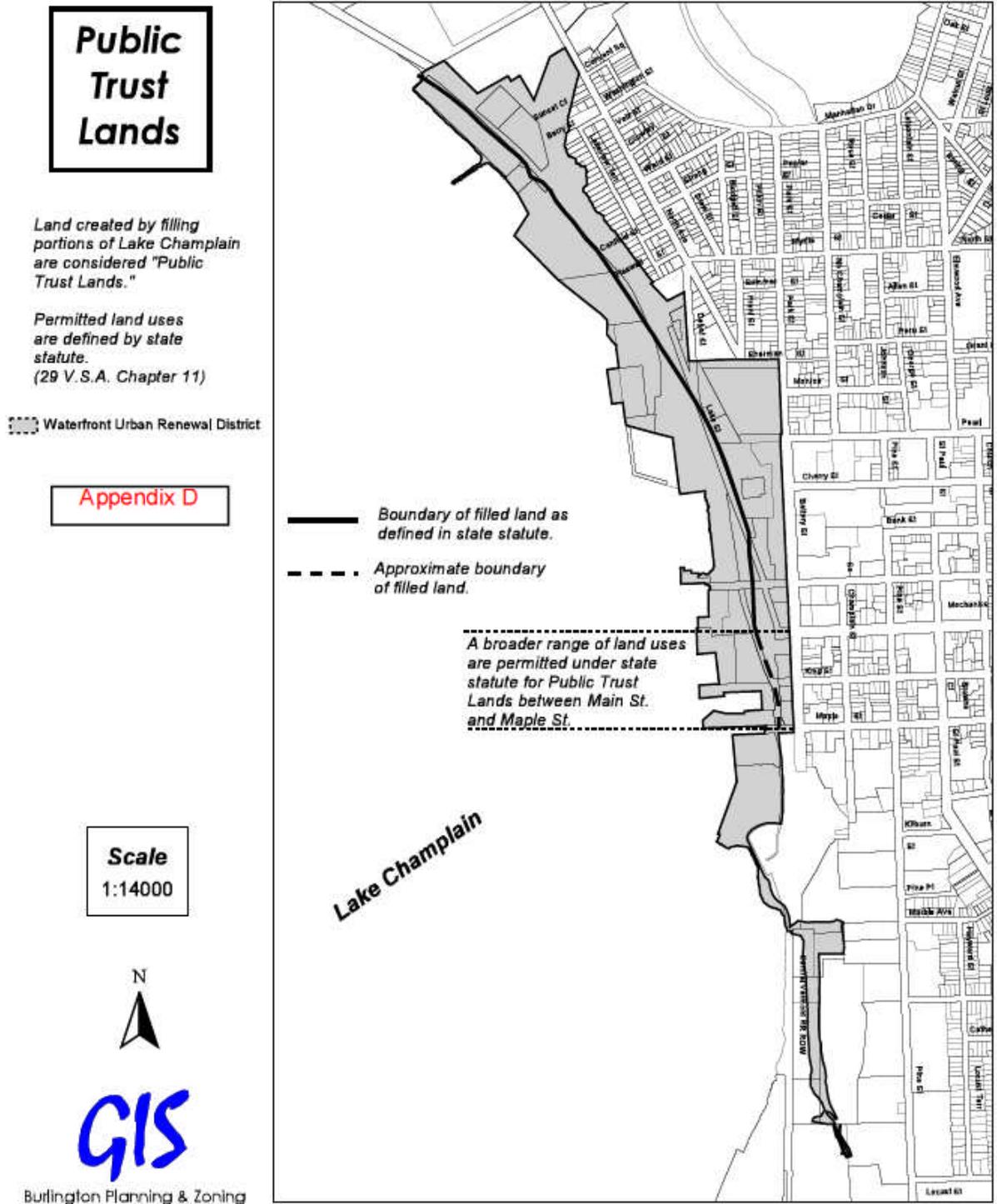
- facilities for transporting pedestrians and vehicles upon Lake Champlain by ferry and cruise vessels, including necessary docks, wharfs, maintenance facilities, administrative offices, gift shops, snack bars and related parking facilities.
- marine related retail facilities.
- restaurants.

Among the guiding principles of the Plan that are relevant to the Transportation Study for the Downtown-Waterfront Plan are:

- that infrastructure improvements be provided on the Waterfront which ensure safe pedestrian and vehicular access;
- that intrusion by the automobile should be minimized through dual footprint, underground, off-waterfront parking structures and innovative public transportation;
- that the patterns of development on the Waterfront should reflect the patterns of development in the center City, primarily Church Street, and that the development should occur incrementally;
- that the Waterfront should complement Downtown and its uses, and that Burlington's Downtown and the Waterfront should be connected through pedestrian linkages;
- that indoor uses be incorporated into the Waterfront;
- that the Waterfront's heritage be given significant consideration in future plans and projects;
- that affordable housing be incorporated into Downtown and Waterfront development activities;
- that Burlington's Downtown be strengthened through continued public improvements and private investments;
- that access to the Lake through boating and fishing be incorporated into public development activities; and
- that people with disabilities have access to Waterfront activities.



Figure 12: Public Trust Lands (Waterfront Revitalization Plan)



The 1998 Waterfront Plan describes 22 projects for the Waterfront Revitalization District. Projects identified in the plan are summarized in Figure 13 and Figure 14; additional detail is provided in Table 9.

Figure 13: Summary Map of 1998 Waterfront Revitalization Plan Projects

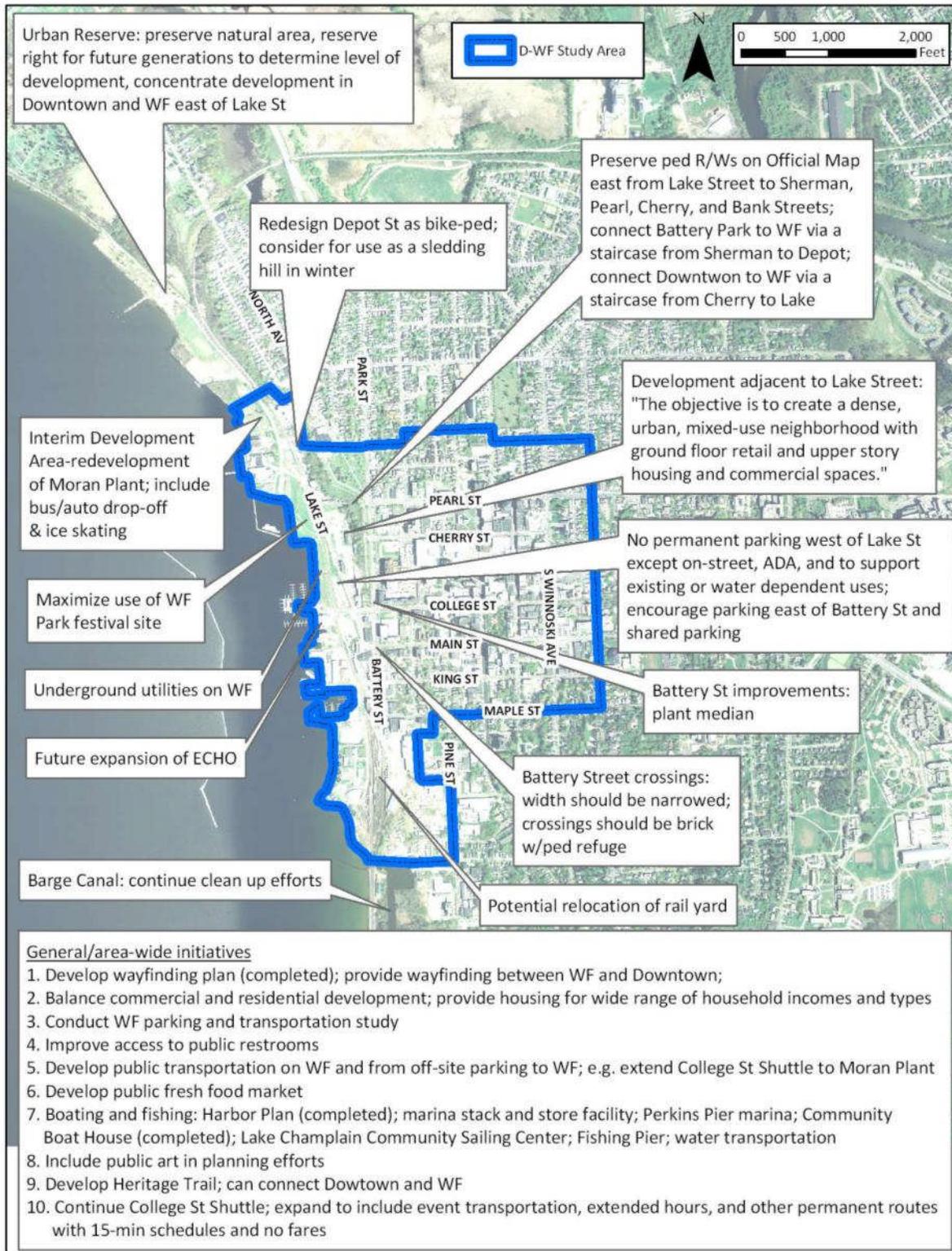


Figure 14: Summary Map of 1998 Waterfront Revitalization Plan Projects (College to Maple)

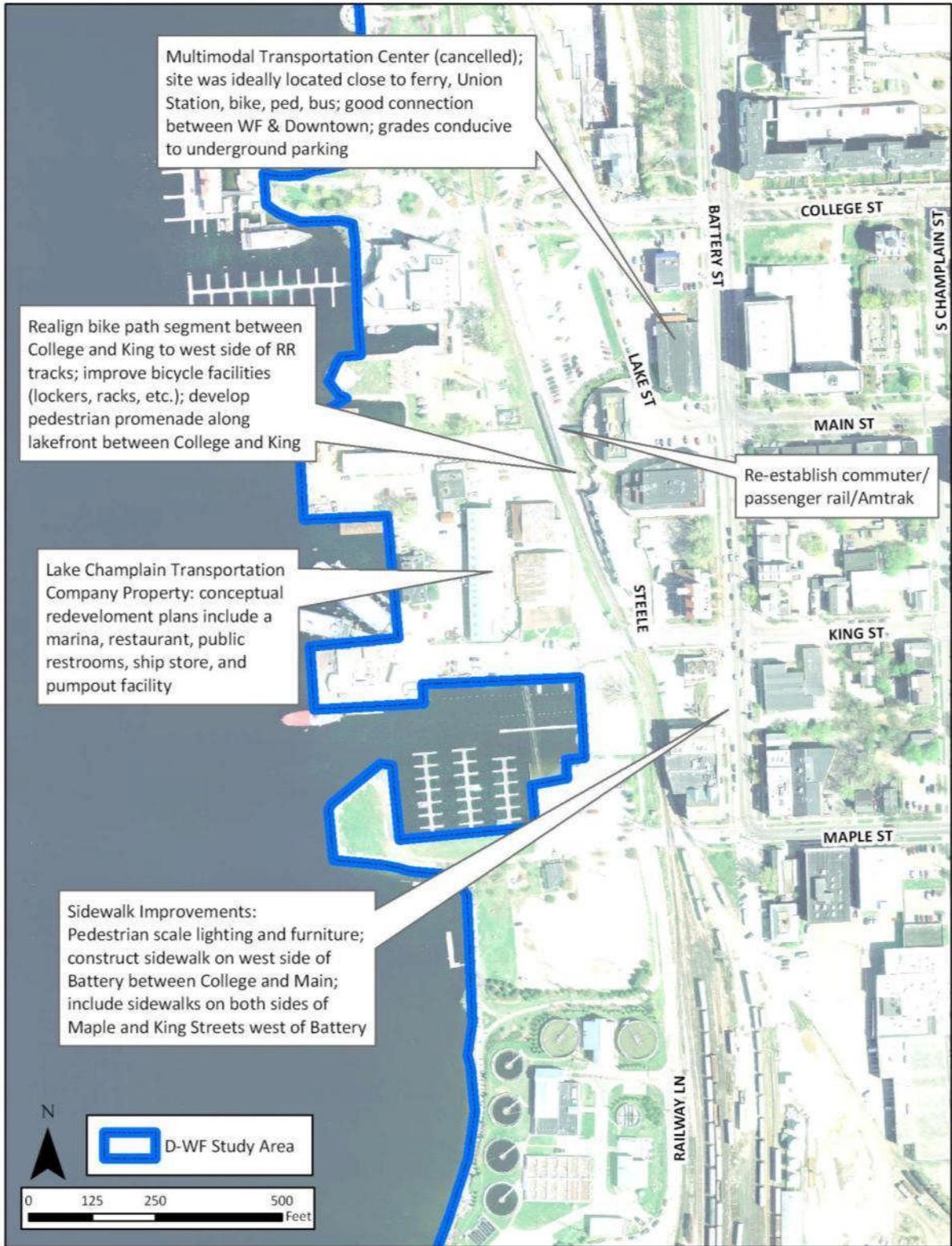


Table 9: Summary of 1998 Waterfront Revitalization Plan Projects

Project	Description
Development Adjacent to Lake Street	Development of the unfilled lands adjacent to Lake Street should reflect the patterns occurring in the City on lower Battery Street and Church Street. The objective is to create a dense, urban, mixed-use neighborhood with ground floor retail and upper story housing and commercial space. The right of the public to use and enjoy the waterfront, including festivals, music, and other noise producing activities must not be limited by development.
Pedestrian Corridor Improvements: Battery Street Crossings	The width of the Battery Street crossings at Main, College, Cherry and Pearl Streets should be reduced. Crossings should be bricked with a median in the center to create a pedestrian refuge. Crossing improvements at King and Maple should be completed as part of the construction of the Champlain Parkway.
Pedestrian Corridor Improvements: Sidewalk Improvements	Upgrades to the walkway and the addition of pedestrian scale lighting and furniture should be included in the improvements. A sidewalk should be constructed along the west side of Battery Street between College and Main Streets. Street furniture and pedestrian scale lighting should be installed along both sides of Battery Street. Consideration should be given to the use of pavers in some downtown "greenbelts" to reduce the need for maintenance and eliminate areas where foot traffic has prevented grass from growing. Sidewalks on lower Maple and King Streets west of Battery Street should be improved so that, like College Street, sidewalks are on both sides of the street. These improvements should be completed as part of the construction of the Champlain Parkway.
Pedestrian Connections to Waterfront from Sherman and Cherry Streets	Battery Park should be linked to the Waterfront by a staircase extending west from Sherman Street Extension to the area at the foot of Depot Street. Downtown should be linked to the Waterfront with a staircase beginning at the Plaza at the end of Cherry Street extending down the bank to the corresponding pedestrian right-of-way extending east from Lake Street.
Pedestrian Right-of-Ways East from Lake Street	Four short (150' to 200'), narrow pedestrian right-of-ways should be preserved extending east off of Lake Street below Bank, Cherry, Pearl and Sherman Streets, as defined on the official map.
Moran Square	Similar to the turnaround at the bottom of College Street, the Moran Plant should be redeveloped to allow adjacent bus/auto drop-off. <i>In Progress</i>
Battery Street Improvements	Planted median from Main Street to Monroe Street. Pedestrian crossing improvements as described above.
Depot Street Improvements	The existing street should be narrowed and redesigned as a pedestrian and bicycle path, with adequate lighting to provide a safe experience day and night. Could be used as an organized sledding hill in the winter.
Utility Undergrounding	Utility lines running to all new developments in Burlington are required to be underground. GMP and BED's overhead transmission and distribution lines from the Moran Plant to Maple Street are currently in transition. These long overdue projects remain a high priority and will significantly improve the aesthetics of Waterfront Park.
Public Restrooms	Directions to existing public restrooms should be clearly marked for the convenience of Waterfront visitors. Additional public restrooms should be included in development in the Interim Development Area. New developments on the Waterfront should contribute toward the construction of such facilities.
Parking & Transportation Study	A Comprehensive Parking, Pedestrian Safety and Circulation Study should take into consideration all permitted and proposed development and infrastructure improvements including but not limited to: the Champlain Parkway, the Moran redevelopment, development east of Lake Street, ECHO Science Center expansion, narrowing of Battery Street and bike-ped improvements to Depot Street. <i>In progress</i>
Boating & Fishing Projects	Harbor Plan, marina stack & store facility, Perkins Pier Marina, Community Boat House & Marina, Lake Champlain Community Sailing Center, fishing pier, water transportation
Integration with Downtown: Directional and Information Signage	Develop a coordinated, comprehensive approach to wayfinding throughout the Waterfront district and between the Waterfront and downtown. Reduce sign clutter.
College Street Shuttle	The College Street Shuttle continues to prove that free transportation between desired destinations works. Every day, the Shuttle keeps dozens—and sometimes hundreds—of vehicles off the Waterfront. Expansion should include event-related transportation, expanded hours, and other permanent routes that connect desirable points with no fares and headways under 15 minutes.
Redevelopment of Moran Plant	The City will support any economically feasible plan that results in permanent reuse of the building that is in keeping with the Public Trust Doctrine and the Guiding Principles of this Plan.
ECHO Lake Aquarium and Science Center	Three phase expansion now complete; efforts for future expansion in progress.



Project	Description
Parking	<p>The City should continue to allow no permanent parking to the west of Lake Street except on-street parking, handicapped parking, parking required to support existing uses, and parking for water-dependent uses. The City should continue to encourage the incorporation of additional parking spaces and dual use shared parking spaces in projects developed east of Battery Street.</p>
Multimodal Transportation Center	<p>Current intermodal connections between the regional and intercity bus systems, ferry service and future passenger rail are either inadequate or nonexistent. CCTA has outgrown its existing Cherry Street terminal space. Pedestrian and bicycle activity are significant contributors to the transportation system and are basic elements of any intermodal system.</p> <p>The block bounded by Battery, Main, Lake and College Streets was chosen for the construction of a new Multimodal Transportation Center. The site was ideally located close to the ferry terminal, Union Station, and the College Street Shuttle, and provides an excellent opportunity to interconnect regional bus, intercity bus, commuter rail, ferry, bicycle, pedestrian and shuttle and circulator bus systems.</p> <p>The development of a Multimodal Transportation Center strategically located on Battery Street at the juncture of Downtown and the Waterfront achieves three of the City's transportation and land use goals:</p> <ul style="list-style-type: none"> ▪ The development of the Multimodal Center would ensure full access to the Downtown/Waterfront area for the future, without expanding the roadway network, by capturing autos before they enter the downtown, and by reducing auto-dependency for downtown trips. ▪ A Multimodal Center located at the intersection of rail, intercity and regional bus, and ferry operations maximizes transit options and transfers between modes, and provides a pleasant, comfortable environment for transit patrons. ▪ The design for the Multimodal Center provides a mixed-use building with an active, pedestrian-friendly retail frontage, parking, and housing and/or office space on the upper floors, consistent with the City's waterfront development goals.
Passenger/Commuter Rail/Amtrak	<p>The expansion of passenger rail is critical to the economic development of Burlington's Waterfront. Passenger rail has the potential of bringing one thousand additional visitors to the Waterfront every day, year round. Commuter Rail will improve access to and from Burlington for commuters and visitors who must now travel on congested roads. An important addition to this project will be the expansion of the Commuter Rail route north and east through Winooski to Essex. With such a route, much of Chittenden County would have fast, affordable and congestion-free access to Burlington.</p> <p>Accompanying transportation from the Burlington train station to the riders' final destinations will be critical to the success of this transportation system. The Multimodal Transportation Center—adjacent to Union Station—would meet that need by providing a link to city buses and taxis.</p> <p>Amtrak currently runs from New York City to Rutland. This route should be expanded north to Burlington. Such an expansion would create a seven hour link to Manhattan for Chittenden County residents. It would provide visitors to Vermont an alternative to interstate highway travel and would put Burlington's Waterfront directly in the path of many visitors to Vermont.</p>
Transportation Around the Waterfront	<p>As the Interim Development Area, the Moran Station and the Lake Champlain Transportation Company property are redeveloped, public transportation between points on the Waterfront and from off-site parking to the Waterfront will be necessitated. Possible people-moving systems might include:</p> <ul style="list-style-type: none"> ▪ Creation of a north-south tram from the Moran Plant to Roundhouse Point. ▪ Use of golf carts or a small van to shuttle visitors from downtown parking to the Waterfront—especially during special events. ▪ An extension of the College Street Shuttle route down Lake Street to the Moran Plant.
Waterfront & Downtown Housing	<p>It is the City's goal to create a downtown with a balance of commercial and residential development and to provide housing to residents of all incomes. New construction and adaptive reuse of buildings in Downtown Burlington and on the Waterfront offer an opportunity to provide housing for a wide range of household incomes and household types - including families with children - in a very convenient location. The Downtown and Waterfront depend on having an active population after working hours and having residents who are concerned about the area. Downtown residents provide the workforce for Downtown businesses without causing additional traffic.</p> <p>While this Plan generally encourages the development of housing in Downtown and on the Waterfront, it also needs to ensure that residents and businesses of those areas do not inhibit or discourage the public's right to use or enjoy both the public and private development that has and will occur. Burlington's Waterfront is a place for all to use and enjoy, and it should not become the exclusive domain of its residents. Policies should be explored and utilized by both the public and private sector to ensure that this occurs.</p> <p>The inclusion of affordable housing with market rate housing is important to maintain a diverse and accessible Waterfront.</p> <p>Housing on the Waterfront is restricted to unfilled lands not subject to Public Trust laws.</p>

Project	Description
Urban Reserve	<p>The principle purposes for the Urban Reserve are threefold:</p> <ul style="list-style-type: none"> ▪ To preserve a large natural area from unwanted commercial development; ▪ To reserve the right for future generations to determine what level of development should occur at this site; and ▪ To concentrate the efforts of Burlington’s development activities within the Downtown Business District and the Waterfront Commercial District east of Lake Street.
Interim Development Area	<p>The Interim Development Area should be developed in conformance with zoning requirements for the area. The development should integrate the adaptive reuse of the Moran Plant, the Skatepark, the bikepath, housing, parking for related uses, and the potential use of existing railroad tracks for passenger rail service between Burlington and Essex.</p>
Skate Park & Rink	<p>The Skatepark called for in the 1998 Plan was completed just north of Waterfront Park.</p>
Lake Champlain Transportation Company Property	<p>The lakefront property between King and Main Streets and west of the railroad tracks is owned by the Lake Champlain Transportation Company and is currently used for operation of the Lake Champlain Ferries, for warehousing and for related amenities such as a restaurant. The ferry has been an important component of the City’s working waterfront and transportation system.</p> <p>These lands are filled and are therefore restricted to those uses allowed under the Public Trust Doctrine. The property is in the section of the Public Trust lands on which the greatest number of uses are allowed.</p> <p>The owner of this property has expressed an interest in redeveloping it in such a way as to provide services and facilities for users of Perkins Pier Marina and the general public. Amenities that may be part of the new development include a restaurant, public restrooms, ship store and pumpout facility.</p> <p>The City supports redevelopment of this prime waterfront property in such a manner as will guarantee:</p> <ul style="list-style-type: none"> ▪ Broad public access to the lakeshore. ▪ Space for relocation of the Bikepath to the west side of the railroad right-of-way between College and King Streets. ▪ Continuation of the ferry dock’s location somewhere between Main and King Streets. ▪ Consideration of and integration with neighboring properties—Perkins Pier and the Lake Champlain Basin Science Center. ▪ Consistency with the principles of the Guiding Principles of this Plan.
Winter Activities	<p>Ice skating facility (included in Moran Plant Redevelopment) and sledding hill and snowmaking.</p>
Public Market	<p>A Public Market could provide a public commercial space where Vermont farmers, crafters, artists, small business people, consumers and local residents can carry on traditional local market activities. A year-round enclosed market would create a destination on the waterfront that would add a sense of community, provide income for small growers and entrepreneurs and keep dollars in local circulation.</p> <p>A February 1998 initial feasibility study found that Burlington has enough people with enough income to support a 20,000 square foot fresh foods market downtown. On the supply side, we have a diverse range of existing food producers that offer an excellent vendor base.</p> <p>A 20,000 square foot market would contain 10,000 leasable square feet that would house approximately 20 permanent vendors. The facility would also provide storage and refrigeration for vendors. The indoor, year-round vendor space would be augmented by outdoor seasonal vending space and common areas for seating, demonstrations and other events.</p>
Barge Canal	<p>The EPA’s website provides background and an update on the Barge Canal:</p> <p>“A manufactured gas plant operated at the Pine Street Canal site from 1895 to 1966. Operations at the plant included disposal of wastes from the gasification process, including coal tars. Manufactured gas wastes were placed in and migrated to a canal on the site, which had been built in the mid-1800’s to serve lumber yards in the area.</p> <p>A remedy to remove coal tar and place excavated contaminated sediments into a disposal facility to be constructed on the site was proposed by EPA in 1992, and withdrawn six months later, due to considerable community opposition to the proposal. From 1994-1998, additional studies were conducted by companies responsible for the contamination under the auspices of EPA, the Vermont Dept. of Environmental Conservation (VT DEC) and the Pine Street Barge Canal Coordinating Council, a citizen’s advisory group. In 1998, the Coordinating Council recommended constructing a cap over contaminated sediments in the canal and nearby wetlands, and restoring the wetlands, so that ecological risks at the site would be addressed. EPA adopted that recommendation in 1998, and the cap was built in 2003 and 2004.”</p> <p>http://yosemite.epa.gov/opa/admpress.nsf/6d651d23f5a91b768525735900400c28/40418778ca66fdd08525777c0068113b!OpenDocument&Highlight=2,Pine,Street</p>



Project	Description
Relocation of Vermont Railyard	<p>While the City encourages the expansion of passenger rail, the railyard is a potential obstacle to development of the Waterfront as a publicly accessible community resource.</p> <p>By moving the railyard off the Waterfront, truck traffic through residential neighborhoods would be eliminated. Noise would be dramatically reduced. There would be a positive impact on Burlington's south end neighborhoods. The storage and handling of hazardous materials would be eliminated. Relocation of the railyard would provide an opportunity to create mixed use development on those lands.</p> <p>On the other hand, relocation of the Vermont Railway yard off the waterfront could possibly mean the loss of rail infrastructure in the City and would further sanitize the Waterfront from its industrial heritage. The movement of goods by rail is far more sustainable, efficient, economical and environmentally responsible than trucking. Future opportunities to transfer goods for manufacturing and public use by rail should not be discarded without careful consideration.</p>
Bike Path and Promenade	<p>The section of the Bikepath between College Street and King Street should be relocated from the east side to the west side of the active rail line.</p> <p>Between College and King streets, a pedestrian promenade should be constructed along the water's edge. The Lake Champlain Basin Science Center and the Lake Champlain Transportation Company have integrated the promenade into their redevelopment plans.</p> <p>In contrast to recommendations in past plans, the relocation of the Bike Path in the Urban Reserve is no longer contemplated. Instead, a pedestrian path or promenade should be created whenever possible extending from the southern end of Perkins Pier to the northern end of the Urban Reserve. Any additions or changes to bike and pedestrian ways in the Urban Reserve should consider possible impacts on natural resources, waterfront access, future uses, and the separation of different type of users.</p> <p>Whenever possible, the bike path should be widened to a minimum of 10' throughout the Urban Renewal area. Bike racks and lockers, showers and locker facilities should be encouraged in new development on the Waterfront. Bike racks should be added as furniture along the bikepath.</p>
Waterfront & Battery Parks	<p>The use of Waterfront Park for festivals and special events brings thousands of visitors to the Waterfront. The use of the festival site should be maximized.</p>
Heritage Protection/ Heritage Trail	<p>A self-guided pedestrian and/or bicycle Heritage Trail should be developed. Points of interest should be marked along the route with a consistent signage system. Models could enhance the educational experience at key points. A Heritage Trail should also link the Waterfront with the rest of Downtown.</p>
Public Art on the Waterfront	<p>The public art planning process shall relate to the City's various planning functions, such as infrastructure improvement, neighborhood planning processes, park planning and redevelopment. Whenever possible sites for artwork projects will be identified at the early stages of planning in order that artwork and art ideas can be effectively and economically integrated into project development.</p>

2.0 TRANSPORTATION PLANS AND STUDIES

2.1 Regional

2.1.1 CCMPO Metropolitan Transportation Plan (MTP) 2025 (2005; amended 2010)

The CCMPO MTP is the overarching transportation planning document for the region. Throughout the MTP 2025, it is stressed that improvements to the transportation system's performance hinge on establishing a land use pattern of concentrated development centers. Specifically, **the MTP says that "the success of the future transportation system investments outlined in the Preferred Alternative...is dependent upon achieving the development pattern" of 45% of housing and 45% of employment within the Metropolitan Areas (which includes all of Burlington).** This is encouraging for the BTV as the CCMPO will give priority to projects that support such areas.

Among the broad but BTV-relevant aspects of the MTP are:

- Focusing on the concentrated development pattern described above;
- Completing committed transportation programs in the CCMPO TIP, including the Champlain Parkway in Burlington and Commuter Rail;
- Increased transit service frequencies;
- Development of a regional bicycle path network; and
- Establishing a regional system of park&ride facilities and a region-wide Transportation Demand Management (TDM) program that targets regional employment centers.

Burlington is located within the MTP's Regional Core planning area as shown in Figure 15. The MTP notes that the majority of peak period travel flows are urban to urban trips as shown in Figure 16. This reflects the demand on the urban transportation system and the importance of developing an efficient infrastructure that is multimodal and well-maintained, supported by and supportive of adjacent land uses.

Strategies and projects within the Regional Core that may specifically influence or impact PlanBTV include:

- Extending a US 2 Urban Traffic Management System (which improves signals and monitors traffic) onto Burlington's Main Street to Battery Street.
- Encouraging TDM efforts focusing on employers in downtown Burlington and the Pine Street corridor through the potential establishment of corridor TMAs.
- Expanding the Lakeside Avenue (future South End Transit Center) intercept lot and creating incentive programs to encourage its use.
- Developing the Exit 14 intercept lot and creating incentive programs to encourage its use.
- Planning for an intercept lot in the vicinity of the railroad underpass with the Northern Connector/VT 127.
- Increasing frequencies on all current CCTA routes.
- Starting new high frequency service linking Burlington, South Burlington and Winooski and linking with the planned I-89 Exit 14 intercept lot.
- Building a new downtown public transit hub.
- Maintaining, rebuilding, and expanding Burlington's sidewalk system.



- Providing on-road bicycle facilities wherever feasible.

Figure 15: CCMPO MTP 2025 Regional Core

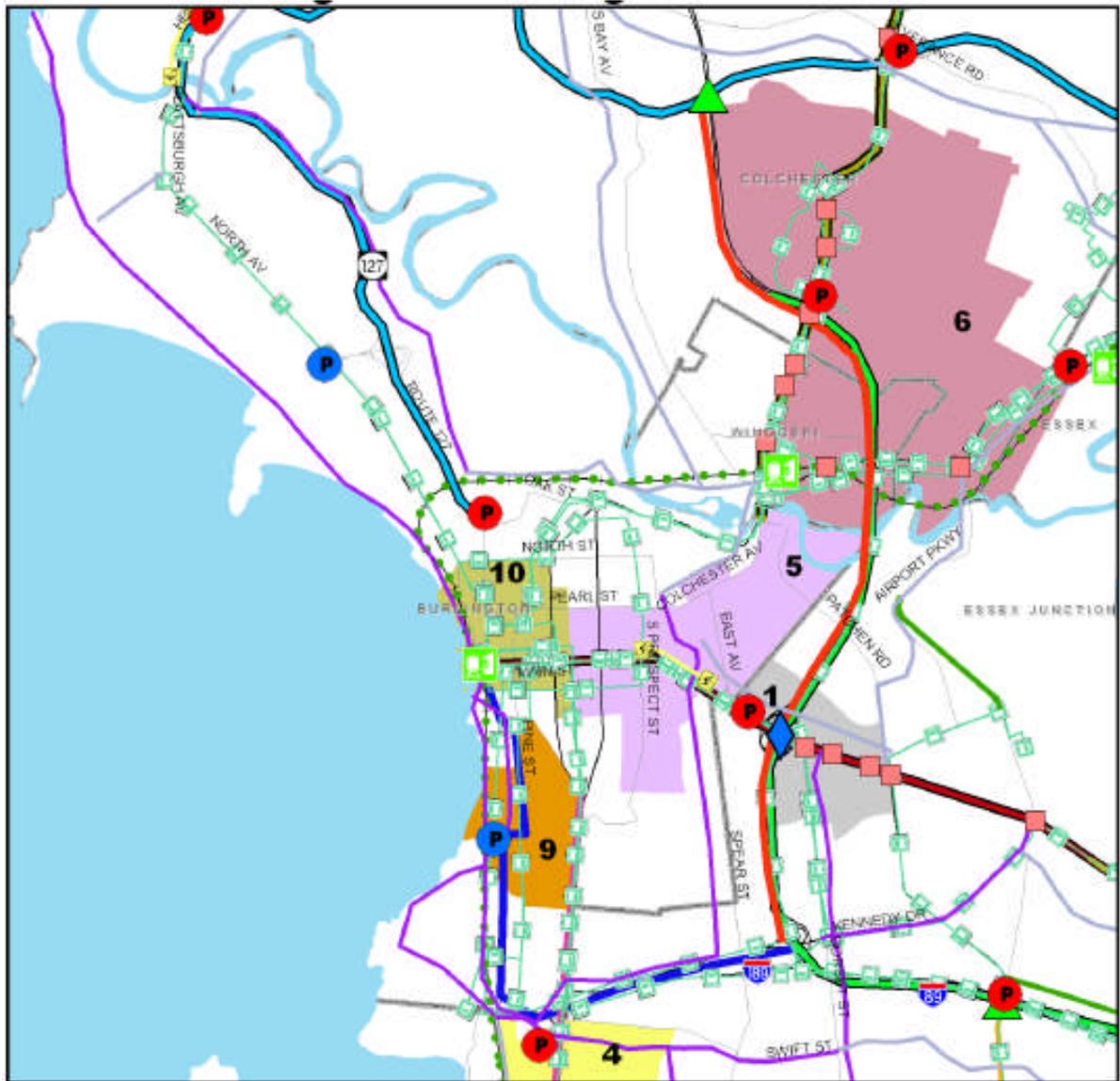
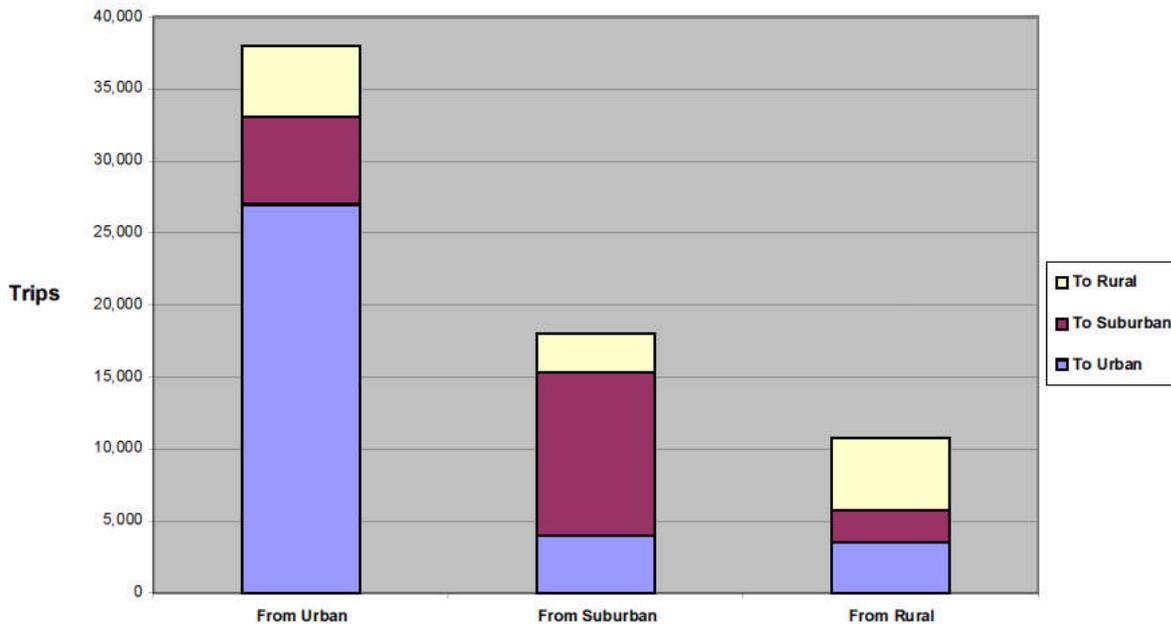


Figure 16: CCMPO MTP 2025: PM Peak Period Travel Flows



Source of Data: Chittenden County Travel Model

In addition, the MTP notes that local commuter and Amtrak rail service should be planned for and the relocation of the Burlington railyard should be considered.

The 2035 MTP is currently in development.

2.1.2 Chittenden County Park & Ride Plan (2011)

This plan will be used by the CCMPO and its members (municipalities, VTrans, CCTA and others) to guide decisions about the use of federal and state transportation funding for planning, scoping, design and construction of park&ride and intercept facility projects. The Plan differentiates between intercept lots (close to destination, urban locations, served by high frequency transit) and park&ride facilities (close to origin, rural or suburban locations, may or may not be served by low frequency transit) and offers a prioritized list of each to pursue. Three sites that have been repeatedly mentioned in the documents reviewed for this synthesis are shown in Table 10.

Table 10: Facilities in Burlington Recommended as Part of the County Park & Ride Plan

Priority/ Type	Location	Recommendation	# of parking spaces	Timeframe	Project Lead
1/ Intercept	US 2 at I-89 Exit 14	Complete scoping study, NEPA documents, and design	1,200	Evaluate over the next 1-2 years; implement in 3-5 years	CATMA
2/ Intercept	South End Transit Center	Construct surface lot in initial phase; construct structured parking in long term	1,000	Evaluate over the next 1-2 years; implement in 3-10 years	CATMA
11/ Park&Ride	Northern Connector/VT 127 near the railroad tracks	Identify potential locations as part of the North Avenue Corridor Plan	70	Evaluate over the next 1-2 years; implement in 5-10 years	CCMPO

Study findings relevant to PlanBTV include:



- The biggest gap between available park&ride spaces and potential demand is in the North Corridor.
- The difference between potential park&ride demand (which is high) and actual park&ride facility occupancy (which overall is low to moderate) suggests that additional park&ride facilities must be provided at locations more convenient to users.

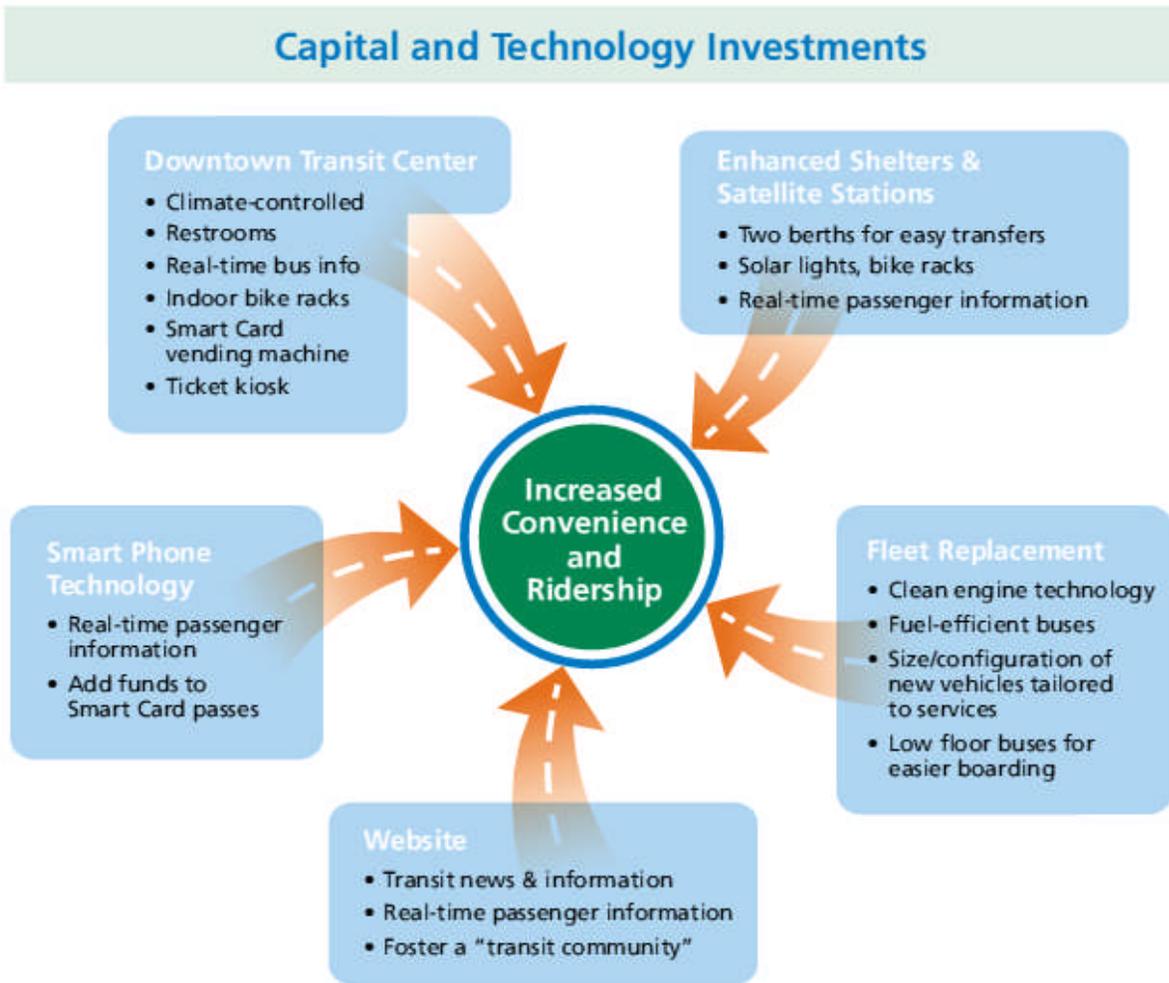
2.1.3 Chittenden County Transportation Authority (CCTA) Transit Development Plan (TDP) (2010)

The TDP aims to increase ridership and improve services and facilities to raise the convenience and attractiveness of transit. The plan notes that in order to be successful, communities will need to support CCTA by focusing development along existing CCTA routes and considering the presence of transit when planning new developments. The primary elements of the 10-year TDP are 1) improved service; 2) geographic expansion; and 3) facility/equipment improvements.

The TDP establishes the following priorities, in order of importance/implementation:

1. Establishing 15-minute peak service on all four of the major corridors into Burlington—North Ave, Colchester Ave/Pearl Street (VT 15), Williston Road/Main Street (US 2), and Shelburne Road (US 7)—is likely to be the most cost-effective investment in new service that CCTA can make. (Executive Summary page 4)
2. Expanding the hours of service on CCTA routes is likely to be the next most cost-effective investment. Service offered 14-16 hours per day (such as 6:00 a.m. to 10:00 p.m.) is considered to be the minimum needed to attract choice riders, but many CCTA routes end service by 7:00 p.m. In addition to more evening service, Sunday service on the four major corridors, with the Essex Junction route leading the way, would generate additional ridership. (Executive Summary page 4-5)
3. Investing in infrastructure and technology: make improvements to shelters, benches, bike racks and other passenger facilities, including real-time passenger information, wi-fi on buses, and trip planning software. (See Figure 17)
4. Improving the pedestrian environment in service corridors to support transit access.

Figure 17: CCTA TDP Investments (Executive Summary, page 4)



The TDP notes that a Downtown Transit Center in Burlington is CCTA’s most needed facility investment. In addition, vehicle replacement and an increase in publicly owned park&ride lots are necessary.

Action items recommended by the TDP are:

- Municipalities should change their local zoning to more strongly support and incentivize transit oriented development—including higher density and mixed use projects—along transit corridors in their communities.
- CCTA, the municipalities of northwest Vermont, and the State of Vermont should work together to develop a regional funding mechanism for public transportation that relieves the burden on the property tax.
- The CCMPO must have greater autonomy and control regarding programming the region’s federal transportation funding.
- CCTA and the CCMPO must have greater control to develop and implement transportation infrastructure projects, such as park&ride lots, in the region.
- Marketing and the dissemination of information to the public are also key issues. (Chapter 8, page 1)

In order to realize the TDP vision of expanded service and improved facilities, a significant change in CCTA’s funding structure is necessary. Current funding options are a New Start grant through CMAQ, working with



the state legislature to develop a regional funding mechanism, and working with VTrans on the update to the Public Transit Policy Plan to examine funding opportunities and establish state policies to secure funding and flexibility. The TDP is also hopeful that the federal transportation reauthorization will provide funding.

2.1.4 Southern Connector/Champlain Parkway Record of Decision (2010)

Project planning for the Southern Connector/Champlain Parkway, which would provide north-south access to downtown Burlington and the Waterfront from I-189 in South Burlington, began in 1965. This summary focuses on the latest alignment, as shown in Figure 18. This alignment involves a less intrusive design on neighborhoods than those previously considered, and does not transverse the Pine Street Barge Canal Superfund Site.

The C-1 segment has already been constructed, but the latest alternative uses a new cross section with one lane in each direction, a raised grass median, and a shared use path parallel to the Parkway along the north side to connect Shelburne Street and Pine Street. The C-2 section alignment would be new and would share the same cross section. The C-6 segment uses Pine Street to access the Waterfront and Downtown. Where feasible along Pine Street, the cross section would include on-street parking, curbing, and sidewalks, and bicycles would share vehicular travel lanes. New traffic signals would be installed on Pine Street at Maple and King Streets and would include pedestrian phasing to support the marked crosswalks at the intersections.

Figure 18: Southern Connector/Champlain Parkway 2010 ROD Alignment



The Record of Decision (ROD) establishes the following project purpose:

“The purpose of the Southern Connector/Champlain Parkway project is to improve access from the vicinity of the interchange of I-189 and US Route 7 to the Burlington [City Center District] CCD and the downtown waterfront area; and to improve circulation, alleviate capacity overburdens, improve safety on local streets in the project study area and provide traffic relief in the southwestern quadrant of the City of Burlington.

The purpose of the project is also to eliminate the disruption to local neighborhoods and separate the local and through-traffic. Truck traffic that is destined for the CCD or the industrial areas access from Home Avenue and Flynn Avenue would be directed onto the Southern Connector/Champlain Parkway and removed from the local street network. The proposed transportation corridor is expected to become the major routing for north-south through-traffic in the area. The reassignment of the majority of through-traffic to this route would reduce traffic volume levels along neighborhood streets and improve accessibility to adjacent neighborhood areas.” (page 2)

The project is expected to address the need for a north-south travel route through Burlington, congestion, safety due to the mix of vehicles and traffic types currently in the neighborhood areas, and the mix of local and through traffic.

The ROD notes that this alternative would not have any impacts to the railyard, Curtis Lumber, of the former Burlington Street Department. Neighborhood cohesiveness is not expected to be impacted because only three houses will be isolated on the west side of the C-2 section. The project is in its final permitting stage and construction could begin by 2013. The Waterfront South Access Study considers economic development potential and connectivity options within this area to improve mobility for all modes.

2.1.5 CCMPO Regional Bicycle-Pedestrian Plan Update (2008)

The CCMPO Regional Bicycle-Pedestrian Plan focuses largely on programmatic recommendations, including periodic maintenance and condition review programs; continuing Safe Routes to School and Youth Traffic Safety Education; developing a Chittenden County Walk-Bike Central Website, Share the Road Campaign, Visibility Campaign, Share the Path Campaign, Sunday Parkways Program, and others.

The Plan acknowledges deficiencies in regional connectivity, making a specific infrastructure recommendation to address bicycle access over the Winooski River at the Winooski-Burlington town line. This deficiency creates a significant barrier to bicycle access to Burlington from points northeast. A stand-alone, shared use structure has been recommended adjacent to the existing vehicular bridge.

2.2 Burlington

2.2.1 Burlington Transportation Plan (2011)

The Burlington Transportation Plan assumes the role of the transportation element of the Municipal Development Plan.

The 2011 plan recognizes that the Downtown, Waterfront, and Hill are major job centers, while the enterprise zone (Pine Street Corridor, enterprise zone south of Waterfront, and industrial areas between Home and Flynn Avenues) may be future centers of growth for the City. During development of the Plan, transportation concerns expressed by businesses in the Downtown and Waterfront areas were parking availability, congestion, and wayfinding.

One of the most significant aspects of the 2011 Transportation Plan is its adoption of a Complete Streets strategy to accommodate all users. The Plan suggests different classifications for City Streets (e.g., Complete, Transit, Bicycle, Slow, State Truck Route, and Neighborhood) and provides guidelines for each type.

The Plan establishes the first priority for transportation as maintenance of the current system, followed by the implementation of funded capital projects, including improving:

- access to Waterfront North and updates to Depot Street
- Waterfront South access through the railyard (addressed in the Waterfront South Access Project)
- side streets off Church Street Marketplace
- wayfinding
- the Burlington bike path

Projects to be developed include:

- the Downtown Transit Center
- South End Transit Center
- Southern Connector/Champlain Parkway



- bicycle connection to Winooski
- implementation of the North-South Bicycle Plan (see Section 2.2.10)

The Plan establishes the following policies to support:

- a Downtown TMA
- passenger rail to Burlington
- alternative funding sources for public transit
- carsharing
- changing zoning parking requirements to allow impact fees or payment-in-lieu options.

The Plan proposes three parking pricing pilot programs to influence use and spread demand to underutilized areas, encourage transportation alternatives, and increase parking revenue. The first pilot program is targeted at on-street spaces in the Downtown and replaces existing parking meters in high demand areas with variable pricing meters that accept credit cards. Meters would remain in effect into the evening rather than ending at 6PM as they currently do.

The second pilot program would focus on the Waterfront and would charge for parking throughout the year rather than only seasonally. The last pilot would expand the residential permit program to address on-street spaces in neighborhoods and would sell a limited number of non-residential permits for daily parking.

The Plan notes that the City has a ‘no net loss’ parking policy, so that spaces lost to redevelopment must be replaced somewhere. Options for adding parking supply include expanding the Marketplace garage, or adding on-street spaces by converting streets to one-way. Parking has also been considered at the TD Bank site and the “super block.” Relocation of the Cherry Street bus terminal would also provide additional capacity. The Plan re-affirms the preference to avoid adding parking on the Waterfront.

The Plan supports development intercept parking facilities at the future South End Transit Center and at Exit 14.

2.2.2 Pearl Street Streetscape Improvements (in progress)

Plans are being developed to add bicycle lanes to Pearl Street between North Winooski Ave and St. Paul St. Curb extensions and crosswalk enhancements will also be included while on-street, parallel parking is maintained.

2.2.3 St Paul St and Lower Church St Sidewalks (2011)

Elements of the Church Street Marketplace are being extended to Lower Church Street to King Street and St. Paul Street behind City Hall Park between College and Main Streets. These streetscape design elements, along with Street Design Guidelines from the Burlington Transportation Plan, provide a "palette" which future improvements in the Downtown and Waterfront area will follow. The sidewalk is being widened on the west side of both streets. This will provide more space for street furniture and landscaping. While some on-street parking spaces will be eliminated, the additional sidewalk width will improve the pedestrian environment and provide more room for businesses for outside café seating, sidewalk sales, etc..

2.2.4 Waterfront North Access Project (in progress)

The overall purpose of the Waterfront North Access Project is:

“To enhance travel access to and on the Waterfront and to improve connections to the remainder of Downtown with the goal of creating jobs and enhancing economic vitality. It is part of an ongoing effort to put in place public infrastructure to reclaim Burlington’s formerly industrial downtown waterfront in a manner that both

drives the regional economy and enriches quality of life by enhancing public access to and enjoyment of the Lake Champlain shoreline.”¹

The project is needed to:

- Improve pedestrian crossings of city streets while maintaining adequate traffic flow.
- Facilitate pedestrian travel down to the Waterfront from the heights, including improving access to Depot Street.
- Improve stormwater management along northern Lake Street.
- Promote access to the Moran site; provide for future access to the Urban Reserve.
- Develop north-south travel alternative to Lake Street.

As a result of the public process and review by the Waterfront Marketplace Downtown (WMD) advisory group; Planning Commission; Public Works Commission; and Transportation, Energy, & Utilities Commission, the following recommendations were made:

1. Pursue a Phase 1 project consisting of:

- Re-alignment of northern Lake Street and the bike path, including pedestrian amenities, stormwater improvements, undergrounding of utilities, street lighting, landscaping, and parking, which will support adjacent development opportunities. (Recent plans show approximately 170 new parking spaces at the redeveloped Moran Plant.)
- Stormwater upgrades to Lake Street that do not preclude future north/south transit opportunities.

2. Plan to address the following during future phases:

- Signal timing improvements and hardware upgrades to Battery Street.
- Continued investigation of improvements to Depot Street to make it a bicycle/pedestrian only route and development of a stairway extending from Sherman Street to the Waterfront. These improvements will address public safety; enhance waterfront access from the Old North End, and upgrade stormwater, utilities and street lighting.
- North-south transit and Waterfront parking should be investigated and a plan developed.
- A pedestrian bridge from Depot Street to the parking near the Moran building should be considered as part of the next phase of Moran.
- Additional improvements to Battery Street require further investigation to determine impact on levels of service to all modes.
- Other concepts identified in the 2009 scoping study such as north-south transit, in-slope parking, and funicular require additional study. With respect to the parking and funicular, the City should pursue partnerships with private property owners.

Construction plans for Phase 1 are currently in development.

2.2.5 Battery-Pearl Intersection (2011 Draft)

Lamoureux & Dickinson have analyzed the Battery-Pearl Street intersection to address safety issues (specifically, vehicles not staying their chosen lanes) on the northbound double right turn lanes. The conclusion is that reducing the northbound lane configuration from a through lane and two right turn lanes to a through lane, one right turn lane, and a bike lane will provide sufficient capacity to maintain adequate levels of service in 2011 and in 2028.

¹ CEDO project website: http://www.cedoburlington.org/waterfront/waterfront_access_north_project.htm



The excess space from the elimination of the outside right turn lane could be made into green space, bus parking/loading/unloading, or metered parking. No changes are proposed to the eastbound receiving lanes.

The significance of this project for PlanBTV is that it improves safety and has potential impacts to parking (five additional metered spaces) or transit access. The bus loading/unloading zone could be used for either tour buses accessing local hotels or CCTA. The area in the immediate vicinity of the intersection currently has limited access except for pedestrians. That is, there is no nearby place to park or disembark from a bus and walk to Battery Park. Bicycle access is constrained by the hill on Battery Street and the multi-lane cross section that does not include bicycle lanes.

2.2.6 The Potential for Enhanced Transit Services in the City of Burlington (2010 Draft)

Smart Mobility, Inc., Oman Analytics, and ORW provided a briefing report on the potential for a streetcar system in Burlington. The report notes that enhanced transit services such as streetcars, Bus Rapid Transit (BRT), or light rail can spur transit-oriented development (TOD). The study notes that streetcars have been used as economic development strategies in other cities, as a streetcar line helps to focus development along its corridors, particularly those which have unrealized development capacity and are connected to an urban center. Developing a vibrant pedestrian environment is also an important part of enhanced transit and economic development.

To generate high ridership, the system should include access to a wide variety of uses, such as employment centers, residential, tourist, retail, and mixed use. The study identified the Pine Street corridor as a prime location for enhanced transit and TOD. Other identified areas for high development potential were the Moran Plant, the TD Bank site on the southwest corner of the Main-St. Paul intersection, the “superblock” (encompassed by S. Winooski-Main-S. Union-College), and Perkins Pier. The study suggests that these areas could be connected by streetcar starting at the South End Transit Center, traveling north on Pine Street and turning east at an undefined location, and possibly connecting with a future intercept facility at Exit 14. As shown in Figure 19, this area creates an inverted L-shape for a three-mile (6 miles both directions) line.

Streetcar service in this area was assumed to replace CCTA’s College Street Shuttle and Pine Street routes (including the Lakeside Commuter), connecting intercept facilities in the South End and at Exit 14. The service would be expected to operate with higher frequency (15-minute headways) and longer daily hours, as well as be more attractive and easier to understand than conventional CCTA routes.

The report suggests that in the long-term, the service would likely influence land development patterns and further increase ridership. Significant implications for development to support enhanced transit are:

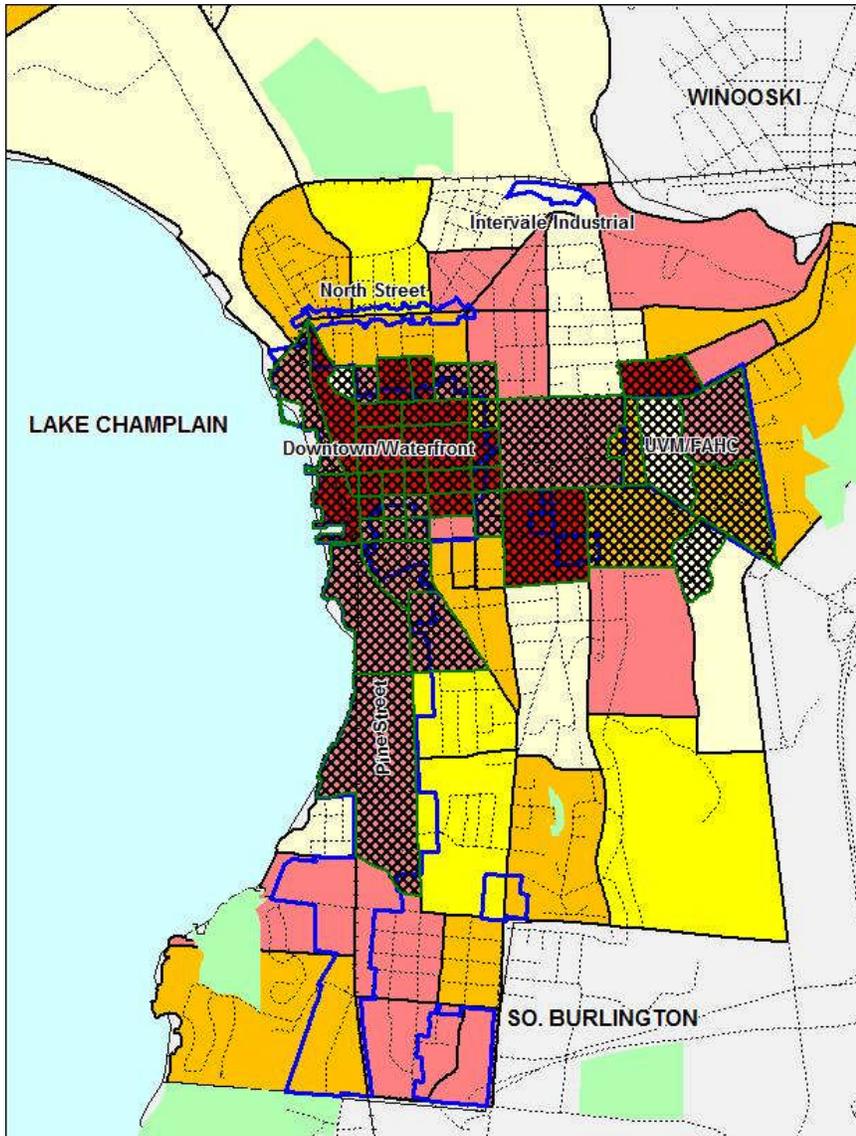
Maximum economic development and environmental benefits would be achieved through medium- to high-density mixed used development that emphasizes housing. Today, the City of Burlington has a significant jobs-housing imbalance that requires a net inflow of 11,000 workers each day into the City of Burlington.¹ Almost all of those commuting into the City do so by car (98%), and it will be difficult to push the share down significantly because of the challenges in serving suburban areas with transit. If transit investments led primarily to non-residential development in Burlington, this would worsen the jobs/housing imbalance, and would likely have a net negative impact on regional energy consumption and greenhouse gas emissions. It would be best to plan for development that is at minimum jobs/housing neutral in total, and that ideally would include more housing than jobs to help correct the current imbalance.... Achieving high ridership requires a combination of residences, workplaces and attractions. (page 21)

The study estimates that 5.5 million sq.ft. of development (consisting of 4,000 new housing units and 1.5 million square feet of new non-residential development) in Figure 19’s inverted L-area development area-

¹ 2000 Census data; “net” means there are 11,000 more in-commutes than out-commutes by Burlington residents.

and primarily Burlington's South End- is needed to achieve the ridership to support a successful streetcar system. The report is not explicit regarding the ridership necessary to support BRT service.

Figure 19: Streetcar study: "Prime area for Development Oriented Transit" (cross hatch)



The report estimates that a streetcar line serving this corridor would cost \$60-100 million, while a high quality BRT system could cost \$30-50 million. The annual operating budget for the streetcar line was assumed to be \$2.5 million, serving 1 million riders each year.

2.2.7 Waterfront South Access Study (2010)

RSG worked with the CCMPO and the City of Burlington to develop alternatives for access and circulation to promote economic development in the southern portion of Burlington's Waterfront. The plan identifies new streets to increase frontage and property access to spur economic development. The study area generally comprised the Waterfront between Main Street and the Barge Canal, west of Pine Street, and included the Lake Champlain Transportation Company/Pecor Property, Perkins Pier, the water treatment plant, the railyard, and Curtis Lumber.



The study developed three design alternatives around a proposed grid street network (Figure 20) to foster private commercial development. Different cross sections create different street characteristics to develop various economic opportunities. Three scenarios were considered to achieve specific objectives:

1. *Low Cost Scenario* -- what access/circulation plan can be pursued most quickly with the lowest infrastructure and permitting costs, which can then be used as a foundation for future improvements?

Under this scenario, all streets in the new grid alignment have the same 25 mph speed profile and 100 new on-street parking spaces are created on the Battery Street Extension to Pine Street. A complete street cross section without a median is assumed.

2. *Maximum Economic Impact Scenario* -- which access/circulation plan can maximize future economic development potential of the project area?

In this alternative, the new grid streets are designed as a hierarchy of collectors and local streets, using narrower lanes, on-street parking, and incorporating higher levels of pedestrian and bicycle activity. While the Battery Street Extension is developed as a 25 mph collector, other streets are 20 mph to encourage street activity supportive of adjacent properties and development. Various cross sections for each type of road include on-street parking, bicycle boulevards, and complete streets with and without medians. This plan would add approximately 150 on-street parking spaces.

3. *Transportation Efficiency Scenario* -- which access/circulation plan provides the greatest transportation mobility and safety benefits?

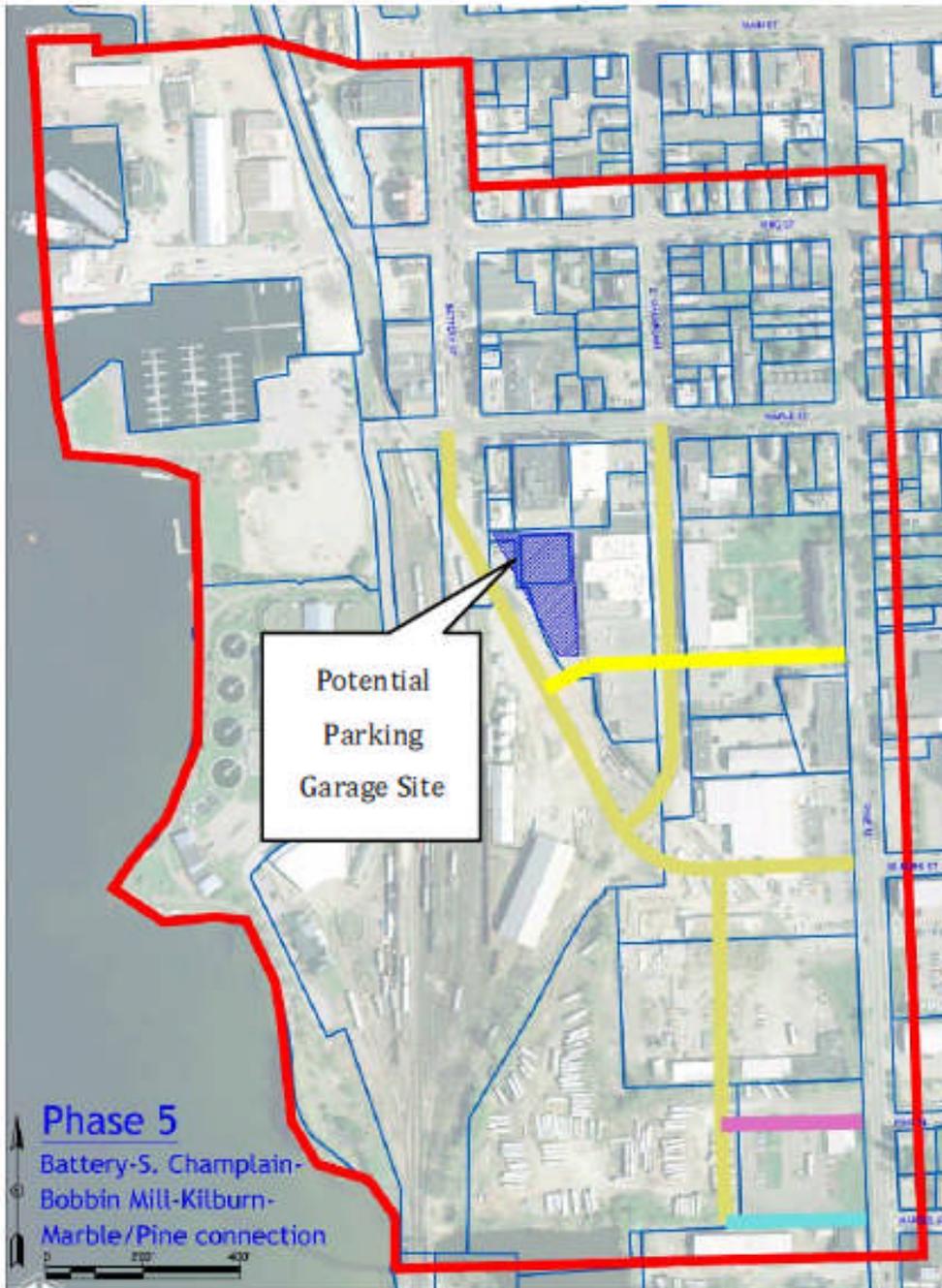
This alternative maximizes opportunities for multimodalism. The cross sectional designs of the new grid streets emphasize bus, bicycle, and pedestrian modes. The Battery Street Extension is proposed as a bicycle boulevard posted at less than 25 mph, while other streets would be either complete streets with or without a median or include parallel parking. This plan would add approximately 150 on-street parking spaces. There is potential for a north-south Waterfront transit alignment, an intermodal center at the former Greyhound/Vermont Transit bus terminal, and a streetcar on the historic rail alignment.

The transportation analysis estimates that each of the alternatives outperform the no build/base case in terms of travel time and intersection Level of Service (LOS), especially at the four-way stop at the Pine-Maple intersection.

Each of the alternatives is estimated to cost \$13M to \$13.3M to construct.

A preferred alternative was not selected, but rather the study presents options for future consideration and scoping.

Figure 20: Waterfront South Study Area and Proposed Grid Street Alignment (broad yellow, pink, and turquoise lines depict proposed streets)



The study also provides an economic profile of the project area to focus on the types of infrastructure investments necessary to spur private investment. Seven parcels are identified as critical to the development of the project area (Figure 21 and Table 11). The Pecor Property/Lake Champlain Transportation Company and Perkins Pier (owned by the City) are located within the Downtown Waterfront Public Trust Zone (see Waterfront Revitalization Plan summary for significance), while the other properties are zoned as Enterprise-Light Manufacturing. Several parcels within the study area have documented hazardous wastes.



Figure 21: Seven Key Parcels Identified by the Waterfront South Study

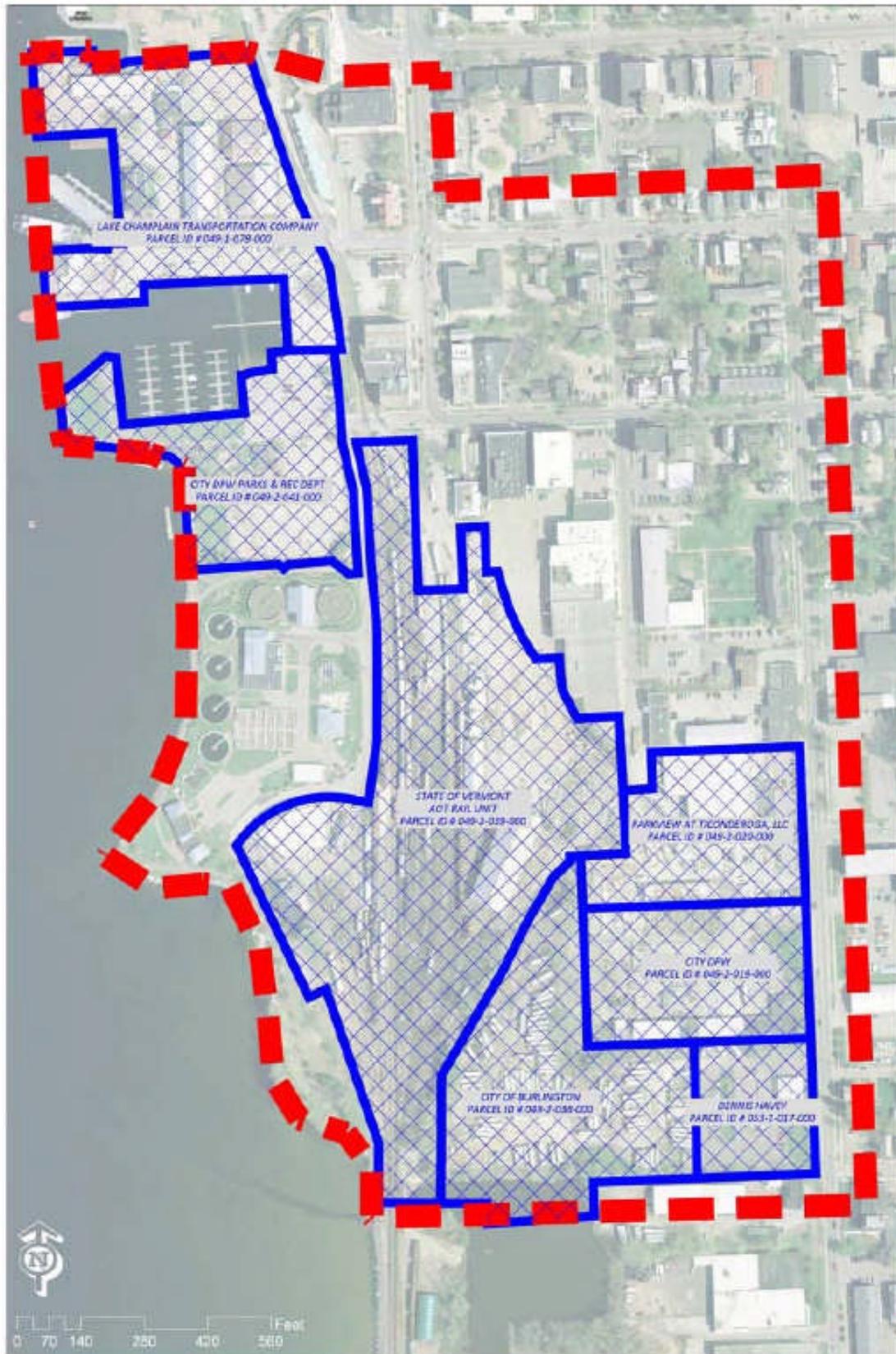


Table 11: Key Parcels Identified by the Waterfront South Study

Parcel ID	Owner Name	Also Known As	Total Acres	Total Value	Land Value	Building Value
049-1-078-000	LAKE CHAMPLAIN TRANSPORTATION	Pecor	5.91	\$3,816,400	\$3,170,600	\$645,800
053-1-017-000	HAVEY DENNIS P	Havey	1.72	\$300,000	\$113,500	\$186,500
049-2-038-000	CITY OF BURLINGTON	Lasmos	5.81	\$336,500	\$336,500	\$0
049-2-019-000	CITY DPW	Burlington Street Dept.	3.23	\$1,353,500	\$1,015,700	\$337,800
049-2-020-000	PARKVIEW AT TICONDEROGA LLC	Curtis Lumber	3.2	\$1,575,000	\$1,006,800	\$568,200
049-2-039-000	STATE OF VT AOT RAIL UNIT	VT Rail-Vtrans	19.5	\$3,312,700	\$2,079,400	\$1,233,300
049-2-041-000	CITY DPW PARKS REC DEPT	Perkins Pier	4.11	\$4,050,200	\$3,134,200	\$916,000

Key highlights about each of the parcels are:

Lake Champlain Transportation Company (LCTC)/Pecor Property

- Current site of Port Kent, NY ferry terminal, LCTC fleet maintenance and administration, a restaurant, marine services (seasonal boat slips, transient moorings, marine fuel, pump-out).
- Site access is at bottom of King Street.
- Dimensional standards per zoning include maximum building height of 35’ and minimum setback from shoreline of 50’.
- A 2009 concept plan developed for the site includes a hotel/conference center and expanded marina; realignment of bike path to west side of railroad tracks, and significant amounts of parking on the west side of the railroad tracks, in contrast to guidance set forth by the 1998 Waterfront Revitalization Plan (see Section 1.2.10) to minimize parking on the Waterfront and emphasize parking on the east side of Battery Street. The concept plans do not further the goal of the Waterfront South Study to improve connectivity through a grid street network as there is no roadway access between King and Maple Streets.
- The hazardous waste site on the property shows no evidence of gross contamination; The Vermont Agency of Natural Resources has indicated that “no unacceptable risk to human health and the environment is present due to any residual contamination.”

Perkins Pier

- This is the most frequently used water access in Burlington: it has 80 boat slips, 20 moorings, a 4-lane public boat ramp, public parking, and a park.
- Per the Burlington Harbor Management Plan, this property will be the site of the Harbor Master’s office and the number public boat slips will be significantly expanded to 300-350 slips.
- There is potential to combine this property with the LCTC parcel to the immediate north to support facility expansion.

345 Pine Street/Havey Parcel

- In the southeast corner of the study area; former site of the Greyhound/Vermont Transit bus terminal.
- Zoned for Enterprise-Light Manufacturing, which is described by the Zoning Ordinance as the “primary commercial/industrial center of Burlington...intended to accommodate enterprises engaged in the manufacturing, processing, distribution...of goods, merchandise...without potential conflicts from interspersed residential uses.”
- Particularly strategic parcel if the grid street network is pursued as it would have frontage on the extensions of both Marble Avenue and Pine Place. Given dimensional standards permitted by zoning, total building size of approximately 79,000 square feet and parking for 40 vehicles could be accommodated on this parcel.
- No land use restrictions associated with the hazardous waste site.



City of Burlington/Lasmos Parcel

- Owned by Havey, but City has a lease with an option to buy.
- Currently used for trailer storage.
- Critical for potential changes to Vermont Railway.
- Located within Barge Canal Superfund boundaries and there are related limitations to the property's use (for example, not using groundwater as drinking water, no excavations greater than five feet deep, etc.).

Burlington Street Department/339 Pine Street

- City leases property to Recycle North.
- Parcel includes historic buildings which CEDO has categorized as "contributing" to the historic value of the area.
- Groundwater contamination is below Vermont enforcement standards; soil contamination is significant, but is being addressed through a soil venting system.

Curtis Lumber

- Across from Kilburn Avenue; strategic property because of potential for extending Kilburn as part of the proposed street grid.
- Straddles rail spur/alignment of Battery Street spur alternative in Southern Connector EIS.
- Abuts Lasmos and could therefore provide alternative access point to Vermont Railways commercial yard if it were relocated.

Vermont Railway/VTrans

- Used for Vermont Railway switching and commercial yards.
- Vermont Railway leases property from State of Vermont; a 99-year lease was renewed in 2005.
- The only truck access to the commercial yard is on Battery Street; Vermont Railways has expressed interest in developing a Pine Street access, which would re-route the truck traffic out of the residential neighborhoods northeast of the parcel.
- Hazardous wastes on the property have been determined not to pose an unreasonable risk to human health or the environment.

2.2.8 2009-2014 Joint Institutional Parking Management Plan (JIPMP) (2009)

The JIPMP fulfills the parking ordinance's (Article 8 of the Comprehensive Design Ordinance) requirement that institutions prepare a parking management plan in order to be considered for a parking waiver. The JIPMP was prepared by CATMA and RSG and includes plans for Champlain College, Fletcher Allen Health Care, and the University of Vermont. The plans present the existing (2009) and planned (through 2014) parking supplies of each of the institutions to account for development projects that they plan to undertake. By doing so, the plans address the ordinance's parking requirements for the institution as a whole and document parking management programs (that is, permits, pricing, enforcement, etc.) and TDM strategies that will be used to mitigate parking demand. The JIPMP demonstrates that the ordinance's parking requirements are typically higher than estimated demand.

2.2.9 Burlington Parking Study Final Report (2003)

This project evaluated existing and future parking supply and demand for the Downtown. A parking accumulation survey was conducted, finding that the peak hours were on a Friday between 1PM and 3PM. During this time, general public parking facilities were 80% occupied; private parking facilities were 60% occupied, indicating that there is excess capacity to be used during the peak period if an arrangement can be made with the owners of the private facilities.

A major finding from the study based on a comparison of estimated demand to the number of spaces required by the zoning ordinance confirms that “zoning regulations, if applied without waivers, require too much parking for non-residential land use.” (See Figure 22.)

Figure 22: 2003 Downtown Burlington Parking Study: Comparison of Ordinance Parking Requirements to Demand (page ES-5)

Table E-2. Comparison Between Spaces Required by Burlington Zoning and WSA Estimated Demand for Existing Non-Residential Land Use at 100% Occupancy by Land Use

Land Use Type	Spaces Required Based on Burlington Zoning Regulations (1)	Spaces Required Based on WSA Developed Peak Parking Demand Rates
Retail - General	5,800	2,661
Office - General	4,524	3,559
Manufacturing	463	463
Public/Instit.	387	387
Total	11,174	7,070

(1) Assumes no parking waivers are granted

The study also determined that peak parking demand of 1) existing non-residential land use at 94% occupancy; 2) existing non-residential land use at 100% occupancy; and 3) 2020 land use at 100% occupancy exceeds existing parking supply (Figure 23).

Figure 23: 2003 Downtown Burlington Parking Study: Comparison of Existing Supply to Estimated Demand (page ES-5)

Table E-3. Parking Space Excess or (Deficiency) for Existing and Future Non-Residential Land Use

Area	Parking Supply Excess or (Deficiency) for Existing Land Use at 94% Occupancy (1)	Parking Supply Excess or (Deficiency) for Existing Land Use at 100% Occupancy (1)	Parking Supply Excess or (Deficiency) for 2020 Land Use at 100% Occupancy and Demand From Waterfront (2)
Zone 1	128	13	(915)
Zone 2	(743)	(940)	(2,066)
Zone 3	94	24	(525)
Zone 4	122	81	19
Study Area	(399)	(822)	(3,487)

(1) Assumes existing non-residential parking supply.

(2) Assumes existing non-residential parking supply plus anticipated changes to the parking supply.

The study notes that the Browns Court lot at the corner of King and St. Paul, the Main-Winooski and library lots, and Elmwood Ave lot may be redeveloped. These lots account for a total of nearly 200 city-owned parking spaces; however, depending on redevelopment plans, a net increase in new spaces could be realized if parking structures were included.

The report includes an evaluation of strategies to increase efficiency and reduce parking demand, such as:



- Provide real-time information about the location of available parking spaces
- Share parking among a group of employees/residents rather than assigning spaces to specific businesses or individuals
- Share parking between sites that have different peak periods (e.g., banks and theaters)
- Offer commuter benefits such as parking cash-out
- Provide a traveler allowance for payment of parking or other transportation mode
- Offer reduced or free parking for carpools
- Un-bundle parking costs from leases so consumers can choose how much parking to include in lease
- Accommodate parking demand with satellite parking lots (requires effective, convenient, reliable, efficient transit system).

The study estimates that implementing these strategies (and establishing a Downtown TMA to manage them) could reduce the 2020 parking space deficiency to 1,540 spaces (Figure 24). The report indicates that a parking structure will be necessary to accommodate this demand.

Figure 24: 2003 Downtown Burlington Parking Study: Comparison of Existing Supply to Estimated Demand if Strategies are Implemented (page ES-6)

Table E-4. Parking Space Excess or (Deficiency) for Existing and Future Land Use Assuming Implementation of Efficiency, TDM, and Satellite Parking Facility Strategies

Area	Parking Supply Excess or (Deficiency) for Existing Land Use at 94% Occupancy (1)	Parking Supply Excess or (Deficiency) for Existing Land Use at 100% Occupancy (1)	Parking Supply Excess or (Deficiency) for 2020 Land Use at 100% Occupancy and Demand From Waterfront (2)
Zone 1	658	543	(311)
Zone 2	168	(29)	(1,169)
Zone 3	416	346	(206)
Zone 4	308	268	148
Study Area	1,550	1,127	(1,538)

(1) Assumes existing non-residential parking supply.

(2) Assumes existing non-residential parking supply plus anticipated changes to the parking supply.

2.2.10 Burlington North/South Bicycle & Pedestrian Route Study (2002)

This study proposes a north-south bicycle corridor based on inventories of Burlington's bicycle and pedestrian systems, origins and destinations, deficiencies, level of service, and regional connections. The study's origins and destinations map is shown in Figure 25 with the Downtown-Waterfront Plan study area overlaid. The majority of origins are the residential neighborhoods outside of the Downtown, while a significant number of destinations are in the Downtown and Waterfront areas, including Waterfront Park, Perkins Pier, the Post Office, Community College of Vermont, City Hall, Church Street, City Market, and Fletcher Free Library.

A north-south corridor involving northbound on-street bicycle lanes on Union Street and southbound bicycle lanes on Winooski Avenue is recommended. This corridor would connect Riverside Avenue to Shelburne Street at Home Avenue. Bicycle lanes currently exist on most of Union Street, but Winooski Avenue would need to be widened and South Winooski between Pearl and Main is recommended to be reduced from four lanes to three or to two lanes and a median. This option was favored in part because it provides direct access to Downtown.

A secondary option involved two-way bicycle travel on Pine and Battery Streets, requiring the reduction of Battery Street from four lanes to two. This option would likely only be feasible if the Southern Connector were constructed. One of the reasons this option is not preferable is that it is removed from Downtown and is somewhat redundant to the Burlington Bike Path/Island Line.

Although the study aims to identify a potential north-south corridor, east-west connections between Downtown and the Waterfront are also considered. Proposed east-west connections are shown in Figure 26. Downtown and the Waterfront are connected by westbound bike lanes on Maple and Cherry Streets and an eastbound bike lane on Pearl Street. One of the challenges associated with east-west connections between Downtown and the Waterfront is the grade, particularly for bicycles.

Figure 25: Bike/Ped Origins and Destinations (Burlington North/South Bicycle & Pedestrian Route Study, page 9)

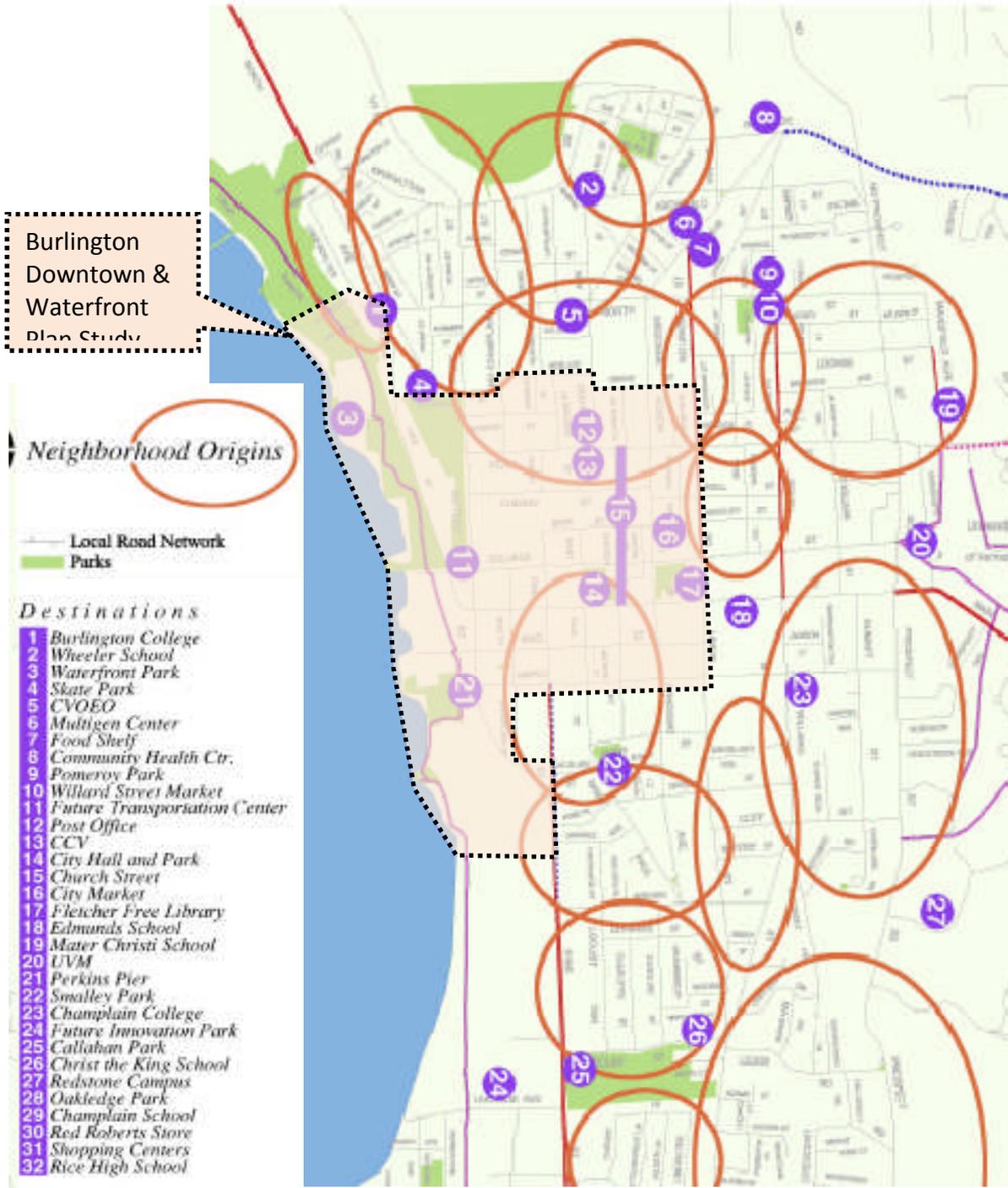
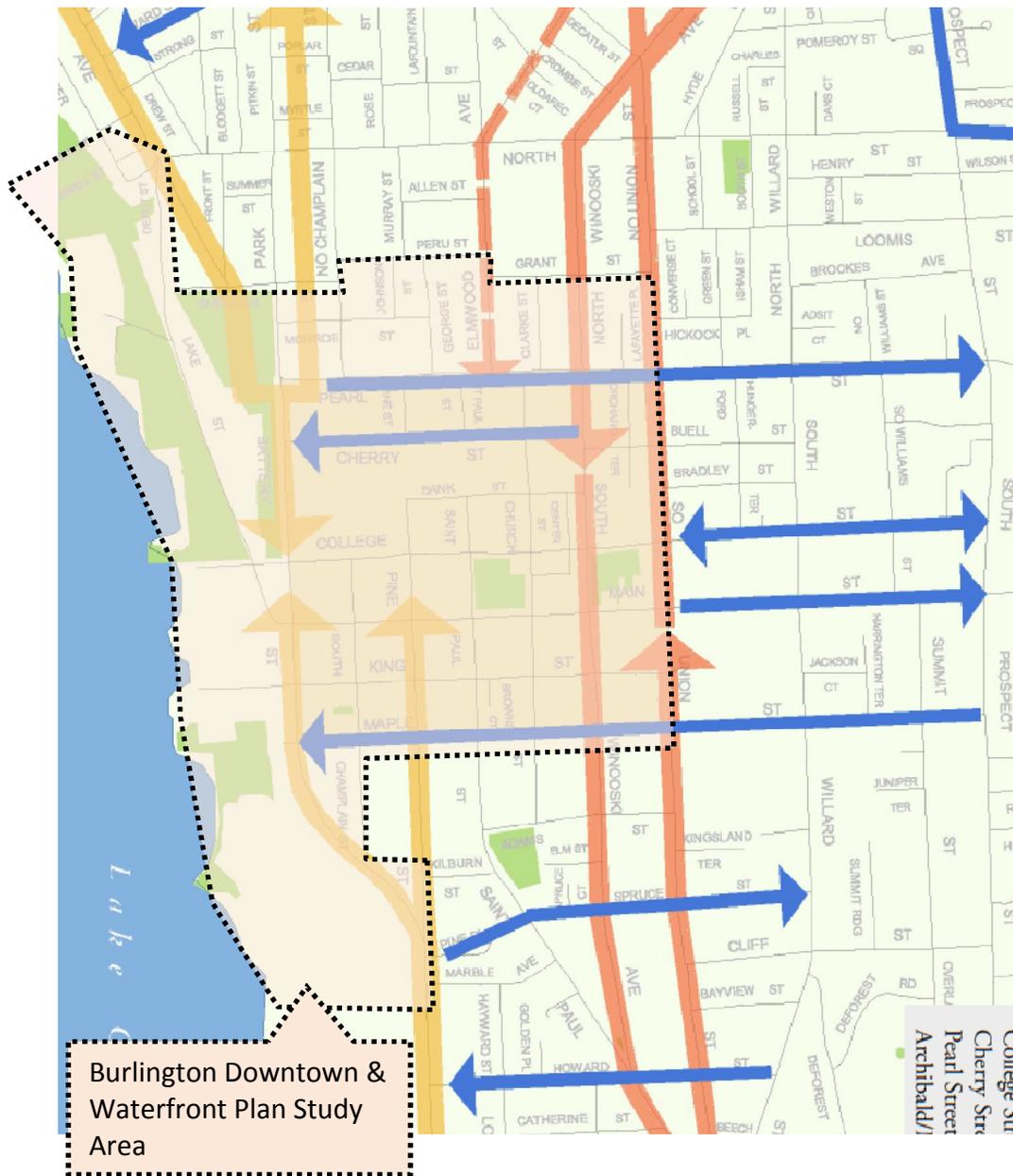


Figure 26: Potential East-West Connections (Burlington North/South Bicycle & Pedestrian Route Study, page 27)



2.2.11 Burlington Waterfront Parking and Circulation Study (2001)

RSG completed this study to understand parking and circulation issues arising from cumulative development proposals for the Waterfront, including the multimodal transportation center, Lake Champlain Science Center expansion, and Moran Plant redevelopment. The study re-establishes the importance of creating pedestrian linkages between Battery Street and the Waterfront. Waterfront parking shortfalls are to be addressed by using excess capacity at the City parking structure (on the west end of Burlington Town Center) on Cherry Street. The study recommends developing Cherry Street into a pedestrian corridor and constructing a walkway from the end of Cherry Street at Battery Street down to the Waterfront. A one-way vehicle circulation plan for College, Lake, and Main Streets is proposed as well as developing a transit system on Lake Street to serve the Waterfront or to connect to other transit routes via Depot Street.

APPENDIX B-EXISTING CONDITIONS PRESENTATION



R | S | G INC.
RESOURCE SYSTEMS GROUP, INC.



Burlington Downtown and Waterfront Plan Transportation Study

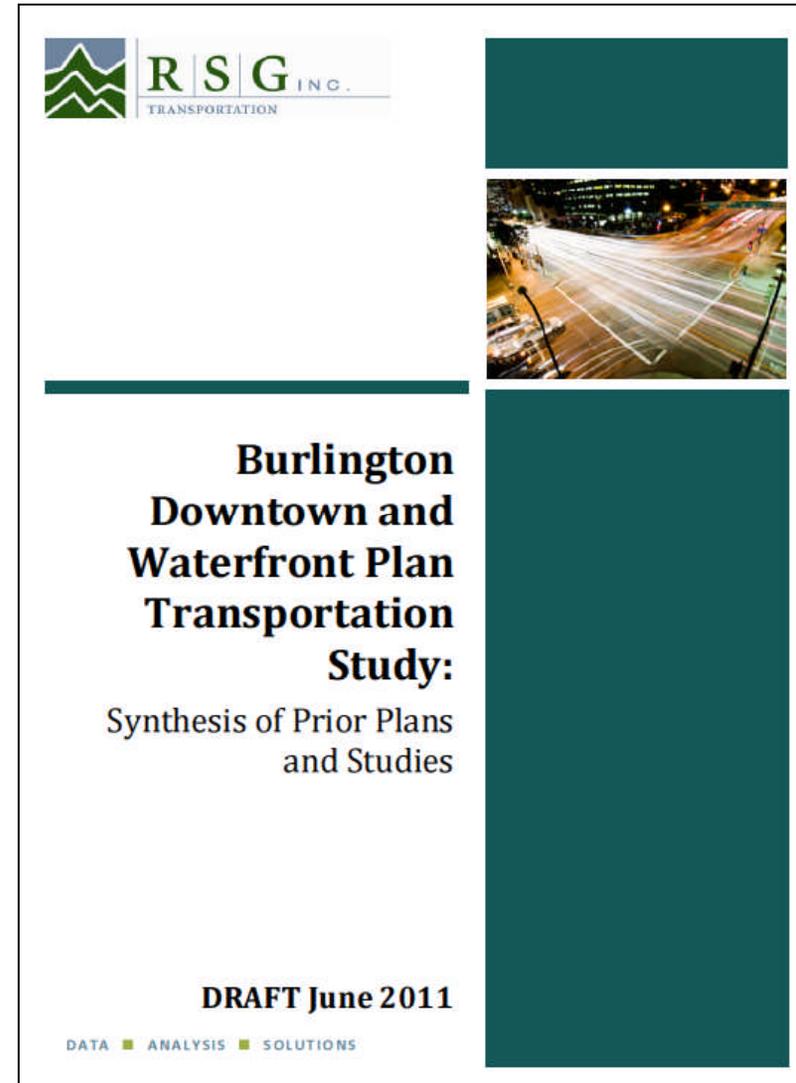
Synthesis Paper Review and Existing
Conditions Presentation

Prepared for:
City of Burlington Planning & Zoning

July 1, 2011

Synthesis of Previous Plans and Studies

- Focuses on aspects of Chittenden County's and Burlington's transportation and land use documents that can influence economic development.
- Identifies common themes to gain a sense of overarching directions that have been established for the region and Burlington.



Synthesis of Previous Plans and Studies

Transportation

- Achieve a seamless multimodal transportation system in Burlington and the region through a strong transit system and bicycle/pedestrian access and connectivity
- Reduce number of private vehicles that enter Burlington
- Improve parking efficiency



Synthesis Highlights

Land Use & Development

- Housing
 - Amount
 - Affordability
 - Downtown's identity as a neighborhood
- Intensify land use and diversity
- Accommodate business expansion and facilitate/encourage development/re-development



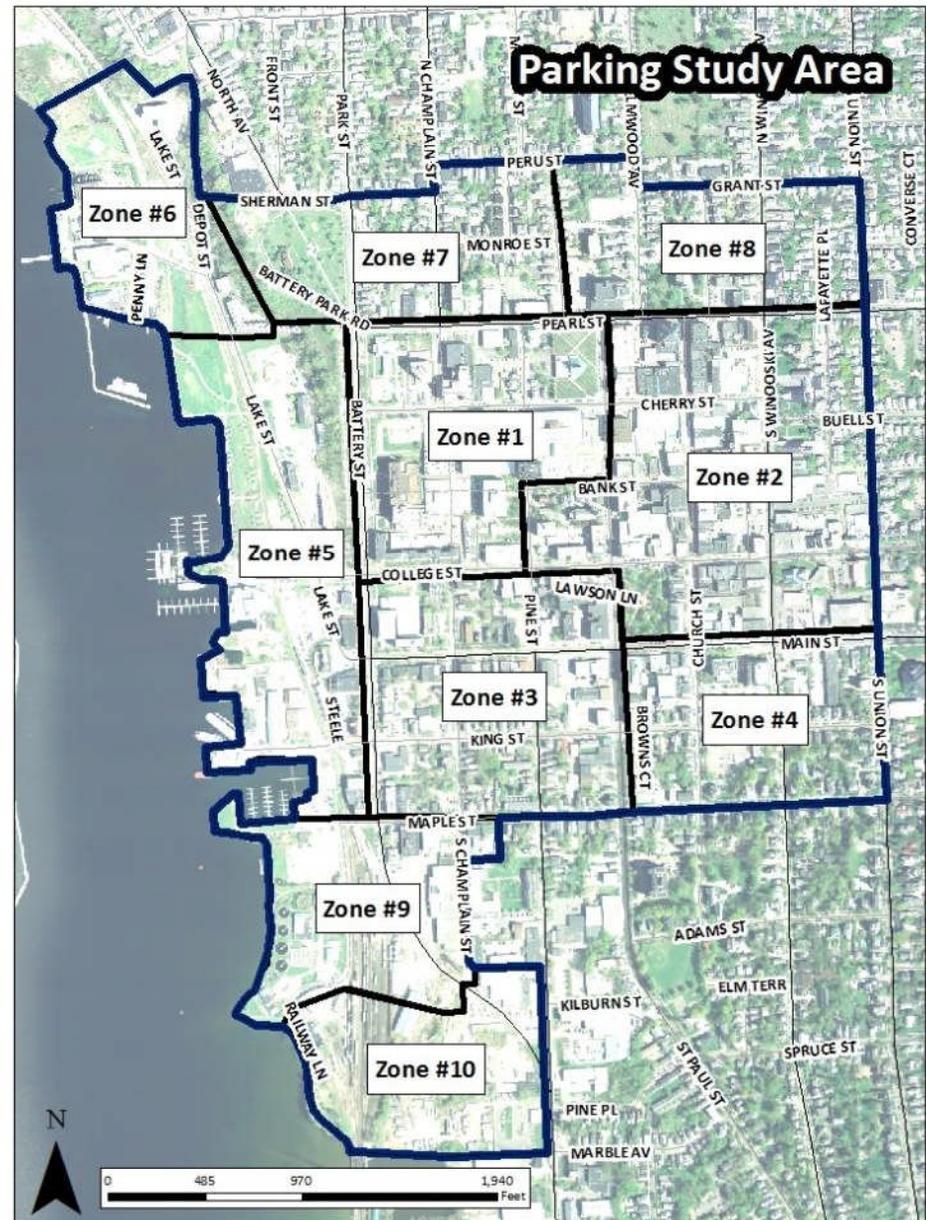
PARKING



Existing Parking Inventory

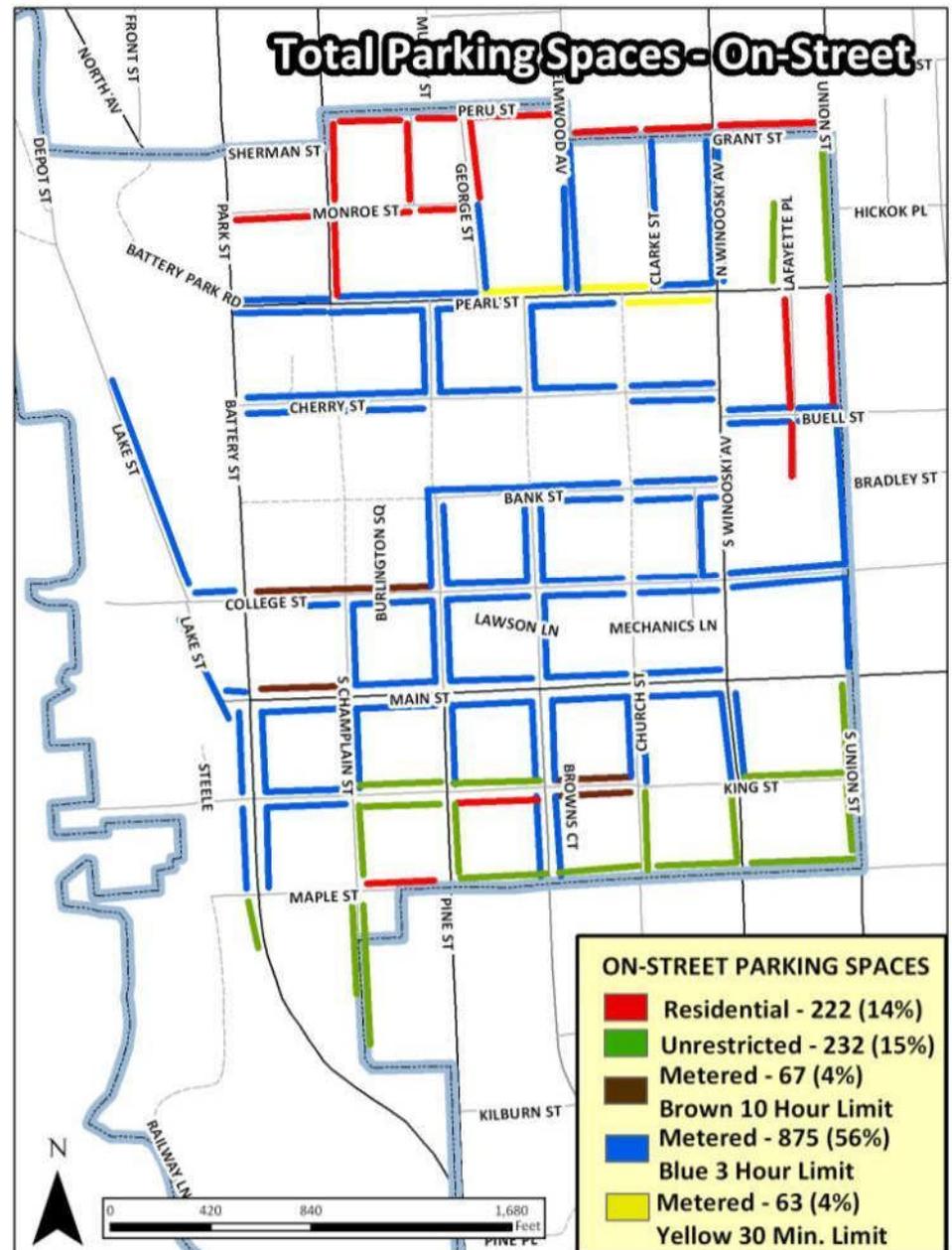
Methodology

- 10 zones
four zones used in the 2003 parking study
+ six new zones
- Take into account barriers, general land uses, ¼ mile walking distance



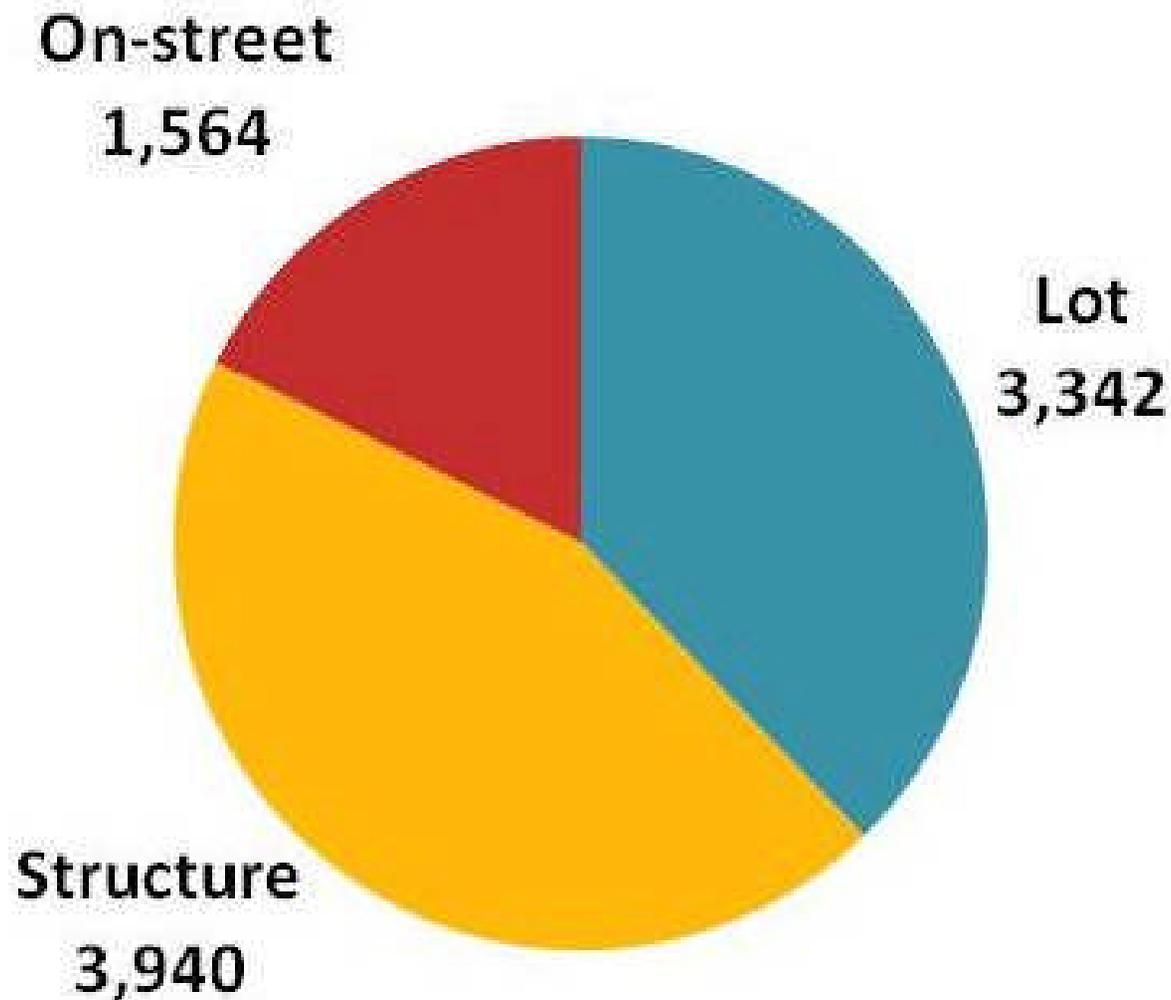
Existing Parking Inventory

- Type
 - Surface
 - Structure
 - On-Street
- Ownership and use, consistent with 2003 study
 - Public/public
 - Private/public
 - Private/private
- Cost



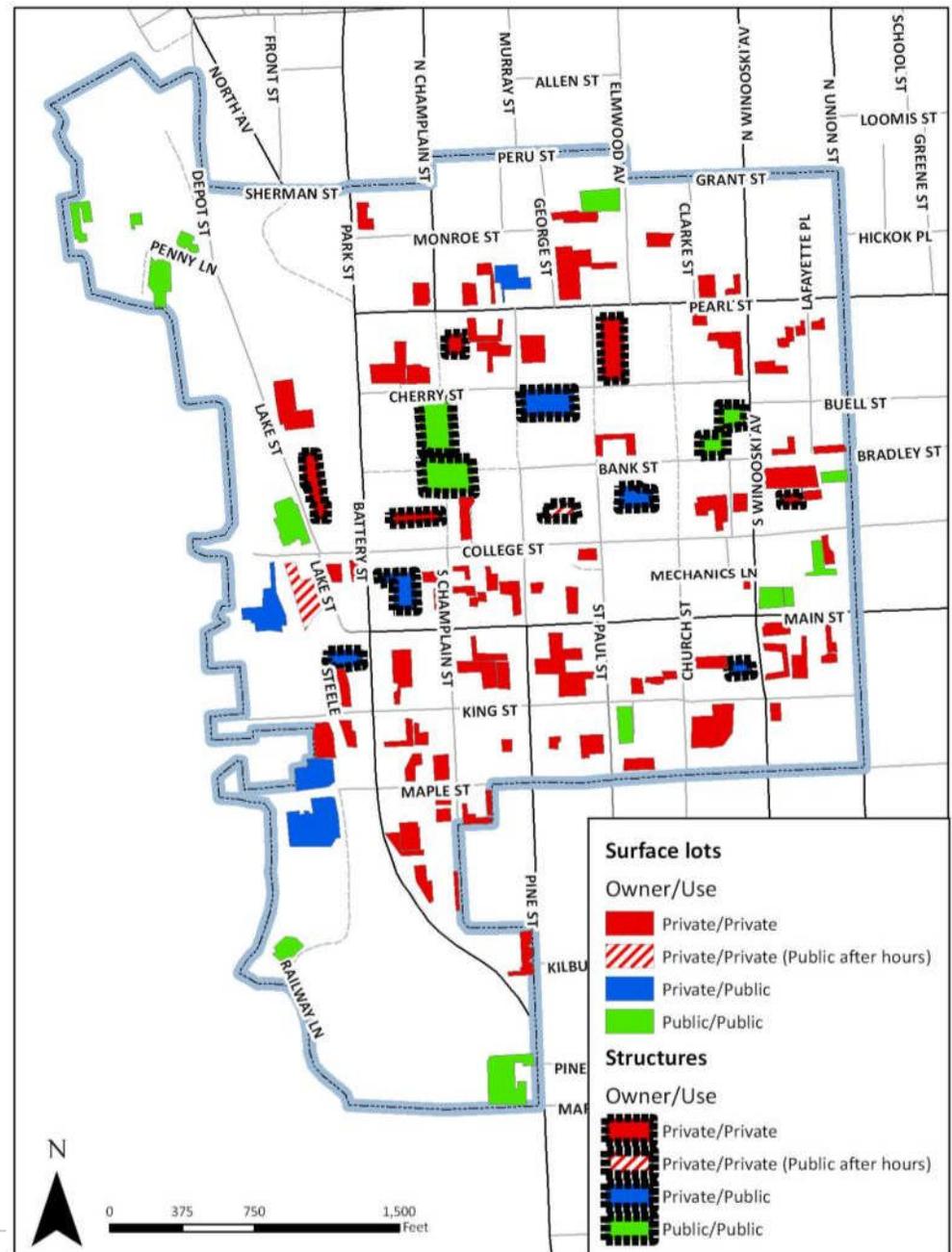
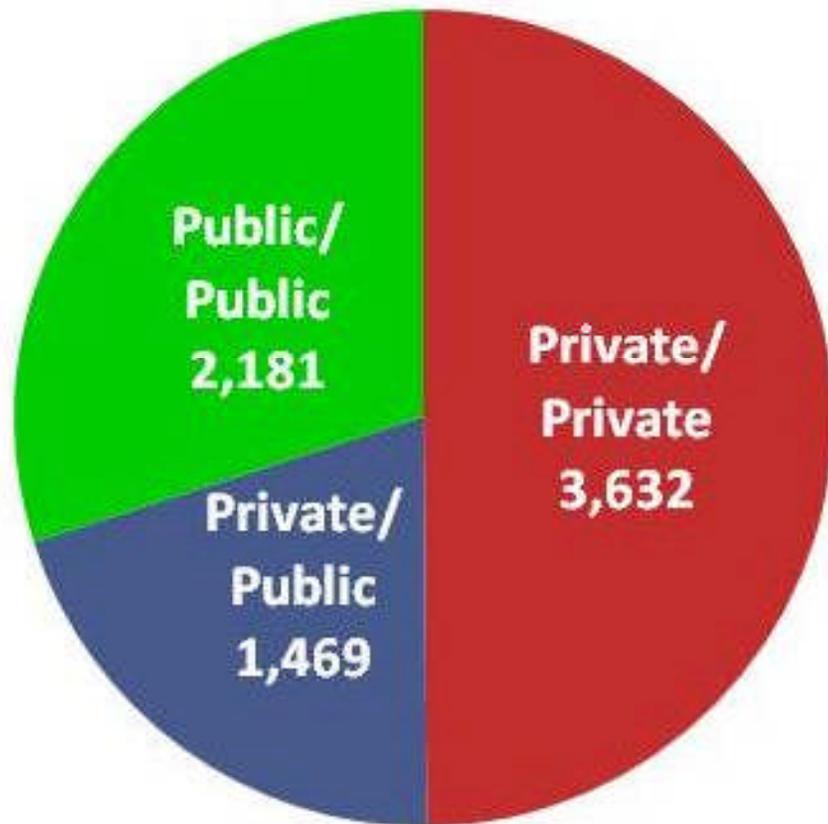
Existing Parking Inventory

Total Parking Spaces in Study Area = 8,846



Existing Parking Inventory

Inventory by Ownership/Use

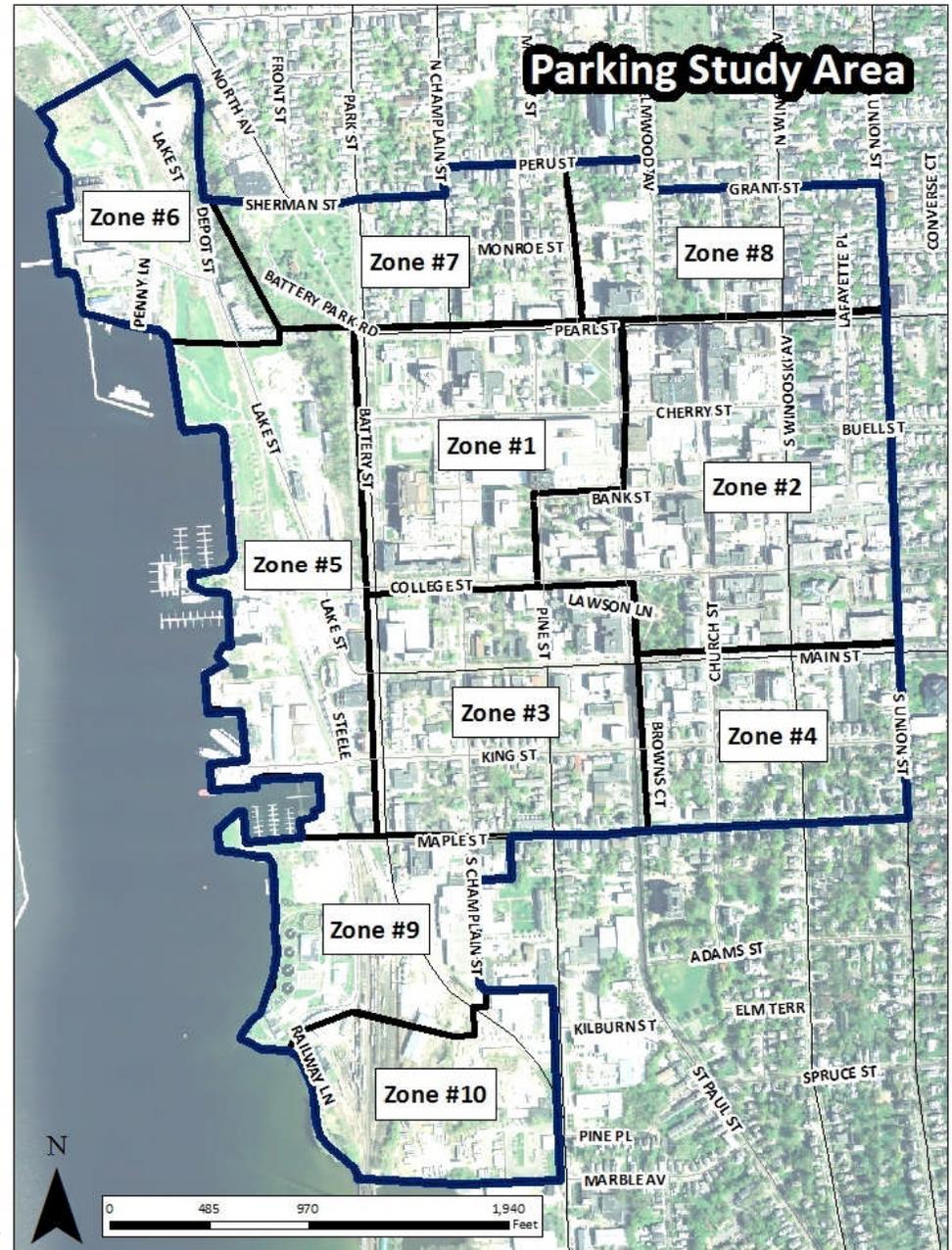


Existing Parking Occupancy

Parking Counts

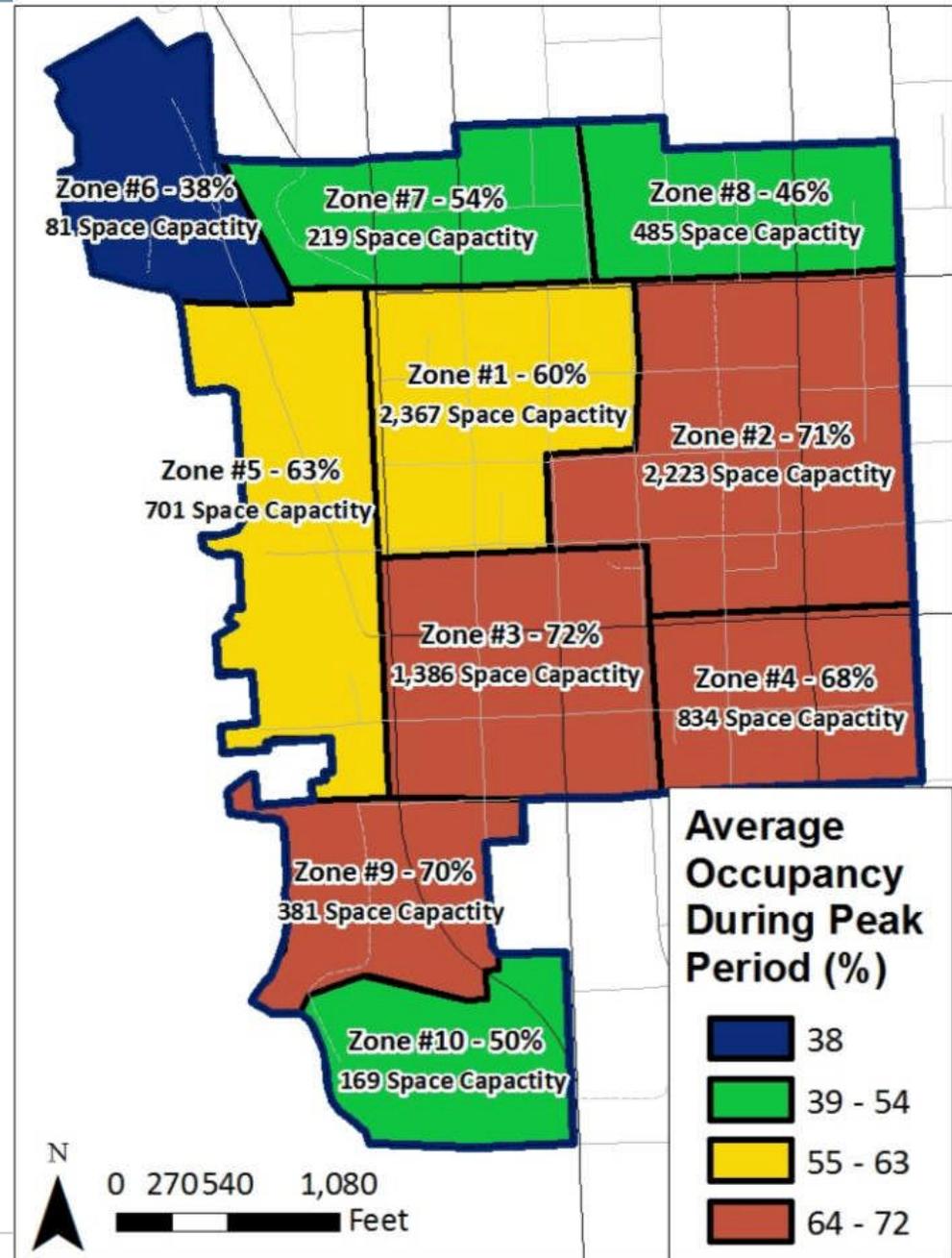
June 16-17, & July 8, 2011

- Counted new zones as done in 2003 Study
 - Friday 9AM to 7PM
 - Saturday 10AM to 4PM
 - Two-hour intervals
- Peak parking occurred Friday, 1PM-3PM as in 2003 Study

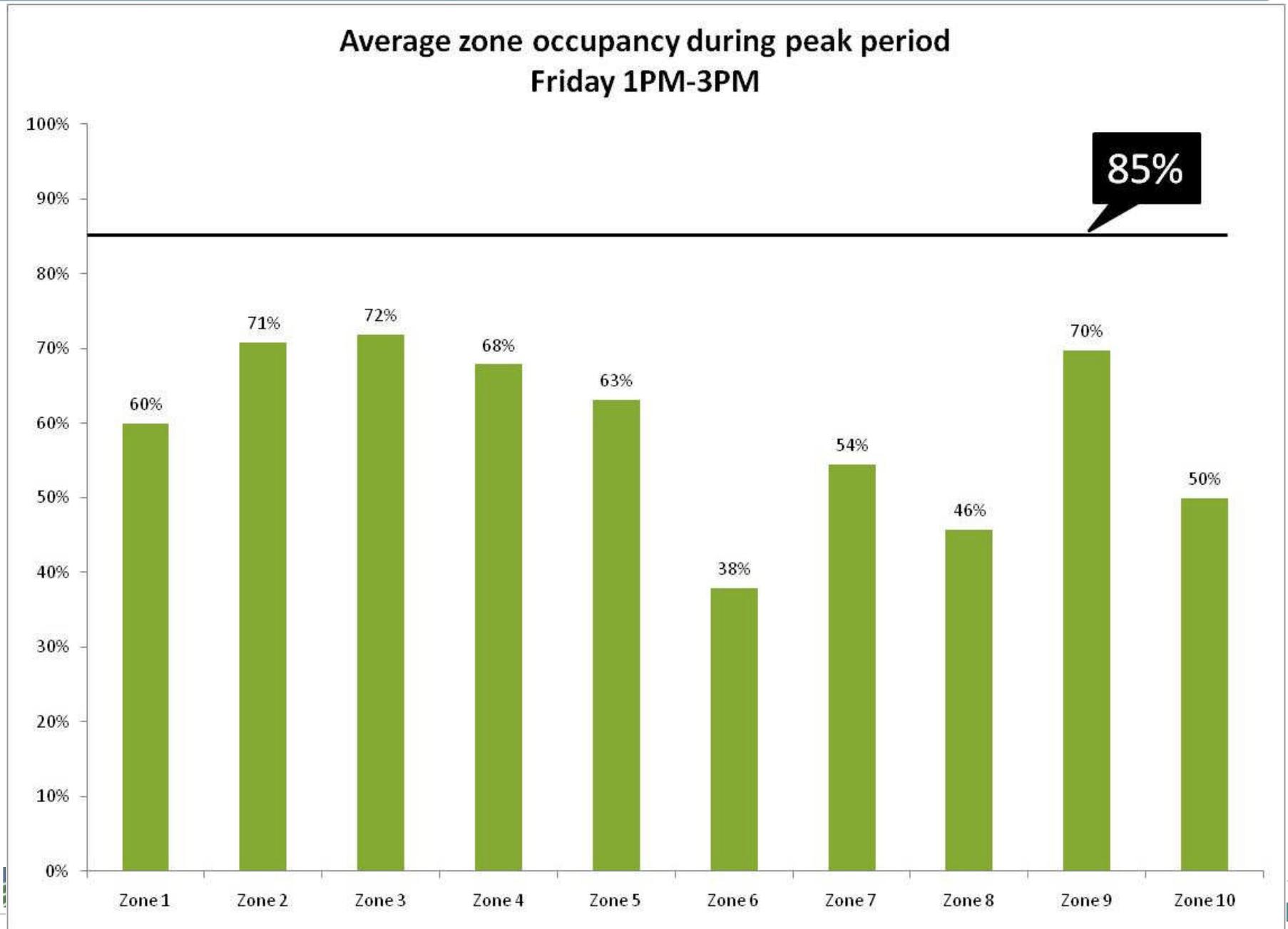


Weekly Peak Parking Occupancy: Friday 1PM-3PM

- Ideal occupancy is 85%
- Most zones were about 60-75% occupied
- Zone 3 had highest occupancy at 72%
- Zone 6 had lowest occupancy at 38%
 - Would be interesting to know how much parking is violating time limits/feeding the meter



Weekly Peak Parking Occupancy: Friday 1PM-3PM

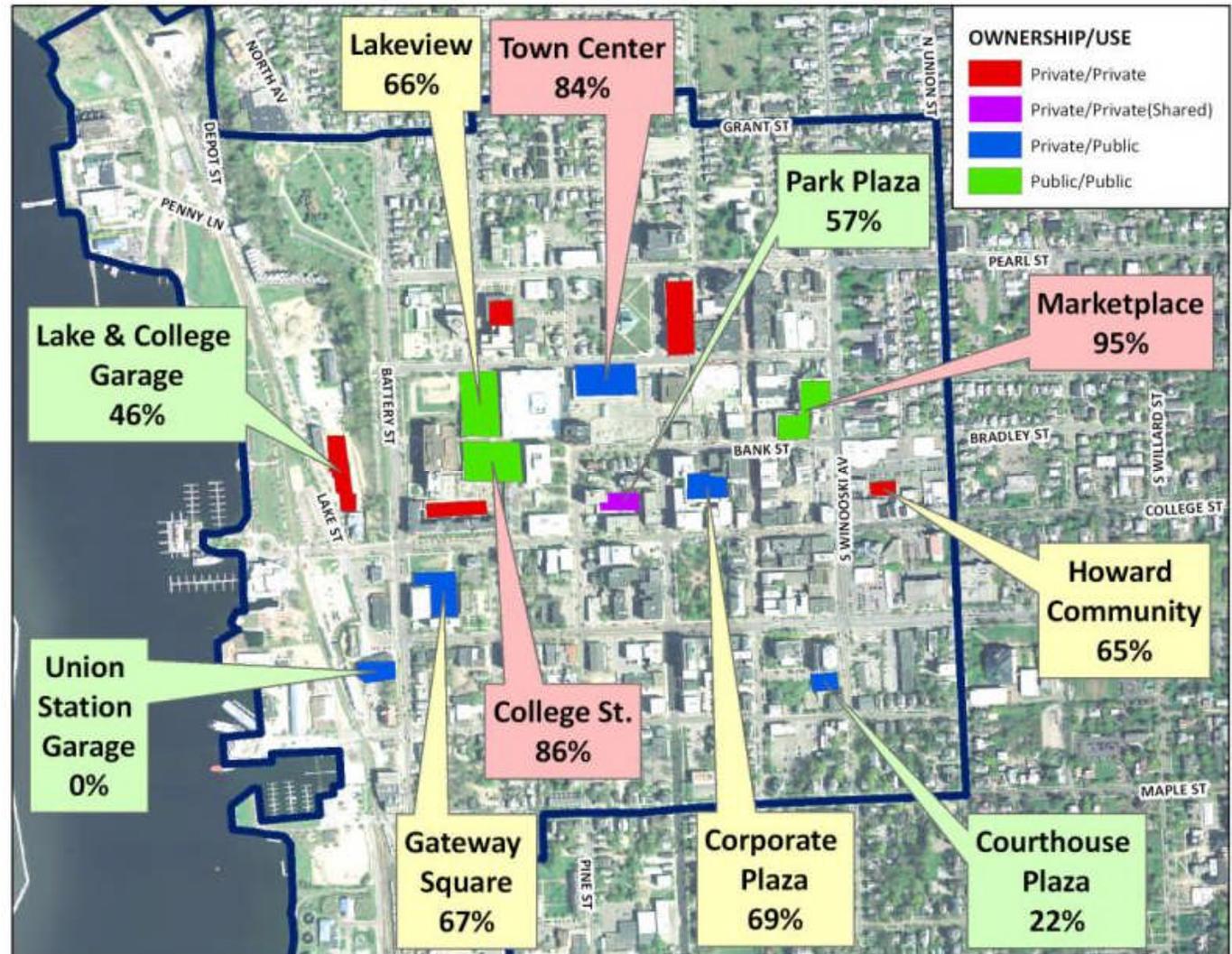


Existing Parking Occupancy: Structures

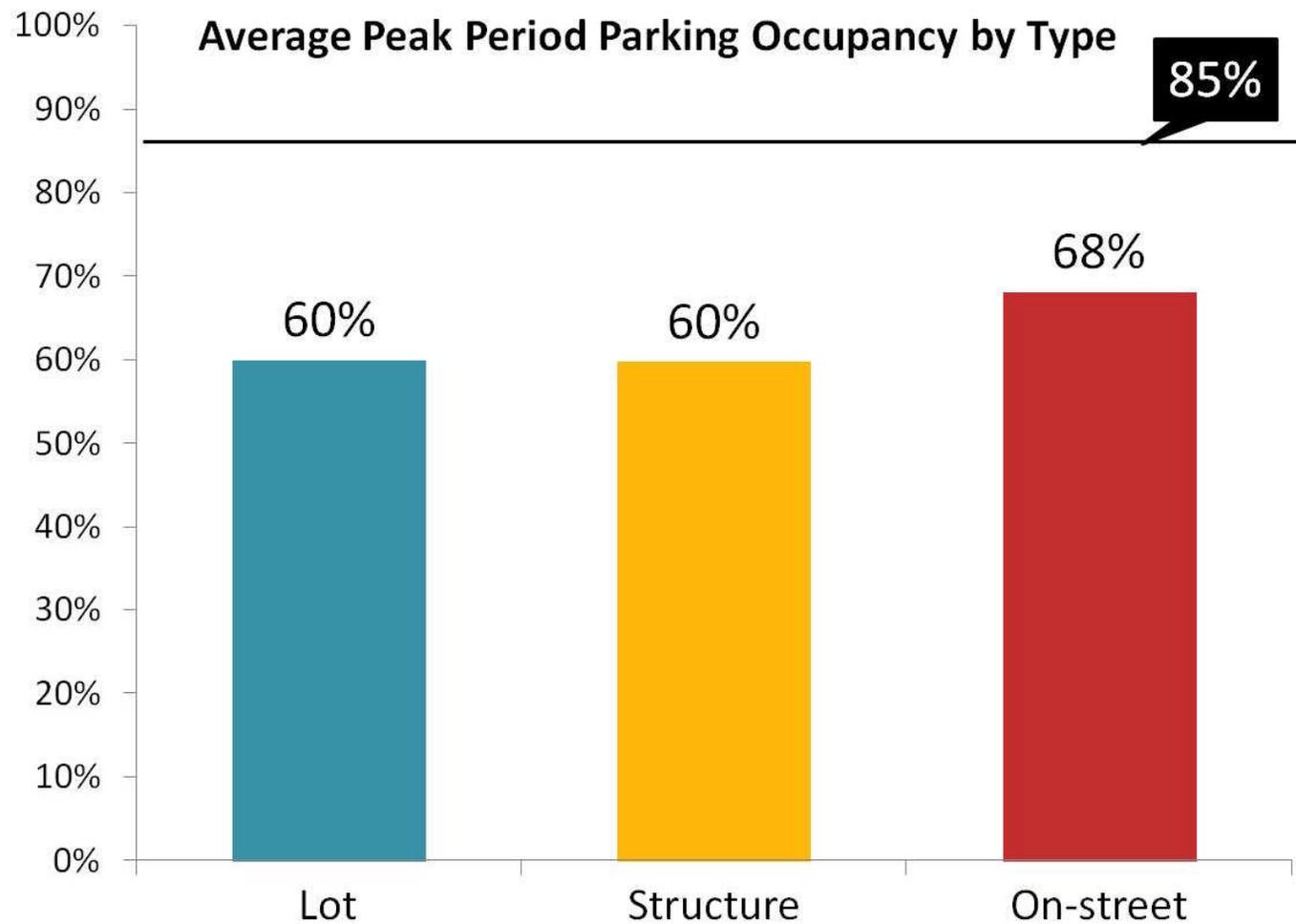


Existing Parking Occupancy: Structures

- Parking occupancy of structures varies greatly
- Only 3 structures meet or exceed 85% occupancy
- Improvements
 - Public-Private sharing arrangements
 - Maintenance & appearance
 - Wayfinding between garages to enhance efficiency



Parking Costs Can Influence Occupancy Mix



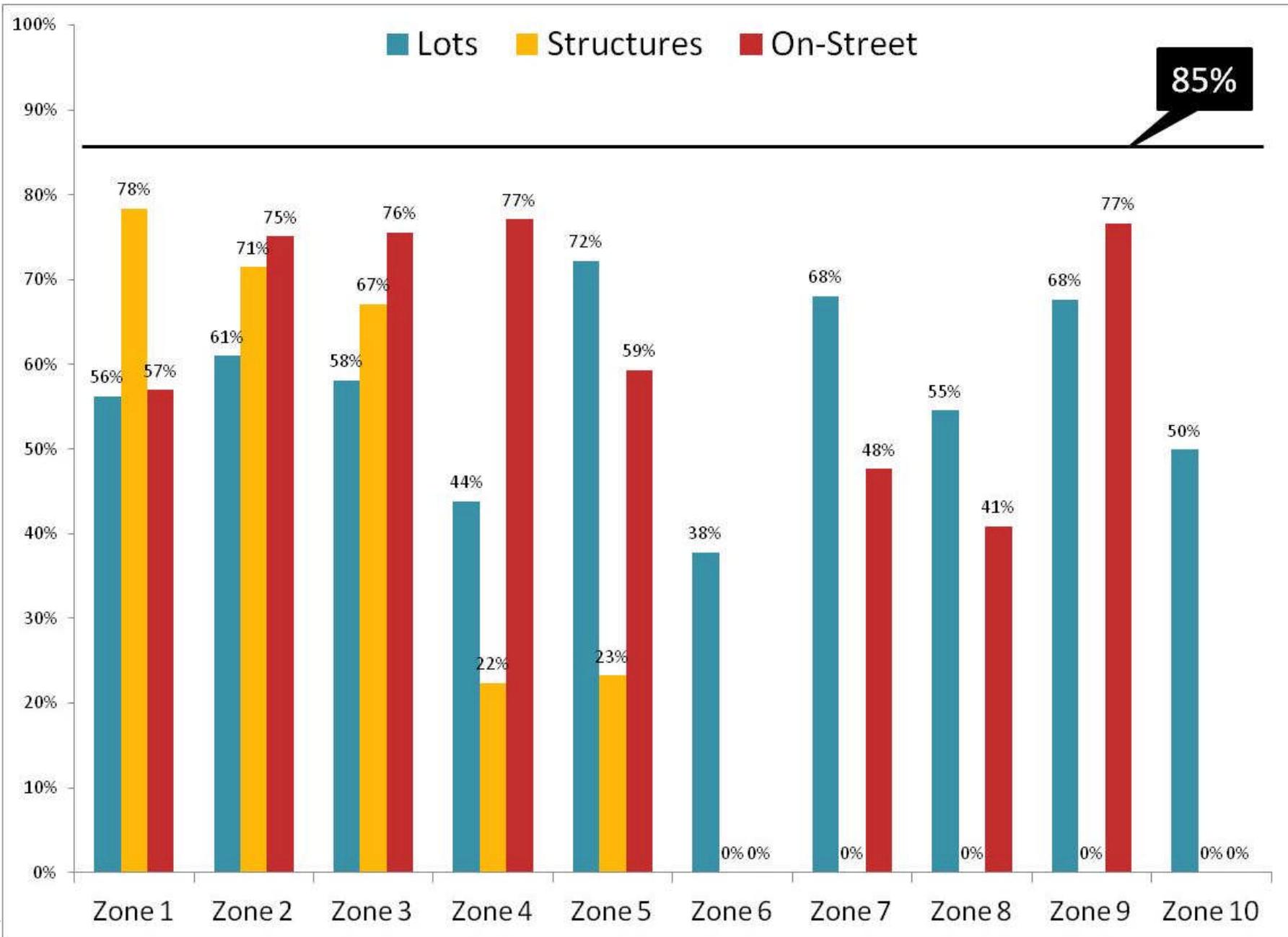
Meters \$0.40 to \$1.00 per hour

Garages \$1-\$2 per hour

Lots ~\$6 per entry



Weekly Peak Parking Occupancy by Zone and Type

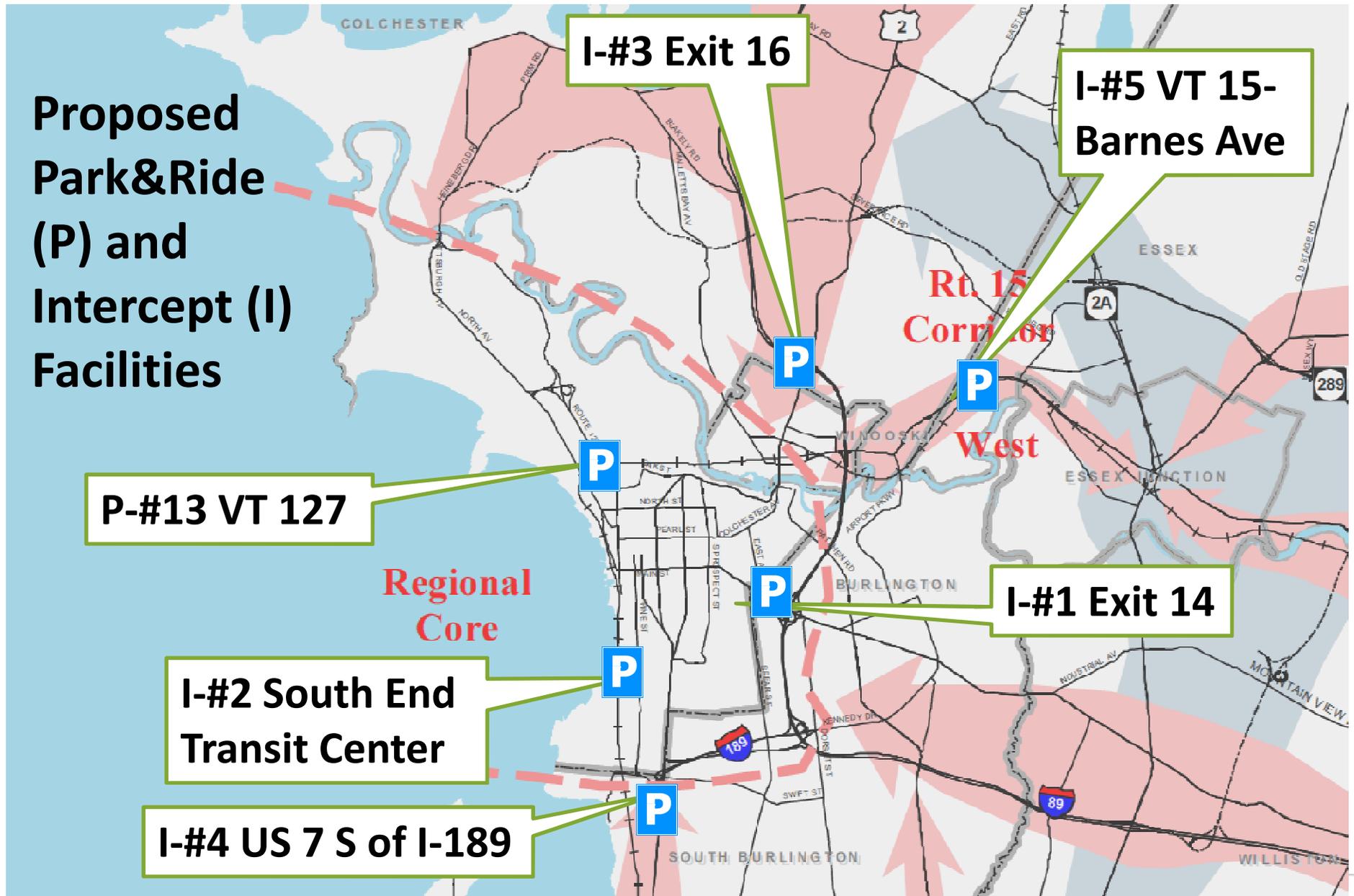


CIRCULATION

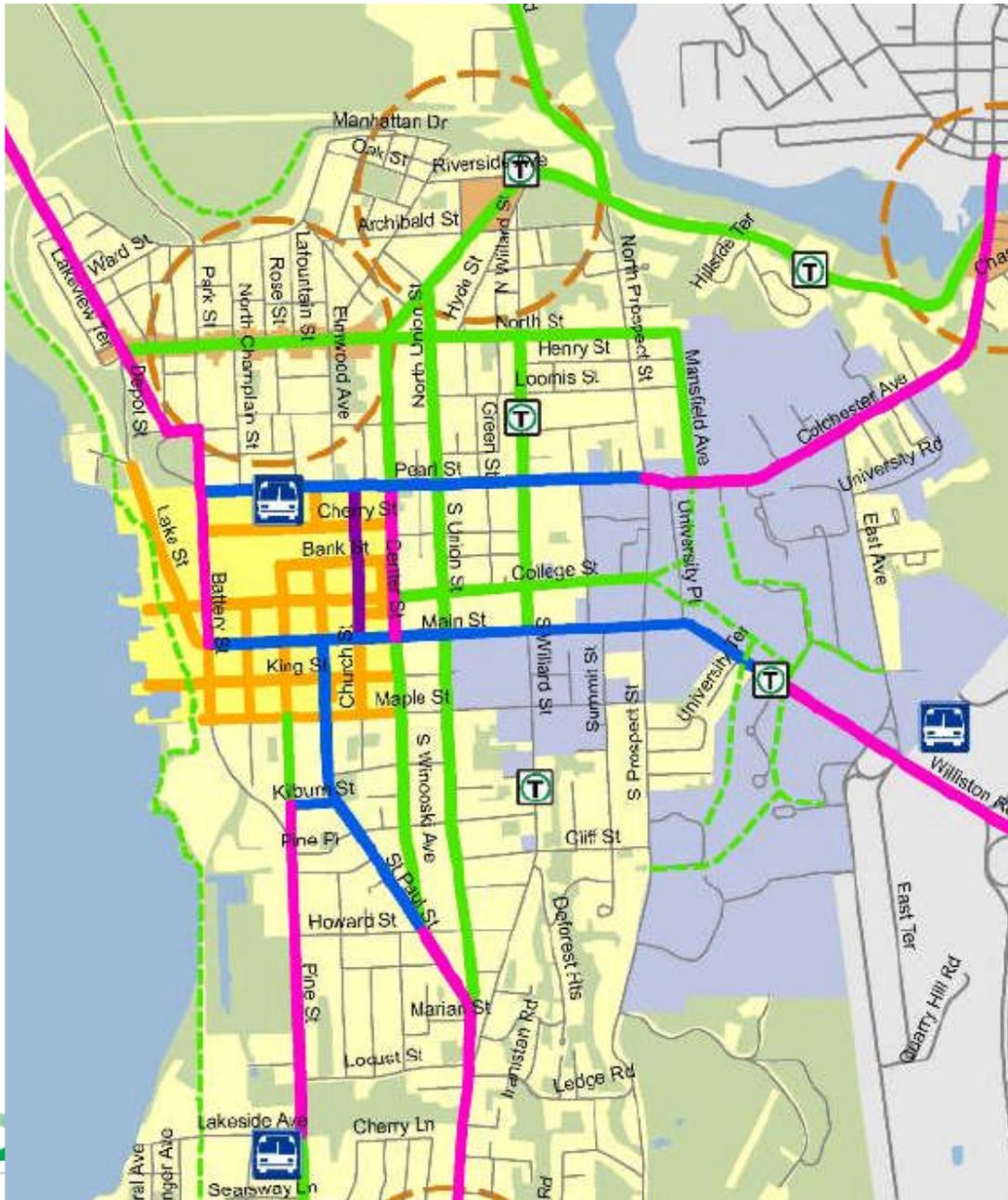


Regional Corridors Entering Burlington: 2011 CCMPO Park&Ride Plan

**Proposed
Park&Ride
(P) and
Intercept (I)
Facilities**



Burlington Transportation Plan: Complete Streets



Legend

Proposed Street System

- Complete Street
- Transit Street
- Bicycle Street
- Slow Street
- Pedestrian Street
- - - Bicycle Path
- Pedestrian Core
- Neighborhood Center & Quarter Mile Radius
- Colleges & Universities
- Transit Center
- State Truck Routes



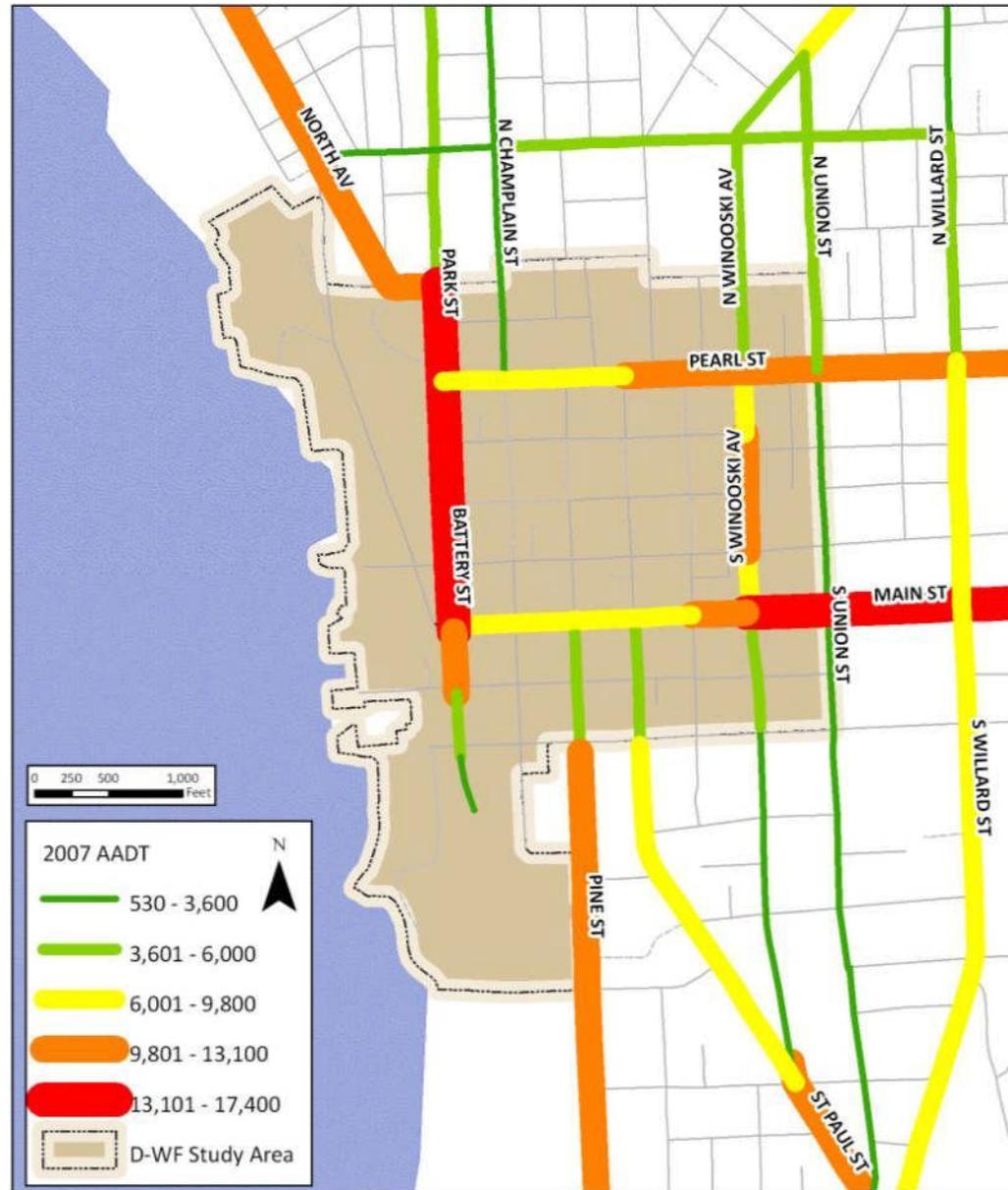
Burlington Transportation Plan: Slow Street Design



Traffic

- Main St.
- Battery St.
- Pearl St.
- Winooski Ave.
- North Ave.
- Pine St.

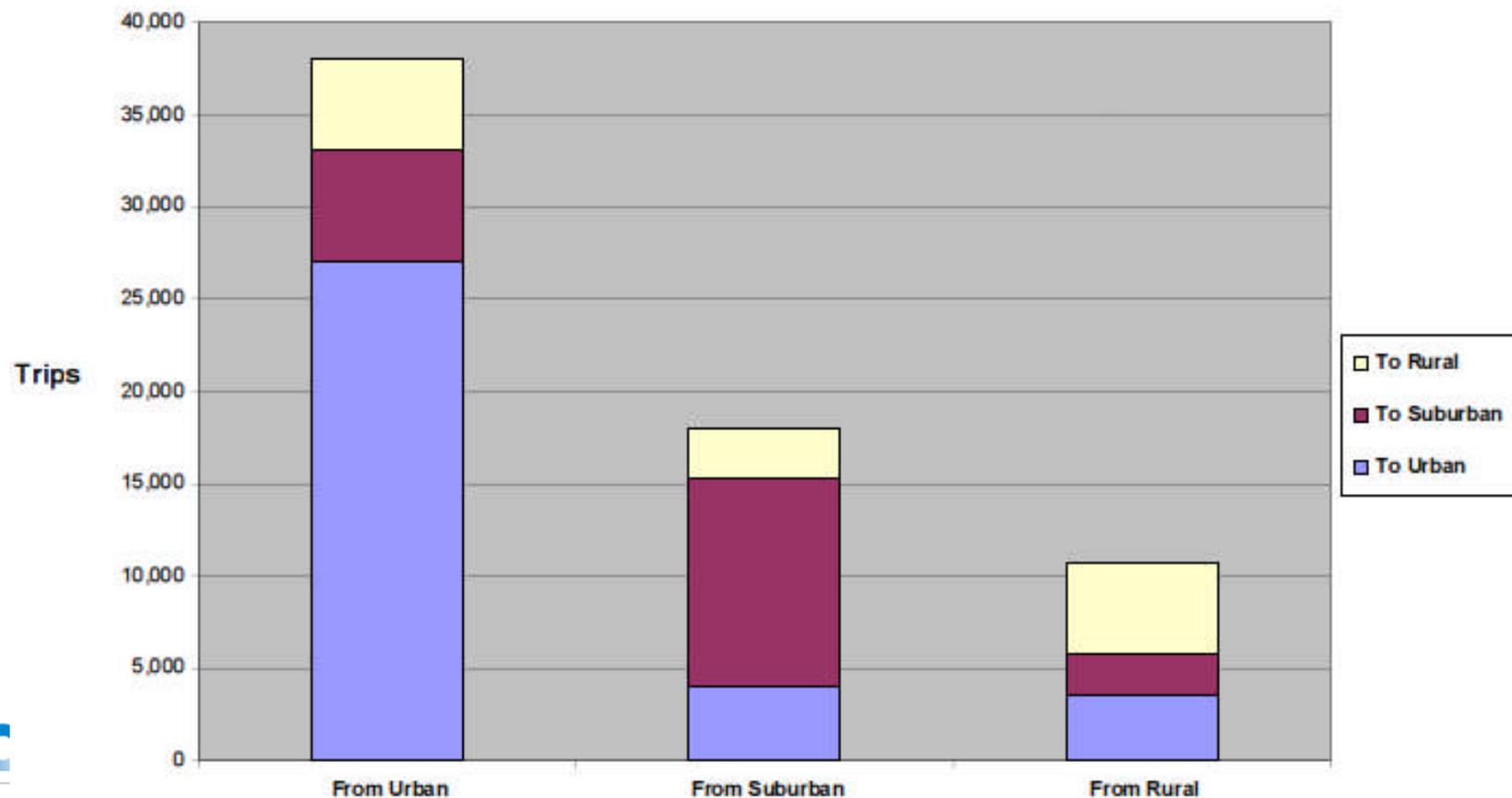
“The CCMPO transportation demand model predicts significant congestion by 2025 along nearly the entire length of North Avenue.” (MTP)



Traffic: CCMPO Metropolitan Transportation Plan (MTP)

CCMPO MTP: “The largest share (40 percent) of peak-hour person trips begin and end in the region’s urban communities (Burlington, South Burlington, and Winooski).”

**Figure 3-2: Travel Flows (PM Peak)
Between Communities: Urban, Suburban and Rural**



Safety: High Crash Locations

■ HCL Sections

- Pine Street
- Pearl Street
- S. Union Street
- St. Paul Street
- S. Winooski Avenue

■ HCL Intersections

- Main-Battery
- Main-Pine
- Main-St. Paul
- Main-S. Winooski
- Pearl-Winooski
- Pearl-Union



Transit

- Local Burlington routes, generally
 - \$1.25 one-way fare, except for FREE College St. Shuttle
 - 30-minute frequencies, except for 15-minute College St. Shuttle & City Loop
 - Operate M-F from 6AM until 6:15PM-10:40PM



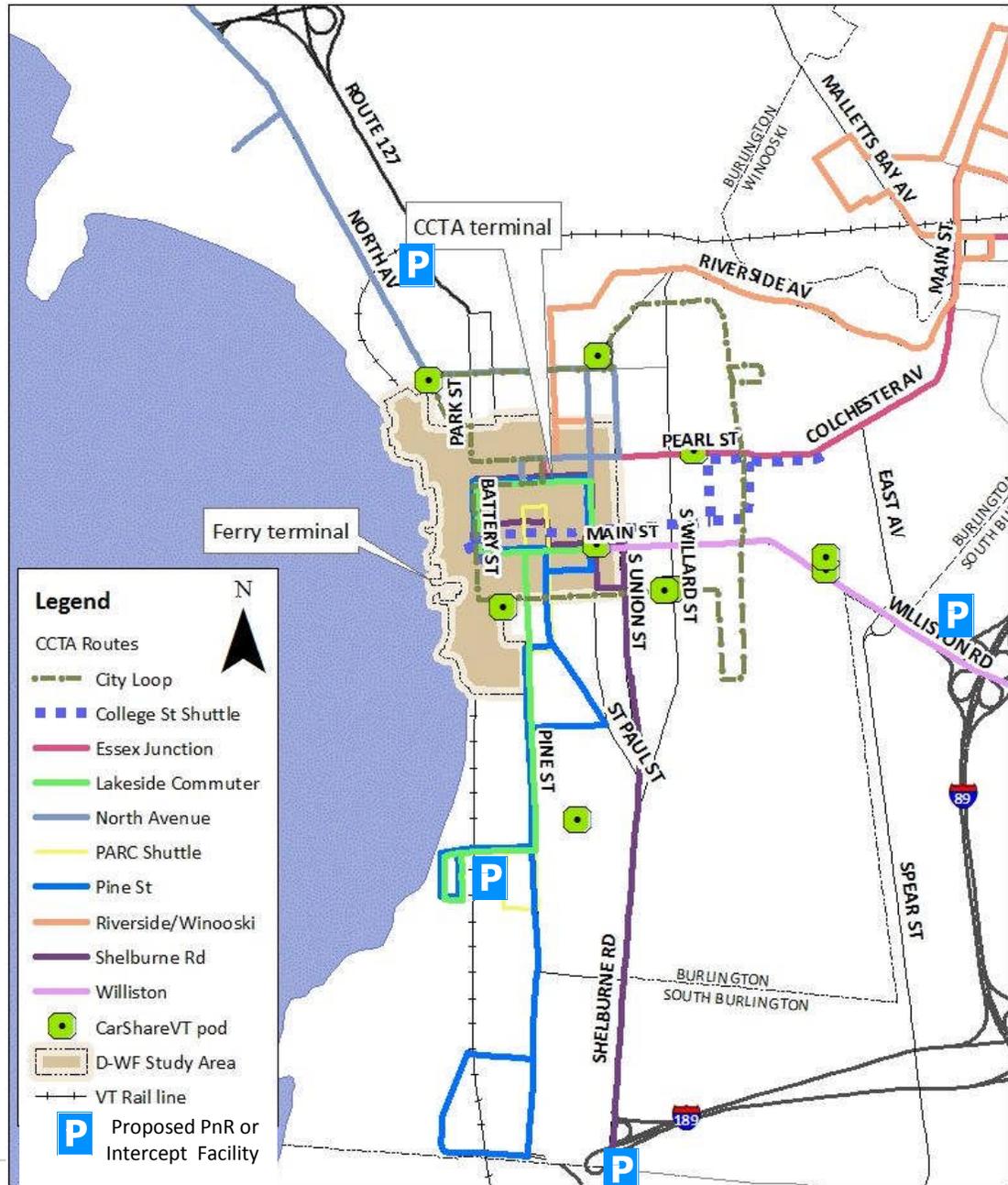
Transit

- County routes, generally
 - \$1.25 one-way fare
 - 15-minute to 1-hour frequencies
 - Operate M-F from 6AM until 6:15PM-10:40PM
- LINK Express routes, generally
 - \$4 one-way fare
 - Operate M-F, AM & PM service only



Transit

- Innermost routes are City Loop and College Street shuttle
- UVM CATS connects to downtown in evenings
- No ferry terminal connection
 - Are ferry passengers travelling through or is Burlington the destination?



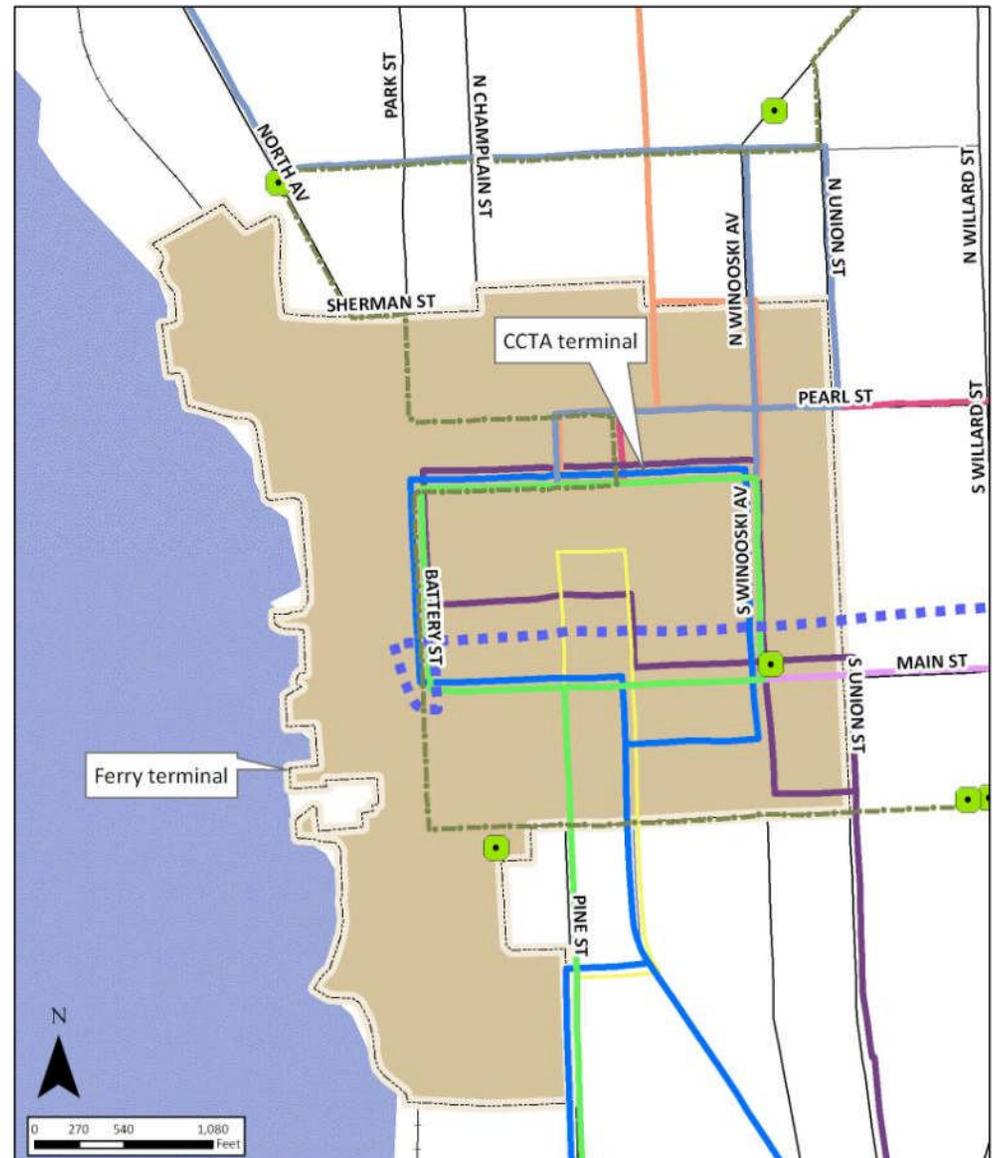
Proposed Transit Improvements

- Multimodal transportation center
 - Identified as “most needed facility investment” by CCTA
 - Critical in advancing improvements in overall system
- Update existing/design new services to resemble the College Street Shuttle
 - high-frequency (15-minute)
 - low fare
 - easy-to-use
 - convenient



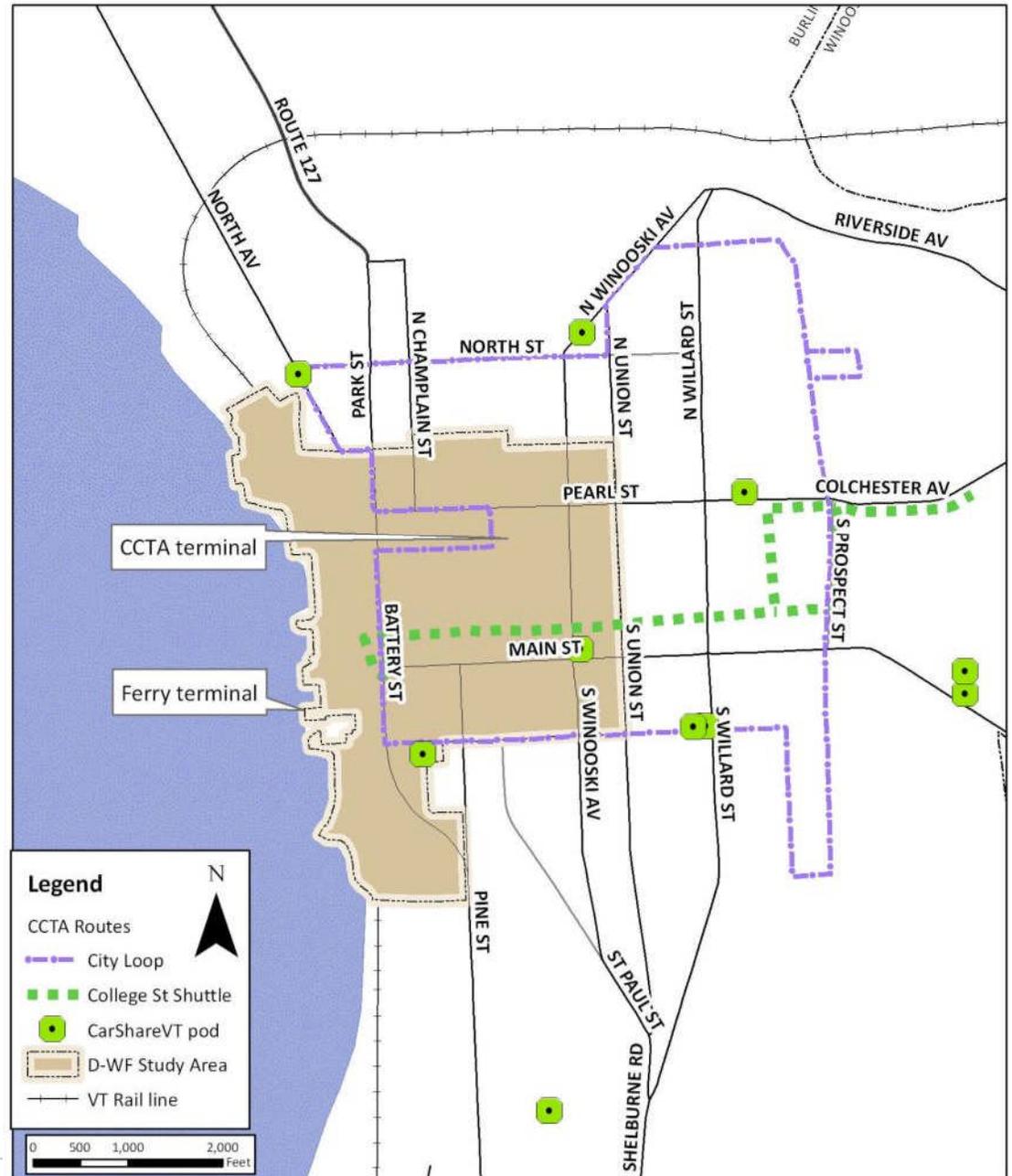
Proposed Transit Improvements

- 15-minute peak service on all four of the major corridors into Burlington (which also have the highest AADT)
 - North Ave
 - Colchester Ave/Pearl Street (VT 15)
 - Williston Road/Main Street (US 2)
 - Shelburne Road (US 7)
- Expand service hours & geography
- North-South transit on Waterfront
- Downtown TMA
- Transit funding reform



Additional Transit Gaps

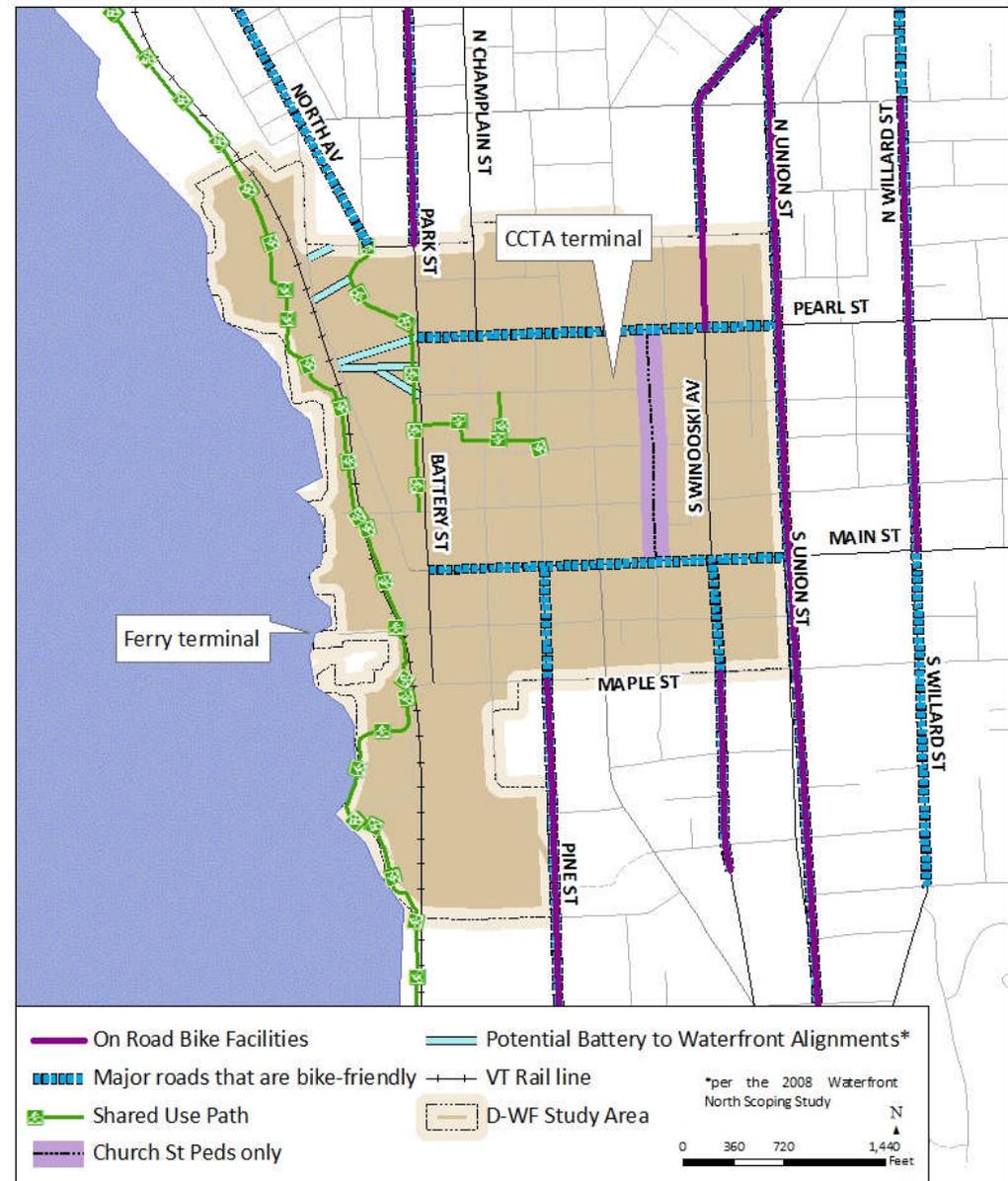
- **Major** reform is needed to give transit the funding & resources it needs to achieve the vision for Burlington
- Consider a community oriented TMA for residents, employees, and visitors, e.g., GO Boulder
 - Transit subsidies for residents
 - TDM programs for employers and developers



Bicycle-Pedestrian Gaps

North-South Travel

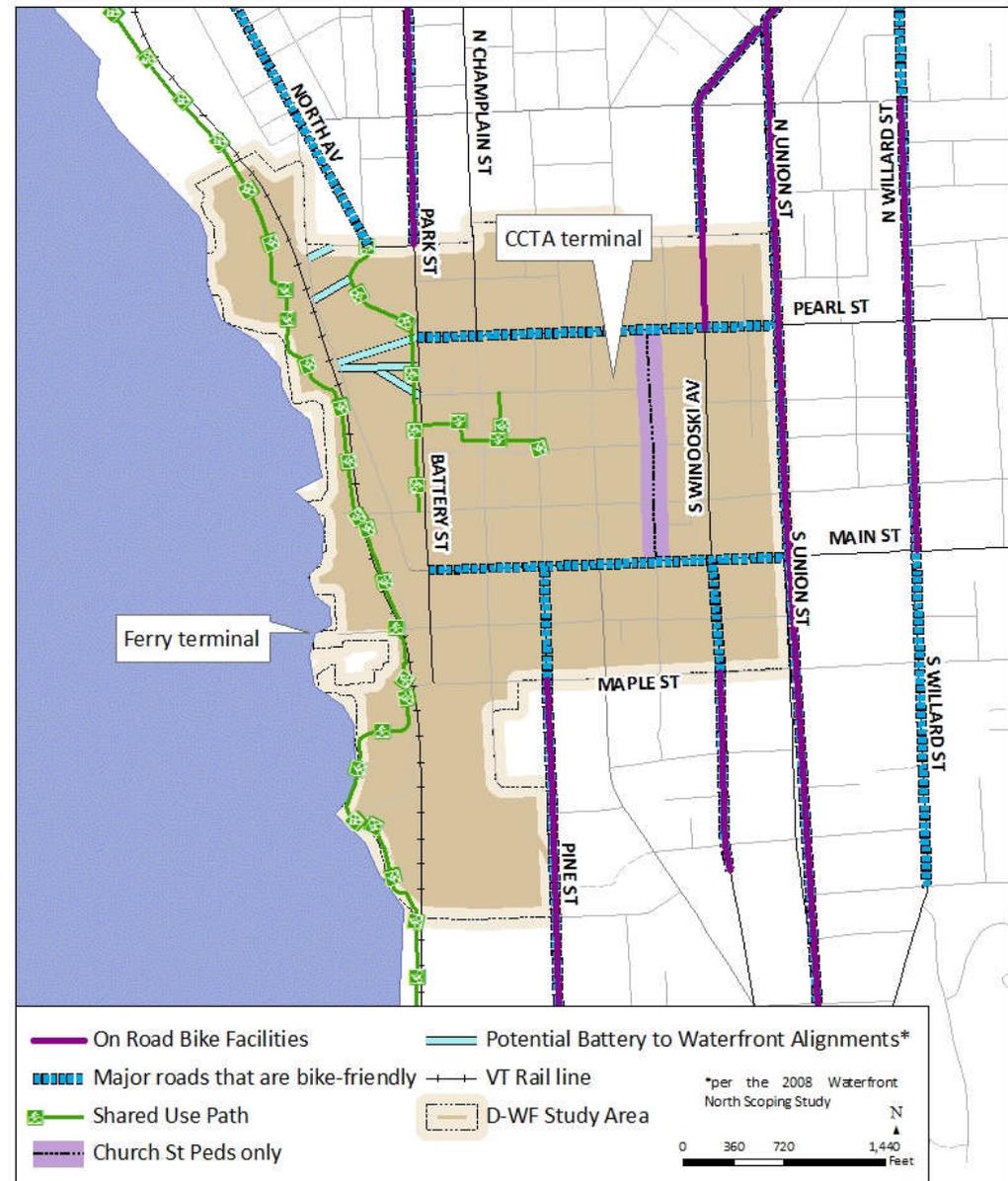
- Island Line/Burlington Bike Path or Union Street
- Battery St. Extension- intermodal conflicts at south terminus (peds, turning vehicles)
- Winooski Ave is difficult for bikes
- Champlain, Pine, & St. Paul Streets are all cut off by Burlington Town Center



Bicycle-Pedestrian Gaps

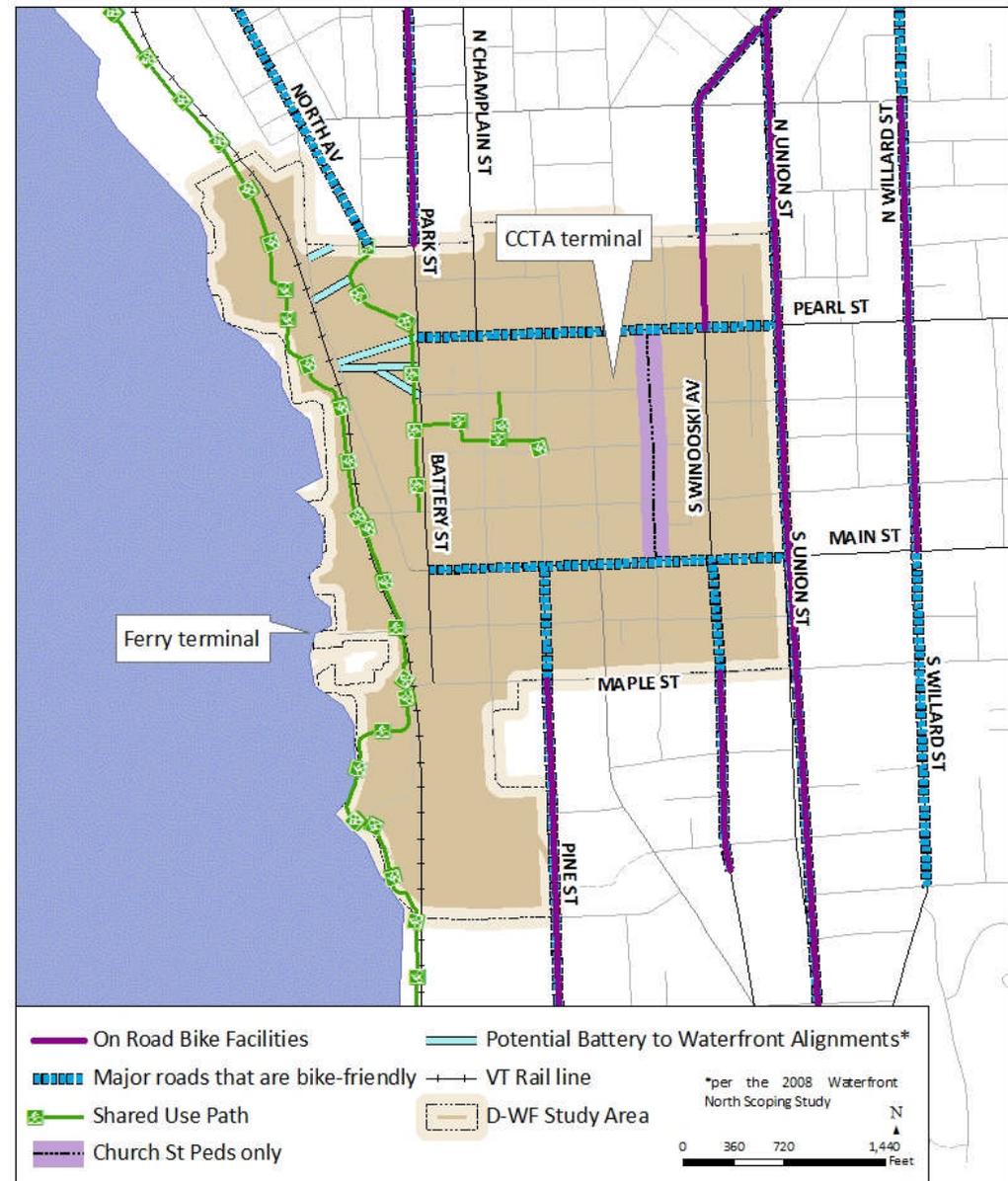
East-West Travel

- No east-west connection south of Maple Street between Island Line and Pine Street
- Battery Street is a barrier: base improvements from Waterfront North Study include upgrading traffic signals, street lighting, crosswalks, raising intersection at College St.



Bicycle-Pedestrian Gaps

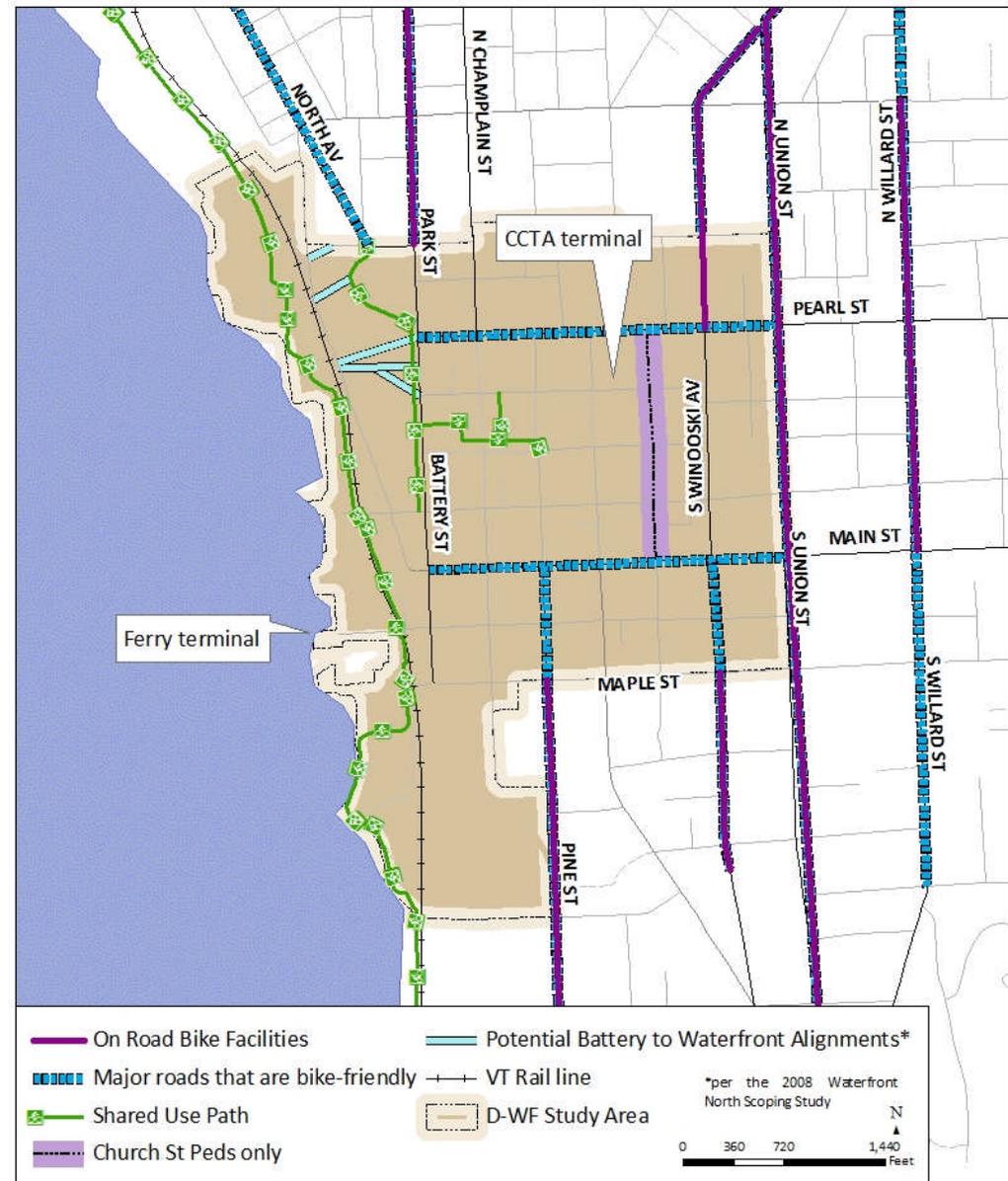
- East-west down the Battery Hill slope
 - Near term-Sherman St. Stairway & Depot Street Improvements
 - Longer term-parking structure built into slope (would include staircase/elevator), stairway streets, funicular
- Some connections are useful but hard to find
 - Bank St. to Battery
 - Pearl to Cherry at S. Champlain



Bicycle-Pedestrian Gaps

CCMPO MTP

- “Significant reinvestment will be required to maintain” the well-developed sidewalk network
- “A well signed and designed on-street network, especially focusing on north/south travel, is needed to provide citywide, safe, on-road bicycle travel.”



Bicycle-Pedestrian Existing Conditions

Bike Parking – Intermodal Connection

- Existing bike parking in Burlington
 - Artistic bike rack on North Winooski Ave.
 - Simple styles on main roads and bike routes
 - Located near bike path, parks and other popular destinations
 - In some parking garages and surface lots





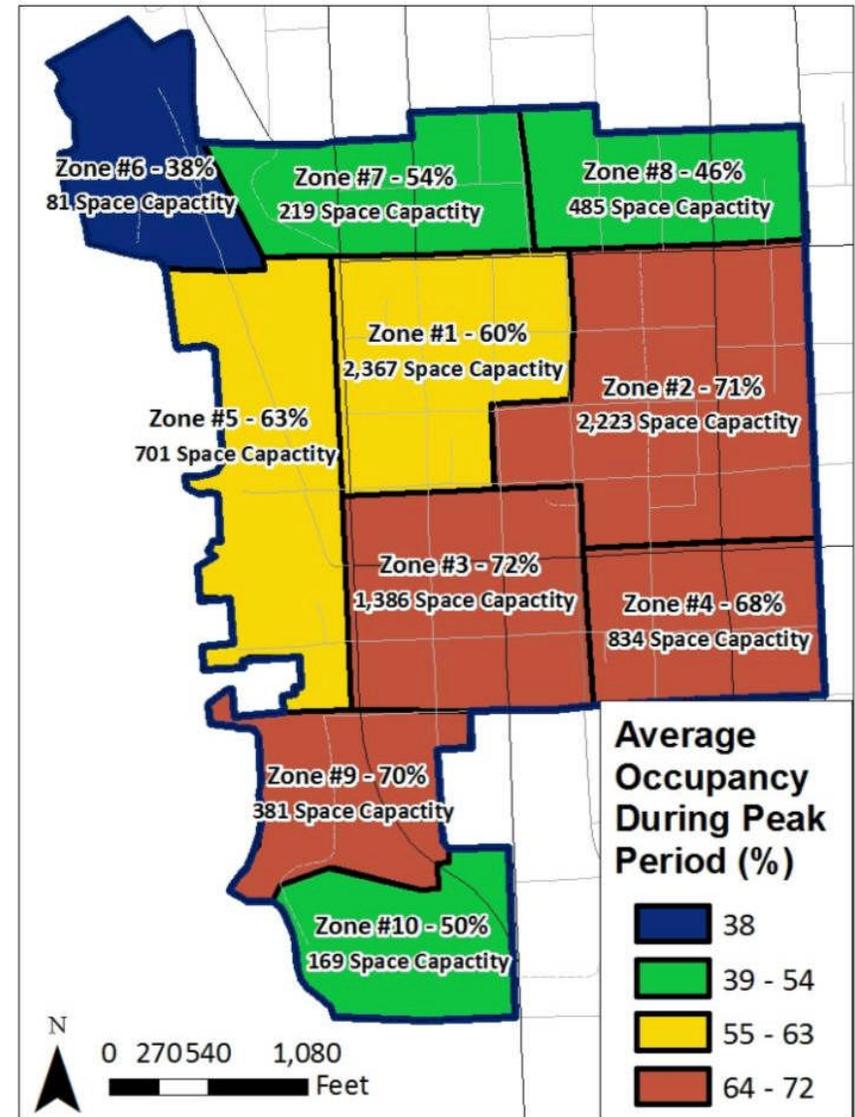
SUMMARY



Existing Conditions Summary

Parking

- Parking occupancy (not demand) is approximately does not meet 85% target
- Parking efficiency needs to be improved
 - Wayfinding
 - Management systems
- Price on-street parking higher than garages/lots to reclaim street space for peds, bicycles, transit and businesses
- Share parking with property owners
 - Arrange for public parking during off hours



Existing Conditions Summary

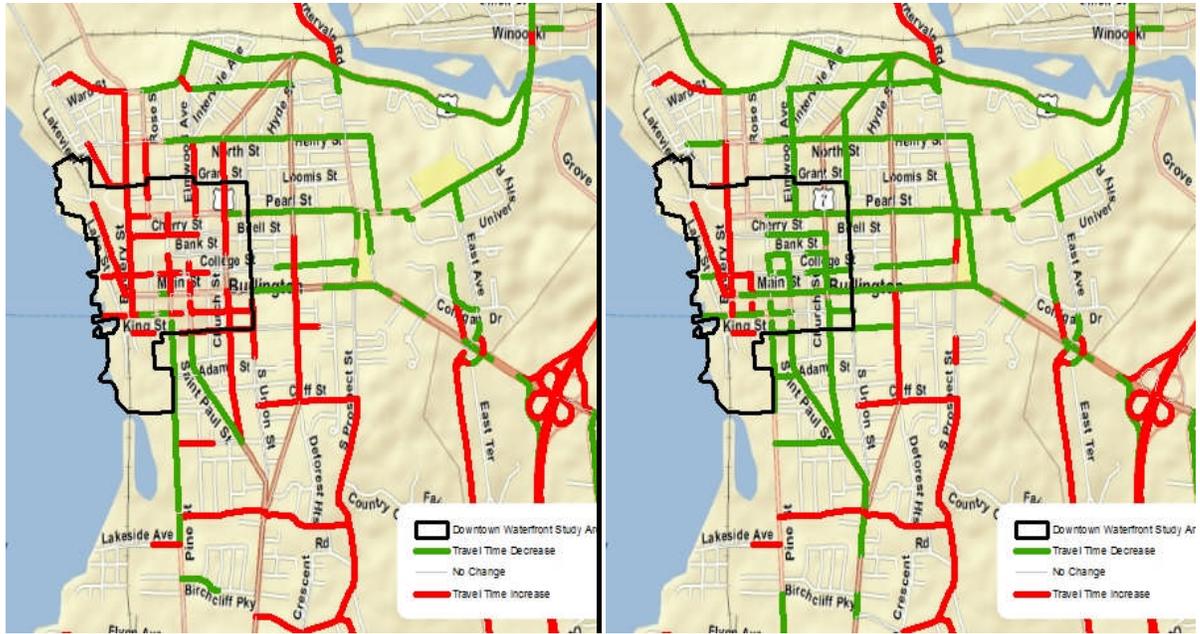
Transportation

- Transit needs more support
 - Multimodal Transportation Center
 - Expand system convenience (frequencies), service hours, routes
- CCMPO finding that 40% of trips are urban-urban suggests resources should be on urban-urban trips (less regional)
- Community oriented TMA
 - Include residents and visitors, not just employees
- On-street bicycle facilities needed
- Reclaim on-street parking for alternative modes



APPENDIX C-TRAVEL TIME COMPARISON

Comparison of 2010 Travel Times with Scenario 1 and Scenario 2 Travel Times



APPENDIX D-ADDITIONAL PARKING INFORMATION

1.1 Parking Garage Condition Checklists

SEMI ANNUAL MAINTENANCE CHECKLIST						
Structure Name:	College St. Garage		Lakeview Garage		Marketplace Garage	
Estimated Lifespan:	1985-2035?		2000-2050?		1976-2026?	
Date Observed:	June 27th, 2011		June 27th, 2011		June 27th, 2011	
Activity	Condition	Comments	Condition	Comments	Condition	Comments
Check Structural System:						
Floor surface deterioration	O	Frequent patches, small holes	+	Very little	+	Good overall, small cracks/patches occasionally
Water leakage	O	Some in typical areas	+	Some in typical areas	O	Some, especially on outer walls and between levels
Cracking of concrete	O	Some on floors and walls, little on ceilings	+	Very little	+	
Floor and Roof Deck Members	+		+		O	
Beams, Columns, and Spandrels	+		+		+	
Stair and Elevator Towers	+	Paint looks good	+	Good signage, but paint could be redone	O	Paint peel, rust, graffiti, dirty, unpleasant but nothing structurally unsound - inspection date good
Exposed Steel	O	Some rust	+		O	
Tripping Hazards	O	Few ramp/curb hazards	+		O	Few, but it's obvious where to walk safely
Rust	O	Minor occasionally. Exposed pipes, steel, etc.	+	Minor on few metal columns and exposed steel	O	
Check Electrical System:						
Check light fixtures	+	Look old, but all functional	+	Look great!	O	Few broken, some off/not working. Look old
Exit and Emergency Lighting	O	Exit signs could be bigger, more apparent from anywhere in garage	+	Good locations, but could be bigger/readily apparent	O	Look old and small, but still functioning
Elevators	+	Comfortable, inspection date is good, some ceiling work could be done	+	Minor graffiti, inspection date is good	-	Paint peel, rust, graffiti, dirty, unpleasant but nothing structurally unsound - inspection date good
PAINTING						
Check for Rust Spots:						
Doors & door frames	+		+		-	Frequent rust/paint peel
Handrails & guardrails	+		O	Repaint	-	Few newly painted, others in bad shape rust/paint
Pipe guards, exposed pipes & conduit	O	Some	+	Some major pipes have a little rust	+	Non-metal pipes look good
Other metal	O		O	Frequent rust on pipes	O	
Check for Appearance:						
Striping	O		+		+	Markings are sufficient and probably recent
Signs	+	Good except for electric "EXIT" signs	+		+	
Walls	O	Rough shape appearance	+		+	Minor leakage
Curbs	O	Could be redone in places	+		O	

1.2 Parking Costs

Downtown Burlington Structure Parking Costs		
Name	Cost	Cost/hour
Corporate Plaza	\$1.00 per 1/2 hour Daily maximum \$8.00	\$2/hour
Courthouse Plaza	75 cents per 1/2 hour Daily maximum \$10.00	\$1.50/hour
Market Place	2 hrs FREE \$1.00 per 1/2 hour, next 2 hours \$1.00 per hour, after 4 hours Daily maximum \$8.00 Sundays/Holidays FREE	Average \$1/hr
College St.	2 hrs FREE \$1.00 per 1/2 hour, next 2 hours \$1.00 per hour, after 4 hours Daily maximum \$8.00 Sundays/Holidays FREE	Average \$1/hr
Lake View	2 hrs FREE \$1.00 per 1/2 hour, next 2 hours \$1.00 per hour, after 4 hours Daily maximum \$8.00 Sundays/Holidays FREE	Average \$1/hr
Town Center	2 hrs FREE 3 hrs or less - \$3.00 4 hrs or less - \$5.00 5 hrs or less - \$7.00 6 hrs or less - \$8.00 8 hrs or less - \$10.00 10 hrs or less - \$12.00 12 hrs or less - \$15.00 Over 12 hrs to 5am - \$20.00 Daily maximum \$20.00 Sundays/Holidays FREE Month Pass \$90	Average \$1/hr
Park Plaza	Permit Only - M-F 7am-5pm Free Parking 5pm-7am and Weekends. Permit \$70/month	Permit Only

Downtown Burlington On-Street Parking Costs		
Type	Cost	Cost/hour
Brown 10-hr meter	\$0.25 per 37.5 minutes \$0.10 per 15 minutes Daily maximum \$4.00 Sundays/Holidays FREE	\$0.40/hour
Blue 3-hr meter	\$0.25 per 15 minutes \$0.10 per 6 minutes \$0.05 per 3 minutes Sundays/Holidays FREE	\$1.00/hour
Gray 1-hr meter	\$0.25 per 15 minutes \$0.10 per 6 minutes \$0.05 per 3 minutes Sundays/Holidays FREE	\$1.00/hour
Yellow 30-min meter	\$0.25 per 15 minutes \$0.10 per 6 minutes \$0.05 per 3 minutes Sundays/Holidays FREE	\$1.00/hour
Yellow 15-min meter	\$0.25 per 15 minutes \$0.10 per 6 minutes \$0.05 per 3 minutes Sundays/Holidays FREE	\$1.00/hour
Residential Permit	FREE	

Downtown Burlington Surface Lot Parking Cost					
Name	Entrance	Use	Owner/Use	Cost/Month	Details
Water Dept.	Penny Lane	Recreation	Public/Public	Free	No signage designating parking restrictions
Skate Park	Penny Lane	Recreation	Public/Public	Free	No signage designating parking restrictions
Coast Guard/Boat Access	Penny Lane	Recreation	Public/Public	\$60	Burlington Resident - \$6/day Non-Burlington Resident - \$8/day Car and Trailer - \$8/day Special Event - \$10/day Day RV Parking - \$10/day Day Bus Parking - \$20/day Overnight Car & Trailer - \$12/day Overnight Car - \$10/day Handicap/Green Mtn. Pass w/ Trailer - \$3 Boat Trailer Pass - \$30/season Business parking pass - \$60/Month
Pease Lot	College Street	Recreation	Public/Public	\$20	Burlington Resident - \$6/day or \$45/season Non-Burlington Resident - \$8/day or \$60/season Business parking pass - \$20/Month
ECHO Lot	College Street	Recreation	Private/Public	\$20	Day Pass - \$5 Nights after 6pm Free Business parking pass - \$20/Month
Pecor Lot	Maple Street	Recreation	Private/Public	\$60	Burlington Resident - \$6/day Non-Burlington Resident - \$8/day Car and Trailer - \$8/day Special Event - \$10/day Day RV Parking - \$10/day Day Bus Parking - \$20/day Overnight Car & Trailer - \$12/day Overnight Car - \$10/day Handicap/Green Mtn. Pass w/ Trailer - \$3 Boat Trailer Pass - \$30/season Business parking pass - \$60/Month
Perkins Pier	Maple Street	Recreation	Private/Public	\$60	Burlington Resident - \$6/day Non-Burlington Resident - \$8/day Car and Trailer - \$8/day Special Event - \$10/day Day RV Parking - \$10/day Day Bus Parking - \$20/day Overnight Car & Trailer - \$12/day Overnight Car - \$10/day Handicap/Green Mtn. Pass w/ Trailer - \$3 Boat Trailer Pass - \$30/season Business parking pass - \$60/Month
DPW-Browns Court	King Street	General	Public/Public	Metered	42 Brown meters
DPW-S. Winooski Main Lot	Main Street	Retail	Public/Public	Metered	37 Blue meters, 10 Brown
DPW-S. Winooski Permit Lot	Main Street	General	Public/Public	\$65	
DPW-Library Lot	College Street	Office/Retail	Public/Public	Metered	26 Brown meters, 16 Blue
DPW-YMCA Lot	South Union Street	General	Public/Public	Metered	22 Blue meters
DPW-Elmwood Avenue	Elmwood Ave	Office/General	Public/Public	\$50	
Behind Laundromat/ Dunkin' Donuts	Pearl St.	Mixed Use	Private/Public	Metered	15 Brown meters, 15 Blue

APPENDIX E-FORUM MEETING NOTES



MEMORANDUM

To: David White, City of Burlington Planning Department
Sandrine Thibault, City of Burlington Planning Department
Nicole Losch, City of Burlington Public Works Department

From: Beth Isler, PE/PTP & Erin Parizo, EIT

Subject: Burlington Downtown & Waterfront Plan Transportation Study: July 14, 2011 Meeting #4-
Forum Notes

Date: 8 August 2011

This memorandum summarizes the July 14th Forum on Transportation Barriers to Infill Development, which took place on the second floor of the Burlington Boathouse. The invitation list included developers, commercial realtors, large employers, businesses, transportation providers, City Councilors, Planning Commissioners, Public Works Commissioners, and City staff. Invitees were emailed a “Save-the-Date” on June 15th, followed by three email invitations within two weeks of the event.

- David White introduced the project and attendees introduced themselves. Attendees included:

Contact	Affiliation
Annie Bourdon	CarShare Vermont
Barbara Suprenaut	ICV
Bob Alberry	Public Works Commission
David Berezniak	City Council
David E. White	P&Z
Michel George	Champlain College
Erik Farrell	Developer
Erik Hoekstra	Redstone
Jeff Nick	J.L. Davis Realty
Jennifer Wallace-Brodeur	Planning Commission
Larry Kupferman	CEDO
Lee Buffinton	Planning Commission
Lisa Aultman Hall, TRC	University of Vermont
Marc Sherman	Public Works Commission
John Moore	CCTA
Nicole Losch	DPW
Pat Buteau	City of Burlington DPW-Parking
Peter Keating	CCMPO
Peter Potts	Planning Commission
Ron Redmond	Church Street Marketplace
Sandrine Thibault	P&Z
Erin Demers	DPW
Kevin Veller	Local Motion
Joel Fleming	DPW
Carol Weston	DPW
Steve Goodkind	DPW
Eli Lesser-Goldsmith	Marketplace Commission
Kirsten Merriman-Shapiro	CEDO
Dawn Francis	
Michael Monte	Burlington Associates in Community Development

- Beth reviewed the meeting agenda and purpose and goals of the forum. The purpose was to discuss problems and solutions and have attendees ‘groundtruth’ the presented materials to connect the gap between ideas and Burlington’s reality. Goals of the forum were to identify parking barriers to infill development and to discuss innovative transportation and parking solutions to achieve infill development. The agenda was as follows:

Agenda Item	Timeframe	Presenter
Welcome & Introductions	9:00-9:05	David White
Downtown-Waterfront Plan Overview	9:05-9:15	David White
Forum purpose & goals	9:15-9:20	RSG-Beth Isler
Interactive Presentation #1: Results of Ordinance and Policy Review (Task 5) What are the barriers to infill development? What are the issues? Where are the gaps?	9:20-10:20	VTPI-Todd Litman
Break	10:20-10:30	
Discussion summary/report back	10:35-10:45	RSG-Beth Isler
Interactive Presentation #2: Innovative transportation and parking solutions to achieve infill development Reactions to proposed solutions? What will work and what won't?	10:45-11:55	VTPI-Todd Litman
Wrap-up	11:55-12:00	RSG-Beth Isler

- Todd Litman presented parking management strategies. Comments made during the presentation were:
 - Be sure to maintain sufficient parking for visitors and others who often must drive to town.
 - Visitors’ parking experiences are the start of their VT/downtown experience.
 - Parking needs to be efficient.
 - What is the mix of parkers? Need to address demand from commuters/employees, visitors, residents, customers, etc..
 - A public/private partnership needs to be organized in order to facilitate strategies and to determine how to manage issues such as how to share existing and new parking among users.
 - The need for convenience is significant. This can put downtown Burlington at a disadvantage when competing with places such as University Mall, where it is easier to park. But people are probably walking the same distance through the U-Mall parking lot as they would from a downtown parking garage to Church Street. This may be a difference of expectations: people expect to park in a large parking lot and walk through it to get into the Mall, whereas Church Street customers expect to be able to park right in front of their destination.
 - Opportunities for infill development are determined by parking.
 - Consider in-lieu-of fees to be paid into a parking fund. The fund could eventually be used to construct a shared parking facility (where? Available sites are limited.) through a public/private partnership; or the fund could be used for ongoing parking management.
 - Development of offsite parking facilities may be feasible if businesses/tenants are compensated for the lack of onsite parking; businesses/tenants would still prefer onsite parking if possible.
 - May be challenging to build an offsite parking structure: who would be eligible to use spaces? What public/private partnerships would be necessary, etc.?
 - Private/Public partnerships should be developed and maintained for management of facilities.



- During the peak hours some downtown-destined vehicles are forced to park in peripheral residential areas. Existing parking between Pearl & Main/S. Winooski & Battery usually fills up and people park in other places such as Hungerford Terrace, pushing out residents who need parking.
- Is there an ideal mix of land uses to support alternative modes/manage parking? What is the mix in the study area?
- The recent extension of time allotted on the parking meters significantly helped in improving the parking experience. (Changed from 2hr to 3hr parking on a majority of the downtown parking meters.)
- Parking management needs to encourage turn-over.
- Maybe there should be a data collection process occurring yearly to have updated, consistent data?
- Be pro-active about parking. Don't wait for a problem to occur or a complaint to be made to investigate parking management ideas.
- Maintain relationships between decision makers, municipalities, business owners, and residents.
- Will people really be willing to park off site and take a shuttle to the destination?
- There currently is a plan to put real-time parking information around the downtown area – starting on the waterfront.
- People feel that there is plenty of subsidized housing in the downtown area, as well as higher end homes/condos. Feel the need for more “work force”/mid-level housing, however, this is expensive to build.
- Which demographics are likely to own a vehicle and require a parking space? Which are likely to use transit, taxis, carsharing?
- Need to improve the quality and supply of transportation alternatives to reduce parking demand.
- Unbundle parking and housing:
 - Sell parking spaces separate from housing. This way only people who need/want parking are allotted spaces and parking is not being over-supplied.
 - Be sure that information/marketing of transportation alternatives is clear to raise awareness/overcome lack of awareness about alternatives.
- What's keeping people from walking?
 - People may not want to walk out of lack of motivation. Seems like our sidewalks and walkability are inviting and attractive.
 - Increased wayfinding may make people more likely to walk (they'll know where they are, places to go, how to get there, and won't be intimidated to walk).
 - Good sidewalks are a good start to walkability, but more attractions along the important routes would encourage people to walk farther and more often.
 - Streetscaping would create a more inviting, walkable feel. For example, College Street is more inviting than Cherry Street.
 - Increase connectivity. Cherry Street is a very long block with no north-south connections.
- Employers could provide shower facilities or more benefits to those who use an alternate mode of transportation.
- Establish a Transportation Management Association (TMA) – There's a good example in Anaheim, CA.
- Consider contingency-based planning: instead of building for the 10th highest hour of demand, build for the 30th and be prepared to accommodate additional demand when it occurs.
- Cost of a surface parking space is \$5 – 15k – a structure space can be \$35k

The key takeaways of the Forum were:



- The parking experience is the first impression of Burlington. It needs to be improved to maintain Burlington's role in the regional economy. Parking efficiency in particular needs to be improved.
- Parking has become a barrier to infill development; it determines available opportunities and limits others.
- Consider in-lieu-of fees to be paid into a parking fund. The fund could eventually be used to construct a shared parking facility through a public/private partnership, or it could be used for ongoing parking management.
- A public/private partnership needs to be organized in order to facilitate strategies and to determine how to manage issues such as how to share existing and new parking among users.
- Expectations are very different for Burlington because it is compared to other places such as University Mall. The need for convenience is significant.
- Maintain relationships between decision makers, developers, municipalities, business owners, and residents.
- Feel the need for more "work force"/mid-level housing, however, this is expensive to build.
- If additional parking were to be constructed, where would it be located? Who would develop it? How would it be funded? How long would it take to build it (likely 5-10 years)? How would it be managed? Because it would take so long to implement, parking demand needs to be managed to improve efficiency of the existing capacity and to most accurately and effectively plan for future needs.





MEMORANDUM

To: David White, City of Burlington Planning Department
Sandrine Thibault, City of Burlington Planning Department
Nicole Losch, City of Burlington Public Works Department

From: Beth Isler, PE/PTP & Erin Parizo, EIT

Subject: Burlington Downtown & Waterfront Plan Transportation Study: Aug. 3, 2011 Transportation Core Group Meeting

Date: August 11, 2011

This memorandum summarizes the August 3rd Transportation Core Group meeting which took place at City Hall. Attendees, many of whom attended the Forum on Transportation Barriers to Infill Development on July 14th, included:

Contact	Affiliation
David White	P&Z
Sandrine Thibault	P&Z
Nicole Losch	Public Works
Larry Kupferman	CEDO
Kirsten Merriman-Shapiro	CEDO
Jeff Nick	J.L. Davis Realty
Yves Bradley	Pomerleau Real Estate
Peter Potts	Planning Commission
Ron Redmond	Church Street Marketplace
Kelly Devine	Burlington Business Association
Jonathan Ayers	Donahue & Associates
Bob Chamberlin	RSG
Beth Isler	RSG
Erin Parizo	RSG

David White introduced the project and described parking in the study area from a management perspective. While expanding parking capacity is one option, it is not immediately implementable. However, improved management and efficiency of existing capacity and demand is. The soonest that a new parking garage might be realized is 10-20 years.

Beth reviewed the meeting goals and purpose, which was to gather input from developers about parking issues and potential solutions. Goals of the meeting were to identify parking barriers to infill development and to discuss potential solutions along with specific action items and next steps to be taken.

Points raised during the discussion are as follows. It should be noted that these comments have not been supported nor refuted by data.

- **Parking is the number one issue for developers.** Infill development is impossible because of parking. Some businesses have left Burlington because parking has been so challenging. There is a flight of skilled workers from downtown and with them go the shopping, errands, and lunches that would otherwise happen downtown. Need to increase parking availability. The 2003 parking study forecasted a parking shortage. It is wishful thinking to expect that alternative transportation will do much to reduce parking demand. Quantify current mode split and then forecast what it might be in the future.
- More parking is needed to sustain Burlington's growth and economy. Location of parking is important. There are surpluses in some areas and shortages in others.
- Parking for office buildings is particularly challenging. Parking spaces consume valuable (\$) space. The low cost of parking in suburban areas can be very attractive to companies looking to establish or expand office space.
- **There are different needs for different users. There cannot be a one-size-fits-all solution.** Short-term parking (such shopping, errands, meals, etc.) should be accommodated downtown (as opposed to remotely). Employees need longer-term parking (8-10 hours), as do some visitors. Employees can be further broken into office (M-F, 9-5) and retail/service (late night, dinner shift, etc.). Office space needs onsite parking to accommodate clients. Need to clearly convey information to visitors and non-Burlingtonians; locals know all the 'secret' parking places and visitors from large cities are comfortable parking in garages, so these groups don't have difficulty finding parking.
 - Option of changing lease prices to be more flexible for distinct users
 - Ex. \$50/month for a M-F 8am-5pm lease
 - \$80/month for M-F 24 hours a day
 - \$100/month for 24/7
- There is unmet demand for large space real estate (such as the former General Dynamics facility) and the parking to support it. There is an over-supply of small non-profits in the downtown area; these do not generate the revenue that large, for-profit companies do.
- **The current parking structures do not attract drivers:** they are dark, smelly, hard to find, and staff are rude. Queues back out of the entrances because vehicles aren't informed that the garage is full until they are trying to get a ticket and there are more cars behind them. This frequently happens at the Marketplace garage entrance on Bank Street.
- **Urban solutions** that have worked in places like Boulder, CO and Portland, OR **are not applicable to Burlington because of its size and its context.** The difference in scale needs to be recognized. It is also difficult to encourage rural Vermonters who come to Burlington to use urban solutions like parking in garages, using transit, etc.
- Strategies need to be extremely **user friendly** (for example, the College Street Shuttle). Need to **provide clear and accurate parking information.** **Wayfinding** is critical to direct drivers (and people unfamiliar with Burlington) to parking. Look into smart phone apps.
- There is a **large contrast between the College Street Shuttle and other CCTA routes.** The shuttle is pleasant and has a direct route. Develop a relationship with CCTA more fully.
- The Transportation Management Association (TMA) works for the Hill Institutions because they are set in place and do not have the option of moving to other communities like downtown businesses can (and will do rather than dealing with parking constraints).
- **Maximize utilization and improve efficiency.** For example, garages could be used more intensively. They are relatively empty from 6PM to 10AM and could potentially accommodate residential parking. Residents could be given a swipe card for entrances and exits.



- Developers prefer covered parking.
- There needs to be **remote/off-site parking (connected to downtown with a shuttle)** at locations such as Exit 14 and the future South End Transit Center. Give people a choice when it comes to parking by informing them as they approach downtown that downtown parking is expensive relative to a remote lot served by shuttle. Remote parking would work for downtown residents who work downtown. It would not work for office employees because bus service is inadequate. Client parking is a priority.
- **Convenience** is a huge factor, as well as **cost**. However, the BBA found that it is not inconvenient for people (which user group?) to find parking, and therefore not inconvenient enough to shift them to alternative modes such as transit.
- Sharing parking is a marketing opportunity.
- Use cost to influence employee parking behavior.
- Potential improvements to parking should focus on wayfinding, automated management, cleanliness and maintenance, and lighting. Make structured parking more attractive.
- **Holiday parking management** is well done. These strategies and programs should be extended to other times of the year. The information campaign that goes along with conveying the parking message is a key part of this. Merchants could include the “2-hours free” message in their advertisements and parking information/brochures could be handed out to customers on the Marketplace.
- **Manage parking as a business**. There are some tasks that the public sector performs well and others that the private sector performs well. These different skill sets should be utilized to manage parking and transportation. These are shared problems that require a shared solution. The holiday parking program is one example of this. Develop a system of incentives and disincentives to influence behavior. For example, parking cash-out for employees, provide showers and lockers for bicyclists, etc.
- One of the main reasons that the City of Boulder parking and transportation system is so successful is that it is **easy to follow the money**. It is clear to stakeholders and users how parking revenue is re-invested in the community. If a **parking fund** were developed, a clear and direct connection like this would be imperative.
- Need to keep in mind that **solutions are not necessarily all-or-nothing**. Implementing an employee commute reduction program does not mean that employees can never drive into Burlington ever again- even switching to an alternative mode just one day per week would be a 20% reduction in demand. **Flexibility can be built into solutions**. For example, providing 3-day/week parking permits (that is, where you can park your car 3 days each week and use an alternative the other 2 days) instead of annual permits helps to avoid an “all-you-can-eat” syndrome in which people drive every day just because they can.
- **Unbundling parking** from residences and employment should be explored.
- **Residential parking incentives** appear to be the most workable from the standpoint of developers. A number of the parking waivers discussed at the meeting appeared particularly appropriate for residential construction. Reducing parking needs for residential construction will lower construction costs and incentivize this type of investment. Some overnight residential parking can be satisfied in city or private parking garages. Also, some residences don’t mind have a car parked remotely if they only need it on weekends or for special trips.
- Valet parking would provide excellent customer service and improve parking efficiency, especially for special events and the Flynn Theater.
- Need to analyze whether an increase in parking supply would still be necessary if parking was managed more efficiently.



- **Barriers to shared parking**, such as liability and how to respond to violations, need to be considered and planned for. Property owners are reluctant to surrender control of parking.
- Parking waivers as provided for in the City Ordinance reduce parking supply, but not demand. This doesn't solve the problem. Work with developers to optimize parking for different projects.
- Regulations in Burlington are much stricter and challenging to work with than anywhere else.

Action Items

- Address the potential (or lack thereof) for expanding parking and quantify future demand.
- Quantify existing mode split.
- Continue to implement the Wayfinding Plan.
- Examine shared parking: what are the barriers? How have other communities overcome them?
- Examine the potential for public-private partnerships:
 - Consider organizing it like the former Parking & Transportation Council, but make sure that it is empowered and well-supported so that it can effectively act. How can the community gain traction on parking and transportation issues?
 - Identify the different strengths and weaknesses of the private and public sectors.
 - Look to the publicly accessible Burlington Town Center garage as an example of a public-private/shared parking arrangement.

Addendum

At the invitation of Main Street Landing, Sandrine Thibault, Nicole Losch, and Beth Isler met with Melinda Moulton on Tuesday, August 9th because Melinda had not been able to attend the August 3rd meeting. The following summarizes the discussion points.

- Multimodal transportation options need to be expanded and improved, particularly rail. Intercity, interregional and interstate services need to be provided.
- Ordinance requirements overestimate the amount of parking that will be needed to support a site. The garage for the Keystone Building is relatively unused, despite the facts that:
 - it only has half the number of spaces that were required prior to obtaining an ordinance waiver,
 - one of the garage levels is public, and
 - monthly leases cost less than those offered by the City.

The garage's spaces could be leased by the ICV building currently under construction on the southeast corner of Battery-King.

- Vehicle domination must end. Consider closing Lake Street to vehicles and making it transit/ped/bicycle only.
- Burlington businesses are trying to compete with Maple Tree Place in Williston. Therefore, need to incentivize alternatives such as 2-hours free parking.
- Rail is frequently overlooked by all. The rail demonstration project from a few years ago did not have enough time to gain traction as it was terminated after two years. The state rail program needs improvement. Rail is a missed opportunity, especially as fuel prices rise and single-occupancy vehicles become too expensive to operate.
- Need to connect with Vermont Businesses for Social Responsibility (VBSR) and review their policy statements. Many high-revenue, progressive businesses and leaders are members of this organization.



- The private sector needs to get behind transit. The current funding structure for transit is inequitable, placing the burden on property owners rather than transportation users. Austin, TX had a very successful program to improve transit through its regional transportation organization: through a bond, transit is funded by 1¢ of every \$1 of gasoline sold.
- Public access is key. The Waterfront needs to be more accessible via stairway streets, funiculars, etc.. Don't gentrify the Waterfront.



APPENDIX F-PARKING DATA HOW-TO GUIDE

This Guide describes background data which should be collected to compile an inventory of parking facilities and a database of how parking is used.

1.1 Background Data

In order to establish an up to date parking inventory, existing data should be collected and compiled so that information about the city's parking facilities can be easily reviewed. This data will include parking capacity, parking costs, ownership and allowed use of parking, and the physical condition of parking structures at each location within the area of interest. Any information from this section that is not already known will need to be obtained by the proper authority in order to have a complete parking inventory.

1.1.1 Parking Maps

Maps of the city's parking facilities should be created for the study area. These maps will show the parking inventory by number of spaces, distinguishing between surface lot, structured, and on-street parking. These maps will preferably be created in GIS to allow for future updates and additions. A map from a recent study for Burlington's Downtown Waterfront Parking plan is shown in Figure 1 on the next page as an example. Separate maps were made in this case to show surface lots, on-street parking, and structured parking to reduce the clutter on a single map. In this case, Figure 1 illustrates only the surface lot parking facilities.

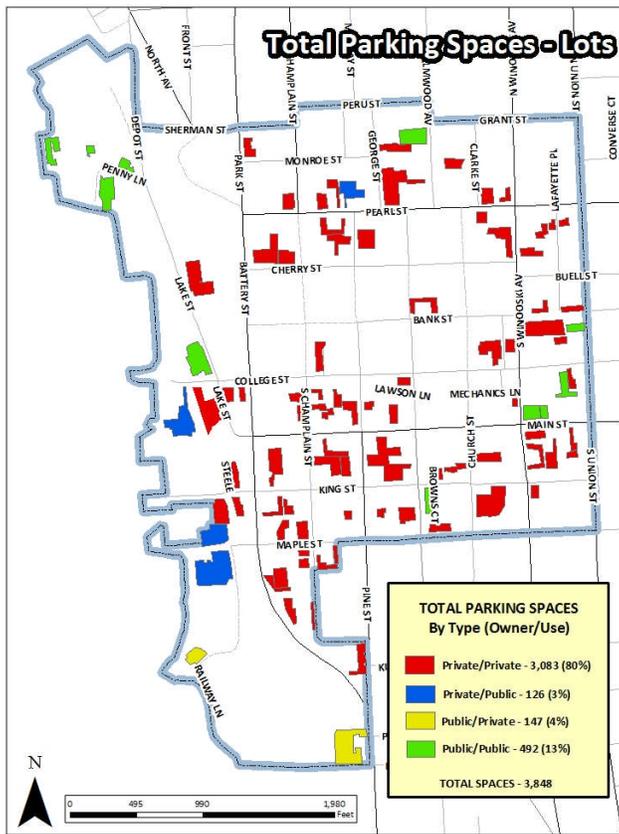


Figure 1. Downtown Burlington Surface Lot Parking Inventory

1.1.1.1 Ownership and Usage

Maps can include a variety of attributes that can be displayed in order to spatially illustrate certain details. The first of these includes the ownership and usage of the parking facility. Typically there are three combinations of ownership and usage, all of which are described below.

Public/Public: Publicly owned garage or lot with parking available for general public use. All on-street parking is public/public.

Private/Public: Privately owned garage or lot with parking available for the general public.

Private/Private: Privately owned garage or lot with parking restricted to private use only. Parking may only be used by employees, customers, residents, or visitors to the building(s) the lot serves.

This information will be helpful when determining opportunities for parking management. A city may notice a trend in public/public ownership and use and want to allocate future public/public parking facilities accordingly.

1.1.1.2 Parking Costs

The next attribute that could be helpful to display on a map is the different costs of each facility. This can consist of any prices for the local facilities; the hourly rate for parking meters, the hourly rate for parking structures, monthly lease prices for parking spaces or any other priced facilities the city may have. An example map from Burlington in Figure 2 shows parking lots and structures by cost, as well as by ownership and use.

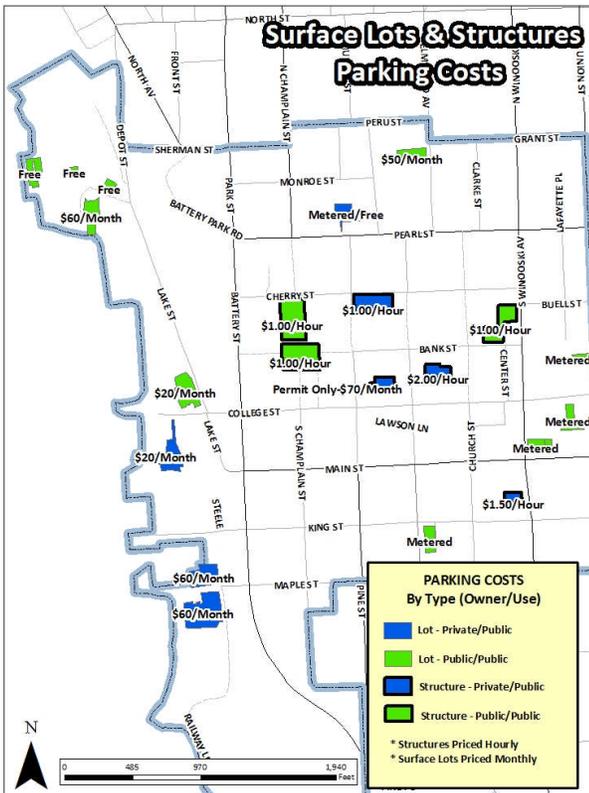


Figure 2. Downtown Burlington Surface Lot and Structure Costs

1.1.1.3 Capacity

Arguably the most important feature for the GIS maps to contain is the capacity of each parking facility. Capacity should be periodically recounted as it can change (spaces are reassigned, a trash dumpster is located in a facility, an on street space is replaced by a bicycle rack or construction, etc.). This requires going to each facility and recording the number of parking spots that it has to offer. Along with the total number of spaces, the type of space should also be recorded. Different varieties of parking spaces may include handicap, loading/unloading truck zones, 15-minute signed spaces, residential parking and other specifics that the city may have.

1.1.2 Condition of Structures

Information concerning parking structures must be obtained in order to accurately predict their remaining life. They should be assessed on their physical condition to properly be compared with the average life cycle of the specific type of structure. Whether or not parking structures need to be replaced in the near future may have an impact on the results and recommendations of the study. If data regarding the physical condition of the local structures is not available, it will need to be gathered. A qualified engineer may be able to visually inspect the structure and predict the remaining life expectancy. Collect information about the materials that the structure is made of, the size, usage, etc to determine what the life cycle of a similar structure would be. Apply this knowledge to the known year of construction and the visual inspection to determine the remaining life of the structure.

1.2 Data

Utilization data can include occupancy, length of stay, turnover, and other factors. (Additional information that can be gathered and are potentially very useful for planning purposes is complaints and violations.) The most basic utilization data is occupancy, which reveals how each parking facility is used over time. Data collector(s) should follow these typical guidelines for gathering occupancy data. Depending on the staff resources available and the size of the study area, observing the parking facilities in the study area every one to two hours is ideal and is further described within this section.

1.2.1 Types

For each type of facility different observations may be recorded, and therefore separate data collection sheets must be made. Various types of data may consist of those shown in Table 1 or any other data that may be relevant for the specific study.

Table 1. Parking Accumulation Data Collected

Parking Facility Type	Data Collected
On-street parking	<ul style="list-style-type: none"> • Total parked cars • Illegally parked cars • Cars parked at long term meters (10 hours) • Cars parked at short term meters (all other meters) • Short and long term meter violations • Cars parked in unrestricted spaces • Cars parked in handicap spaces • Cars parked in residential permit areas • Cars parked in 15 minute signed spaces
DPW surface lots	<ul style="list-style-type: none"> • Total parked cars • Cars parked at short term meters • Cars parked at long term meters • Cars parked in leased spaces • Cars parked in handicap spaces • Illegally parked vehicles
Private Surface Lots	<ul style="list-style-type: none"> • Total parked cars • Cars parked in unrestricted spaces • Cars parked in handicap spaces • Illegally parked cars
DPW garages	<ul style="list-style-type: none"> • Total parked cars
Champlain Parking Garages	<ul style="list-style-type: none"> • Total Parked Cars • Leased Cars • Parked cars purchasing ticket
Gateway Square, Park Plaza, State Office Building and Howard Community Service garages	<ul style="list-style-type: none"> • Total parked cars • Cars parked in handicap spaces

1.2.2 Collection

A full survey should be completed if time allows or if there is not previous data suggesting a peak occupancy period. Otherwise a partial survey of only the peak hours, as dictated by earlier studies, can be completed. Depending on the size of the study area, it may help to divide it into smaller zones for data collection and analysis. These zones can be approximately ½ square mile in area to reflect how far someone is willing to walk to a destination from their parking space.

For a full survey, the data collector for each zone will observe and record the necessary data during each time period (hourly or otherwise). For example, they might observe the parking occupancy in their zone on Friday at 7am, then again at 9am, and continue every two hours until 11pm. When a full survey is not needed, the collectors may observe the parking occupancy at two or three times during the known peak period. An example of a data collection sheet for a small portion of the Downtown Waterfront Parking study in Burlington is shown in Table 2 below.

Table 2. Sample of Occupancy Data Collection Sheet

Friday, 6/16/2011		Zones 5&6: on-street, lots, structures														
9AM to 11AM																
Type	ID	Study Zone	Entrance Location	Description	Notes	Regular space	Illegal Parker	HC	Grey meter	Blue meter	Brown meter	Yellow meter	15 minute	Loading/unloading	Residential permit	TOTAL
L	88	5	Maple St.	Pecor Lot												
L	93	5	Maple St.	Pecor Lot	Attended, 7 large spots for boats/trailers											
L	96	5	King St.	Shanty on the Shore	Gravel - unmarked spaces											
L	95	5	King St.	Ice House												
G	13	5	Steele St.	Corner Stone	SW corner Main/Battery											
O	90	5	Lake St.	College	NB											
O	91	5	Lake St.	College	SB											
L	70	5	Lake St.	Lake & College Surface Lot	Some gravel spaces											
L	69	5	College St.	ECHO Surface Lot												
L	67	5	Lake St.	Burlington Bay Market and Café												
L	68	5	Battery St.	Burlington Bay Market and Café												
L	71	5	College St.	Pease Lot												
O	88	5	Lake St.	Depot												
G	12	5	Lake St.	Lake & College Garage	NE of College and Lake											
L	72	5	Lake St.	Lake & College Surface Lot	Gravel - unmarked spaces											

1.2.3 Peak Parking Period

After collecting the necessary data, results can be compiled and tabulated as to what percentage of available capacity is currently being utilized at various times of the day. The peak parking period is the time span when the percent utilization is the greatest.