RSG INC.
TRANSPORTATION

Final Report of the Waterfront South Access Project

June 2010

Prepared for:

Chittenden County Metropolitan Planning Organization
&
City of Burlington Department of Public Works

DATA ■ ANALYSIS ■ SOLUTIONS

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2. 11x17 Map of Proposed VT Railway Railyard Operations

1.0 INTRODUCTION

The objective of the Waterfront South Access Project is to develop alternatives for access and circulation to and within the Waterfront South area (Figure 1) with a primary objective of promoting economic development. To facilitate the development of the Waterfront South area, the emphasis in this project is to develop a street network, supported with appropriate municipal and transportation infrastructure that will in turn foster private commercial investment.

The sequence of steps leading up to this final report included several key meetings (see Meeting Notes in the Appendix), starting with an initial meeting with Burlington Community and Economic Development Office (CEDO), the Department of Public Works (DPW), and other City planning and administrative staff (12-9-2009). This meeting focused on the project goals and economic potential of the project area, which informed the work described in the Task 2 Memo (2-23-10). The Task 2 Memo describes the existing conditions mapping, base traffic model calibration, and the key parcels, including the VT Railway railyard, which are expected to benefit from the enhanced access that a new network of streets might provide.

Subsequently, a meeting with the VT Railway was held (1-15-10) in which the extent and needs of their operations were discussed. It should be noted that the alternatives presented are intended to avoid impacts to their existing and future operations. However some changes are suggested, such as moving the existing transload facility to the southern end of the parcel when the Havey parcel is redeveloped. The reorganization of the railyard is shown in Figure 2, which was developed as part of the Champlain Parkway SEIS (a full size copy is provided as an Appendix).

As a possible starting point for a new street network it was determined that access to Pine Street from the railyard would be a great benefit since it would allow many of the truck trips that are generated to and from the south to avoid the residential areas adjacent to Maple, King and northern Pine Streets.

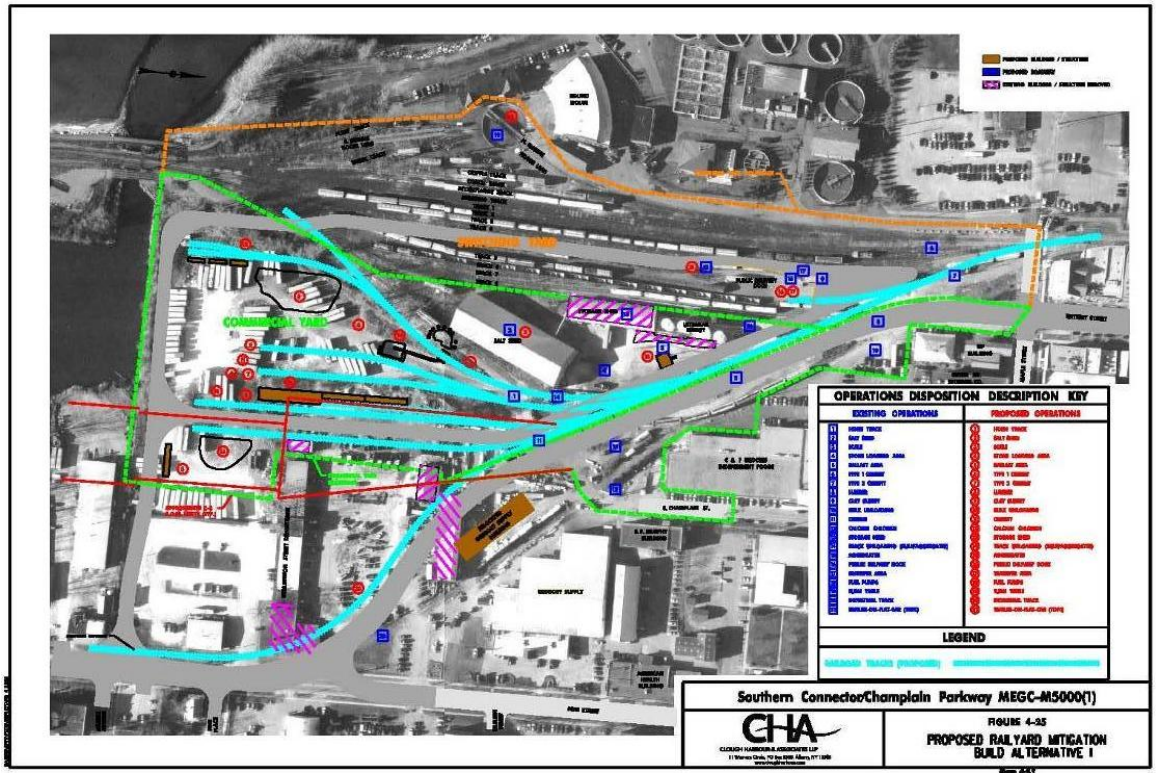
RSG developed several possible new street alignments, cross section alternatives and phasing scenarios for the project area. These were presented and discussed at a workshop held on 15 April 2010. This workshop was attended by CEDO, the DPW and other City staff. The outcome of this meeting narrowed the various options to three preferred alternatives. These three alternatives are presented here with details comparing the potential traffic impacts and cost.

This alternative analysis considers potential phasing which would allow the City to do portions of the network as opportunities arise and funding is made available. A primary emphasis will be on developing alternatives that the City of Burlington can pursue initially with city resources.

This final project deliverable presents a set of three access/circulation alternatives for the Project Area, described at a Conceptual Plan level, and an associated assessment of their transportation impacts, infrastructure costs, and permitting requirements. A phasing plan is proposed to assist the City in pursuing a short-term and long-term plan for a favored approach.

Figure 1: Waterfront South Project Area

Figure 2: Proposed Railyard Operations Accommodated by Waterfront South Access Alternatives



This project relied upon data collection and analysis conducted for the Southern Connector EIS and SEIS, particularly with respect to environmental constraints and traffic volume information.

2.0 WATERFRONT SOUTH CIRCULATION ALTERNATIVES

The project team pursued a scenario planning approach when developing access alternatives. Three scenarios were investigated:

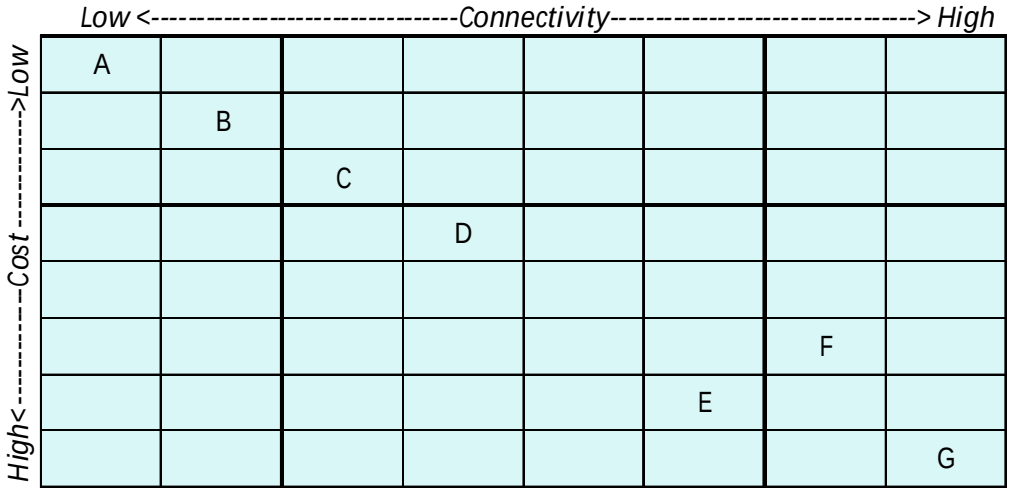
1. Low Cost Scenario -- what access/circulation plan can be pursued most quickly with the lowest infrastructure and permitting costs, which can then be used as a foundation for future improvements?
2. Maximum Economic Impact Scenario -- which access/circulation plan can maximize future economic development potential of the project area?
3. Transportation Efficiency Scenario -- which access/circulation plan provides the greatest transportation mobility and safety benefits?

A total of seven street alternatives for these three scenarios were developed (Figure 3). These seven alternatives covered a range of access options from low to high cost and low to high connectivity (Figure 4).

Figure 3: Table of Scenario Access Alternatives

Scenario	Alternative	
# 1 Low Cost	A	Railroad service road from Pine Street
	B	Horseshoe Pine to Pine
	C	3-leg intersection: horseshoe connecting to S. Champlain
	D	4-leg intersection: horseshoe connecting to S. Champlain and Battery
#2 Max Economic Impact	E	Grid system
#3 Max Transportation Efficiency	F	Multimodal network
Hybrid of 2 & 3	G	Hybrid grid + multimodal

Figure 4: Cost-Connectivity Matrix



2.1 Cross-Sectional Alternatives

In addition, each alternative has cross-sectional options that can be applied for each street or to different segments along a street. A total of six distinct cross-sections have been described, as follows:

1. Complete Streets (Figure 5)
2. Complete Streets without Median (Figure 6)
3. On-Street Parallel Parking (Figure 7)
4. On-Street Reverse Angle Parking (Figure 8)
5. Bicycle Boulevard-No Bike Lanes (Figure 9)
6. Bicycle Boulevard with Bike Lanes (Figure 10)

Over 3,300 feet of new streets, and over 6,600 linear feet of new street frontage, are proposed in the three alternatives evaluated in this report.

Figure 5: Complete Streets Cross Section

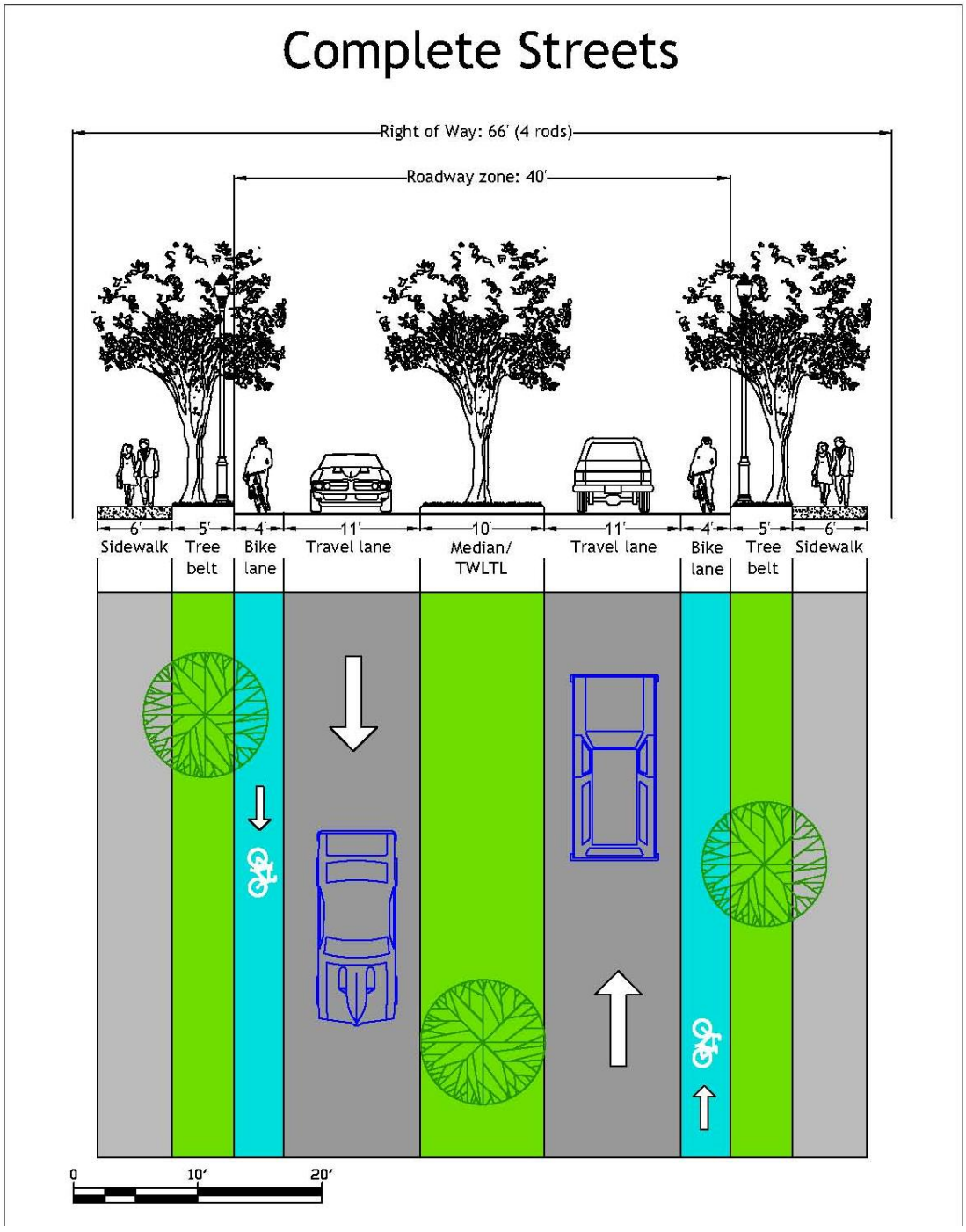


Figure 6: Complete Streets without Median

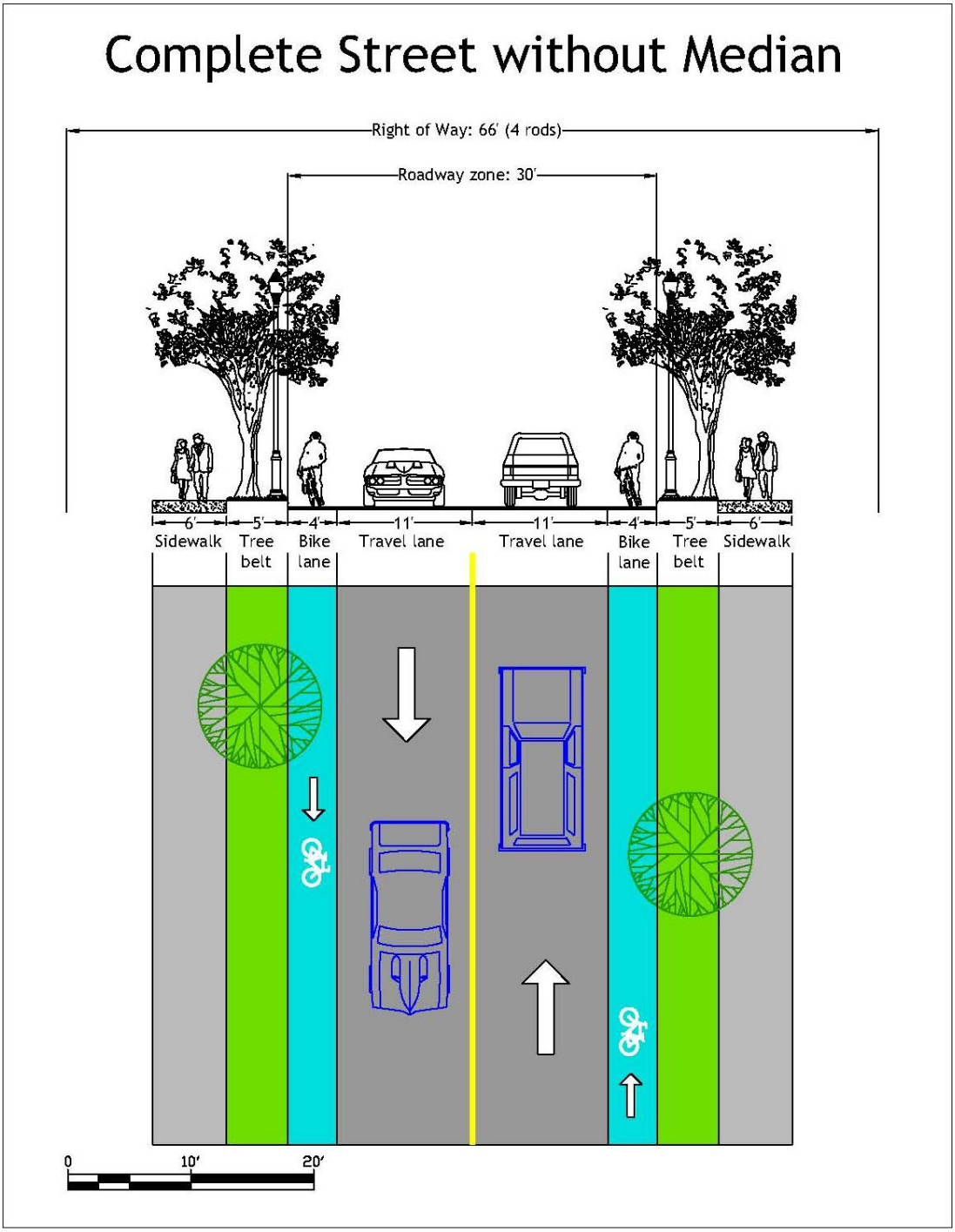


Figure 7: On-Street Parallel Parking

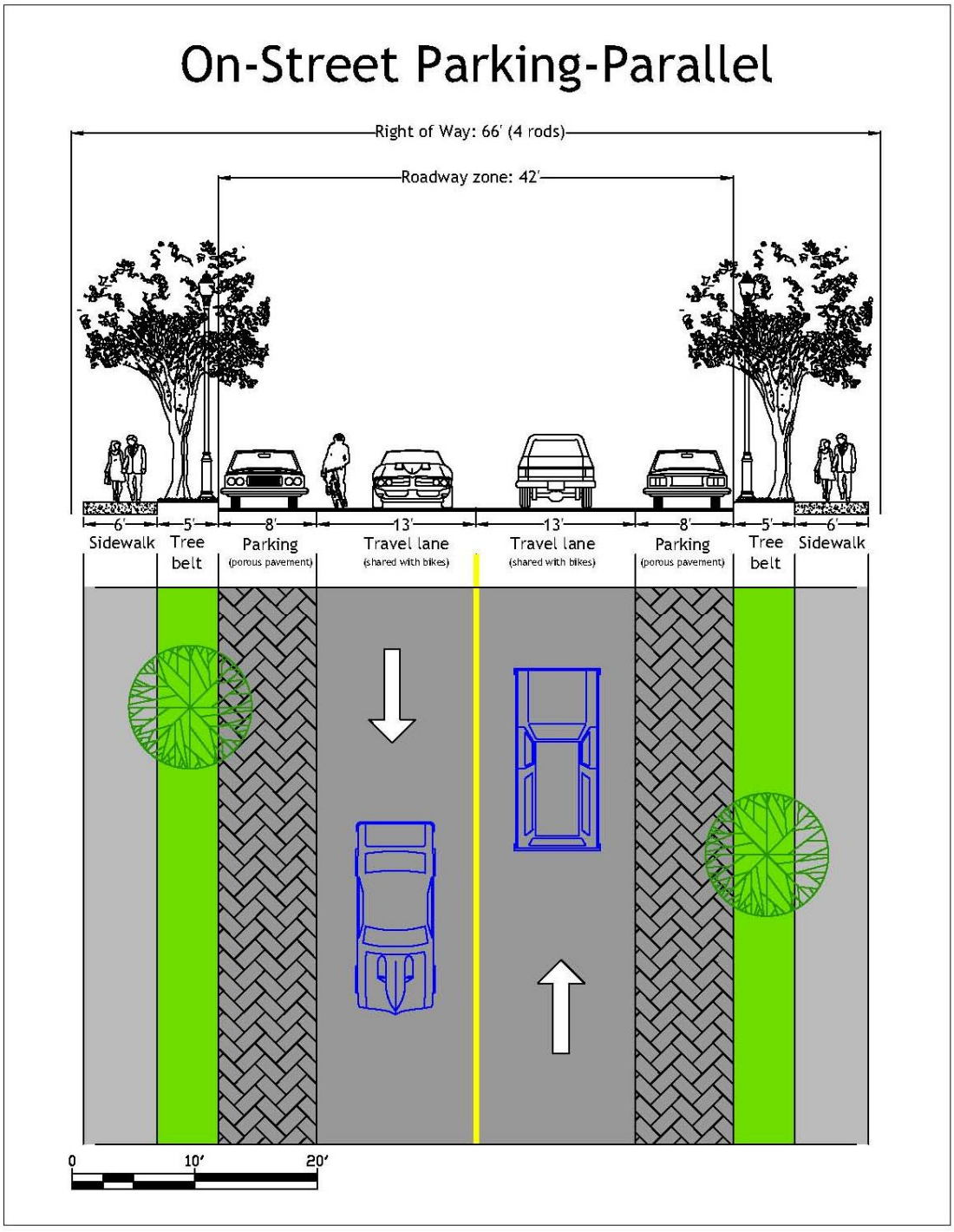


Figure 8: On-Street Reverse Angle Parking

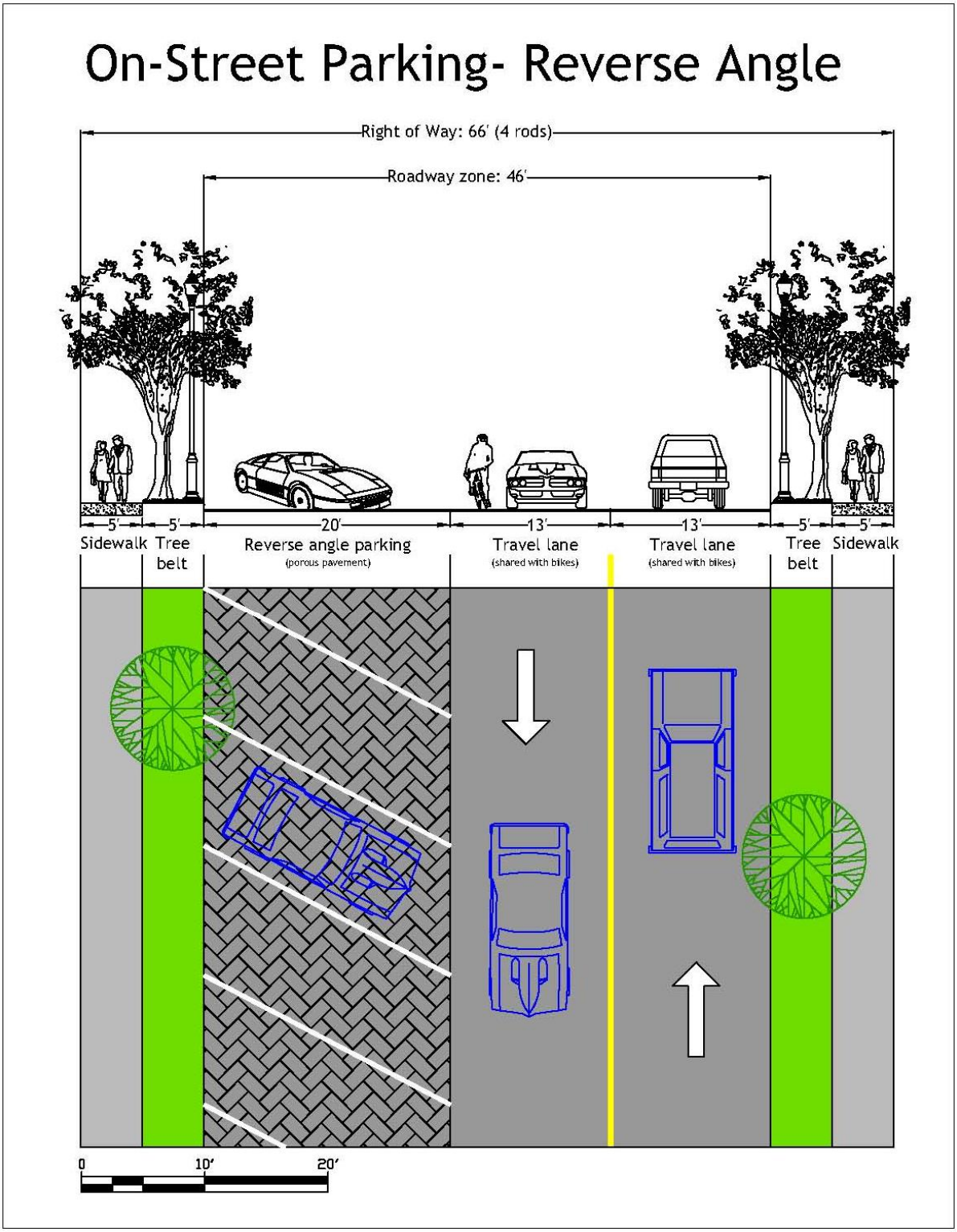


Figure 9: Bicycle Boulevard-No Bike Lane

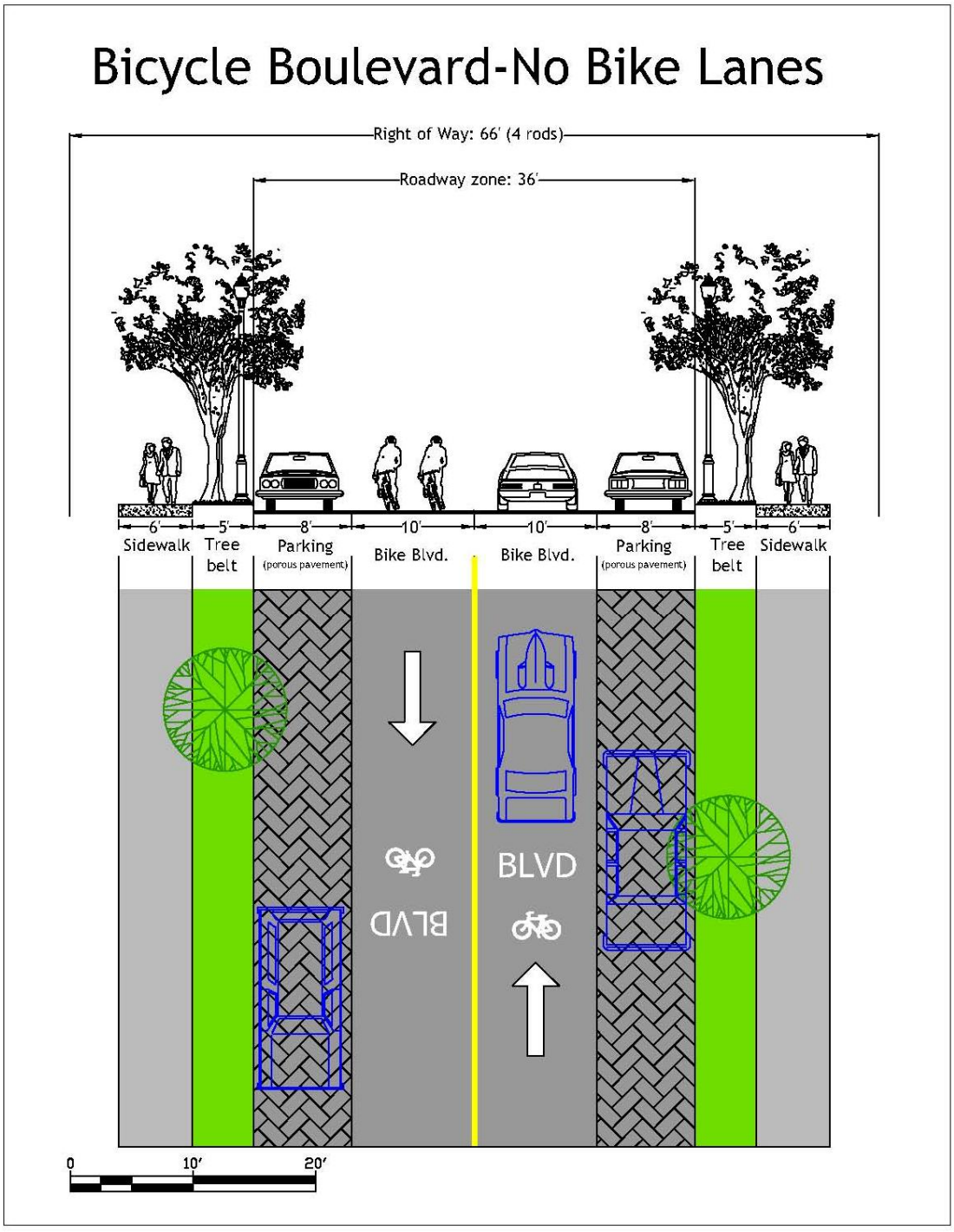
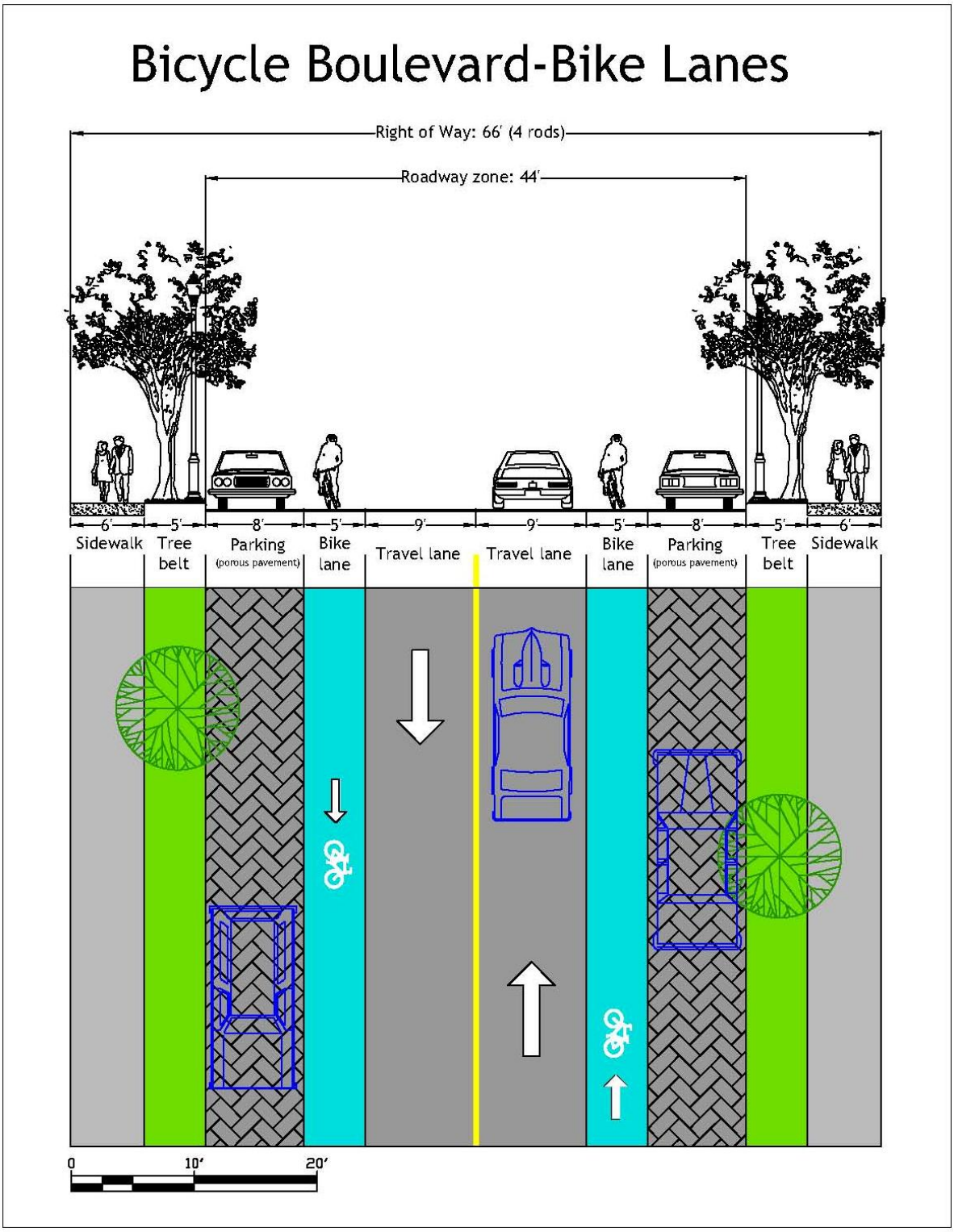


Figure 10: Bicycle Boulevard with Bike Lanes



2.2 Alignment Alternatives

The three alignment alternatives described below were selected by City and CCMPO officials at a workshop held on 15 April 2010. Each alternative is a grid street system representing a high cost-high connectivity approach to access. Each of the three alternatives is identical along several dimensions, including the core street alignment.

Street connections are made to Battery from four Pine Street intersections:

- At Marble Avenue
- At Pine Place
- At Kilburn Street
- At a new intersection aligned with the Bobbin Mill parking aisle.

All intersections at Pine Street would be stop-controlled on the minor approach. Access to the railyard could be achieved via a private street extension from Pine Place (shown in all conceptual alignments) or via an extension from Marble Avenue. The City may decide to emphasize the North/South Connector Street with treatments favoring bicycle-pedestrian travel.

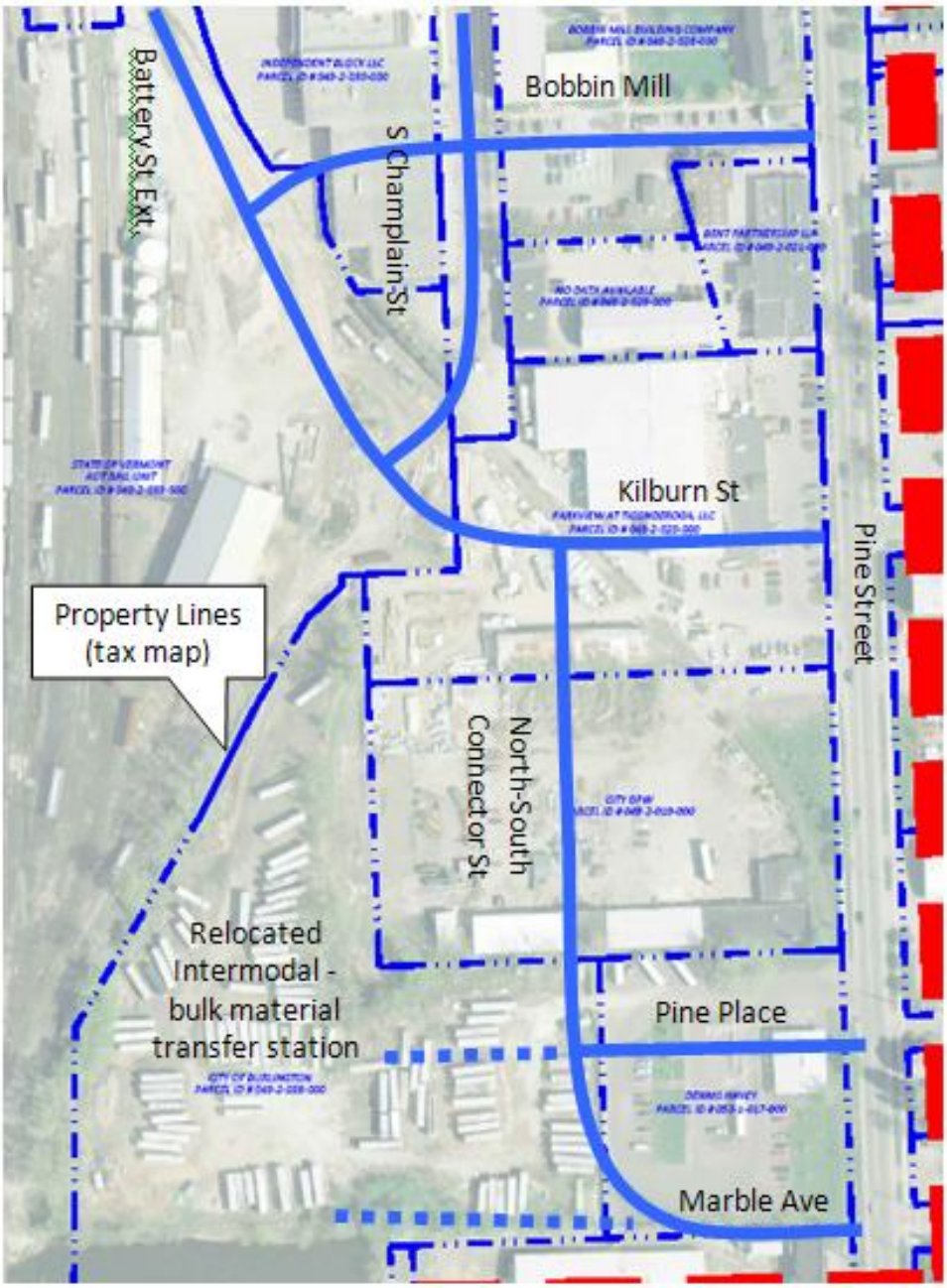
2.2.1 Alternative 1: Battery-to-Kilburn Grid Alignment

The conceptual plan for Alternative 1 is shown in Figure 12. In this alternative, all street alignments are shown in blue and are assumed to have the same speed profile (25 mph). Figure 11 shows one potential cross-sectional treatment for this alternative. An estimated 100 on-street parallel parking spaces would be accommodated along the Battery-to-Kilburn block. No on-street parking would be provided on the other streets given the Complete Street (without Median) cross-sectional treatment.

Figure 11: Potential Cross-Sectional Treatments for Alternative 1

	Street-Block	Cross-Sectional Treatment	Speed Profile
Alternative 1	Battery-to-Kilburn	On-Street Parallel Parking	25 mph
	South Champlain	Complete Street without Median	25 mph
	Bobbin Mill Extension	Complete Street without Median	25 mph
	N-S Connector	Complete Street without Median	25 mph
	Pine Place	Complete Street without Median	25 mph
	Marble	Complete Street without Median	25 mph

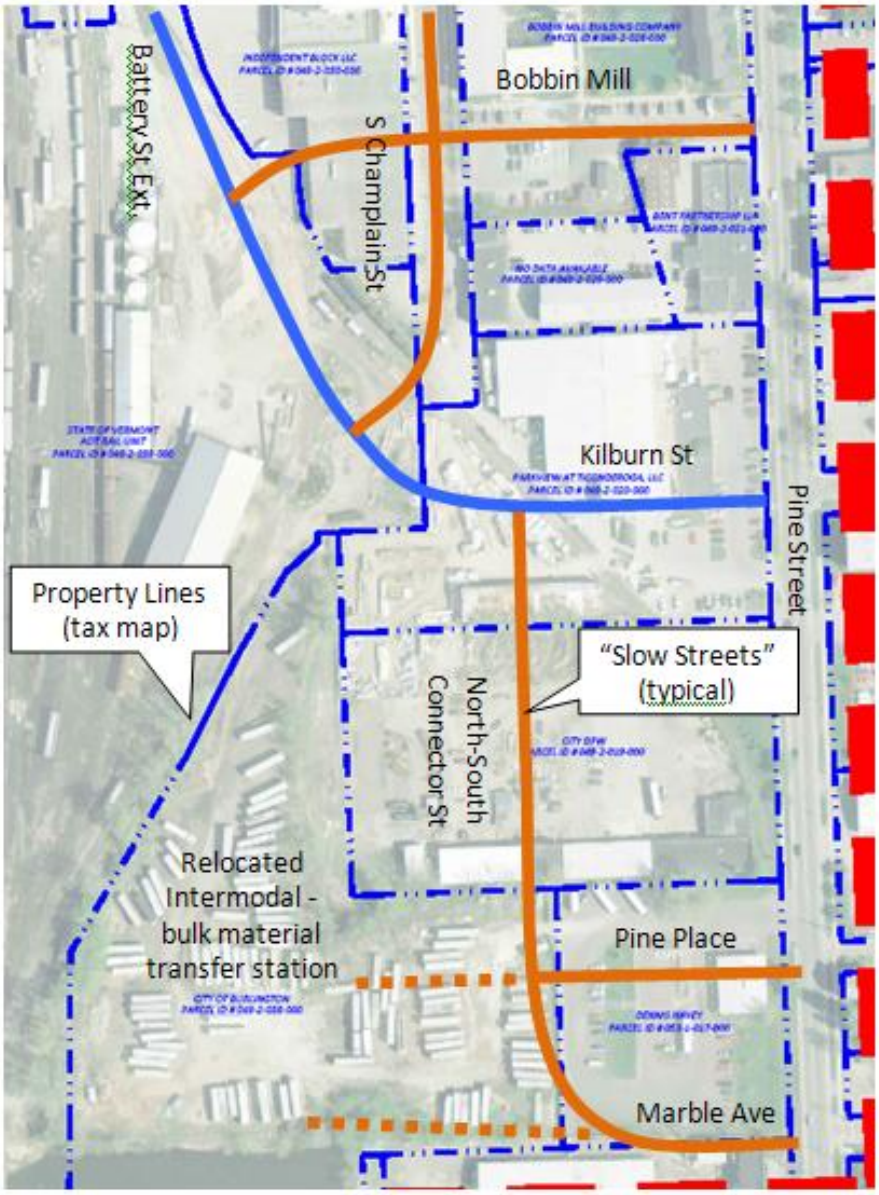
Figure 12: Alternative 1 – Battery-Kilburn Grid Alignment



2.2.2 Alternative 2: Battery-Kilburn with Slow Streets

The conceptual plan for Alternative 2 is shown in Figure 13. This alternative has an identical street alignment to Alternative 1, but incorporates a street hierarchy of collectors and local streets. In Alternative 2, the Kilburn-Battery connection is maintained as a 25 mph collector roadway while the other minor streets are local streets with lower speed profiles due to narrower lanes, on street parking and higher levels of pedestrian and bicycle activity (20 mph). Note that the assumption of a lower speed profiles is partially dependent on the type of adjacent development that occurs, (i.e. those that generate higher street activity).

Figure 13: Alternative 2 –Battery-Kilburn Grid with Slow Streets



As with Alternative 1, Alternative 2 provides an opportunity to build different cross-sections to each street, as shown in Figure 14. This street plan would provide approximately 150 on-street parallel parking spaces along Battery-to-Kilburn, South Champlain, and along the Bobbin Mill Extension.

Figure 14: Potential Cross-Sectional Treatments for Alternative 2

	Street-Block	Cross-Sectional Treatment	Speed Profile
Alternative 2	Battery-to-Kilburn	On-Street Parallel Parking	25 mph
	South Champlain	Bicycle Boulevard	<=25 mph
	Bobbin Mill Extension	Bicycle Boulevard	<=25 mph
	N-S Connector	Complete Street	25 mph
	Pine Place	Complete Street without Median	<=25 mph
	Marble	Complete Street without Median	<=25 mph

2.2.3 Alternative 3: Multi-Modal

Alternative 3 (Figure 15) maintains consistency with the street alignments proposed for Alternatives 1 and 2, but incorporates significant considerations for bus transit and potential integration of a streetcar system within the historic rail alignment.

Implicit in Alternative 3 is an emphasis on bicycle and pedestrian modes. Unlike Alternatives 1 and 2, this alternative specifies Battery-to-Kilburn as a lower speed Bicycle Boulevard. High quality pedestrian facilities along the Battery-to-Kilburn alignment would connect directly to sidewalks leading to the waterfront and to the Burlington Bike Path. Other streets in Alternative 3 would be posted at 25 mph but, as with the other alternatives, could have a variety of cross-sectional treatments (see Figure 16).

Due to its high emphasis on non-automobile facilities, a10% reduction in traffic is assumed in the traffic modeling.

Consideration of a North-South Waterfront Transit Alignment

An important element of Alternative 3 is incorporation of a north-south transit service, shown as a dashed line in Figure 15. The concept of a north-south transit service extending along the waterfront has been considered in a series of planning, scoping, and design studies along the Burlington Waterfront[1].

While this service might be provided by conventional transit bus, such as what CCTA operates, the service could be provided with alternative vehicles that are appropriately sized to the market for north-south waterfront travel. It may be possible to accommodate an alternative vehicle in off-street alignments. However, the conceptual plan for Alternative 3 assumes that this transit vehicle would use the street system.

Potential Intermodal Center

Until recently, a Greyhound/Vermont Transit station occupied the Havey parcel at the southern end of the project area. This parcel could house an intermodal facility that could interact with several other modes:

1. A Pine-to-Battery streetcar alignment.
2. The north-south waterfront transit system.
3. Other CCTA service in the corridor.
4. Bicycle service, storage, rental.

The Havey parcel is well located for this function. An option for Alternative 3 would be to adaptively re-use the building on the Havey parcel for the functions described above. Further, the Havey parcel fronts on Pine Street and the recommended streetcar alignment recommended by the Burlington Streetcar study (see below). Assuming that the existing building could be renovated to suit a north-south transit service along with bicycle locker facilities and other transportation services, a lump sum estimate of $150,000 would be assumed for this purpose.

Consideration of a Streetcar Alignment

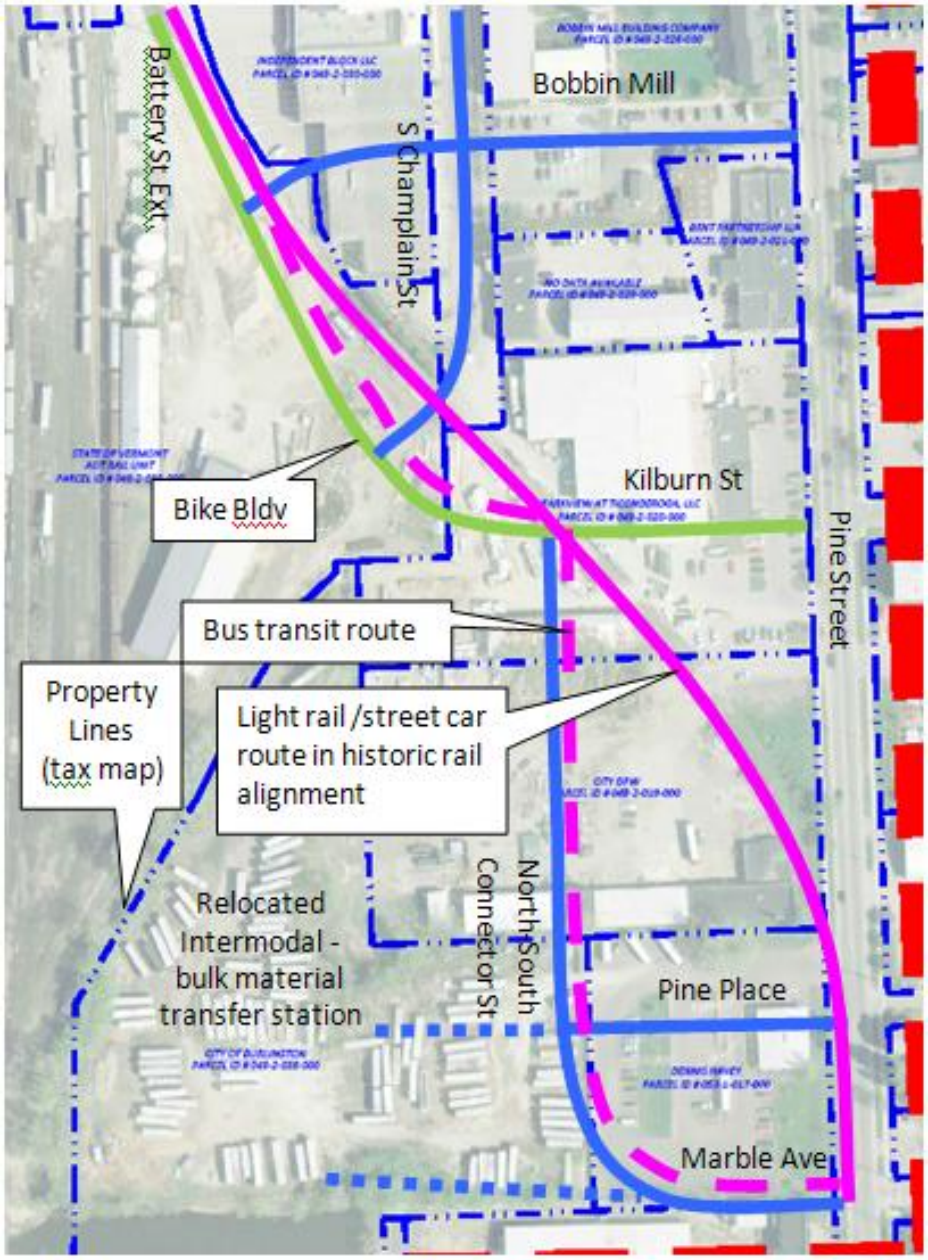
The streetcar alignment shown in Figure 15 capitalizes on the existing historic rail alignment running from Pine Street in a northwesterly direction toward Battery Street. This alignment does not match the historic alignments (ca 1922) of Burlington Streetcars as depicted in the Burlington Streetcar Briefing Report prepared for the Burlington DPW. Nor does this alignment exactly match that suggested within the same report and described as follows:

[1] These include the Lower College Street Design Project and the Waterfront North scoping study.

"The potential development pattern suggests a possible streetcar system connecting these development areas in the inverted "L" pattern. The route would begin at the South End Transit Center, continue in the Pine Street corridor to the waterfront area and then turn to the east to connect with the downtown, UVM and FAHC, and possibly to an Exit 14 park-and-ride lot depending on its route."[1]

The potential Pine-to-Battery streetcar alignment is intended to be suggestive of multimodal opportunities within Alternative 3. Any further planning of this concept should be coordinated with the ongoing Burlington Streetcar study.

Figure 15: Alternative 3 – Multi-Modal



[1] Briefing Report: The Potential for Enhanced Transit Service in Burlington, DRAFT. 5 January 2010.

Figure 16: Potential Cross-Sectional Treatments for Alternative 3

	Street-Block	Cross-Sectional Treatment	Speed Profile
Alternative 3	Battery-to-Kilburn	Bicycle Boulevard	<=25 mph
	South Champlain	On-Street Parallel Parking	25 mph
	Bobbin Mill Extension	On-Street Parallel Parking	25 mph
	N-S Connector	Complete Street	25 mph
	Pine Place	Complete Street withouth Median	25 mph
	Marble	Complete Street withouth Median	25 mph

This street plan would provide approximately 150 on-street parallel parking spaces along Battery-to-Kilburn, South Champlain, and along the Bobbin Mill Extension.

2.3 Commonalities of the Alignment Alternatives

Each of the three final alternatives evaluated in this project have several important common features. While cross-sectional treatments can vary from place to place, the overall alignments of new streets are identical. As a result, several other items are also common to all alternatives:

1. Right-of-way acquisition. Each of the three access alternatives has significant right of way impacts in the study area. New street alignments are assumed to have 66-foot rights-of-way, matching those of Pine Street and South Champlain Street.

   Where streets are aligned along existing property boundaries, it is assumed that half of the right-of-way is supplied by each of the two adjacent properties. Right-of-way acquisition costs are based on the per acre assessed valuation of land from the City of Burlington Grand List. The affected properties are shown in Figure 17.

Figure 17: Estimated Right-of-Way Acquisition for All Alternatives

Impacted Parcel	New Street	Linear Feet of New Street	Acquisition Area (sf)	ROW Cost
Bobbin Mill	Bobbin Mill Lane	315	20790	$151,858
City of Burlington	Shared Boundary with Havey	295	9735	$0
City of Burlington	N/S Connector	310	20460	$0
Havey	Marble Avenue Extension	260	17160	$25,995
Havey	Shared Boundary with Lasmos	295	9735	$14,747
Havey	Pine Place Extension	275	18150	$27,495
Independent Food	Bobbin Mill Lane Extension	188	12408	$93,240
Parkview at Ticonderoga (Curtis Lumber)	N/S Connector	130	8580	$96,946
Parkview at Ticonderoga (Curtis Lumber)	Kilburn Street	420	27720	$313,210
State of VT AOT Rail Unit	Battery Street Extension	970	64020	$0
State of VT AOT Rail Unit	South Champlain Extension	160	10560	$0
				$723,492

   The Burlington Street Department property is also affected by a new street referred to herein as the N-S Connector. The conceptual alignments indicate the construction of a new street that would go through the existing Street Department building.

2. Building Acquisition/Demolition: Some recommended street alignments (e.g. Pine Place extension and a new street from S. Champlain to the Battery St. Extension) are only possible if existing buildings are demolished. The cost for building purchase is based on the assessed value of the building from the City of Burlington Grand List. Building demolition is included in each alternative.

Figure 18: Estimated Building Acquisitions Costs or Other Damages for All Alternatives[1]

Impacted Parcel	New Street	Building Acquisition Cost	Other Damages	Building Demolition Cost
Bobbin Mill	Bobbin Mill Lane		$100,000	
City of Burlington	N/S Connector			$20,000
Havey	Pine Place Extension	$186,500		$15,000
Independent Food	Bobbin Mill Lane Extension	$4,186,200		$25,000
		$4,372,700	$100,000	$60,000

3. Municipal infrastructure. It is assumed that stormwater and municipal water and sewer will serve each street in the newly served area. As the street alignments are identical, the municipal infrastructure is identical for each alternative.
4. Permitting. The following are the types of resources that are potentially impacted and may require permits.
   - Flood Zones
   - Archaeological Resources
   - Historic Resources
   - Hazardous Waste Sites
   - Public Lands

   The following permits may need to be acquired for any of the alternatives:
   - Act 250
   - 401 Water Quality
   - 404 Corp of Engineers Permit
   - Stormwater Discharge Permit
5. Intersection costs. A total of seven new intersections are included in the proposed grid street alignments. These intersections are:
   - Pine/Marble
   - Pine/Pine Place
   - Pine Place/N-S Connector (new street)
   - N-S Connector/Kilburn
   - Pine/Kilburn (new 4-leg intersection)
   - S. Champlain/Battery St. Extension
   - Bobbin Extension/Battery St. Extension.

   The costs for curb ramps, lighting, signing, and controlling each intersection are common to all alternatives. The cost of constructing the intersection travel way is incorporated into the linear foot costs of the street cross-section (e.g. see Figure 27-Figure 29).
6. Base Improvements. "Base Improvements" have been assumed for each alternative. These base improvements are:
   a. The road accessing the Vermont Railway commercial yard is private and not open to the public.

[1] A lump sum of $100,000 in damages is assumed for converting the on site Bobbin Mill circulation to a public street.

b. A new parking structure could be sited at the southerly extent of Lower Battery Street, accessible from Lower Battery and/or from South Champlain Streets. A parking structure (see Figure 31) at this location would be consistent with the general development direction established by the City to minimize parking west of the railroad tracks. This proposed structure would be approximately 500 feet, or a 2-minute walk, from Perkins Pier and the Burlington Bike Path. The structure would occupy the triangular footprint of the parking lot currently on the western side of the Independent Food building. Given the site constraints, approximately 70 vehicles could be accommodated per parking level. A 3-level garage would accommodate over 200 vehicles, and could be constructed for an estimated cost of $6.4 million.

c. Appropriately designed sidewalks and pathways would lead from the parking structure to the waterfront area, crossing the railroad tracks along Maple Street.

7. Miscellaneous Costs. Costs such as permit acquisition (1%), engineering design (15%), mobilization (7.5%), construction management and contingency (25%) are common to all alternatives.

3.0 TRANSPORTATION PERFORMANCE OF ALIGNMENT ALTERNATIVES

Each alternative was evaluated for its transportation performance relative to the No Build condition. To evaluate transportation performance a traffic microsimulation model has been developed for the Waterfront South Access project using Paramics (Version 6.6). This model uses a microsimulation method where discrete vehicles are assigned routes based on an estimate of traffic volume from one geographic zone to another. Origins and destinations (OD) to and from each zone are estimated using a variety of methods, and compared against future traffic volumes as provided by the Champlain Parkway FSEIS. Calibration of this model is described in the Task 2 memorandum dated 7 April 2010.

This type of model is well suited to an alternatives analysis. As new roadways and intersections are developed, the model determines the expected new travel flow (where links are added) or change in flow (where lanes or other modifications are made). Other elements of transportation performance such as travel time, queuing, and congestion, are also based on model output.

Transportation performance has been measured using multiple runs of the microsimulation model for the Base Case (2018 PM No Build) and the 3 Alternatives. The following model output is provided:

1. PM Peak Hour Traffic Volumes
2. Origin-Destination Travel Times, Pine Street Corridor and Pine-to-Battery
3. Level of Service
4. Queues

3.1 Peak Hour Traffic Volumes (2018 PM Peak Hour)

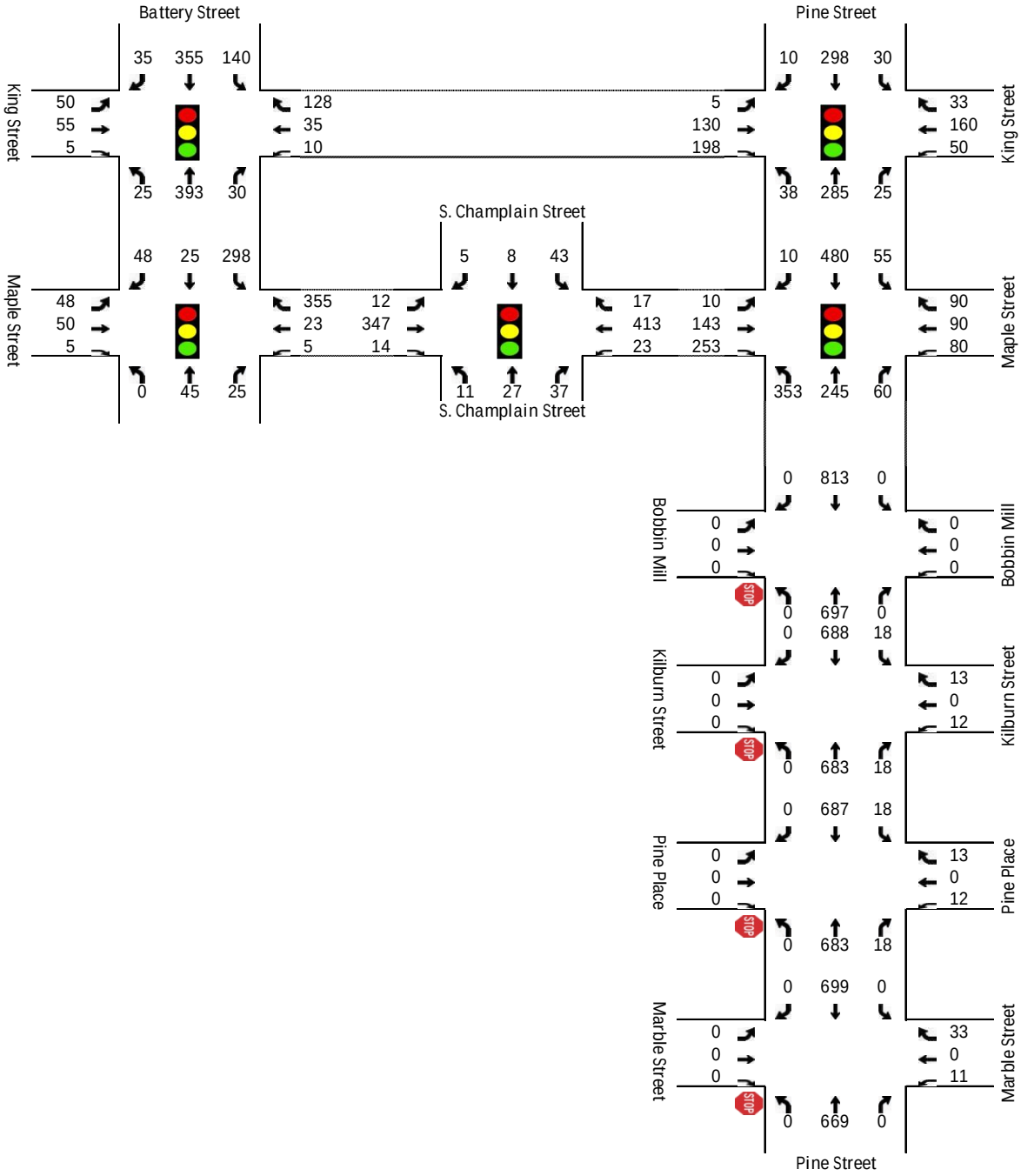
Figure 19-Figure 22 show the estimated traffic volumes for the 2018 PM peak hour for the project area under No Build and Alternative conditions.

For the base case No Build (Figure 19) traffic is calibrated to conditions estimated in the Champlain Parkway FSEIS. As a result, congestion is projected to be similar to that reported in the FSEIS.

Each of the alternatives is successful in inducing significant north-south travel flow, as evidenced by the increased northbound and southbound vehicle flow at Battery/Maple when compared to the No Build. Access to and from Pine Street within each alternative varies. The microsimulation model has limitations in determining the precise turning volumes at each new Pine Street intersection. In reality, the City can encourage or discourage vehicle use at one intersection or another based on key design features that a

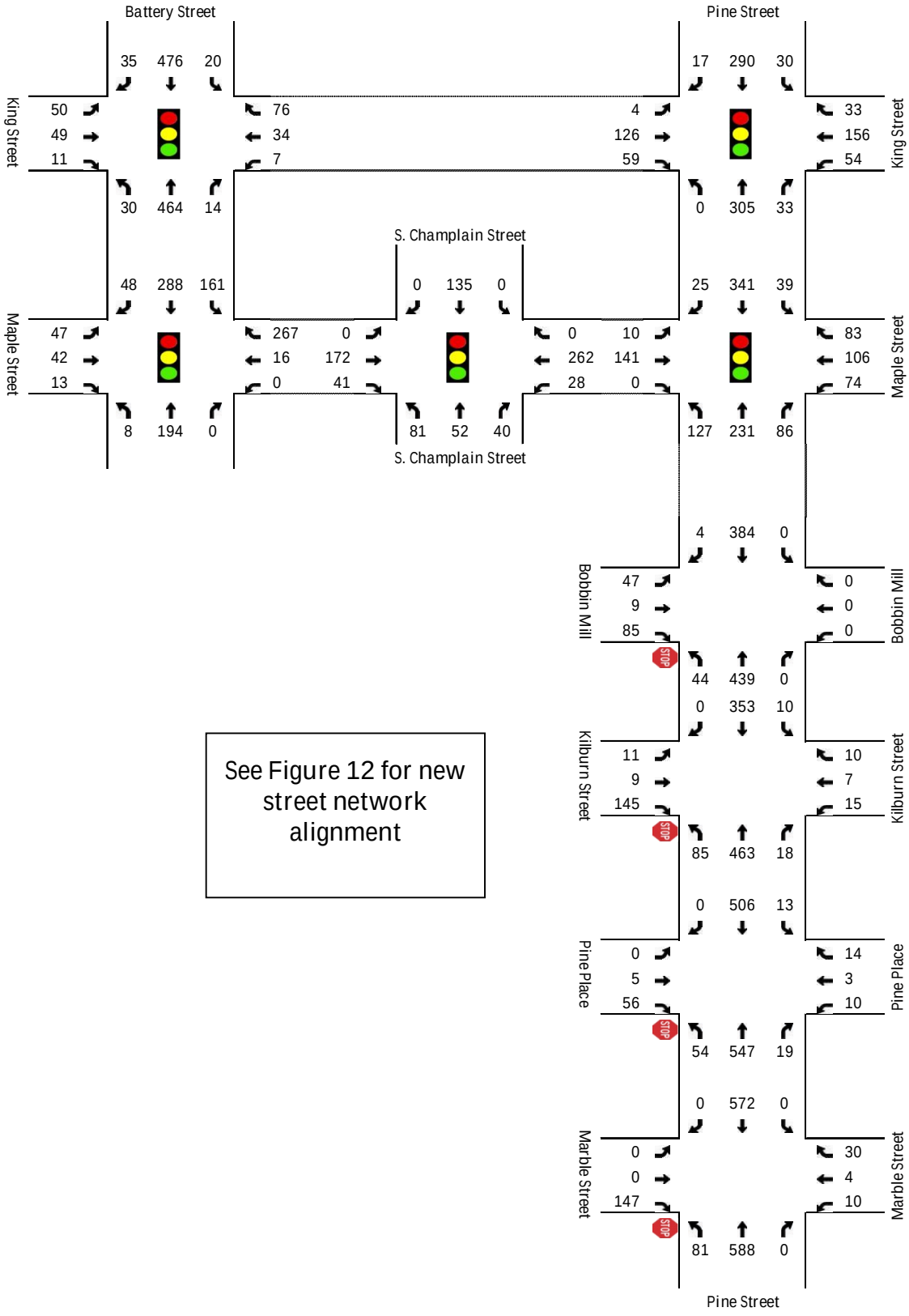
microsimulation model may not be sensitive to. For this reason, the exact Pine Street portal that traffic enters or exits is less critical than the overall southeast-northwest travel flow.

Figure 19: 2018 PM Peak Hour No Build Traffic Volumes for the Project Area



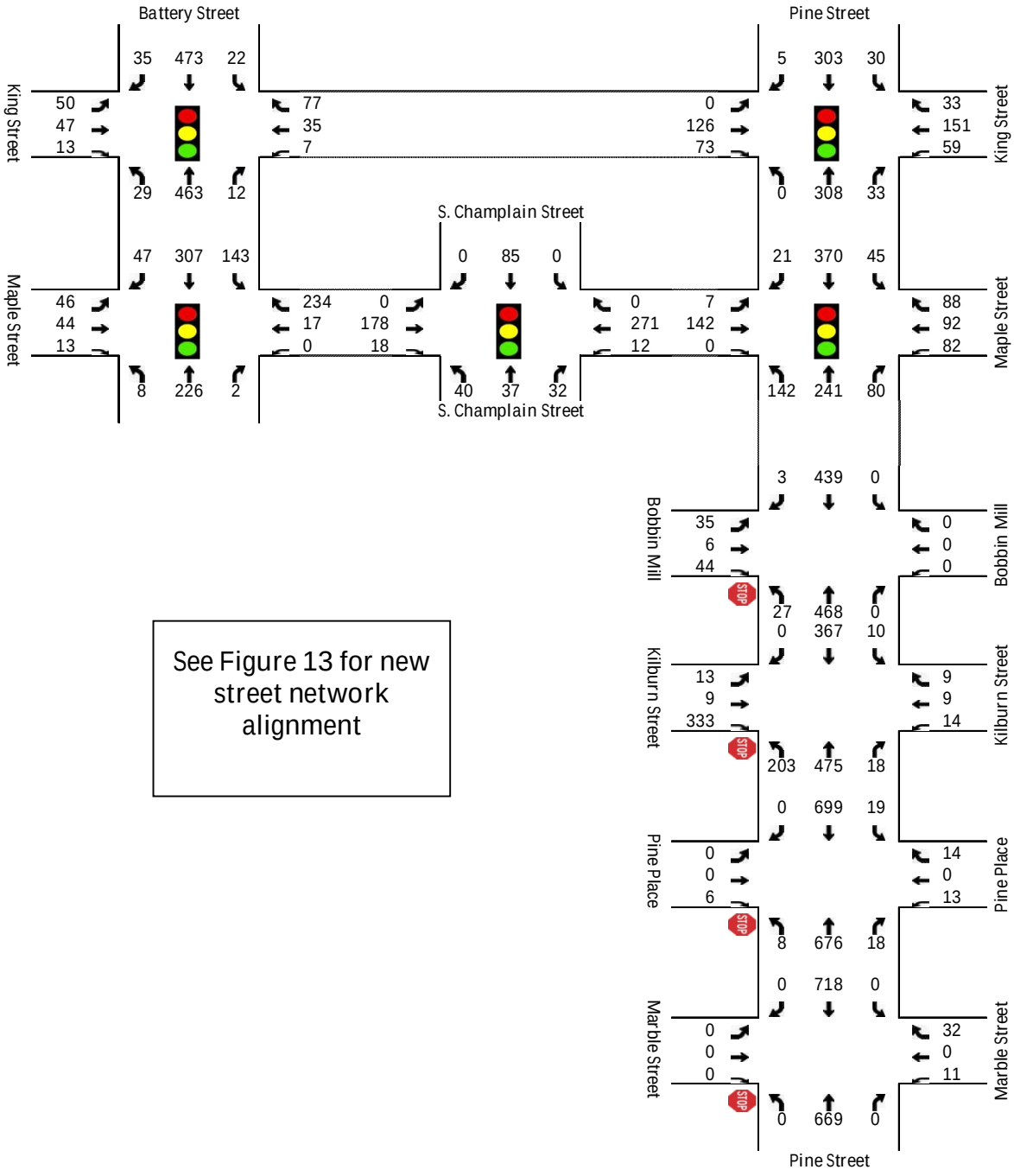
Traffic volumes for Alternative 1 show significant changes (when compared to the No Build) at Pine/King (approximately 150 fewer vehicle trips overall for the intersection), Battery/Maple (approximately 160 more vehicle trips overall for the intersection), Maple/S. Champlain (approximately 150 fewer vehicle trips overall for the intersection), and most significantly at Pine/Maple (approximately 600 fewer vehicle trips overall for the intersection). Access to and from Pine Street is heaviest at Kilburn and Marble.

Figure 20: 2018 PM Peak Hour Traffic Volumes for the Project Area, Alternative 1



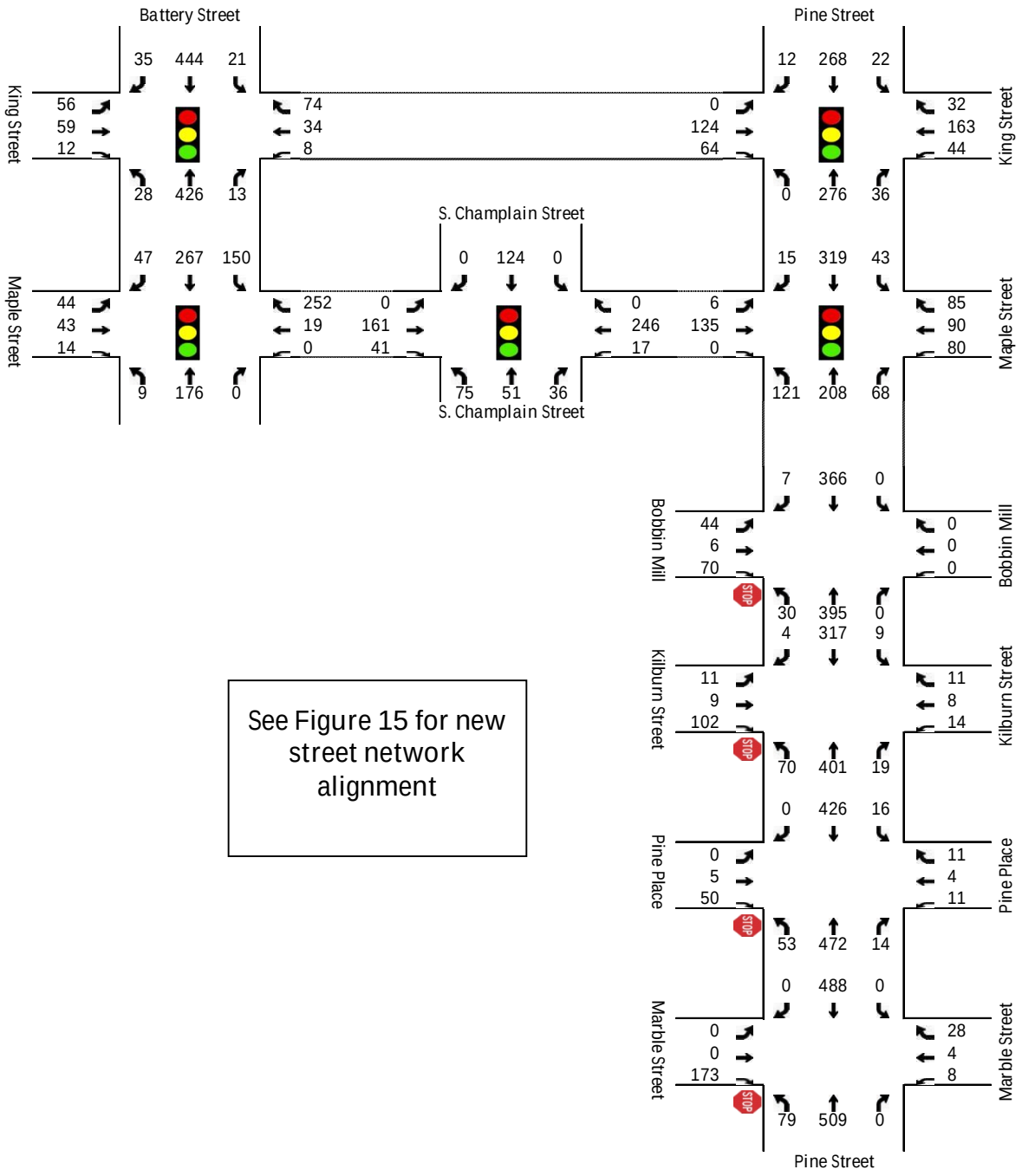
Alternative 2 shows a preferred use of Kilburn Street as the main portal to the Waterfront South area from Pine Street. Intersection-level differences between Alternative 2 and the No Build are very similar to the differences described for Alternative 1 with the exception of Maple/S. Champlain showing a reduction of nearly 300 vehicle trips when compared to the No Build.

Figure 21: 2018 PM Peak Hour Traffic Volumes for the Project Area, Alternative 2



Alternative 3 shows the largest intersection-level volume changes of all alternatives. Travel demand for alternative modes is assumed to be higher for Alternative 3 due to the emphasis on multi-modal investments. Peak hour traffic volume reductions exceed 200 vehicles at Pine/King and Maple/S. Champlain and are nearly 700 vehicles at Pine/Maple when compared to the No Build.

Figure 22: 2018 PM Peak Hour Traffic Volumes for the Project Area, Alternative 3



3.2 Travel Time Comparison

Using the microsimulation model we are able to estimate average travel times for specific origin-destination pairs within the project area. Figure 23 shows two origin-destination pairs that have been compared for each alternative against the Base Case No Build. In one instance, travel time between Pine Street at the southern and the northern portion of the project area is measured. In the other instance,

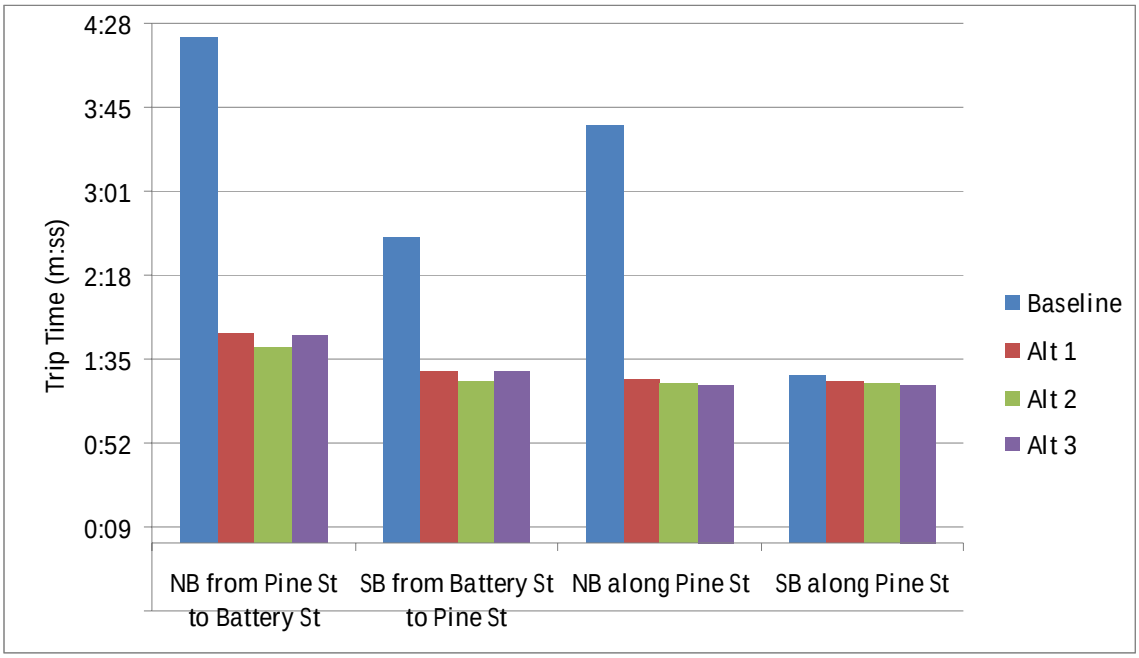
comparison of travel time between southern Pine Street and Battery Street at the northern end of the project area is measured and compared.

Figure 23: End Points of Travel Time Measurements (Model)

Figure 24 shows the differences between the Baseline and the three Alternatives. In three of the four cases, the alternatives are significantly better at reducing travel time and congestion in the project area.

In the fourth instance, southbound along Pine Street, the alternatives are only marginally better than the Baseline. This is due to the relatively few southbound left turns off of Pine Street in the Baseline. Left turns off of Pine Street, in the southbound or northbound direction, can back up thru-traffic due to the lack of left turn storage lanes and left turn phasing at the traffic signals. Translocating northbound left turns to other intersections, as is done in all Alternatives, has a significant impact on northbound travel movement. Since the Alternatives have minimal impact on southbound flow, there is a correspondingly minor impact on southbound travel time.

Figure 24: Travel Time Performance, Base Case (No-build) and Three Alternatives



3.3 Peak Hour Level of Service and Queues (2018 PM Peak Hour)

Figure 25 shows the Level of Service, volume to capacity ratio (v/c), and queue results for the Base Case (No Build) and three alternatives. The results are based on an HCM analysis using the model volumes (Figure 19 - Figure 22) and modeled in Synchro (v7).

Figure 25: Level of Service and Queues, Base Case (No Build) and Three Alternatives[1]

Signalized Intersections	PM Peak Hour 2018 Base					PM Peak Hour 2018 Alt1					PM Peak Hour 2018 Alt2					PM Peak Hour 2018 Alt3				
	LOS	Delay	v/c	50% Queue	95% Queue	LOS	Delay	v/c	50% Queue	95% Queue	LOS	Delay	v/c	50% Queue	95% Queue	LOS	Delay	v/c	50% Queue	95% Queue
Battery & King																				
Overall	A	7.8	0.48			A	4.9	0.39			A	4.9	0.41			A	5.2	0.39		
Eastbound	C	21.4	0.21	16	45	C	20.0	0.22	12	41	B	15.3	0.19	9	32	B	14.8	0.21	11	36
Westbound	B	16.4	0.27	25	m4	A	2.2	0.24	1	m0	A	1.5	0.22	1	m0	A	1.3	0.21	1	m0
Northbound	A	4.1	0.35	33	191	A	3.3	0.40	43	146	A	3.9	0.43	38	167	A	4.1	0.41	34	169
Southbound	A	5.3	0.51	57	178	A	3.9	0.41	54	134	A	4.5	0.44	46	136	A	4.7	0.43	43	126
Battery & Maple																				
Overall	B	11.1	0.43			A	9.3	0.46			B	12.7	0.48			B	14.1	0.47		
Eastbound	B	16.8	0.35	26	65	B	14.0	0.25	20	58	D	35.7	0.62	41	98	D	42.1	0.68	40	96
Westbound	B	16.4	0.29	7	87	B	13.8	0.20	3	62	C	28.2	0.20	7	93	C	28.4	0.22	8	100
Northbound	A	4.8	0.06	5	21	A	5.9	0.20	25	57	A	3.8	0.18	30	61	A	3.6	0.14	23	48
Southbound	A	5.3	0.46	69	25	A	7.1	0.57	5	191	A	4.4	0.44	85	20	A	3.7	0.41	74	23
Pine & King																				
Overall	B	10.3	0.43			B	10.3	0.43			B	10.3	0.43			B	10.3	0.43		
Eastbound	B	15.4	0.50	52	78	B	15.8	0.37	34	79	B	11.4	0.33	16	38	B	11.0	0.32	14	33
Westbound	C	23.7	0.69	65	121	C	20.3	0.64	57	114	B	14.4	0.58	41	86	B	13.9	0.55	40	82
Northbound	A	4.1	0.32	39	m45	A	3.8	0.29	36	m80	A	5.8	0.33	26	m109	A	5.7	0.30	21	m104
Southbound	A	5.8	0.31	43	130	A	5.3	0.31	40	117	A	6.0	0.35	38	114	A	5.6	0.30	32	100
Pine & Maple																				
Overall	E	62.1	1.00			B	11.2	0.52			A	9.0	0.57			A	9.9	0.49		
Eastbound	C	27.8	0.69	76	#250	B	13.7	0.26	32	76	B	13.5	0.37	26	67	B	10.8	0.24	22	58
Westbound	E	71.5	0.90	68	#228	B	16.7	0.46	48	122	B	16.4	0.62	36	#128	B	13.3	0.42	31	91
Northbound	F	>100	1.04	~240	#491	B	11.1	0.56	71	175	A	7.9	0.55	54	#169	B	10.4	0.54	50	132
Southbound	A	6.7	0.54	71	150	A	6.9	0.45	55	94	A	4.3	0.43	39	62	A	6.6	0.46	36	58

Unsignalized Intersections	PM Peak Hour 2018 Base		PM Peak Hour 2018 Alt1		PM Peak Hour 2018 Alt2		PM Peak Hour 2018 Alt3	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Pine & Kilburn								
Eastbound	A	<1	B	15	D	26	B	13
Westbound	D	28	D	28	F	>100	C	21
Pine & Marble								
Eastbound	A	8	A	8	A	8	A	8
Westbound	C	21	D	29	C	21	C	23

Using conventional Highway Capacity Manual (HCM) procedures, the analysis indicates that all alternatives outperform the base case (no-build), particularly in regard to traffic operations at the Pine/Maple intersection. HCM methods likely understate the improvements attributable to the alternatives as significant traffic interactions between intersections are not accounted for.

4.0 Cost Estimates

For cost estimating purposes, the per foot construction cost of each cross-section has been estimated, using the most recent VTrans unit bid prices. Estimates are shown in Figure 26. These estimates include all cross-sectional transportation elements such as sidewalks, curbing, bicycle lanes, on-street parking, medians, and travel lanes. Costs associated with stormwater collection, municipal water and sewer, right-of-way, design, permitting, and contingency are above and beyond the linear foot estimates shown in Figure 26 and are described in detail below.

Costs for the parking structure, estimated to be $6.4 million, and for renovating the intermodal building on the Havey parcel ($150,000) are in addition to the cost estimates presented below.

[1] In interpreting the queue results, the following information is important. The 50th percentile queue length is the maximum back of queue for a typical cycle; the 95th percentile queue is the maximum back of queue under 95th percentile traffic flow. The "#" and "~" signs indicate that overcapacity queuing may occur. The "m" indicates that an upstream signal meters volume at this intersection.

Figure 26: Estimated Full Depth Construction Costs for Each Cross-Sectional Alternative

	Cost per Linear Foot of X-Section
Complete Street	$535
Complete Street w/o Median	$499
On-Street Parallel Parking	$558
On-Street Reverse Angle Parking	$578
Bicycle Boulevard	$529
Bicycle Boulevard-Bike Lane	$568

Cost estimates for the street/sidewalk components of each Alternative are shown in Figure 27 - Figure 29.

Figure 27: Street/Sidewalk Construction Cost Estimates for Alternative 1

	Street-Block	Cross-Sectional Treatment	LF of New Street	Street/Sidewalk Costs
Alternative 1	Battery-to-Kilburn	On-Street Parallel Parking	1390	$776,000
	South Champlain	Complete Street without Median	160	$80,000
	Bobbin Mill Extension	Complete Street without Median	503	$251,000
	N-S Connector	Complete Street without Median	735	$367,000
	Pine Place	Complete Street without Median	275	$137,000
	Marble	Complete Street without Median	260	$130,000
				$1,741,000

Figure 28: Street/Sidewalk Construction Cost Estimates for Alternative 2

	Street-Block	Cross-Sectional Treatment	LF of New Street	Street/Sidewalk Costs
Alternative 2	Battery-to-Kilburn	On-Street Parallel Parking	1390	$776,000
	South Champlain	Bicycle Boulevard	160	$85,000
	Bobbin Mill Extension	Bicycle Boulevard	503	$266,000
	N-S Connector	Complete Street	735	$393,000
	Pine Place	Complete Street without Median	275	$137,000
	Marble	Complete Street without Median	260	$130,000
				$1,787,000

Figure 29: Street/Sidewalk Construction Cost Estimates for Alternative 3

	Street-Block	Cross-Sectional Treatment	LF of New Street	Street/Sidewalk Costs
Alternative 3	Battery-to-Kilburn	Bicycle Boulevard	1390	$735,000
	South Champlain	On-Street Parallel Parking	160	$89,000
	Bobbin Mill Extension	On-Street Parallel Parking	503	$281,000
	N-S Connector	Complete Street	735	$393,000
	Pine Place	Complete Street withouth Median	275	$137,000
	Marble	Complete Street withouth Median	260	$130,000
				$1,765,000

Figure 30 provides the estimated construction costs for the three alternatives inclusive of:

- Intersection costs;

- Municipal infrastructure costs (water, sewer, stormwater);
- Demolition and damages;
- ROW acquisition;
- Building acquisition;
- Mobilization;
- Engineering design and construction management;
- Permits;
- Contingency.

Figure 30: Estimated Construction Costs for Three Alternatives

	Alternative 1	Alternative 2	Alternative 3
Street/Sidewalk Costs	$1,741,000	$1,787,000	$1,765,000
Intersection Costs	$100,000	$100,000	$100,000
Municipal Infrastructure Costs	$1,680,000	$1,680,000	$1,680,000
Demolition of Existing Facilities/Damages	$160,000	$160,000	$160,000
ROW Acquisition Cost	$720,000	$720,000	$720,000
Building Acquisition/Renovation	$4,372,700	$4,372,700	$4,522,700
Mobilization/Demobilization (7.5%)	$660,000	$660,000	$670,000
PE/CE (15%)	$1,320,000	$1,320,000	$1,340,000
Permits (1%)	$90,000	$90,000	$90,000
Contingency (25%)	$2,190,000	$2,200,000	$2,240,000
	$13,033,700	$13,089,700	$13,287,700

Due to the high level of comparability among the three alternatives, the cost estimates are similar, around $15.5 million. A key assumption in the cost estimation is that no right-of-way costs would be incurred on the State of Vermont property (currently leased by Vermont Railway) in creating the Battery-to-Kilburn alignment.

5.0 PROJECT SEQUENCING

Five project phases are recommended to implement any of the final three alternatives described above:

- Phase 1: Access to Vermont Railway Commercial Yard from Pine Street (Figure 31);
- Phase 2: Battery-to-Kilburn Connection (Figure 33);
- Phase 3: North-South Connector (Figure 35);
- Phase 4: South Champlain Extension
- Phase 5: Bobbin Mill Extension

5.1 Phase 1: Access to Vermont Railway Commercial Yard from Pine Street

Phase 1 is designed to address a key transportation problem of commercial deliveries, which currently use residential streets north of the study area to access the Vermont Railway commercial yard from Battery Street. Phase 1 would provide a commercial vehicle access to the railyard from Pine Street. Phase 1, particularly the option utilizing a Marble Street extension, would be a low cost alternative that the City may fund with local dollars.

Figure 31 shows two options for accessing the Vermont Railway commercial yard from Pine Street: via Marble Avenue or Pine Place. Both access points create 4-way intersections at Pine Street along the frontage of the Havey parcel. The Marble Avenue option has its alignment closely parallel with the parcel's southern boundary, and unlike the Pine Place alignment would not require purchase or condemnation of the former bus terminal building.

Estimated construction costs of Phase 1 are shown in Figure 32. The cost estimates assume municipal infrastructure would be extended for this short street segment, but the city may decide to forgo this investment in order to expedite the roadway connection to the commercial yard. A Complete Streets cross-section is assumed for all phases, which represents the median cost of all cross sectional alternatives considered.

Figure 31: Recommended Phase 1 Waterfront South Access Development

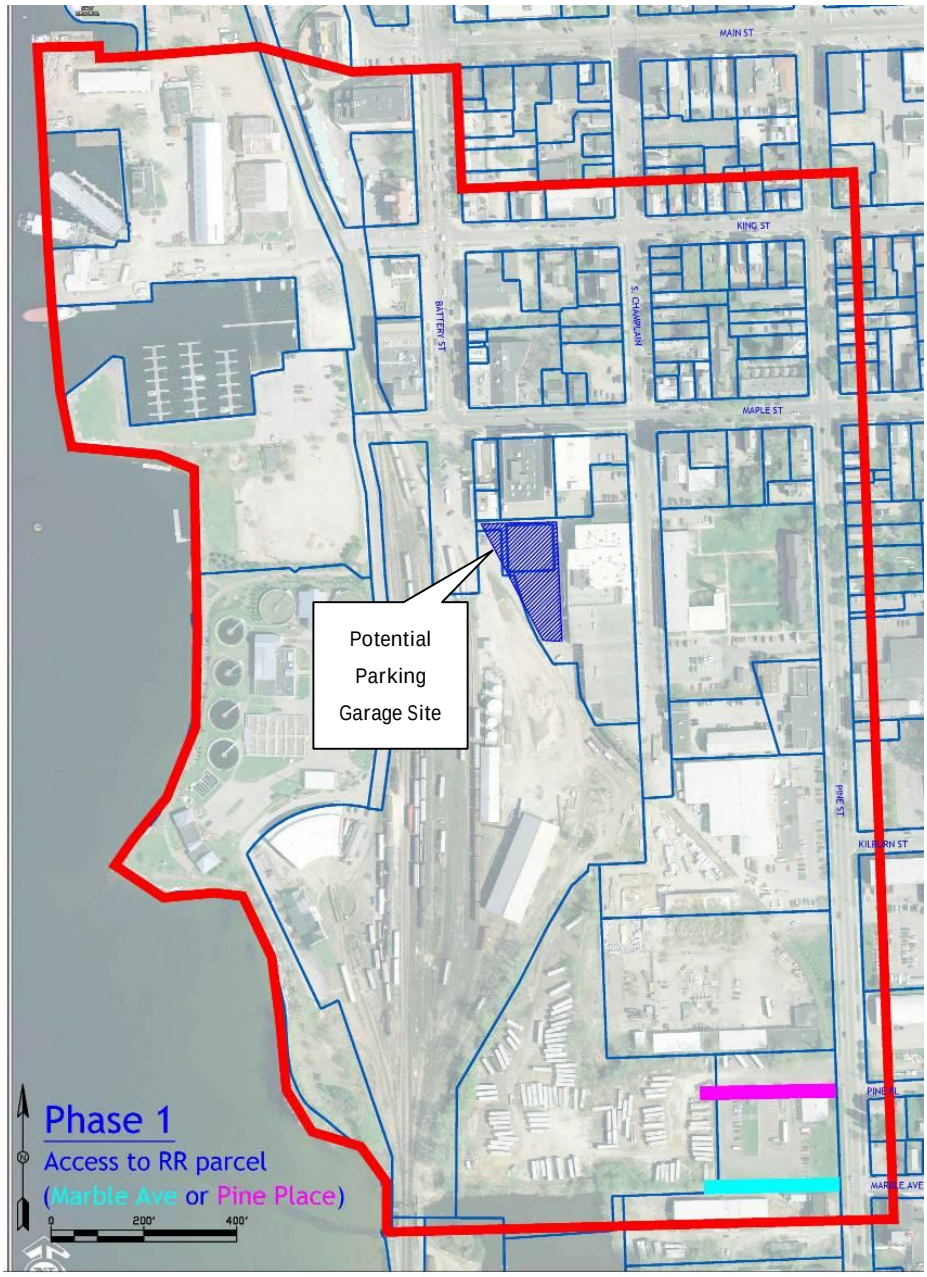


Figure 32: Estimated Costs of Phase 1 Construction

	Phase 1 (Marble)	Phase 1 (Pine Place)
Street/Sidewalk Costs	$139,000	$147,000
Intersection Costs	$10,600	$10,600
Municipal Infrastructure Costs	$132,000	$139,000
Demolition of Existing Facilities/Damages	$0	$15,000
ROW Acquisition Cost	$26,000	$27,000
Building Acquisition	$0	$186,500
Mobilization/Demobilization (7.5%)	$20,000	$40,000
PE/CE (15%)	$50,000	$80,000
Permits (1%)	$3,000	$10,000
Contingency (25%)	$80,000	$130,000
	$460,600	$785,100

5.2 Phase 2: Battery-to-Kilburn Connection

Figure 33 shows the recommended Phase 2, which connects Battery Street with Kilburn Street. This street connection represents a sizable increase in construction costs (Figure 34), but generates proportionate transportation benefits.

Figure 33: Recommended Phase 2 Waterfront South Access Development – Battery-to-Kilburn Connection

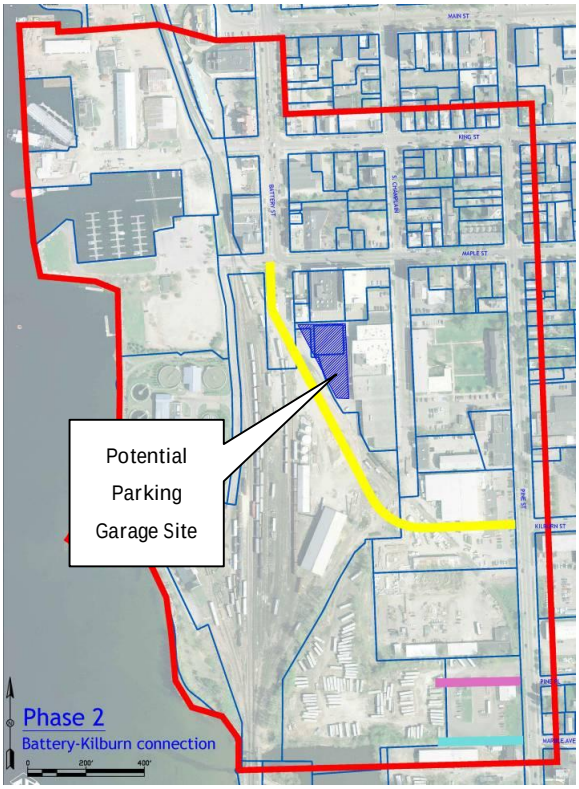


Figure 34: Estimated Costs of Phase 2 Construction

	Phase 2
Street/Sidewalk Costs	$744,103
Intersection Costs	$23,600
Municipal Infrastructure Costs	$703,411
Demolition of Existing Facilities/Damages	$0
ROW Acquisition Cost	$1,002,273
Building Acquisition	$0
Mobilization/Demobilization (7.5%)	$190,000
PE/CE (15%)	$370,000
Permits (1%)	$20,000
Contingency (25%)	$620,000
	$3,673,387

5.3 Phase 3: North-South Connector

Phase 3 (Figure 35) connects Phase 1 and Phase 2, providing another connection between Pine and Battery and opening up more street frontage along a new street parallel to Pine Street. The Phase 3 alignment progresses across the Burlington Street Department property and would intersect with the historic building. Phase 3 would need to be constructed to avoid mapped hazardous sites on this property.

Estimated costs for Phase 3 are shown in Figure 36.

Figure 35: Recommended Phase 3 Waterfront South Access Development – North-South Connector

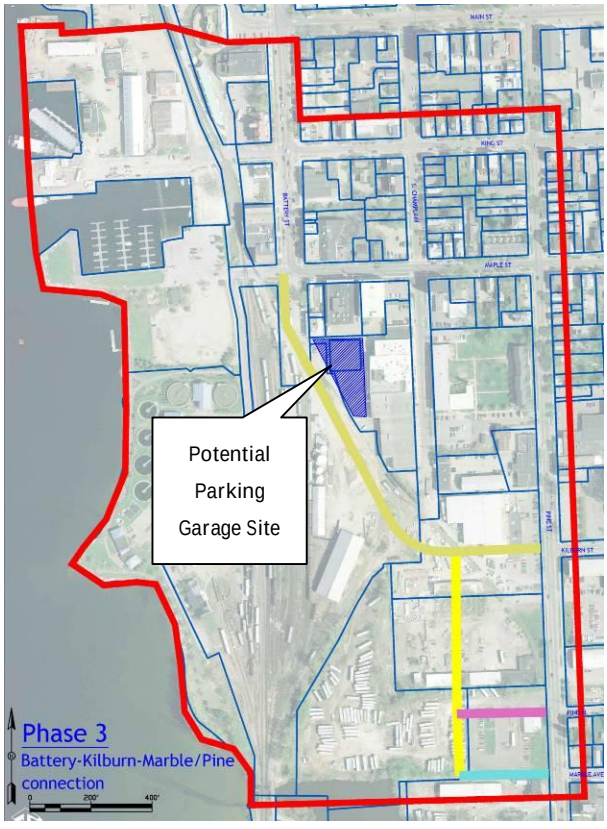


Figure 36: Estimated Costs of Phase 3 Construction

	Phase 3
Street/Sidewalk Costs	$393,000
Intersection Costs	$23,200
Municipal Infrastructure Costs	$370,000
Demolition of Existing Facilities/Damages	$20,000
ROW Acquisition Cost	$112,000
Building Acquisition	$0
Mobilization/Demobilization (7.5%)	$70,000
PE/CE (15%)	$140,000
Permits (1%)	$10,000
Contingency (25%)	$230,000
	$1,368,200

5.4 Phase 4: South Champlain Connection

Phase 4 connects South Champlain into the prior phases (Figure 37). As this phase involves a short street segment and involves no ROW or building acquisition, the estimated costs are relatively low (Figure 38).

Figure 37: Recommended Phase 4 Waterfront South Access Development – South Champlain Connection

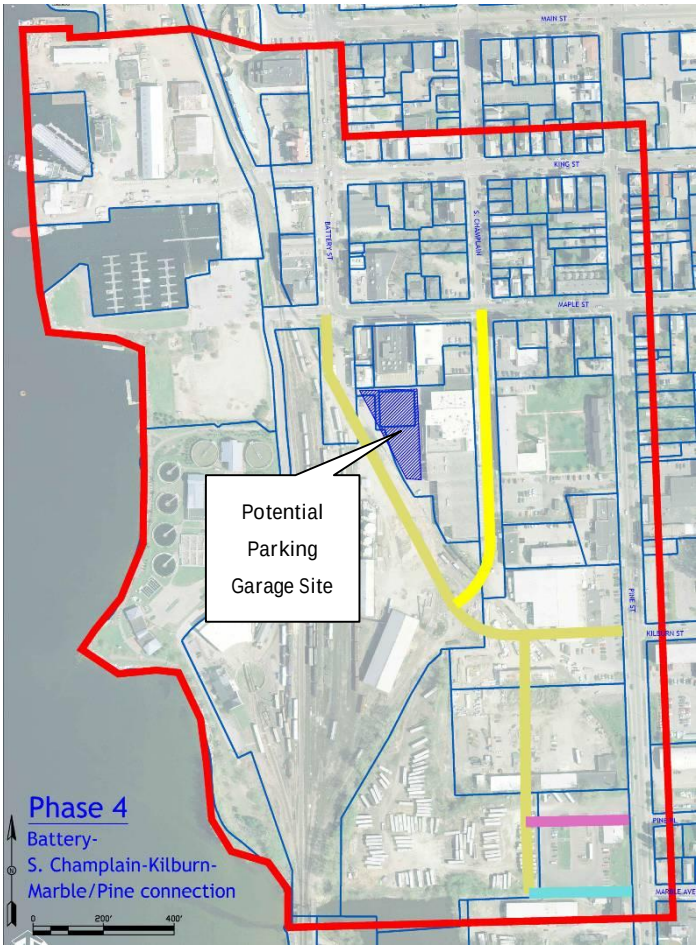


Figure 38: Estimated Costs of Phase 4 Construction

	Phase 4
Street/Sidewalk Costs	$86,000
Intersection Costs	$17,800
Municipal Infrastructure Costs	$82,000
Demolition of Existing Facilities/Damages	$0
ROW Acquisition Cost	$0
Building Acquisition	$0
Mobilization/Demobilization (7.5%)	$10,000
PE/CE (15%)	$30,000
Permits (1%)	$0
Contingency (25%)	$50,000
	$275,800

5.5 Phase 5: Bobbin Mill Extension

Phase 5 creates a new east-west street aligned approximately within the existing parking lot of the Bobbin Mill, intersecting South Champlain at a 4-way intersection, and T-ing on the Battery Street Extension (Figure 39). This final phase has higher costs of right-of-way and building acquisition (Figure 40).

Figure 39: Recommended Phase 5 Waterfront South Access Development – Bobbin Mill Extension

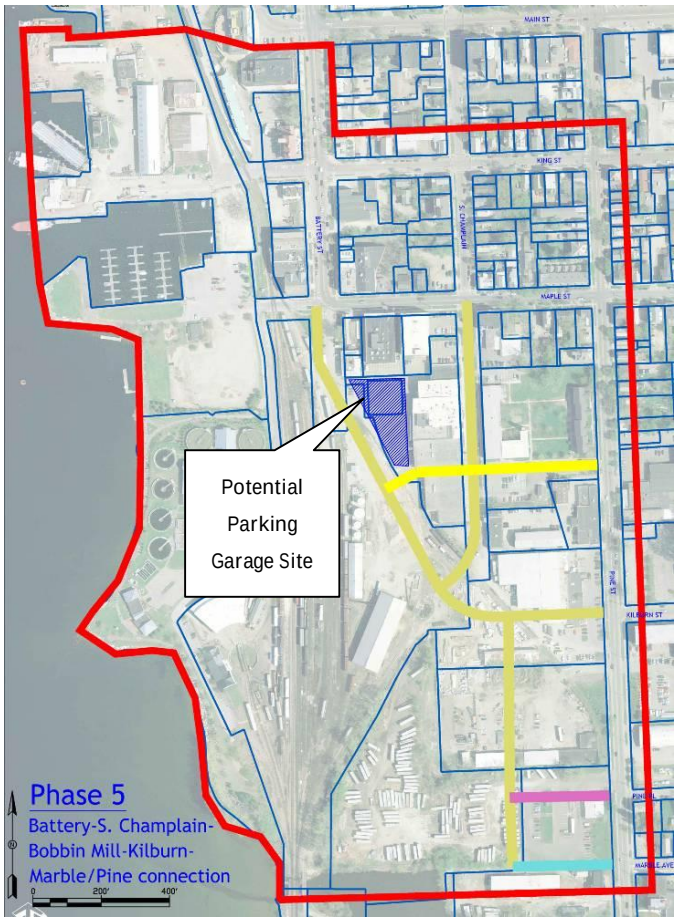


Figure 40: Estimated Costs of Phase 5 Construction

	Phase 5
Street/Sidewalk Costs	$169,000
Intersection Costs	$17,800
Municipal Infrastructure Costs	$255,000
Demolition of Existing Facilities/Damages	$125,000
ROW Acquisition Cost	$245,000
Building Acquisition	$4,186,000
Mobilization/Demobilization (7.5%)	$370,000
PE/CE (15%)	$750,000
Permits (1%)	$50,000
Contingency (25%)	$1,250,000
	$7,417,800

6.0 ECONOMIC PROFILE OF THE WATERFRONT SOUTH PROJECT AREA

Due to the relatively short-term planning horizon of this study (2018), the focus of this project has been to describe the types of infrastructure investments necessary to spur private investment within the Waterfront South area. The analysis underpinning this project assumes that municipal investments in this area are necessary to spur development. The project does not make assumptions about the magnitude of development that could take place, however.

Given this, there are key parcels within the project area in consultation with the DPW and CCMPO to focus on for determining short-term economic development options.

6.1 Key Parcels in the 2018 Waterfront South Build Out

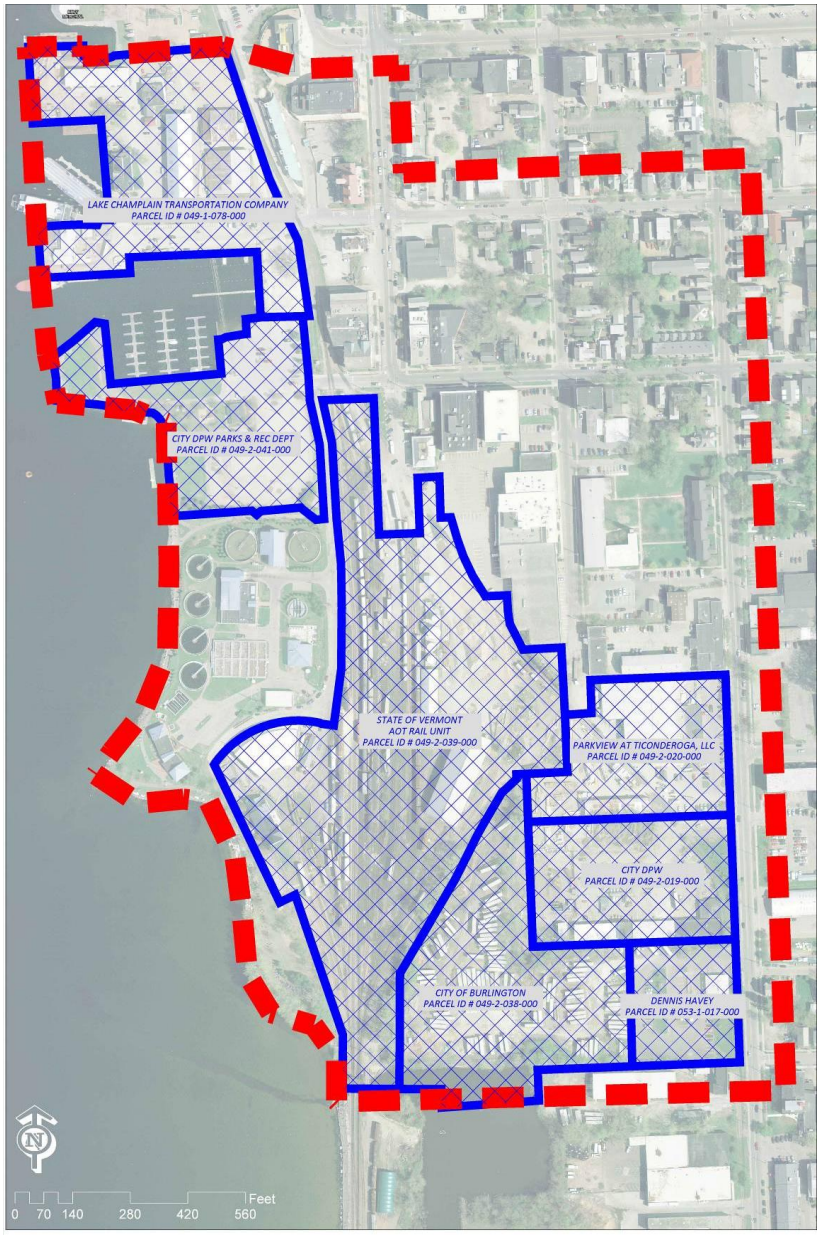
Figure 41 lists 7 parcels that are critical to the economic future of the Waterfront South project area. Three parcels are publicly-owned (City or State of VT). Three parcels are privately owned and are critical in their potential developability or in their ability to provide right-of-way for alternative street alignments. A final parcel (Lasmos) is privately owned but encumbered by an option to purchase in favor of the City of Burlington.

Figure 41: Key Parcels for Alternatives Development, Waterfront South Project

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

Figure 42 shows the locations of these parcels (highlighted in yellow) within the Waterfront South project area.

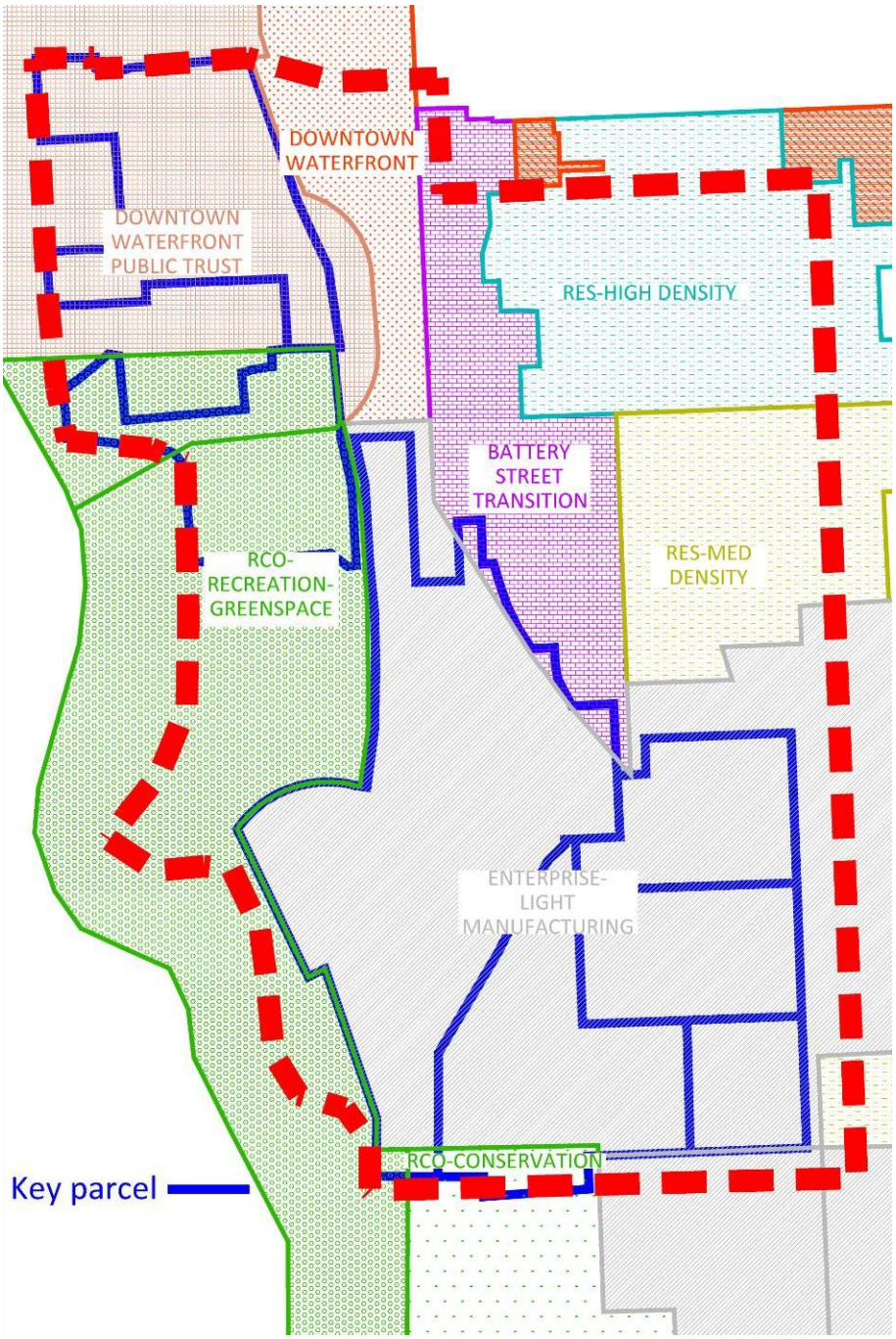
Figure 42: Waterfront South Project Area with 7 Key Parcels Cross-Hatched



6.2 Development Potential and Restrictions

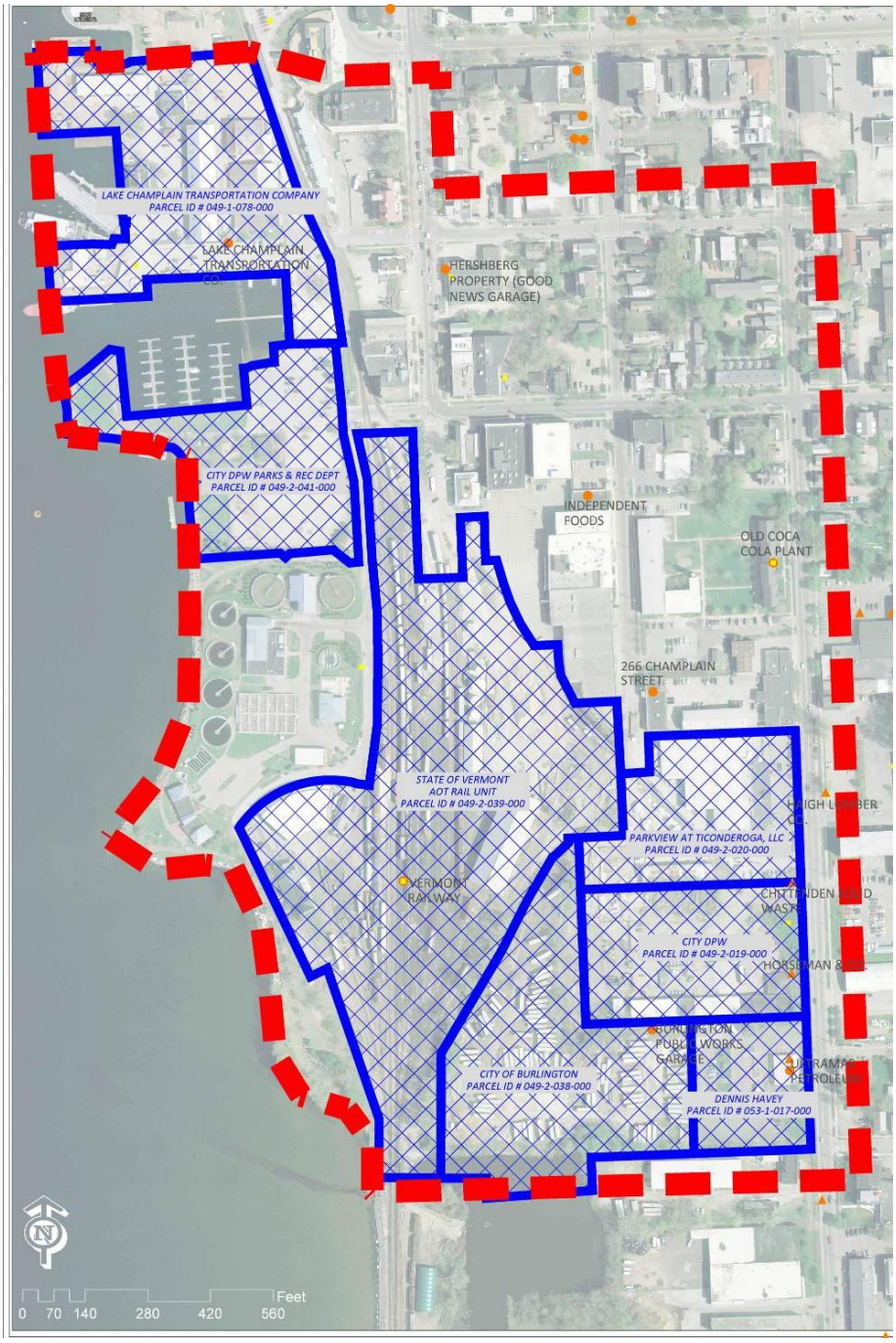
Figure 43 shows the zoning designations within the project area. The key parcels fall into 2 separate zoning districts. The Pecor property is within the Downtown Waterfront Public Trust zone. The remaining key properties are within the Enterprise-Light Manufacturing zone.

Figure 43: Zoning within the Waterfront South Project Area



In addition to the Barge Canal at the southern boundary of the project area, several properties within the Waterfront South project area have documented hazardous wastes (based on data from VCGI and the VT Agency of Natural Resources. The severity of each site differs based on the age and nature of the contamination.

Figure 44: Waterfront South Project Area Showing Areas with Hazardous Waste



Lake Champlain Transportation Company (Pecor)

The Pecor Lot is currently used as the terminal location for the Lake Champlain ferry to Port Kent, NY. The lot consists of 5.91 acres and has several buildings on it for maintenance of the LCTC fleet, administration, and a café. The property provides complete marine services. In addition to the ferry terminal, the LCTC property provides seasonal boat slips, transient moorings, marine fuel, and pump-out. Access to the property is at the western terminus of Maple Street.

The Pecor property is located within the Downtown Waterfront – Public Trust District (DW-PT), which is associated with "filled lands" along the waterfront and thereby subject to the public trust doctrine making the lands "available to the public on an open and nondiscriminatory basis." The Burlington Zoning Ordinance allows several uses within the DW-PT district, including[1]:

- Research Lab
- Restaurant
- Restaurant-Take Out
- Warehouse
- Hotel-Motel
- Small and Large Retail
- Public Transit Terminal
- Recreational Facility

Permitted uses within DW-PT are defined further within Section 4.4.1(d)2 of the zoning ordinance. With respect to the portion of the district located north of Maple Street, where the LCTC property is situated, additional uses are permitted as follows:

- Transportation-related facilities
- Marine-related facilities
- Inns with public spaces
- Public markets
- Publicly-accessible restrooms

Key dimensional standards include a maximum building height of 35 feet and a minimum setback from the Lake Champlain shoreline of 50 feet.

In 2009 the LCTC property underwent concept planning for a potential hotel/conference center and expanded marina development (Figure 46). The concept plan has been developed in concert with plans for expansion of the Burlington Parks and Recreation property at Perkins Pier, to the immediate south of the Pecor property. Figure 45 enumerates the existing and proposed future uses on the LCTC Property.

Figure 45: Existing and Potential Future Uses, LCTC Property

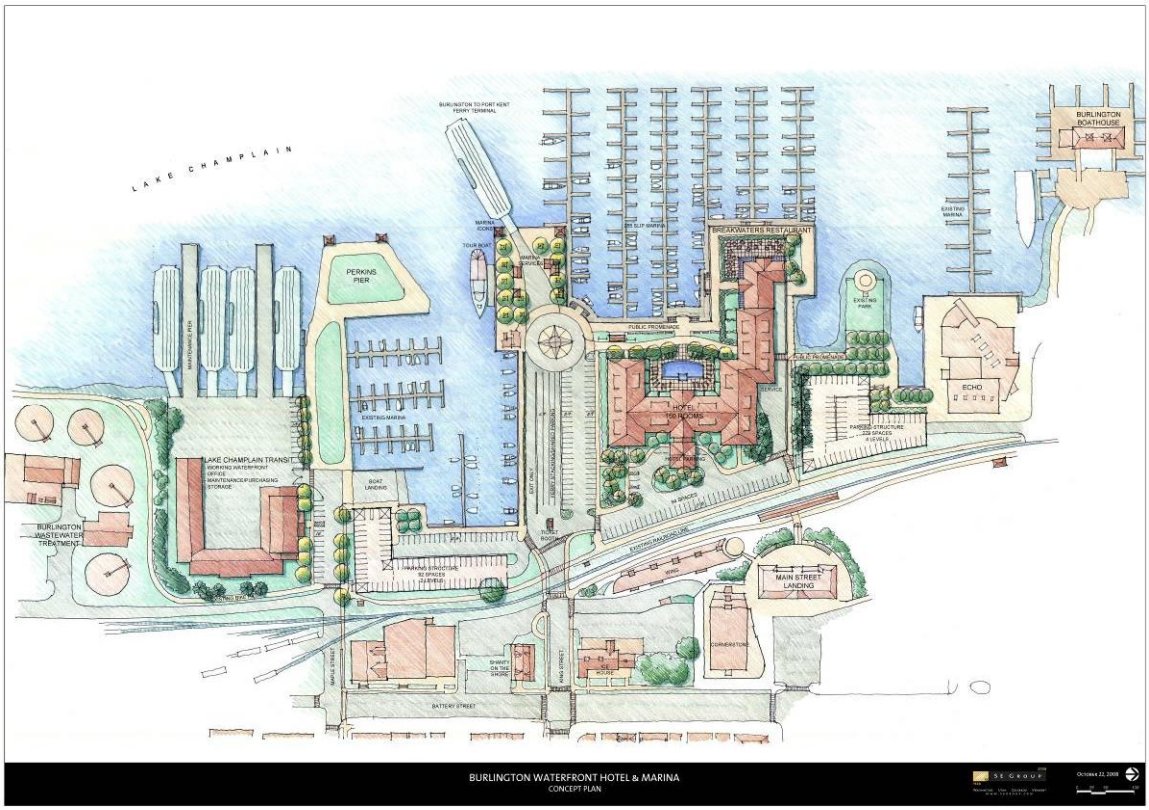
Existing Uses	Future Uses
Ferry Service	150-Room Hotel/conference center
LCTC Administration	255 Slip Marina
LCTC Marina Services	75-Seat Restaurant
70 Surface Parking Spaces (approx.)	94-121 Surface Parking Spaces
	Potential Joint Parking Development with Adjacent Public Lands
	LCTC Adminstration and Marina Services as Joint Development

The future site plan also shows a realignment of the Burlington Bike Path to the westerly sideline of the railroad tracks. Currently, the Bike Path diverts to the easterly sideline at King Street and continues on the easterly sideline until College Street. It is the objective of the City to construct the entire alignment along the westerly sideline of the railroad.

Marine service and maintenance facilities are shown in the concept plan as being moved further to the south, immediately adjacent to the wastewater treatment plant.

[1] See City of Burlington Zoning Ordinance, Appendix A-Use Table

Figure 46: Concept Plan for a Hotel and Marina, Pecor Property.



As discussed above, the significant concentration of parking west of the railroad tracks conflicts with the land development direction the City has established with other waterfront projects, most notably the Lower College Street redevelopment project. In these other projects, the City has emphasized minimizing parking west of the railroad along with the improvement of alternative modes of access to the waterfront from parking areas east of the railroad tracks.

Further, ECHO has indicated their interest in constructing another building on the parking lot shown to accommodate the 279-vehicle parking structure on the Pecor concept plan. The 4-story parking structure proposed for the ECHO lot would exceed the height dimension standard for the DW-PT zone.

The WFS Access project will maintain consistency with the general development direction established by the City to minimize parking west of the railroad tracks.

Another design objective that is not well developed in the Pecor site plan is the desire to establish a transportation grid in the area to provide routing redundancy. The lack of a southern access to the Pecor property, and the lack of a roadway connection between King and Maple Streets is a weakness of the concept plan shown in Figure 46.

Hazardous wastes on the LCTC property were from the removal of 3 underground storage tanks in 1999. In subsequent investigations it was determined that no evidence of gross contamination was found. In 2000 the ANR assigned a Site Management Activity Completed (SMAC) designation to the property indicating that "no unacceptable risk to human health and the environment is present due to any residual contamination."

Perkins Pier

According to the Burlington Harbor Plan Perkins Pier is the most frequently used access to the harbor, with 80 boat slips, 20 moorings, a 4-lane public boat ramp, public parking, and a public park.

The Burlington Harbor Management Plan foresees an expanded role for this parcel in the future, as it will house the office of the Harbor Master, plus accommodate a significant expansion of publicly-accessible boat slips. The Harbor Plan envisions an expansion of 300-350 boat slips, which can only be supported by combining facilities with the LCTC property. The Pecor concept plan (Figure 46) assumes combination of properties, primarily for supporting structure parking, but does not show an expansion of public boat slips.

Havey (345 Pine Street)

The 1.72 acre Havey parcel is located in the southerly portion of the Waterfront South project area on Pine Street and within the Enterprise-Light Manufacturing (E-LM) zoning district. The Enterprise-Light Manufacturing districts are located outside of the Downtown Mixed Use Districts, which include the Waterfront Districts. The Zoning Ordinance describes E-LM 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."

Two city streets terminate on Pine Street across from the Havey frontage: Marble Avenue and Pine Place. This gives the property a strategic location should one or both of these streets be continued westerly to formalize a grid street arrangement. Of note is that Marble Avenue is one way westbound terminating on Pine Street.

Should Marble Street be extended along the southerly sideline of the Havey property, a 66.0 feet ROW would be established which would use approximately 0.4 acres of the parcel. The remaining parcel, consisting of 1.32 acres, could still support significant development according to the dimensional standard of the E-LM district – FAR of 2, maximum lot cover of 80%, 45 foot building height, and no minimum lot size. Accounting for these dimensional standards, and including parking for approximately 40 vehicles, would enable a total building size of approximately 79,000 SF (26,300 SF for 3 stories or 39,500 SF for 2 stories).

The Havey property currently is the location of the Greyhound intercity bus terminal. The transit terminal use is according to a lease that is due to expire in April 2010. Greyhound has expressed interest in re-locating to the Burlington International Airport.

The Havey parcel is shown to have a hazardous waste site documented, but no land use restrictions are currently listed for the site.

City of Burlington (Lasmos)

Immediately to the west of the Havey parcel is a parcel referred to as Lasmos, which is owned by Havey, but over which the City has a lease option. This property is currently used for trailer storage, but is critical for any potential changes to the Vermont Railway switching and commercial facilities as shown in Figure 2.

The most critical future use of the Lasmos property is to accommodate the proposed railyard changes which, in turn free up critical areas along the northern boundary of the Vermont Railway property currently used to store bulk items such as lumber and aggregate.

The property is located within the boundaries of the EPA-designated Barge Canal Superfund site.

If the city exercises its option to purchase the Lasmos property, presumably some negotiations could occur enabling an adjustment to the western Havey parcel boundary to compensate for the extension of Marble Street across the Havey property to the Lasmos property.

VTrans has communicated potential limitations to the use of the Lasmos property due to contamination. Key restrictions listed are[1]:

1) The properties will not be used for residential use or for children's day care centers;

2) Groundwater under the properties shall not be used for potable drinking water purposes;

3) The properties will not be used so as to interfere with investigations of environmental conditions, or cause re-contamination of the site or contamination of off-site properties following completion of the remedy;

4) No construction activities that will change hydrogeologic conditions and that would cause migration of contaminated groundwater to Lake Champlain will be allowed;

5) Excavations to depths greater than five feet on the properties will be prohibited unless specific enumerated cases apply.

Burlington Street Department (339 Pine Street)

This lot contains several historic buildings from the Burlington Street Department. Recycle North currently operates on this property under a lease agreement with the City.

Hazardous wastes on the Burlington Street Department property are related to one or more underground storage tanks. Groundwater sampling conducted in 1999 showed a diesel plume of contamination extending north-northwest. A second gasoline plume was also identified at the same time associated with a 1,000 gallon gasoline storage tank leak. It has been determined through subsequent testing that contaminant levels are stable and not migrating off site, and that contamination will "eventually attenuate due to naturally occurring biological activity."[2]

The 1999 investigation also tested waste-oil contamination in the soil stockpile and determined a "very significant level of contamination,...a sign that there is a high volume of waste oil that is adsorbed to the soil particles." A soil venting system was installed to draw vapor from and to oxygenate the soil stockpile, which will eventually degrade the waste oil. Monitoring of groundwater wells in this area ceased in 2003 after two rounds of monitoring showing contaminant concentrations below Vermont's Groundwater Enforcement Standards.

CEDO is currently conducting a review of historic resources for a Pine Street Historic District. The Burlington Street Department buildings have been categorized as "Contributing" to the historic value of the area. The technical narrative for the Pine Street Historic District has not been completed as of the writing of this memorandum so it is unclear how the categorization as "contributing" affects the use or disposition of the buildings.

Curtis Lumber

Curtis Lumber occupies the Pine Street frontage where Kilburn Avenue terminates and thus provides a potential extension connecting to a future grid of streets within the project area. The Curtis Lumber property straddles the rail spur that was the former location of the Battery Street spur alternative in the Southern Connector EIS (Figure 47). The property abuts the Lasmos property and could provide an alternative access point to the relocated Vermont Railways commercial yard in the future.

[1] EPA New England Record of Decision, September 1998.

[2] Notice to the Land Record. City of Burlington Land Records. Book 975 page 216.

Figure 47: Rail Spur Through the Curtis Lumber Site

VT Rail-VTrans

This 19.5 acre parcel currently houses the Vermont Railway switching and commercial yards. Vermont Railway leases the property from the State of Vermont. Vermont Railway renewed a 99-year lease of the property in 2005.

The Vermont Railway property's commercial yard receives truck traffic from Battery Street only, forcing large trucks to use the residential streets to the north of the project area (Figure 48). In a project meeting on 15 January 2010, Dave Wulfson, Vermont Railway's President, emphasized their interest in obtaining a Pine Street access to their commercial offloading functions.

Figure 48: Access to the Vermont Railway Commercial Yard from Battery Street

Hazardous wastes have been identified on the VT Rail property in the past, associated with petroleum contamination identified during the removal of Underground Storage Tanks. These were identified in October 2000. A Site Management Activities Completed (SMAC) letter was issued by Vermont DEC in 2008 indicating that the site does not pose an unreasonable risk to human health or the environment.

Using the Phasing plan as a guide, Figure 49 shows how new streets and street frontage will be developed within each phase, and the land use zone that governs land development for the affected parcels.

Figure 49: Development of New Street Frontage by Proposed Project Phase

Impacted Parcel	New Street	Linear Feet of New Street	New Street Frontage	Land Use Zone	Proposed Phasing Sequence
Havey	Marble Avenue Extension	260	520	Enterprise Light Mfg.	Phase 1
Havey	Pine Place Extension	275	550	Enterprise Light Mfg.	Phase 1 (option)
Parkview at Ticonderoga (Curtis Lumber)	Kilburn Street	420	840	Residential Medium Density & Battery St. Transition	Phase 2
State of VT AOT Rail Unit	Battery Street Extension	970	1940	Enterprise Light Mfg.	Phase 2
City of Burlington	Shared Boundary with Havey	295	295	Enterprise Light Mfg.	Phase 3
City of Burlington	N/S Connector	310	620	Enterprise Light Mfg. & Battery St. Transition	Phase 3
Havey	Shared Boundary with Lasmos	295	295	Enterprise Light Mfg.	Phase 3
Parkview at Ticonderoga (Curtis Lumber)	N/S Connector	130	260	Battery St. Transition	Phase 3
State of VT AOT Rail Unit	South Champlain Extension	160	320	Enterprise Light Mfg.	Phase 4
Bobbin Mill	Bobbin Mill Lane	315	630	Residential High Density	Phase 5
Independent Food	Bobbin Mill Lane Extension	188	376	Residential High Density, Battery St. Transition, Downtown Waterfront	Phase 5
		3343	6096		

The primary emphasis within Phase 1 is to serve truck deliveries to and from the railyard from Pine Street. While some new street frontage is created in Phase 1 at one of two locations (extensions of Marble Avenue or Pine Place) it is anticipated that the primary economic benefit of Phase 1 is reducing truck travel in neighborhoods while creating some freight efficiencies for the Vermont Railway commercial yard.

A more substantial economic impact is associated with Phase 2, when a true east-west connection is made from Pine to Battery Streets. The affected area would incorporate nearly 2,800 feet of new street frontage within 3 land use zones.

Phase 3 establishes a north-south connection between Phases 1 and 2, creating an additional 1,470 feet of new street frontage. Over 900' of this frontage would be on City-owned property.

Phases 4 and 5 could also have substantial economic development impact, but have significantly longer-term potential.

7.0 Summary of Findings and Next Steps

This report provides information on alternative street alignments and cross-sectional options for the Waterfront South project area. Based on input from Burlington City and CCMPO officials, a set of alternatives offering a high level of street connectivity were selected for detailed analysis of transportation performance, construction cost, and phasing.

The City has significant flexibility in determining the "look and feel' of each new street based on the 6 cross-sectional options described in this report.

Each of three alternatives showed substantial transportation improvements in the way of travel time savings and improved intersection Level of Service.

Overall construction costs for any alternative, inclusive of building and right-of-way acquisition, are approximately $13 million. Additional optional costs include a parking garage proximate to the Battery Street Extension ($6.4 million) and the potential for an intermodal facility, an adaptive re-use of the former Greyhound station (Havey parcel).

A phasing plan is proposed to enable the City to build out this street plan incrementally, relying to the largest extent possible on City resources.

The alternatives and phasing plan presented herein have not been constrained by considerations of private property. The potential unavailability of certain key parcels may require that the City adapt this plan to those realities. Further, funding availability may suggest a re-ordering of the recommended phasing plan.

Key next steps include:

1. Initiate landowner meetings to discuss findings of the report, vision for the area. Landowner meetings can focus on the following issues:
    - Overall vision for the WFS area;
    - Improved access;
    - Need for ROW acquisition;
    - Feedback/input on cross-sectional alternatives;
    - Specific information on property easements/restrictions;

    Key landowners include: Lake Champlain Transportation Co. (Pecor); Havey (critical early phase property for access to VT Railway commercial yard from Pine St.); Independent Foods (site of potential structured parking and future street connection); Curtis Lumber (for providing key E-W access from Kilburn to Battery); and VT Railway

2) Investigate funding options with the Congressional Delegation to discuss vision for the area, needs for funding for ROW acquisition, infrastructure development. Other funding options include: TIGER2 grants for a portion of the project area; downtown improvement funding options, including Tax Increment Financing; Livability grants (upcoming from DOT-HUD-EPA joint program initiative); and brownfield redevelopment grants (applicable to Phase I Havey access to VT Railway).

3) Initiate a public outreach process. After receiving input from key landowners and evaluating funding options, the City will have a clearer idea of which phases of the WFS project to pursue and the approximate design and costs of those phases. At this point it would be opportune to initiate a public involvement process to generate interest and support in the broader vision of the WFS redevelopment. This public outreach project could underpin a more detailed scoping project, as described below. As an initial step, a brief presentation to the NPA would make sense.

4) Simultaneous with initiating public outreach process, the City may wish to obtain the professional opinion of an economic development expert to advise them on phasing of street improvements. The analysis presented herein has been based on the assumption that public infrastructure investment is a necessary precondition of private investment. The analysis has not attempted to quantify the private sector response to public investments, which is a technical area best addressed by an economic development specialist. Ideally a formal economic development analysis would involved both a local development expert and someone with national credentials who could help inspire a vision for the WFS area based on successful experiences elsewhere.

5) Initiate scoping project for Phase 1-2. A scoping project would advance design to 25-40% and would establish permitting needs. Advance design further to 100% as funds allow.

6) Continue to work with the RR to shape the best configuration of the transload facility and other railyard configurations.

APPENDIX 1

Meeting Notes

e) Kickoff meeting 11-19-2009

f) 1st Meeting with CEDO and other City Staff 12-9-2009 (Agenda: Economic Development)

g) Meeting with VT Railway 1-15-2010

h) 2nd Meeting with CEDO and other City Staff 4-27-2010 (Agenda: Discuss Alternatives)

Kickoff Meeting Notes
19 November, 2009

Attending:

Dan Bradley, DPW

Carol Weston, DPW

Jason Charest, CCMPO

Eleni Churchill, CCMPO

Mark Smith, RSG

Bob Chamberlin, RSG

7.1 Discussion

- Bob will revise Scope of Work following this meeting for City and CCCMPO to review.
- VTrans should be invited to future meetings – either Wayne Davis or Amy Bell. Two meeting planned with larger group. Eleni will coordinate this. Also include City Planner – David White. The assigned VTrans staffer and David White will be cc'd on project communications.
- Project Objective – Economic Development is primary. Local master plan that screens possible impacts and provides potential solutions is intended outcome.
- Dan will identify the appropriate CEDO staffer to advise the project after consultation with Larry Kupferman. CEDO will have input at several points in the project:
    - To provide an economic profile of the project area with Task 2.
    - To participate in the scenario planning workshop and in the final meeting presenting alternatives.
    - To provide information on the 3 scenario planning alternatives on land use mix, resulting property tax base, time frame and sequencing of development, and necessary utility upgrades.
- Steve Goodkind will meet with Dave Wulfson to get his feedback on project. Dan, Carol or Steve to provide debrief info for documentation. Essentially Dave likes the current plan so changes from their perspective should be minimal.
- Connector to open in 2013 at the earliest, 2018 would be appropriate study year for traffic analysis. 2028 is too far out.
- Bob to contact CHA directly for data needs.
- Road Network – making road connections is most desirable. Variations to the Alternative 1 alignment are essential to investigate. Curtis Lumber Property configuration may be flexible. Neighborhood traffic effects will be important.
- Many Alternatives have already been explored -see the 1996 EIS (and even the '79 EIS, which should be mentioned in the update). Carol to provide a copy for RSG to scan.
- No preferred alternative is necessary. To be determined in future phases.

- Project to be complete by June 30th.

Action Items:

Bob to submit final scope of work to Eleni and Dan.

DPW staff to arrange meeting of Steve Goodkind with Dave Wulfson to confirm railyard changes established in SEIS.

Mark Smith to obtain 1996 FSEIS from Carol Weston for RSG to copy.

Dan Bradley to identify CEDO participant in project. RSG will work with this person in early stages to discuss economic potential of area.

Dan or Eleni to contact VTrans (Wayne Davis or Amy Bell mentioned) to determine who from VTrans should be included in communications.

Dan to contact David White to invite his participation in the Scenario Planning workshop.

END OF MEETING NOTES

December 9, 2009
Meeting Notes

City of Burlington, Room 12, City Hall, 1 pm

Attending: CEDO - Larry Kupferman, Kirsten Merriman-Shapiro, Ed Antczak, Bruce Seifer; City Planning - David E. White, Sandrine Thibault; DPW - Carol Weston, Dan Bradley; RSG - Mark Smith, Amanda Clancy; CCMPO - Eleni Churchill, Jason Charest.

- Brief explanation of zones in study area:

Battery St Transition – mixed use; smaller scale than downtown area

Downtown Waterfront – stricter limits on building heights

Downtown Waterfront (Public Trust) – follows specifications outlined by the Public Trust, as established by the Supreme Court

Recreation – functions as "urban open space"

Enterprise – loosely defined at present and open for discussion; in this zone, there is an opportunity to redefine the allowed uses based on future development events and on the outcome of this study.

- Potential development scenarios include:
  - Extend the adjacent Battery / Waterfront zones southward into the existing Enterprise zone (i.e. extend Waterfront, Waterfront-Public Trust, and Battery St Transition zones southward). Note that this area is not currently defined as a Public Trust area, but it should be noted that this area could qualify as Public Trust land in the future.
  - "Extend the grid," allowing Battery and Champlain to extend southward, and extending the East/West streets to the water (via vehicle or ped/bike access)

- Create a NW/SE leg that connects Battery St to Pine St and extends East/West routes to this connector route.
- The "max economic impact" scenario should be tangible and reasonable; it should not be a far-fetched concept, but rather an achievable solution.
- A much diminished railroad function comprised of removing the switching and maintenance operation and moving the transload facility south, should be part of the "max impact" scenario
- Alternatives should identifies ways to pay for infrastructure based on the economic development potential proposed (TIF district not supported)

- The goals and objectives include the following items:

Promote economic development

Encourage road and neighborhood connections

Relieve or otherwise address congestion

- This study will assume the Southern Connector will be been built, and the assumptions in the EIS are valid
  - How does the FEIS restrict the alignment of new connections?
- The costs of ROW purchase should be considered in any alternative
- The following groups should be consulted:
  - The Planning Commission – to help identify access points
  - Parks & Rec – to gather information on existing and proposed land uses
- The following items should be included on the project Base Map:
  - Key points from the Official Map
  - Key points from the Harbor Plan
  - Parcel lines and ownership
    - Parcel boundaries and ownership are confusing and may be inconsistent between data sources (particularly on S Champlain). These inconsistencies should be identified by this study, but not necessarily resolved.
  - Brownfields & hazardous plumes
  - "Federalized" areas from the original spur analysis
  - Fill line, as identified by EIS
  - Bicycle and pedestrian desire lines
- The following known developments were discussed:
  - Lake Champlain Transportation is considering moving the maintenance facilities and headquarters to an alternate location, perhaps further south in the study area (these

facilities do not need to be adjacent to the ferry service). It should be assumed that the ferry service and existing location will not change or move. RSG to call Pecor for details.

  - Perkins Pier may be expanding the marina for public use. Consider appropriate development as a result (i.e. facilities for travelers and arriving/departing boats) should be assumed. Call Trey at Pecor for details.
  - Recycle North is interested in taking over the City Garage to use as a headquarters for their operations
  - There is a potential 40,000 sq ft office building at Battery & King (in the works for 7 years)

- This study should assert that as the Waterfront South area is developed, appropriate zoning recommendations should be developed to guide the design and development of the area (re: building height, character, etc.), including;
  - A newly defined zone should encourage potential business owners to renovate existing spaces; perhaps with incentives, rather than building new spaces
  - Consider current shortage of space in downtown Burlington (office vacancy rate is 4-5% vs. suburban office vacancy rate of 14%, Vacancy of industrial is 3% in City)
  - Bicycle and Pedestrian connectivity
  - Focus on serving the needs of residents. This was the driving philosophy behind the downtown re-development, and should be extended to this study as well.
- Existing buildings should not be considered as a constraint to future development (i.e. if an existing building is in the line of a proposed new roadway, it is assumed that the building could be removed/relocated)
- The "Hague" parcel at the northern end of the barge canal is currently owned by the City, and the original deed grants access to the lake (possibly through the dammed cut/outlet). Details of this grant can be obtained from Carol Weston or Dan Bradley, or Bob Penniman, the former parcel owner.
- Passenger rail and light rail could be considered uses in the proposed scenarios; potential accesses to the rail line should be ensured.
  - Freight should still be considered the primary use
  - The historic nature of the rail should be considered before moving forward with the rail assessment (as identified in EIS)
- When re-routing traffic, trucks should be considered. If a connection to Pine St is an alternative, then cement, salt, fuel and other trucks should be diverted to access Pine St. via the bus depot, as identified on the CHA map.
- The proposed development should be:
  - Residential and retail uses are a low priority for future development here– the primary focus should be office/commercial/industrial/"cultural" (museums, etc.)
  - Seasonality should be considered – winter land uses should be encouraged (e.g. skating rinks)

- The Harbor Plan should be considered to identify on-lake activities, which may in turn guide potential on-land activities
- Expanded marina use is an option

- Other possible resources for this study include:
  - UVM class that is has focused on the redevelopment of the waterfront
  - Harvard class that focused on urban design, including the waterfront area
  - Diane Gayer's study of the waterfront

Action items

- The following items are needed from the City of Burlington/CEDO:
  - GIS or other Parcel data showing ownership
  - 1996 So Connector FEIS
  - Battery St Historic resource assessment (Nick Warner, as part of Smart Growth analysis.)
  - Burlington Official Map
  - Burlington Harbor Plan
  - Brownfield and plume locations (RR, barge canal, So. Champlain St property, see partial / recent catalog by Nick Warner,)
- RSG will work with the DPW/Planning to obtain input from:
  - Parks & Rec (Aaron Moreau)
  - Planning Commission
- RSG will gather all materials and make contacts as necessary to determine appropriate build-out scenarios, including:
  - Pecor
  - Parks & Rec
  - Eric Farrell
  - UVM – Rubenstein Center
  - Gilbane (Chip Meyers is manager)

End of Notes

Meeting Notes
January 15, 2010
Vermont Railway Offices in Burlington

Attending: Dave Wulfson, VTR; Steve Goodkind, Carol Westin, and Dan Bradley Burlington DPW; Eleni Churchill, CCMPO; Bob Chamberlin, RSG.

- RSG opened the meeting by describing the Southern Connector project.
  - Alternative 1, incorporating the Battery Street spur, was not selected as the Preferred Alternative. The Preferred Alternative, with its northern alignment along Pine Street, did not address congestion issues in the northern part of the project area as well Alternative 1 could have.
  - "Federalization" makes it difficult or impossible to reconsider a rejected alternative (e.g. Alternative 1.
  - The City is revisiting access/circulation in the entire Waterfront South area with a key objective on promoting economic development. The City would like to develop access/circulation alternatives in partnership with VTR. The result of the present study is to develop a "blueprint" for how this area develops.
- DW described issues associated with the Pecor property.
  - There are congestion issues associated with the ferry. As many as 200 vehicles are dropped at the ferry terminal creating acute access/congestion. Stacking is a problem in both directions—entering and exiting the ferry.
  - A possible solution incorporating a one way circulation system utilizing Maple and King was discussed.
  - Parks and Recreation manages the marina adjacent to the Pecor property.
  - VTR has discussed the possibility of moving the ferry to other locations further south along the VTR lake frontage. This would provide more development flexibility on the Pecor property.
- DW asked the City representatives whether they (the City) would be able to relocate the railyard and/or the Wastewater Treatment Plant?
- The City emphasized that the current WFS investigation was not considering the relocation of the railyard or a significant re-orientation as established for Alternative 1 in the SEIS.
- The current investigation needs to consider lower cost means of providing access in the WFS area, without foreclosing options for re-orienting the switching and commercial yards as established for SEIS Alternative 1 at some point in the future.
- DW indicated that the best way to access the railyard from Pine Street would be via a new street connection at Marble Street.
  - DW estimated that 30-50% of truck trips generated by the railyard would use this access point. Use would be higher in winter due to the predominantly southbound travel of oil and salt trucks.

  - Of the remaining truck traffic generated by the railyard, the majority (approx. 90%) uses the Battery Street access point. The remainder accesses the railyard from S. Champlain Street.
  - Approximately 40,000 trucks per year are generated by the yard (assumed to be round trips, or 80,000 vehicle trips, enter + exit, to be confirmed by Dave Wulfson). Truck trips occur 7 days per week at variable times including at night. Truck demand can vary widely (e.g. high salt truck activity associated with winter storms).
- The City is in the process of establishing historic district boundaries. Mary O'Niell from Planning is overseeing this work. The WFS study should be in contact with her regarding the potential location of new streets which should align with any boundary lines established through the historic district study.
- The City is currently leasing an option on the Lasmos property which is estimated to expire in 2012 or 2013. This is a key property as any railyard site re-orientation would need to use this property for switching and offloading facilities.
- Heavey subdivided the property housing the Greyhound terminal from the larger parcel. Greyhound's lease of the Heavey property expires in April 2010.
- The back portion of the parent parcel, referred to as the Lasmos property, is essential to the rail commercial yard and switching operations.
- Clarifying property ownership in the WFS study area is critical. Ownership/restrictions associated with the following properties should be clarified:
  - VTR/VTrans
  - Burlington Street Department
  - Heavey property (Greyhound)
  - Lasmos property (City option lease)
  - Curtis Lumber
- Economic development considered within the WFS project should focus on redevelopment of Pine Street, S. Champlain St., and new public streets located off of VTR property.
- DW pointed out that a 7-8 car Amtrak train with 2 engines would extend from College Street to King Street. This may happen if Amtrak service to Burlington from Rutland occurs.
- DW discussed possible long term visions of a rail circulator with a relocated railyard proximate to the Circ Highway ROW.

Action items

- RSG will obtain from the City of Burlington/CEDO and CHA:
  - accurate parcel data.
  - 1996 So Connector FEIS
  - Battery St Historic resource assessment (Nick Warner, as part of Smart Growth analysis.)
  - Burlington Official Map

  - Burlington Harbor Plan
  - Brownfield and plume locations (RR, barge canal, So. Champlain St property, see partial / recent catalog by Nick Warner,)
- RSG will obtain development master plans for the Pecor property. Others to be contacted include:
  - Eric Farrell
  - UVM – Rubenstein Center
  - Parks & Recreation Department
  - Trey Pecor
- RSG will draft an "economic profile" template for the CCMPO and DPW to review. The purpose of this is to provide a basis of comparison for each of the 3 alternative scenarios with regard to economic development impact.
- RSG will maintain contact with Amy Bell of VTrans over the course of the project; RSG will provide Joe Flynn with the final report of the project.

End of Notes

Meeting Notes
April 27, 2010

Agenda: Discuss Street Network Alternative Development

Attending: Eleni Churchill – CCMPO, Dan Bradley – City DPW, David White – City Planning, Joe Reinert – City Mayor's Office, Larry Kupferman – CEDO, Steve Goodkind – City DPW, Carol Weston – City DPW, Mark Smith – RSG, Beth Isler – RSG.

- Need to get a better handle on public trust lands; the filled land data is too coarse to identify them. Beth to contact Jay Appleton for GIS data.
- Cross-sections: instead of sandwiching bike lane between travel lane and parking, put parking on one side and a full two-way bike facility (w/ contra-flow lane) on the other. (To be within roadway, not separated path.)
- Parking garage will be critical to supporting economic development.
- Connect the bike facilities identified here with the bike path at the northern end of the study area.
- Goal of streets is to be slow-speed, but move lots of people (not just cars).
- Project greatly enhances potential for economic development potential on Pecor property.
- Model should include WB right-turn pocket at Maple/Battery.
- Connection to Battery is more important than connection to S. Champlain.
- Connectivity at Kilburn is more important than at Marble or Pine Place.
- Uses will be mixed, not just commercial or industrial; need to reduce scale of blocks in order to achieve mixed use.

- Battery to Pine is going to be dominant movement no matter what.
- Potential for bike boulevard to be considered in scoping (too fine a level of detail at this stage).
- There isn't really any potential for a bike path on the north side of the parking garage; perhaps on the north side of Curtis Lumber along property line.
- Curtis Lumber could be a transit center.
- Havey/Bus Depot/Street Dept site is potential location for fire station; public services like the fire department are very supportive of any alternative that increases connectivity.
- Make secondary streets very multimodal and park-like (like bike blvd).
- Will be interesting to understand how streets perform when all are treated equally (refinement #1) rather than designing flow/intersections with a favored through movement in mind.
- Carol also noted that the public works site (and maybe the bus depot site?) may have old access rights to S Champlain. Regardless, there are lots of "crossing" or other access rights that need to be researched/discovered.
- Changing the use of Perkins Pier would have enormous economic impact; what opportunities are there in this project to support the Harbor Plan (e.g. boat access, trailer parking, etc.)?
- Development potential:
    - Planning envisions a mixed use developments in this area, with an exact mix TBD. "Build (the streets) and they will come".
    - Relatively smaller blocks are better for fostering development. Better access. Avoid "superblocks"
    - Consider that it is next to an existing railyard, this will define things more practically than some vision of mix.

Dan will coordinate communication between RSG and Smart Mobility/streetcar study so that the streetcar project can inform the WFS project. We need to know how to fit streetcar alternatives into WFS; the likeliest alignment is along Pine St. Dedicated transit R/W would increase support. RSG to revisit streetcar study, esp. its economic development piece.

Beth to follow up with Carol Duncan on parcel deeds at the south end of S. Champlain; also obtain Public Trust Lands data from Jay Appleton.

THREE ALTERNATIVES to be explored:

1. All roads being equal (refinement #1)
2. A dominant through route with slow street-like secondary roads (refinement #2)
3. Multimodal grid network

End of Notes

APPENDIX 2

Map of Proposed VT Railway Railyard Operations