

NEWBURGH COMPLETE STREETS PROJECT



Implementation Plan

Submitted to City of Newburgh December 9, 2015



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November 15, 2015

Complete Streets are a reminder that public spaces extend from building face to building face, and that streets can provide far more for a City than being a storage area for cars. Complete Streets in Newburgh mean space for green infrastructure that provides environmental and quality of life improvements. Complete Streets in Newburgh mean traveling areas for pedestrians, bicyclists, transit users, and cars to more safely and efficiently get to where they need to go. Complete Streets in Newburgh acknowledge that people have different accessibility needs. Complete Streets in Newburgh mean amenities that promote business development. Complete Streets in Newburgh mean amenities that invite people to hang out and enjoy the public realm. Complete Streets in Newburgh acknowledge that our city has important historic features and assets that must be protected.

This document provides policy framework and background materials to align City goals with best practices and gives Newburgh concrete examples and suggestions for implementation. It is, however, only an advisory document. This must be followed by thoughtful action on the part of the City and its residents to make sure that we build and improve streets in Newburgh to consider all residents, all resources, and all generations.

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INTRODUCTION

For the first half of the 20th Century, Newburgh thrived as one of the many gems nestled along the banks of the bustling Hudson River. Only 60 miles north of Manhattan, the city was an economic center and trading port for goods travelling along the Eastern Seaboard. At the center of the activity was the city's main street, Broadway. The corridor was bustling with tourists and residents alike, shopping, dining, and enjoying entertainment at the historic Ritz Theater. At the peak of its heyday, Newburgh was named 1952's "All-American City" by Look Magazine.

Today, the industrial sector has largely fled, but the backdrop of the city's former splendor remains. Similar to many other American small towns, Newburgh saw the economy of its manufacturing sector shrink and the industry relocated elsewhere in the latter half of the century. However, the historical and once-bustling main street remains with its expansive roadway, bordered by a mixed building stock of Victorian-era homes and former architectural gems that have fallen into disrepair. Despite its desolate state, Broadway remains an artery connecting the heart of Newburgh to both the Hudson River and the surrounding region.

Newburgh has many unique qualities, but the current predicament in which it finds its struggling main street is not one of them. Cities across the U.S. are looking for ways to revive the economic vitality and sense of place that once made their downtowns a point of pride and community. With an overwhelming docket of issues to be addressed and ever dwindling budgets, cities are seeking fiscally responsible interventions with far-reaching benefits. Many communities are responding by adopting Complete Streets policies that improve the safety and accessibility of streets, while boosting the economic vitality of the properties that line them.

Complete streets, streets designed and operated to enable safe access for pedestrians, cyclists, transit riders as well as drivers, are being heralded as a way to draw life back into struggling commercial centers. Functional improvements along streets such as providing benches, tables and chairs, along with urban design enhancements such as distinctive paving, landscaping, pedestrian-scale street lighting and street art will draw customers by helping the street to function as a destination in its own right. Once potential customers are already on-site, creating a comfortable and enjoyable public realm will encourage them to linger and potentially patronize local businesses more than they otherwise would.

Complete streets policy will function as an economic revitalization strategy for Newburgh because of its ability to impact the bottom line of businesses and property owners along Broadway. By improving the street environment and the desirability of the surrounding neighborhood, complete streets policy has the ability to directly affect retail sales along Broadway, but also, among other things, will have an effect on retail rents, office rents, and commercial property values.¹ The positive and varied effects of complete streets interventions have already been witnessed by cities across the nation.

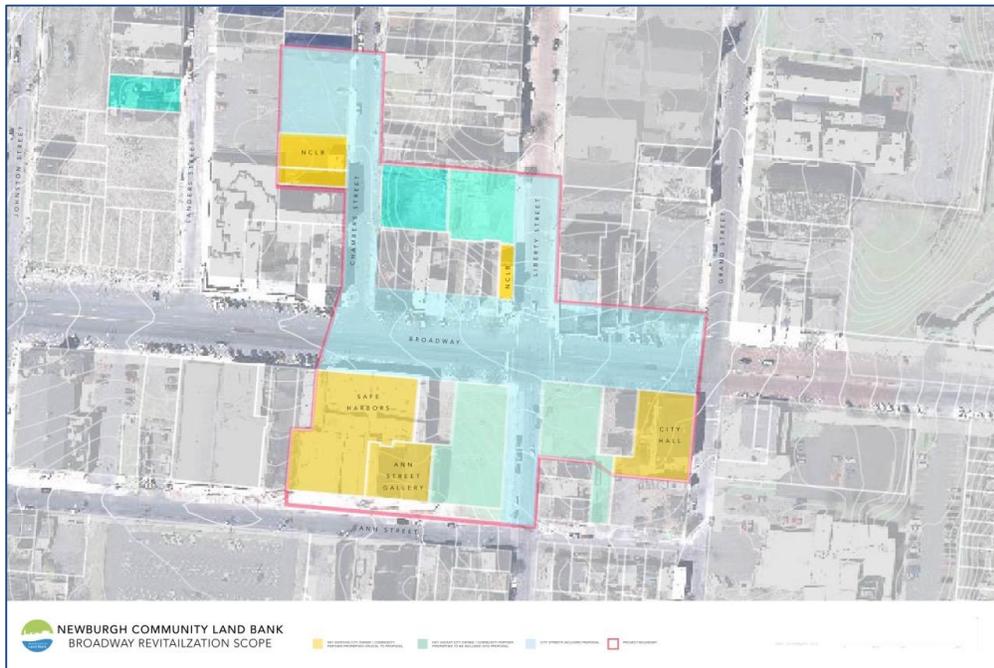
¹ <http://www.nyc.gov/html/dot/downloads/pdf/dot-economic-benefits-of-sustainable-streets.pdf>

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The addition of parking protected bike lanes and pedestrian islands had a transformative effect on 8th and 9th Avenue in New York City, resulting in a 49% increase in retail sales and a 58% decrease in injuries to all street users in this area. Furthermore, complete streets have also been shown to revive struggling communities. West Palm Beach's downtown was 80% vacant and crime was common before the mayor pushed for revitalization through investments in pedestrian crossings, traffic calming measures, and streetscaping. Today, West Palm Beach boasts a booming, safe downtown with an 80% commercial occupancy rate. Small communities such as Lodi, California have also witnessed the benefits of complete streets. Lodi invested \$4.5 million in a pedestrian-oriented project over five main downtown blocks by widening sidewalks, extending curbs, and adding streetscaping amenities. Sixty new businesses came to the area resulting in a 40% increase in sales tax revenue. There is no shortage of case studies highlighting the positive effects of complete streets, suggesting that whether a community is small, large, struggling, or thriving, safe and efficient streets are always good policy. The potential for economic revitalization, however, designates it as essential policy.

The Newburgh Complete Streets Project entails the development and implementation of a comprehensive short-term and long-term complete streets program for Broadway. The City of Newburgh and Pace Land Use Law Center (LULC) managed this initiative with design provided by Newburgh Land Bank and policy guidance provided by Kevin Dwarka Land Use and Economic Consulting (KDLLC). Figure 1 shows the boundaries of the demonstration area for the short-term program. Over the long-term program the full length of the Broadway corridor will be subject to complete streets interventions.

Figure 1. Demonstration Area for Short-Term Program



Source: Newburgh Land Bank

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The Newburgh Complete Streets Project is organized into the following seven sections. Specific and detailed technical information regarding complete streets interventions, standards, legislation, and policy structure is provided within the attached appendices.

Section I of this report highlights various opportunities and challenges facing complete streets interventions in Newburgh, while simultaneously establishing a benchmark against which future data and observations may be measured.

Section II provides a review and summary of prior planning initiatives relevant to the core study area.

Section III provides description of four potential conceptual plans to redesign Broadway.

Section IV summarizes the community feedback received on the four plans.

Section V presents the proposed design.

Section VI presents a flow chart depicting the implementation process for a complete streets initiative.

Section VII discusses the potential barriers a City may face when making the transition from complete streets policy adoption to actual implementation. More importantly, it aims to provide the tools and information necessary for overcoming such barriers.

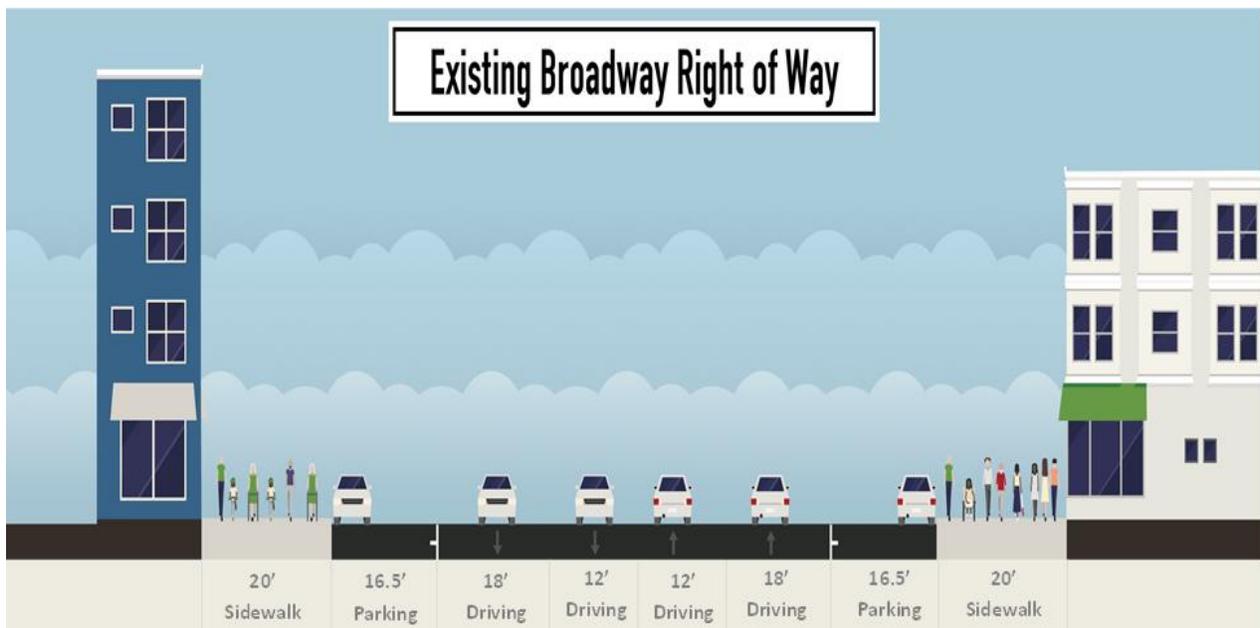
Roadway Description and Traffic Levels

Street Network

Broadway is the city’s primary east-west arterial and main corridor in Downtown Newburgh. The wider four lane section of Broadway is comprised of a 133-foot cross section, with the roadway spanning 93 feet from curb to curb (see Figure 3). The portion of Broadway spanning from Colden Street to West Street contains angled parking and wide sidewalks on either side of the street. West of West Street, Broadway becomes more suburban, less dense, and more auto-oriented with a greater number of curb cuts and off-street parking areas. At the intersection of US Route 9W/Robinson Avenue, the road has one wide travel lane in each direction with narrow sidewalks. Parallel parking is allowed on the south side of the street and prohibited on the north.

After crossing the city line, Broadway becomes Route 17K and widens back into a 4-lane low-density commercial corridor. Sidewalks along this portion of Broadway are either noncontiguous or nonexistent. There is no on-street parking along this section of the road. Acting concurrently as a local main street and regional thoroughfare, the Broadway corridor connects the city’s waterfront, the east end business district, retail areas off Route 300, the Town of Newburgh, and Stewart Airport.⁴

Figure 2. Dimensions of Broadway within Core Study Area



Source: Streetmix

⁴ Ideas for improving Broadway were presented in the Newburgh Area Transportation and Land Use Study’s technical report, City of Newburgh-Broadway Conceptual Design Study (January 30, 2012). For a summary of this report, see Section II: Prior Planning – Broadway Corridor Improvement, 2012. For the full report, see http://www.orangecountygov.com/filestorage/124/9893/10054/9897/BroadwayReport_20120128_FINAL.pdf

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Traffic Levels

Traffic data was collected in July 2015 at the intersection of Broadway and Liberty Street. The project team collected traffic data on a weekday (Tuesday) in one-hour increments during the morning (8:00 a.m. – 9:00 a.m.), midday (1:00 p.m. – 2:00 p.m.), and evening (5:00 p.m. – 6:00 p.m.). Within each hour, data was collected by four surveyors, each recording traffic volumes travelling into the intersection from one of four directions: Eastbound on Broadway, Westbound on Broadway, Northbound on Liberty Street, and Southbound on Liberty Street.

The data collected and presented below is not a complete traffic analysis, but allows for a rough estimation of peak hour volume (PHV), defined as the highest hourly volume during an average day, traveling through the main intersection within the core study area.

Figure 3. Hourly Traffic Volumes along Broadway (July 2015)

	Broadway Eastbound			Broadway Westbound			Total Volume (EB + WB)
	Right	Thru	Left	Right	Thru	Left	
AM Peak	37	99	37	8	90	11	282
MID-Day	66	142	44	10	142	37	441
PM Peak	74	110	49	4	124	43	404

Figure 4. Hourly Traffic Volumes along Liberty Street (July 2015)

	Liberty Northbound			Liberty Southbound			Total Volume (NB + SB)
	Right	Thru	Left	Right	Thru	Left	
AM Peak	11	48	45	42	48	10	204
MID-Day	15	61	64	85	68	18	311
PM Peak	30	107	88	70	75	15	385

Figure 5. Total Hourly Traffic Volumes Travelling Through the Intersection of Broadway and Liberty Street

Total Hourly Volume Through Intersection			
	Broadway	Liberty	Total
AM Peak	282	204	486
MID-Day	441	311	752
PM Peak	404	385	789

The total hourly volume of vehicles passing through the intersection during the morning observation period was 486 vehicles. During the midday and evening observation periods, the hourly volume increased considerably to 752 and 789 vehicles, respectively.

Parking Capacity and Utilization

The parking utilization data recorded in this section is not a comprehensive study, but rather a snapshot of the time and location of parked cars for a typical day within the study area. Parking data was collected in July 2015 along the both sides of Broadway, in block segments between Grand Street and S. Miller Street. Data was collected on a weekday (Tuesday) in one-hour increments during the morning (8:00 a.m. – 9:00 a.m.), midday (1:00 p.m. – 2:00 p.m.), and evening (5:00 p.m. – 6:00 p.m.).

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Figure 6. Study Area for Parking Utilization Data



Source: Google Earth

Parking Capacity

The majority of observed parking spaces were metered on-street spaces, with the exception of eight parking spaces reserved for police vehicles and City officials along the southern side of Broadway between Lander Street and Johnston Street. Metered parking along Broadway charges \$0.25 per half hour, and is restricted by a two hour time limit.

During the morning observation period, parking data was collected for the entire study area as shown in Figure 7. During the morning observation hour, counts were collected at two discrete times for each block segment. The parking inventory identified a supply of 167 on-street spaces within the study area; 159 metered public spaces, and 8 reserved spaces.

Morning Peak Period

In the morning observation period, peak utilization along the entire five blocks reached a high of 32% with an average utilization of 28%. On average, utilization increased towards the second half of the observation hour. Examining each block face individually, utilization reached a high of 71% on the south side of Broadway between Chambers Street and Landers Street (vacancy rate of 29%). The second highest utilization percentage of 61% occurred on the north side of Broadway along the block face between Johnston and Miller Street (vacancy rate of 39%). While each of these segments experienced relatively high utilization compared to other block segments within the study area, it is important to note that neither exceeds the recommended maximum occupancy per block face of 85-90%.⁵

Midday Period

Parking data was collected on both the north and south side of Broadway, along the four block-segments between Grand Street and Johnston Street. Parking counts were collected once for each segment observed within the midday observation hour. The parking inventory identified a supply of 130 on-street spaces within the observed area; 122 metered public spaces, and 8 reserved spaces.

⁵ Nelson/Nygaard Consulting Associates Inc. City of Portsmouth, NH Parking Supply and Demand Analysis. (January 2012). <http://www.cityofportsmouth.com/transportation/reportdowntownparkingfinalreport.pdf>

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In the midday observation period, peak utilization along the entire four observed blocks reached a high of 65%. Examining each block face individually, utilization reached a high of 93% on the south side of Broadway between Chambers Street and Landers Street. The second highest utilization percentage of 89% occurred on the north side of the same block. The midday peak utilization for this block is significantly high and close to exceeding the recommended vacancy per block face. However, it is important to note that if that block is removed from the calculation, the peak utilization on remaining blocks only reaches 54%. Thus, while it may seem that parking is undersupplied on that particular block segment during the midday observation hour, there is a large underutilized supply of parking on immediately adjacent blocks.

Evening Peak Period

During the evening peak period, parking data was collected only for the segment of Broadway between Grand and Liberty. The number of parked vehicles was observed and recorded at four points within the one-hour observation period. Utilization on the block reached a high of 21%, with an average utilization of 14% throughout the hour.

Summary & Further Research

Based on the data collection effort, the study area's peak utilization occurs near midday (1:00 p.m. – 2:00 p.m.) on typical weekday. Further research would strengthen this notion including but not limited to weekend utilization data and data collected over a longer observation period, such as a 12-hour period from 7am until 7pm.

Transit Services and Utilization Levels

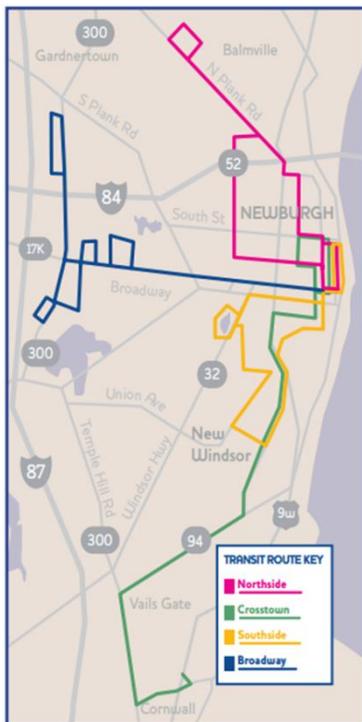
Newburgh’s current transit service is confusing, poorly marked, and infrequent. As summarized in the table below, the Broadway corridor is served by a variety of local and region-serving routes, none of which provide a reliable transit option in Newburgh’s downtown for residents, workers, or visitors.

Figure 7. Local and Regional Transit Service in Newburgh Area

ROUTE	OPERATOR	SERVICE TO THE BROADWAY CORRIDOR
New Paltz to Newburgh X Line	Ulster County	<ul style="list-style-type: none"> Passes through Broadway but does not stop along Broadway; Only four runs a day.
Newburgh Local Service	Transit Orange/ Leprechaun Lines	<ul style="list-style-type: none"> North-south lines and east-westline all stop at Broadway & Liberty for transfer Service every 30 minutes on Broadway Line Service every 90 minutes on Crosstown Line
Newburgh Beacon Stewart Shuttle	Leprechaun Lines	<ul style="list-style-type: none"> Service limited to commuting hours Serves Liberty and Robinson

Local Bus Service on Broadway

Figure 8. Newburgh Local Bus Routes



Source: Orange County Transportation and Leprechaun Lines

Operated by Newburgh Area Transit, the local bus network was extended in December of 2014 to incorporate four lines to serve the City of Newburgh (Figure 9)⁶. The bus service runs Monday thru Friday, 6:50 AM to 7:00 PM and Saturday 7:50 AM to 7:00 PM except on major holidays. The major bus stop within the study area is at the intersection of Liberty Street and Broadway. At this location, riders can board the Broadway line for east-west access along Broadway, or the Crosstown line for southern access along Liberty Street. Service runs every 30 minutes on the Broadway line, and every 90 minutes on the Crosstown line.

Additionally, Newburgh Beacon Bus Corporation operates a commuter shuttle that connects the Beacon Metro North Station with the City of Newburgh as well as the 17K Park and Ride Lot in the Town of Newburgh. However, the service is infrequent. Service is limited to commuting hours and stops at Liberty Street and Robinson Street.

Service & Utilization Levels

In order to assess transit utilization within the study area, the project team observed the number of boardings and alightings that occurred during the morning peak period (8:00am-9:00am) and midday period (1:00pm-2:00pm) near the intersection of Broadway and Liberty Street within the study area on a typical weekday (Tuesday, August 5th, 2015). In the morning peak period, a total

⁶ Newburgh Area Transit Service Expansion December 2014. <http://transitorange.info/about-us/Newburgh%20Expansion.html>

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of 8 buses were recorded stopping within or near the intersection of Liberty Street and Broadway. During this time, a total of 10 boardings and 6 alightings were recorded. A total of 8 buses were also recorded stopping in or near the intersection during the midday observation period, with 14 boardings and 8 alightings.

Bike and Pedestrian Utilization

Pedestrian Counts

Pedestrian counts were collected at the intersection of Broadway and Liberty Street. Data was collected in one-hour increments at three points throughout the day; morning peak period, midday, and evening peak period. In the morning and midday period, pedestrian counts were recorded for pedestrians travelling through the intersection in all directions. In the evening period, data was recorded only for pedestrians travelling westbound on Broadway.

The total volume of pedestrians counted in the study area throughout all three observation periods was 358. In the morning and midday periods, a total of 99 and 190 pedestrians were recorded passing through the intersection, respectively. A total of 69 pedestrians were recorded travelling westbound on Broadway during the evening observation period.

Overall, midday counts in all directions were higher than morning counts. In both the morning and midday periods, the majority of observed pedestrians were travelling east and west, along Broadway. Although only partial data was collected in the evening period, the relatively high volume of pedestrian travelling in a single direction suggests that evening pedestrian activity may be equal to if not greater than midday volumes.

Figure 9. Pedestrian Counts Collected at Intersection of Broadway and Liberty Street (July 2015)

Pedestrian Counts						
Time	Position	North	South	East	West	Total
AM	SE	7	7	13	14	41
AM	NE	15	2	16	25	58
MID	SE	8	30	25	26	89
MID	NE	25	7	26	43	101
PM	NE	NA	NA	NA	69	69
					Total	358

Mid-Block Crossing

To investigate the necessity of installing a proposed mid-block crossing at the intersection of Chambers Street and Broadway, pedestrian crossing data was collected in one-hour increments in the morning (8:00-9:00a.m.), and during the lunch period (1:00 p.m. - 2:00 p.m.). During the morning observation period, a total of 59 pedestrians were recorded illegally crossing the Broadway at midblock, 35 northbound and 24 southbound. During the midday observation period, a total of 110 pedestrians were recorded crossing Broadway at midblock, 47 northbound and 63 southbound.

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Figure 10. Number of Pedestrians Crossing Broadway Illegally at Mid-block near Chambers Street (July 2015)

Mid-block Crossing Counts				
Time	Position	North	South	Total
AM	N	35	24	59
MID	S	47	63	110

Bike Counts

Bike counts were collected at the intersection of Broadway and Liberty Avenue in one-hour increments during the morning (8:00 a.m. – 9:00 a.m.), the lunch period (1:00 p.m. – 2:00 p.m.), and in the evening (5:00 p.m. – 6:00 p.m.). In the morning and midday observation periods, counts were recorded for bikes travelling through the intersection in all directions. In the evening observation period, counts were recorded only for bicycles travelling westbound on Broadway and Southbound on Liberty.

In total, 21 bicycles were recorded passing through the intersection throughout all three observation periods. Bike volume remained relatively steady throughout the day (6 per hour) with a slight increase in the evening observation period (9). Overall, an average of 7 bicycles per hour were recorded passing through the intersection.

Figure 11. Bicycle Counts Collected at Intersection of Broadway and Liberty Street (July 2015)

Bicycle Counts						
Time	Position	North	South	East	West	Total
AM	SE	0	2	1	2	5
AM	NE	0	0	1	0	1
MID	SE	2	0	1	1	4
MID	NE	1	0	0	1	2
PM	NE	1	NA	NA	4	5
PM	NW	NA	4	NA	NA	4
Total						21

Zoning and Land Use

Presented below is a summary description of current land uses and zoning in the core study area and surrounding neighborhoods. For a full inventory of land uses in the City of Newburgh, see Newburgh Land Use and Market Analysis.

Existing Land Uses in Study Area

Figure 13 presents existing land uses in the area surrounding the core study area, outlined in red. Two-family and three-family homes are clustered in the city's downtown near the core study area, with apartment buildings scattered throughout. Commercial, single-family homes, and larger apartment complex are found east of the study area along the city's waterfront. Commercial and industrial uses are found throughout the city. However, there is a greater concentration of commercial and industrial uses along and below Broadway. Civic uses including governmental services as well as colleges (SUNY Orange and Mount Saint Mary College) are located in the city's eastern end, from Dubois Street to the waterfront.

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The land uses within the core study area of Broadway consist of civic, recreation, and retail uses on ground floors with warehouse, office, and residential space on upper stories. Residential uses prevail in the neighborhoods to the North and South of the study area.

Figure 12. Existing Land Use in Study Area



Source: BFJ Planning

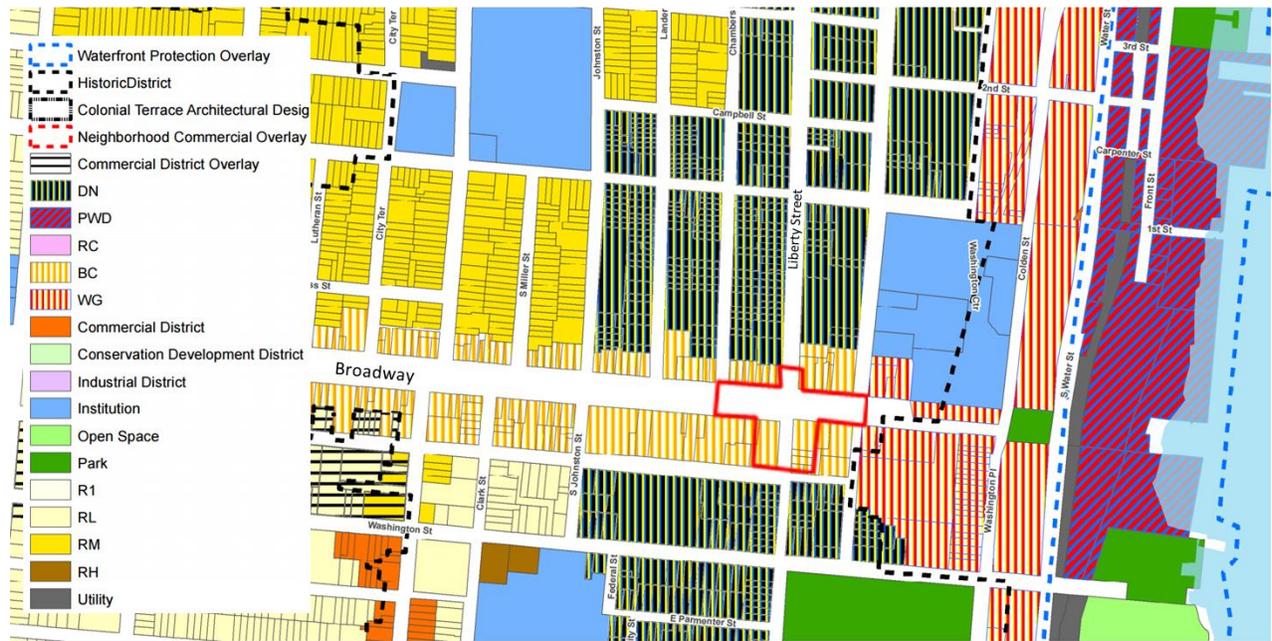
Existing Zoning in Study Area

In July of 2015, Newburgh City Council voted unanimously to approve a zoning update that became effective in September 2015. As part of the rezoning, the City of Newburgh utilized a Form-Based Zoning approach in order to promote a more urban, walkable, and vibrant downtown⁷. The length of Broadway from West Street to Grand Street is designated as the Broadway Corridor Zone (BC), a form-based district designated as a transit corridor intended for public transit uses and public open space, with a focus of drawing commercial activity to the main thoroughfare. Mixed use growth is designated for almost the full extent of Lower Broadway. The neighborhoods to the North and South of the study area are designated as the Downtown Neighborhood Zone (DN), which contains allocations for higher residential densities such a row houses and mixed-use buildings.

⁷ City of Newburgh (2015). Article XV of the Zoning Ordinance Form-Based Code: Downtown Districts and Waterfront. <http://ecode360.com/attachment/NE1082/NE1082-300.pdf>

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Figure 13. Existing Zoning in Study Area



Source: City of Newburgh Planning Department⁸

Retail Activity and Economic Indicators

As part of New York State’s Community, Opportunity, Reinvestment (CORe) Initiative, the following tables were produced for the CORe Neighborhoods in Newburgh and published in the 2015 Progress Report⁹. The identified CORe Neighborhoods within Newburgh are census tracts 4, 5.01, 5.02, clustered on the East End of Newburgh. Census tracts 4 and 5.01 share a boarder along Broadway, extending directly through the center of the core study area.

The 2015 Progress Report reports on a range of economic prosperity indicators¹⁰; a sample of two are depicted in Figures 15 and 16. Longitudinal data for the change in monthly new hires in Newburgh’s CORe Neighborhoods and the greater City of Newburgh are depicted in Figure 15. Overall, the total number of new hires in Newburgh and in the CORe Neighborhoods specifically has declined 31% and 37% respectively since October 2014. Despite a decrease in monthly new hires, the year of 2014 experienced slight increase in total employment numbers (see Figure 16).

⁸ http://www.cityofnewburgh-ny.gov/sites/newburghny/files/u98/rezoning_map.pdf

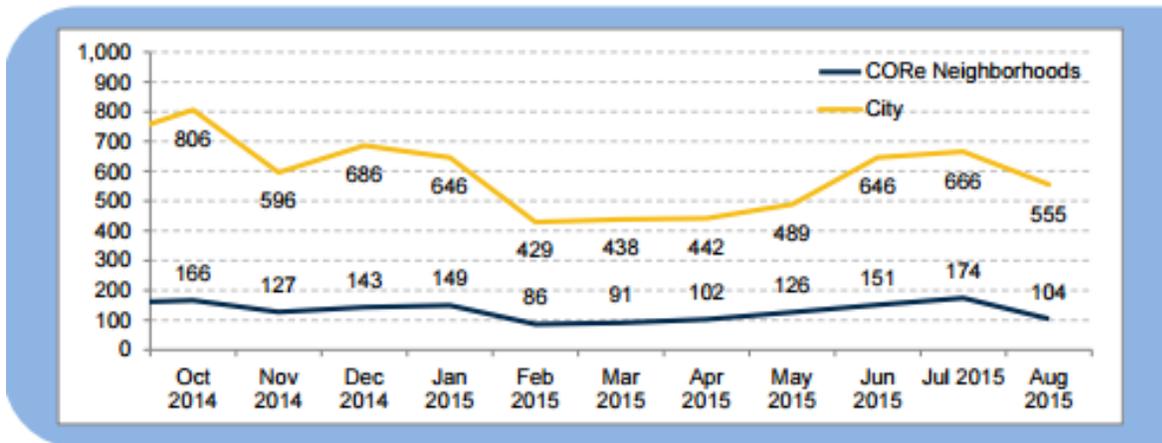
⁹ New York State Community, Opportunity, Reinvestment (CORe) Initiative. 2015 Progress Report. (July 29, 2015)

https://www.ny.gov/sites/ny.gov/files/atoms/files/CORE%202015%20Report_Final_072915.pdf

¹⁰ Other economic prosperity indicators in 2015 Progress Report include: Percent and Number of People Collecting Unemployment Insurance, Unemployment Rate, Total Employment, Percent and Number of People Receiving TANF/Safety Net benefits, Percent and Number of People Receiving SNAP Benefits, Number of TANF/Safety Net Recipients Entering Jobs, Percent and Number of People Enrolled in Medicaid, Monthly New Hires, Average Weekly Wage, and Percent of People Below the Poverty Line Before Public Assistance.

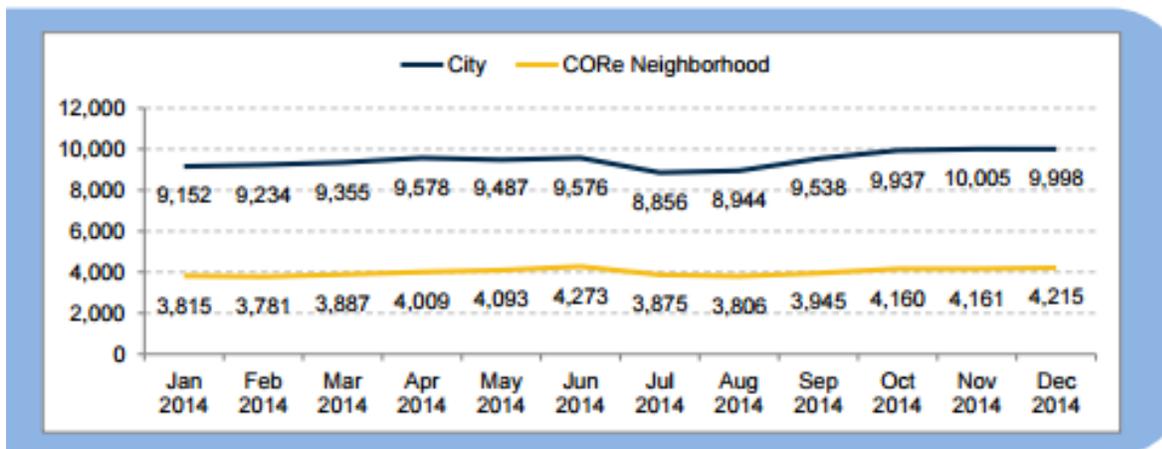
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Figure 14. Monthly New Hires in Newburgh and CORE Neighborhoods between October 2014 and August 2015



Source: New York State

Figure 15. Total Employment in Newburgh and CORE Neighborhoods for 2014



Source: New York State

Prior to the implementation of complete streets interventions within the core study area, and eventually throughout Downtown Newburgh along Broadway, specific data should be collected to set a benchmark of economic vitality along the corridor prior to treatment. Recording data for indicators such as those utilized by the CORE Initiative and New York City Department of Transportation¹¹ will allow the City of Newburgh to track the successes and shortcomings of various complete streets interventions. The importance of performance evaluation is further discussed in Section VIII: Implementation Barriers and Solutions.

Additional metrics utilized by New York City’s Department of Transportation to measure the economic vitality benefits of complete streets interventions include total number of businesses, retail sales, and visitor spending. The various data sources and strengths of these indicators are depicted in Figure 17.

¹¹ NYC DOT research on the Economic Benefits of Sustainable Streets offers insight into recording retail uptake effects of complete streets. <http://www.nyc.gov/html/dot/downloads/pdf/dot-economic-benefits-of-sustainable-streets.pdf>

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Figure 16. Economic Data Sources Considered for Analysis by NYC DOT

Data Source	Selected for Analysis	Pros	Cons	Source Strength
Retail Sales Tax Filings	Yes (Full)	<ul style="list-style-type: none"> Strong, direct indicator of business vitality Data available at the individual business level Good proxy for overall neighborhood economy 	<ul style="list-style-type: none"> Multiple variables affect retail sales Confidentiality limitations reduce data availability Privacy restrictions require significant data cleaning 	Strong
Commercial Leases & Rents	Yes (Limited)	<ul style="list-style-type: none"> Retail rents are strong indicator Good proxy for overall neighborhood economy 	<ul style="list-style-type: none"> Insufficient sample sizes Limited availability (3rd party firms) Historic data difficult to obtain 	Moderate
City-Assessed Market Value	Yes (Limited)	<ul style="list-style-type: none"> Moderate indicator Readily available data Data contains market value for most properties 	<ul style="list-style-type: none"> Obscure methodology Infrequently updated 	Moderate
Real Estate Transactions & Market Sales	No	<ul style="list-style-type: none"> Data includes sale price and date 	<ul style="list-style-type: none"> Insufficient sample size over short time period 	Weak
Business Establishment Creation/Loss *Local	No	<ul style="list-style-type: none"> Moderate indicator 	<ul style="list-style-type: none"> Poor availability of data due to time lag Insufficient sample size 	Weak
Business Establishment Creation/Loss *Federal	No	<ul style="list-style-type: none"> Moderate indicator 	<ul style="list-style-type: none"> Data not available at granular level 	Weak
Employment	No	<ul style="list-style-type: none"> Moderate indicator 	<ul style="list-style-type: none"> Data difficult to obtain at the neighborhood level 	Weak
Building Permits	No	<ul style="list-style-type: none"> Readily available data Large and multifaceted data source 	<ul style="list-style-type: none"> Weak indicator Data cleaning is too onerous for this type of study 	Weak

Source: New York City Department of Transportation

SECTION II: PRIOR PLANNING

Newburgh has engaged numerous consulting firms to advise the city on its revitalization process. Two prior planning initiatives that are specifically relevant to the implementation of a complete streets policy along Broadway are the Waterfront Master Plan¹² and the Broadway Corridor Improvement Plan¹³. The objective and work product of each study is summarized below.

Waterfront Master Plan, 2007

The Waterfront Master Plan was designed as part of a public-private-partnership between the City of Newburgh and Duany Plater-Zyberk & Company. The project aimed to rejuvenate 30 acres of waterfront area lost to the Urban Renewal movement of the 1960s. The design includes over five hundred residential units, a hotel, office space, a fishers' market, and civic space such as a pedestrian promenade and amphitheater. In order to connect the new waterfront development with the existing downtown area, the project includes a reconfiguration of Broadway in order to create a pedestrian-friendly and vibrant main street with public plazas, diverse retail businesses, and rapid transit connection to the nearby airport. This project was not advanced forward.

Broadway Corridor Improvement, 2012

In 2012, the Orange County Planning Department issued a study on potential improvements for the Broadway corridor. These improvements were meant to rehabilitate and restructure Broadway while also enhancing the economic development of the City of Newburgh. Goals included making the corridor more pedestrian friendly, improving safety, providing an appropriate amount of parking, providing adequate road capacity, and incorporating green elements.

Newburgh held public design workshops to discuss various plans and concepts for improving Broadway. Complete streets design elements usually include streetscape improvements, improve pedestrian mobility and safety, allow for safe bicycle traffic, introduce bus transit lanes, and allocate parking. These elements were all discussed and considered. The goal was to combine these elements in a way that best meets the needs and enhances the efficiency of Broadway. The planning process also included a review of prior plans (such as PLAN-IT Newburgh Sustainable Master Plan," Land Use Plan, and the "Newburgh Waterfront Charrette").

Five schematic concepts were proposed as alternatives for improving the Broadway/17K corridor. Each of these concepts is summarized in the table below. More details about each concept follow.

¹² City of Newburgh. Waterfront Master Plan (2007). Prepared by Duany Plater-Zyberk & Company <http://www.dpz.com/Projects/0635>

¹³ Orange County Planning Department. Newburgh Area Transportation & Land Use Study –m Broadway Conceptual Design Study (January 30, 2012). Prepared by AKRF, Inc. http://www.orangecountygov.com/filestorage/124/9893/10054/9897/BroadwayReport_20120128_FINAL.pdf

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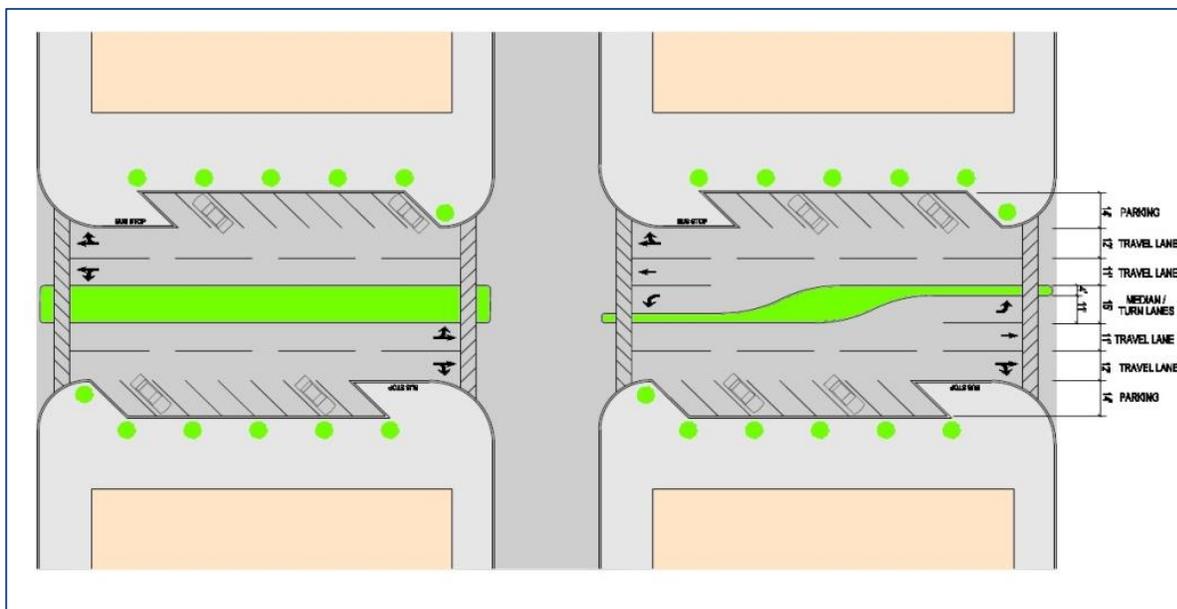
Broadway Design Concepts						
Concept	Median	Parking	Travel lanes	Bicycle lanes	Designated turn lanes	Streetscape Improvements
Concept 1	15-foot median	Angled	Two in both directions		Left turn lanes at key locations	Yes
Concept 2	15-foot median	Angled	Two in both directions (one a shared travel lane)	Shared travel lane with buses and cars making right turns	Right turn lane in both directions; left turn lane at key locations	Yes
Concept 3	18-foot wide	Parallel	2 in both directions	Separate lane between parking and traffic	Left turn lanes at key locations	Yes
Concept 4	27-foot wide	Parallel	1 in both directions	Separate lane at sidewalk	Left turn lane at each intersection	Yes
Concept 5	17-foot wide	Mix	2 in both directions	Mix of separate and shared lanes		Yes

Broadway Concept 1

Maintain the current arrangement of travel lanes and angles parking but introduce a variable width median.

- In this concept, the only major change would be the introduction of a 15-foot wide median with streetscaping and curb bump-outs.
- The median shortens pedestrian crossings and allows for a left turn lane at key intersections.
- It also incorporates sidewalk streetscaping (as do all 5 concepts).

Figure 17. Broadway Concept 1



Source: Orange County Planning Department / AKRF, Inc.

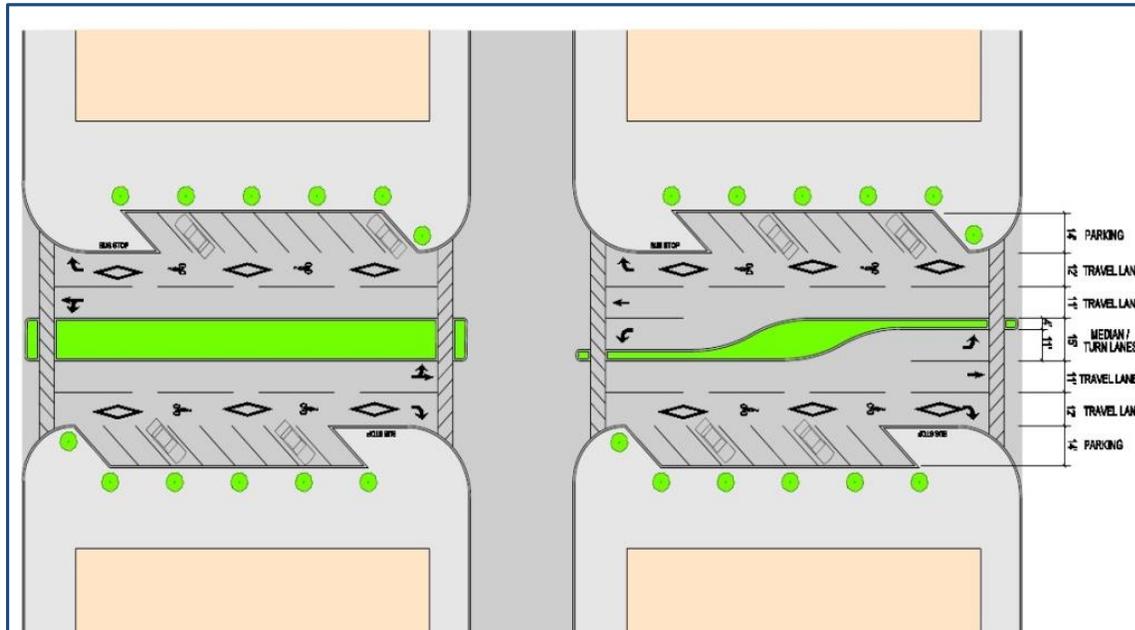
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Broadway Concept 2

Maintain the current arrangement of travel lanes and angled parking but introduce a shared bicycle lane and variable width median.

- In this concept, a transit lane is introduced in both directions that would accommodate bicycles, buses, and right turns.
- A 15-foot median would also be introduced with streetscaping and curb bump-outs.
- The median shortens pedestrian crossings and allows for a left turn lane at key intersections.

Figure 18. Broadway Concept 2



Source: Orange County Planning Department / AKRF, Inc.

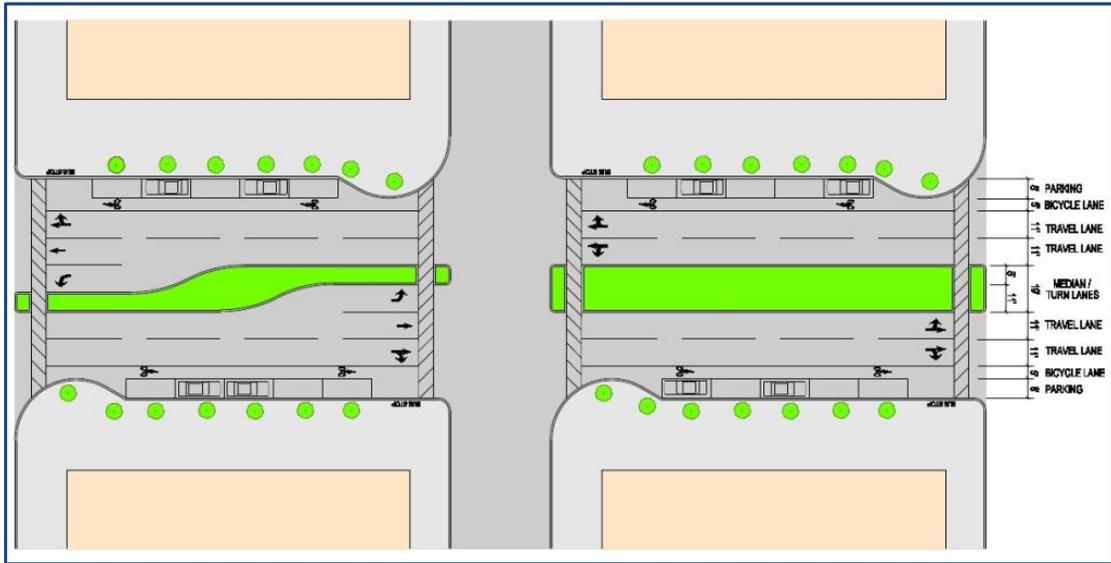
Broadway Concept 3

Retain the current arrangement of two travel lanes in each direction, but switch the parking to parallel parking and use the additional space for a shared bicycle lane.

- In this concept, the key change is the switch from angled parking to parallel parking.
- This decreases the number of available parking spaces but the extra space allows for the inclusion of a transit lane in both directions that would accommodate bicycles, buses, and right turns.
- This concept includes an 18-foot median with streetscaping and curb bump-outs.
- The median shortens pedestrian crossings and allows for a left turn lane at key intersections.

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Figure 19. Broadway Concept 3



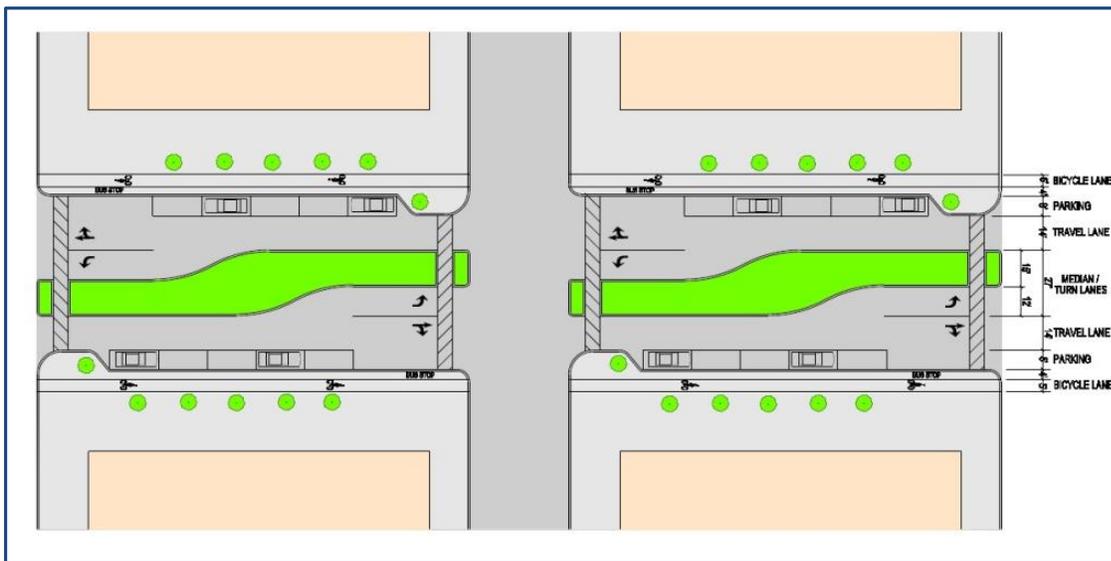
Source: Orange County Planning Department / AKRF, Inc.

Broadway Concept 4

Reduce the number of travel lanes to one in each direction, switch the parking to parallel parking and introduce a green median and a bike lane between the parking lane and sidewalk.

- In this concept, the two key changes are the switch from angled parking to parallel parking and the reduction in travel lanes in both directions from two to one.
- The extra space from the parking allows for a 27-foot wide median with streetscaping and curb bump-outs.
- In this concept, there would be left turn lanes at every intersection. The concept also includes a bike lane next to the sidewalk that is totally separate from pedestrian and traffic.

Figure 20. Broadway Concept 4



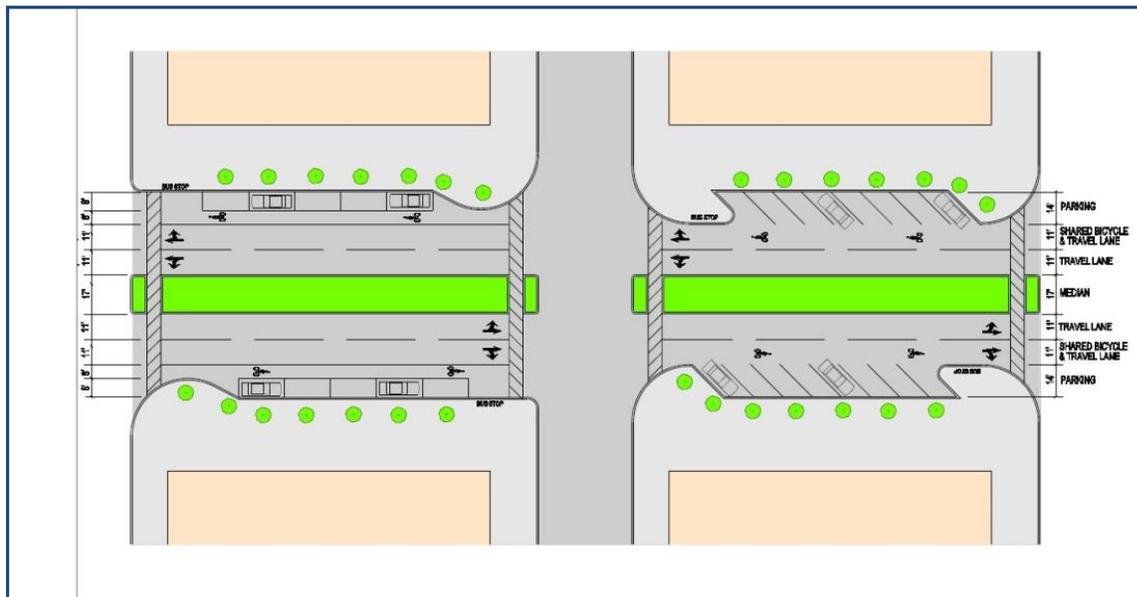
Source: Orange County Planning Department / AKRF, Inc.

Broadway Concept 5

Retain two travel lanes in each direction and consider a combination of parallel parking with bike lane and angled parking with a shared travel/bicycle lane. Provide a consistent 17-foot wide median.

- In this concept, parking is a mix of angled or parallel parking.
- Where parking is parallel, there would be a bike lane next to the sidewalk that is totally separate from pedestrians and traffic and where parking is angled, there would be a shared vehicle and bike lane.
- This concept includes a 17-foot wide median.

Figure 21. Broadway Concept 5



Source: Orange County Planning Department / AKRF, Inc.

SECTION III: 2015 CONCEPTUAL PLANS

Based upon a combination of site analysis as well as a review of the prior conceptual plans for Broadway, the project team developed four conceptual plans for introducing complete streets elements into the study area. Initially the scenarios were developed as operational plans focused on the allocation of right of way and the movement of various modes of transportation through the Broadway corridor. These operational plans were then translated by the Newburgh Land Bank into formal design drawings that included more detailed street segments as well as photo illustrations showing the proposed concept in elevation view. Provided below is a summary table of the four concepts as well as the existing conditions. The table shows comparatively how the scale of change for each concept becomes progressively more complex, beginning with a simple informational change that simply supports the sharing of the road and culminating in a far more ambitious scenario featuring a dedicated transitway. However, none of the four scenarios require extensive changes to the curbs or alterations to the width of the sidewalk.

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Figure 22. Summary of 2015 Conceptual Plans

	EXISTING	CONCEPT 1	CONCEPT 2	CONCEPT 3	CONCEPT 4
Alternative		Share the Road	Reallocated Right of Way	Main Street as Public Street	Enhanced Bus Service
Impact		Minimal	Moderate	Significant	Significant
Permanent Curb Cut Changes		None	None	None	None
Operational Changes		None	Minimal	Significant	Significant
Lanes	2EB, 2WB	2EB, 2WB	2EB, 2WB	1EB, 1WB	1EB,1EB
Crossways	Need Striping	Restriped	Pedestrian Refuge	Large Median	Pedestrian Refuge
Bike Infrastructure	None	Sharrows	Bike Lanes	Bike Path	None
Street Furniture	Minimal	Movable Planters	Movable Planters	Street Trees Bike Racks, Benches	Street Trees, Transit Shelters
Green Infrastructure	None	Permeable Parklet	Street Trees, Permeable Parklet and Curb Extensions	Street Trees, Permeable Parklet and Curb Extensions, Bikepaths	Street Trees, Transitway, Permeable Transit Parklet

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Concept 1 Share the Road

Under Concept 1, Share the Road, the overall operation of Broadway remains largely unchanged. The travel lanes are restriped with share the road icons indicating that the road is intended for use by both automobile drivers and bicyclists. Movable planters and parklets are provided as part of Concept 1.

Figure 23. Share the Road Concept



Source: Newburgh Land Bank

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Concept 2 Reallocated Right of Way

Under Concept 2, the right of way is reallocated in order to provide a pedestrian refuge and dedicated bike lanes. Space for the refuge is provided by changing the parking from perpendicular to parallel. As in Concept 1, planters and parklets are provided. In addition, curb extensions are proposed for key intersections.

Figure 24. Reallocated Right of Way Concept



Source: Newburgh Land Bank

Concept 3 Main Street as Public Street

Under Concept 3, Broadway's potential to enhance the public realm is emphasized. The pedestrian refuge from Concept 2 is considerably expanded to include a much larger pedestrian median. A dedicated bike path, buffered from both parking and moving vehicular traffic, would ensure a safe and pleasant experience for bicyclists. In order to accommodate the central pedestrian median, the bike path, and planting strips acting as buffers, one travel lane would be removed from each direction of Broadway. Parallel parking would be provided on both sides of Broadway.

Figure 25. Main Street as Public Street Concept

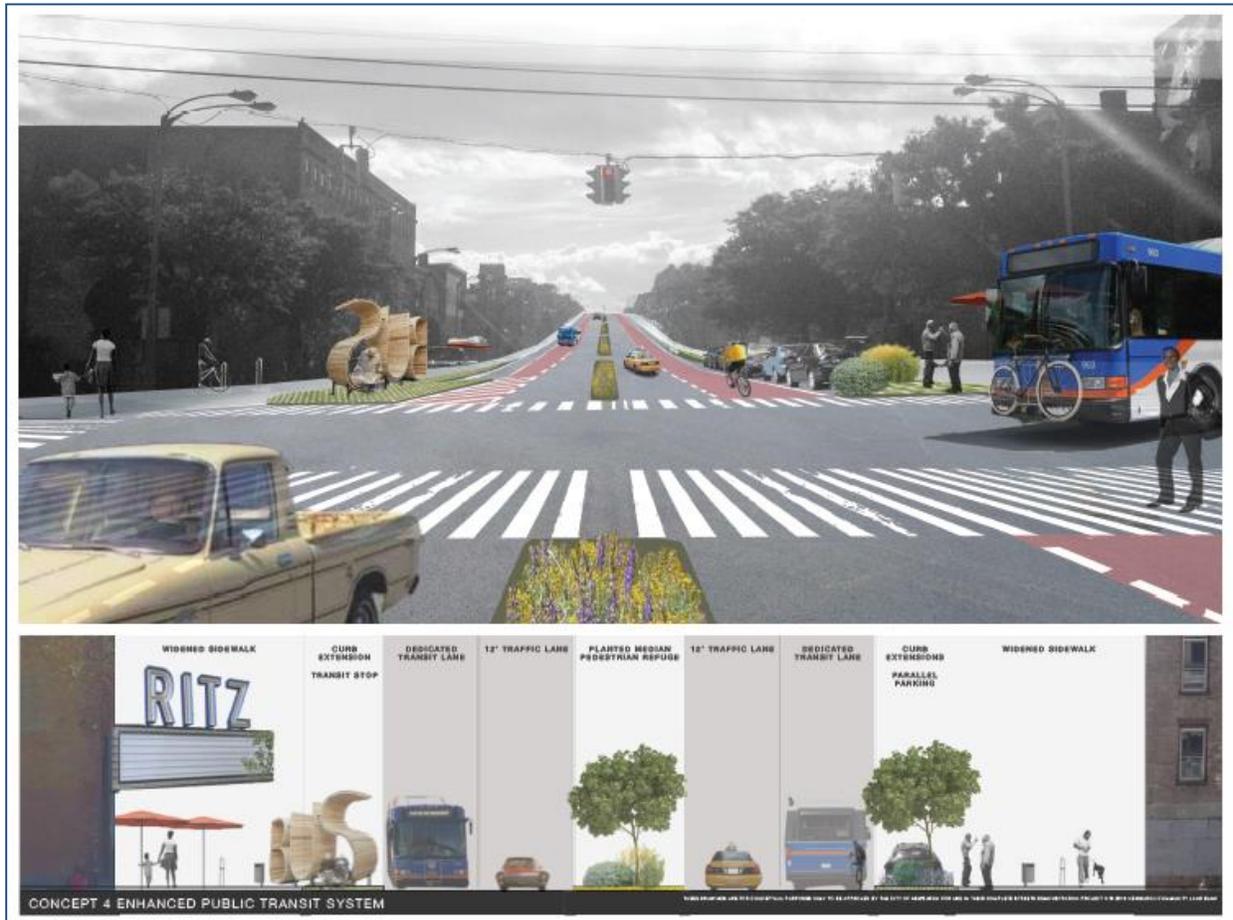


Source: Newburgh Land Bank

Concept 4 Enhanced Public Transit System

Under Concept 4, a dedicated transitway would be provided along the length of Broadway. The transitway would be usable only by buses and bicyclists. Cars, however, would be prohibited from using the transitway, which would be painted a unique color in order to distinguish it from the vehicular travel lanes. Concept 4 does not feature a dedicated bike lane or a bike path. In order to accommodate the transit access, one vehicular travel lane would be removed in each direction. Parallel parking would be provided on both sides of the street.

Figure 26. Enhanced Public Transit System Concept



Source: Newburgh Land Bank

SECTION IV: EVALUATION OF CONCEPTUAL PLANS

The project team evaluated the four projects through a comprehensive public outreach event held on Broadway itself as part of the Newburgh Illuminated event in June 2015. The table below presents a summary of the feedback received on the four conceptual plans.

CONCEPT 1	CONCEPT 2	CONCEPT 3	CONCEPT 4
Share the Road	Reallocate Right of Way	Main Street as Public Street	Enhanced Transitway
LIKES			
<ul style="list-style-type: none"> ▪ Beautiful (3) ▪ Love green spaces 	<ul style="list-style-type: none"> ▪ Love Bike lanes (4) ▪ Bike racks 	<ul style="list-style-type: none"> ▪ Like green ▪ Clear striping (enhances pedestrian safety) 	<ul style="list-style-type: none"> ▪ Makes the sidewalk cool ▪ Beautiful
<ul style="list-style-type: none"> ▪ Great for kids 	<ul style="list-style-type: none"> ▪ Keeping sidewalks the same 	<ul style="list-style-type: none"> ▪ Love it (2) 	<ul style="list-style-type: none"> ▪ Love this one (7)
<ul style="list-style-type: none"> ▪ Will bring jobs 	<ul style="list-style-type: none"> ▪ Love parallel parking (3) 	<ul style="list-style-type: none"> ▪ Flowers always welcome (2) 	<ul style="list-style-type: none"> ▪ Removing head-in parking will make road safer (2)
<ul style="list-style-type: none"> ▪ Very accessible 	<ul style="list-style-type: none"> ▪ Love parklet (9) 	<ul style="list-style-type: none"> ▪ Beautiful (2) 	<ul style="list-style-type: none"> ▪ Like center median (4)
<ul style="list-style-type: none"> ▪ Like pocket park (5) as an outdoor space for gathering and eating 	<ul style="list-style-type: none"> ▪ Like Center Strip Ped Refuge (7) 	<ul style="list-style-type: none"> ▪ Like Median (6) 	<ul style="list-style-type: none"> ▪ Walking and biking will reduce congestion
<ul style="list-style-type: none"> ▪ Great for kids 	<ul style="list-style-type: none"> ▪ This is the best option (3) 	<ul style="list-style-type: none"> ▪ Like safety 	<ul style="list-style-type: none"> ▪ Like bike locks (4)
<ul style="list-style-type: none"> ▪ Love diagonal parking (more efficient) 	<ul style="list-style-type: none"> ▪ Great ideas (3) 	<ul style="list-style-type: none"> ▪ Beautification enhances community 	<ul style="list-style-type: none"> ▪ Like bus shelter (4)
<ul style="list-style-type: none"> ▪ Like crosswalk 	<ul style="list-style-type: none"> ▪ Like retention of two travel lanes (2) 	<ul style="list-style-type: none"> ▪ Like parklets 	<ul style="list-style-type: none"> ▪ Like transit/bikeway (4)
	<ul style="list-style-type: none"> ▪ Like striped crosswalk 	<ul style="list-style-type: none"> ▪ Like bike lanes (5); bike lane separated by divider is best (safest) option 	<ul style="list-style-type: none"> ▪ Like this best
		<ul style="list-style-type: none"> ▪ Better than what is already here 	
		<ul style="list-style-type: none"> ▪ Love this one the most (2) 	
DISLIKES			
<ul style="list-style-type: none"> ▪ Shared bike lanes are dangerous (2) 	<ul style="list-style-type: none"> ▪ Need to think about safety first 	<ul style="list-style-type: none"> ▪ Do not put center median 	<ul style="list-style-type: none"> ▪ Single lane traffic is impossible (think about morning commute hour)
<ul style="list-style-type: none"> ▪ No busses – too dangerous 	<ul style="list-style-type: none"> ▪ Curb extensions shrink Broadway, which is supposed to be a major street 	<ul style="list-style-type: none"> ▪ Blind spots 	
<ul style="list-style-type: none"> ▪ No protection of pedestrians in parklets from vehicles 	<ul style="list-style-type: none"> ▪ Need to think about snow removal (2) 	<ul style="list-style-type: none"> ▪ Median separating bike lane and parking lane from travel lanes blocks traffic 	
<ul style="list-style-type: none"> ▪ Cars Reversing into traffic 		<ul style="list-style-type: none"> ▪ Before you build, figure out how to keep the streets clear. 	
		<ul style="list-style-type: none"> ▪ Has been tried before on Broadway 	
		<ul style="list-style-type: none"> ▪ Not a big fan of planters 	
		<ul style="list-style-type: none"> ▪ Maintenance problems (snow removal (2), weeding) 	
		<ul style="list-style-type: none"> ▪ Installation will attract kids and become dangerous 	
		<ul style="list-style-type: none"> ▪ May not be enough parking 	
SUGGESTIONS			
<ul style="list-style-type: none"> ▪ Close Lower Broadway on Sundays for Open Market 	<ul style="list-style-type: none"> ▪ More garbage/recycling cans to combat litter 	<ul style="list-style-type: none"> ▪ Talk with Citibank about NYC Bike Share program 	<ul style="list-style-type: none"> ▪ Need a bike shop

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<ul style="list-style-type: none"> ▪ Parks should be open for the public with increased security 	<ul style="list-style-type: none"> ▪ Make parking free 	<ul style="list-style-type: none"> ▪ Plant native trees in the median between cars and bike lanes to shade bicyclists and parked cars; and to reduce heat vortex 	<ul style="list-style-type: none"> ▪ Street art and kiosks
<ul style="list-style-type: none"> ▪ Stores open all night 	<ul style="list-style-type: none"> ▪ Install speed bumps 	<ul style="list-style-type: none"> ▪ Provide a single lane of traffic but instead of using the extra space for a median, extend the sidewalk through a continuous fill length parklet 	<ul style="list-style-type: none"> ▪ Include benches with umbrellas
<ul style="list-style-type: none"> ▪ Significantly narrow the roadway 	<ul style="list-style-type: none"> ▪ Recycling 	<ul style="list-style-type: none"> ▪ Newburgh needs more flowers and greenery (2) 	<ul style="list-style-type: none"> ▪ Add city insignia to bus shelter
<ul style="list-style-type: none"> ▪ More outdoor dining that will encourage people to stay. 	<ul style="list-style-type: none"> ▪ Curb Extensions 	<ul style="list-style-type: none"> ▪ Preserve Newburgh’s historic architecture 	<ul style="list-style-type: none"> ▪ Get a trolley (SF style)
<ul style="list-style-type: none"> ▪ Need individual bike lanes 	<ul style="list-style-type: none"> ▪ Broadway needs less stores that are devoted to selling insurance and more places that promote community 	<ul style="list-style-type: none"> ▪ Add trees to median (4) 	<ul style="list-style-type: none"> ▪ Add art to median (2)
	<ul style="list-style-type: none"> ▪ Covered bus shelters 	<ul style="list-style-type: none"> ▪ Need more crosswalks 	<ul style="list-style-type: none"> ▪ Add trees to median for environmental reasons
	<ul style="list-style-type: none"> ▪ Put parking between travel lanes and bike lanes 	<ul style="list-style-type: none"> ▪ Reduce speeds on Broadway 	<ul style="list-style-type: none"> ▪ Put umbrellas on sidewalks
	<ul style="list-style-type: none"> ▪ Do anything to make Broadway narrower 	<ul style="list-style-type: none"> ▪ Need wayfinding signage 	
	<ul style="list-style-type: none"> ▪ Add trees to median 	<ul style="list-style-type: none"> ▪ Add public art (2) 	
	<ul style="list-style-type: none"> ▪ Put lights in road bed at crosswalks 	<ul style="list-style-type: none"> ▪ Add Dancing Man Crosswalk 	
	<ul style="list-style-type: none"> ▪ Widen sidewalk 		

SECTION V: PROPOSED DESIGN

Following the review of the four conceptual drawings, the Land Bank proceeded to develop a new design intended to serve as the one that best responded to public need and desires. This scenario, as shown in the drawings below, entails the provision of a large central median. This median would include turning lanes at key intersections. As in Concept 3, the proposed design also features a dedicated bike path that is buffered from both moving traffic and parked vehicles through the introduction of a planting strip. One traffic lane is removed from each direction of Broadway in order to accommodate the median and the bike paths. However, the introduction of turning lanes is provided in order to forestall the possibility of major queuing at intersections that could result from eliminating a lane of traffic.

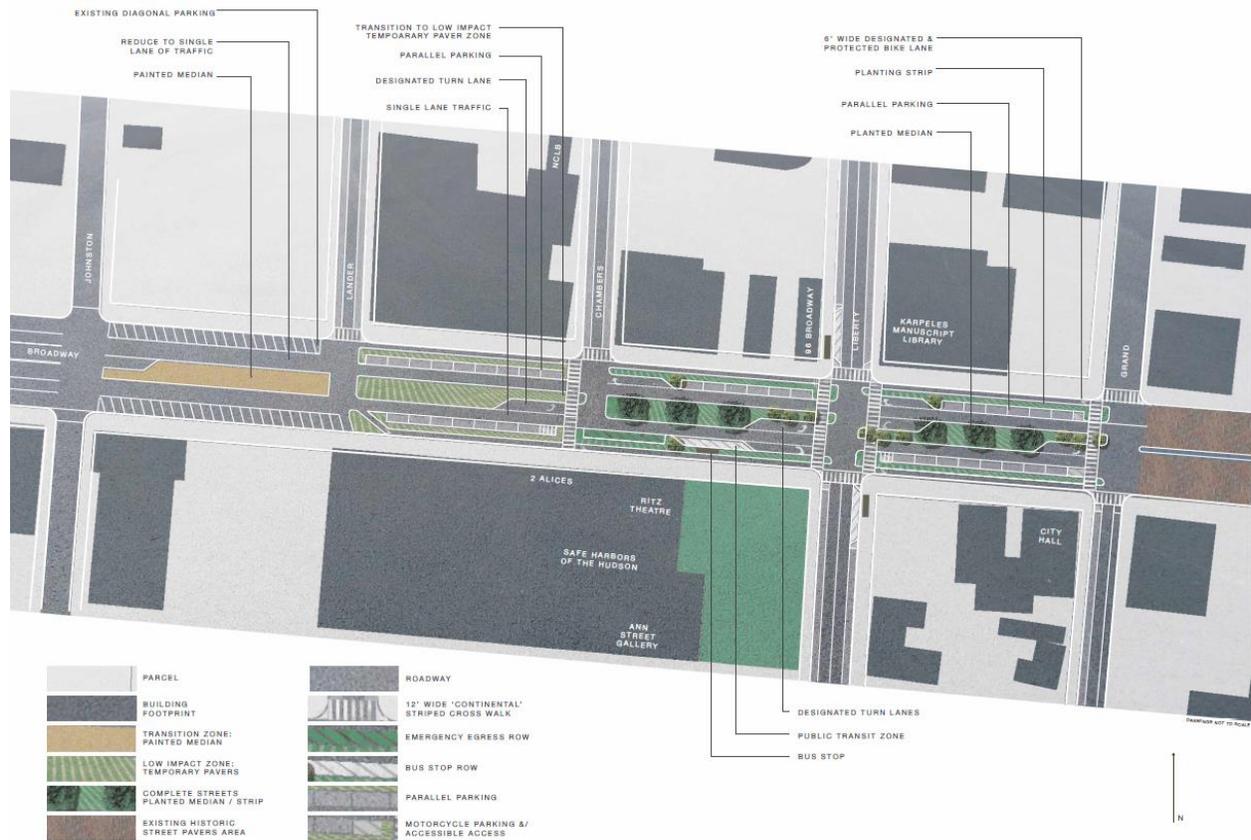
Figure 27. Illustrative View of Proposed Design



Source: Newburgh Land Bank

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Plan View of Proposed Design



CITY OF NEWBURGH - COMPLETE STREETS DEMONSTRATION PROJECT

THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES ONLY TO BE APPROVED BY THE CITY OF NEWBURGH FOR USE IN THEIR COMPLETE STREETS DEMONSTRATION PROJECT. © 2014 NEWBURGH COMMUNITY LAND BANK

Source: Newburgh Land Bank

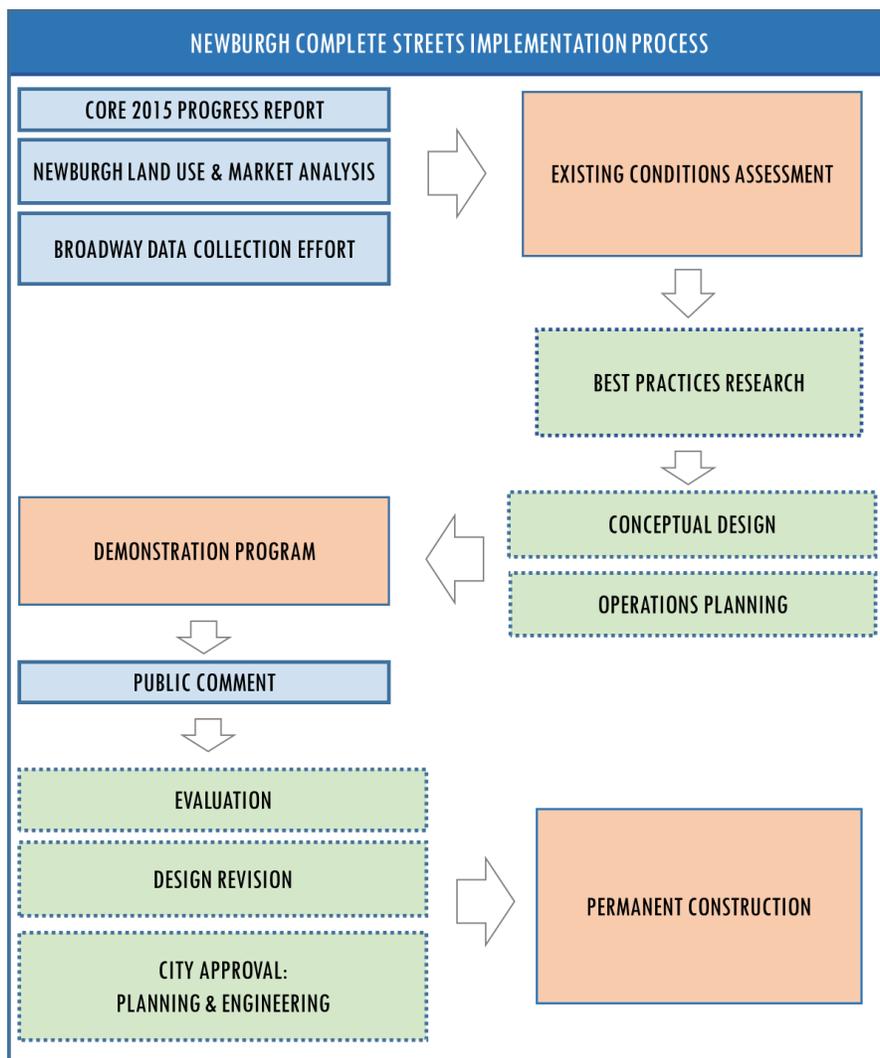
Street Section of Proposed Design



Source: Newburgh Land Bank

SECTION VI: IMPLEMENTATION PROCESS

The flow chart below provides a general road map for moving complete streets interventions through the implementation process. Various complete streets interventions may begin and move through the implementation process at different rates depending on the finalized short-term and long-term program goals. For example, low-cost temporary interventions such as parklets may progress to the construction phase relatively quickly, where as other components, such as shared lanes and midblock pedestrian crossings will require more time and inter-agency collaboration during earlier phases of the implementation process. The following section on implementation barriers and solutions will act as a guide for moving various complete streets interventions through the implementation process.



SECTION VII: IMPLEMENTATION BARRIERS & SOLUTIONS

Complete streets policy is a shift from the status quo, a fundamental change in the day-to-day responsibilities of municipal engineers and planners. As such, the changes demanded by complete streets are often met with hesitancy and skepticism. Existing literature thoroughly identifies these challenges and the ubiquitous barriers that many cities have faced when attempting to implement complete streets policies, while simultaneously highlighting the potential and immense benefit of overcoming them. There is no shortage of cities that have adopted and implemented complete streets policies and reported beneficial results including investment in new development, increased retail sales, and decreased injuries on the streets. Broadway, like many main streets across the nation, has the potential to be exponentially more than it currently is. The proposed redesign of the corridor aims to capitalize on Broadway's potential as a community asset and revitalize the once vibrant main street of Newburgh.

This section discusses the potential barriers a city may face when making the transition from the adoption of complete streets policy to implementation. More importantly, it aims to provide the tools and information necessary for overcoming such barriers. The barriers addressed in this chapter are not exhaustive, but rather aspects that have been specifically identified by the public and city staff of Newburgh. Barriers to the implementation of complete streets in Newburgh fall within three categories: safety and convenience, maintenance, and institutional inertia. The following sections will first introduce a specific complete streets intervention proposed for Broadway; its purpose, existing conditions, and proposed improvements. The barriers and concerns surrounding each intervention will then be discussed, followed by standards and examples for overcoming them.

Safety and Convenience Barriers

Concerns regarding the safety and convenience of particular complete streets components can become barriers to successful implementation if not proactively addressed and mediated. While not an exhaustive list, the following four components of complete streets can often engender concerns: 1) the safety of an unsignalized midblock crossing as opposed to a signalized crossing or absence of a midblock crossing; 2) the safety of a shared road where cyclists, pedestrians, and motor vehicles are operating in close proximity to one another; 3) the inconvenience of road congestion as an effect of "road diets" or the removal of a traffic lane; and 4) the inconvenience of converting angle parking into parallel parking to free up right-of-way space.

Unsignalized Midblock Crossing

Midblock crosswalks facilitate pedestrian crossings in an area where demand exists, but existing traffic infrastructure does not. Intervention commonly takes the form of a marked crosswalk placed equidistance between two intersections. Long city blocks, gaps in traffic, and the inconvenience of the nearest established crossing are all factors that may contribute to a pedestrian's decision to illegally cross the road at an undesignated location. Instead of travelling out of their way, pedestrians choose to cross the street using the most direct route, even if that means crossing several lanes of busy traffic. The installation of a midblock pedestrian crossing decreases random and unpredictable crossings that are associated with a high risk of collision.

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The proposed location of a midblock crossing in Newburgh is the intersection of Broadway and Chambers Street (see Figure 29). The site is located at a T-intersection where Chambers Street terminates at Broadway. As was indicated in the existing conditions chapter, a high volume of pedestrians cross Broadway at this location throughout the day making the installation of a midblock crossing a logical intervention. Guiding research highlights that installation of a midblock crossing is most suitable at locations where a high number of illegal pedestrian crossings acknowledges a non-existent, yet rational crossing, albeit dangerous¹⁴.

Figure 28. Intersection of Broadway and Chambers Street in Newburgh



Source: Google Earth

The short-term complete streets program for Broadway includes the installation of an unsignalized crossing, with consideration for the provision of a signalized crossing in the long-term. The short-term proposal will contain painted striping, raised pavement, and a pedestrian refuge, and will provide pedestrians with the legal right-of way to cross the road.

While a midblock crossing has been deemed prudent, the exclusion of signalization in the short-term program has raised safety concerns and potential liability issues. Questions arise as to the benefits of limited intervention, an unsignalized crossing, versus full investment in a signalized crossing or alternative measures, such as the enforcement of jay walking laws. Since midblock crossings and pedestrian priority are a fundamental component of complete streets, we will operate under the assumption that provision of dedicated crossing infrastructure is preferable to the alternative of pedestrian traffic law enforcement. Under this assumption, our research seeks to understand whether limited infrastructure can be utilized safely and successfully to facilitate midblock crossing on a roadway with characteristics such as

¹⁴ National Association of City Transportation Officials (NACTO). (2013). *Urban Street Design Guide*. Consultant Team: Nelson/Nygaard.

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Broadway's. Thus, the following section will provide guidance on the mitigation of potential risks associated with a signal-free midblock crossing.

The national Manual on Uniform Traffic Control Devices (MUTCD)¹⁵ sets forth criteria for roadways that are suitable to undergo the installation of an unsignalized crossing. First, the MUTCD recommends that installations of this type occur on multilane streets carrying less than 10,000 average daily trips (ADT), or 15,000 ADT if a raised pedestrian refuge median is provided. In lieu of a full traffic volume analysis, a conservative estimate was applied utilizing traffic level data reported within the existing conditions section of this report. Under the liberal assumption that peak traffic volumes occur for a three-hour period in the morning, midday, and evening, it was calculated that traffic volume for nine hours of an average day within the core study area will reach a total of 6,084 vehicles (9 hrs x 789 vehicles= 7101). For the remaining fifteen hours in a day, traffic volume was calculated under the assumption that hourly volumes would on average equal half of the peak hourly volume, equaling a total of 5,917 vehicles (15x .5(789)= 5918). Thus, on a typical weekday, Broadway will experience an estimated traffic volume 13,019 ADT. In addition to the assessment of ADT, it is recommended that treated streets not have an operating speed over 40 mph. The posted speed limit for Broadway within the Downtown of Newburgh is 30mph, less than MUTCD's recommended operating speed.

In order to demonstrate the necessity of a midblock crossing, it is recommended that a minimum volume of 25 pedestrians per hour shall be recorded crossing the study area for at least 4 hours of a typical day. As was reported in Section I, the intersection in question experiences an existing volume of more than 100 illegal pedestrian crossings across Broadway during peak hours. This volume sufficiently meets the minimum standards to demonstrate the necessity of a midblock crossing.

Once proper traffic volumes, speed limits, and pedestrian volumes are assessed, the MUTCD requires that an adequate sight line is available for both pedestrians and motorists in order to ensure safety. Existence of an adequate sight line confirms that a crossing is not placed near a grade change or curvature in the road way where visibility may be impaired. The portion of Broadway that intersects with the proposed midblock crossing is both flat and straight, with unobstructed sight lines. In the case of unsignalized midblock crossings, sight lines and visual cues become even more imperative. When drivers yield or stop too close to crosswalks that cross unsignalized multi-lane streets, they place pedestrians at risk by blocking other drivers' views of pedestrians and by blocking pedestrians' views of vehicles approaching in the other lanes. Thus, it is critical that the City follow MUTCD recommendation that stop lines be set back at least 20-50 feet from edge of crossing path to make crosser visible to second driver. For the same reason, it is also necessary to restrict parking or "daylight" in advance of a crosswalk to make pedestrians more visible to motorist and vice versa. Daylighting may be achieved via a curb bump out, paint, or restrictive parking regulations and signage.

¹⁵ FHWA. (2009). *Manual on Uniform Traffic Control Devices*.

Figure 29. Mid-block Crossing treatments by NACTO Urban Street Design Guide



Source: National Association of City Transportation Officials

Figure 30 illustrates enhanced crossing treatments recommended to improve safety at unsignalized midblock crossings. These include additional warning signage, high-visibility lighting, actuated beacons, and traffic calming features. Actuated pedestrian signals (half-signals), hybrid beacons, or rapid flash beacons may also be appropriate.

In regards to the potential installation of a signalized crossing in the long-term complete streets program for Broadway,

criteria for a signalized crossing include the following conditions: higher volume roadways, infrequent gaps in traffic flow, proximity to school zones, high potential of crossings by elderly or disabled pedestrians, and the existence of high vehicular travel speeds. It is also important to note that not all midblock crossings demand signalization. In fact, fully signalized crossings are not appropriate in many cases. Localities must use even more caution when deciding whether or not to install a signal at midblock locations due to the fact that pedestrians may feel frustrated if a signal is holding them back from crossing when there is an ample gap. In these cases, pedestrians will typically cross without waiting for the signal, resulting in car stopping at a red light a few moments later with no pedestrians in the crosswalk. This may lead to frustration by pedestrians and motorists alike, and perceived inefficiencies¹⁶.

Safety Concerns of Sharrows

The purpose of a sharrow is to improve safety for cyclists by increasing awareness amongst drivers that the roadway must be shared with cyclists, as well as providing a sense of which lane cyclists should occupy. The sharrow marking typically consists of a bicycle symbol and two chevrons placed in a travel lane to indicate that the right-of-way is shared between motorists and bicyclists. The main advantage of sharrows versus designated bike lanes is that implementation requires minimal infrastructure and little or no road reconfiguration. Investment includes reasonably low-cost materials: paint, a sharrow stencil, and signage. Thus, sharrows are appealing to many localities due to their ability to produce traffic calming effects without displacing parking or travel lanes by encouraging motorists to reduce their speed to maintain a safe distance from cyclists.

Broadway's wide right-of-way provides more than an adequate amount of space to accommodate the installation of sharrows. As described in the Section I: Existing Conditions, the section of Broadway that runs through Downtown Newburgh and the core study area consists of four lanes with a 133-foot cross-section, spanning 90 feet from curb to curb. The outer travel lanes in both directions span an excessive 18

¹⁶ "Many will choose to cross away from the crossing, while others will dutifully push the activator button, not get an immediate response, and cross when there is a sufficient gap. A few seconds later, the approaching motorists must stop at a red signal for no reason, which can encourage motorist disrespect for the signal in the future" (NACTO http://nacto.org/docs/usdg/university_course_on_bicycle_and_ped_trans_fhwa.pdf)

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feet, 6 to 8 feet wider than the minimum required travel lane width for an urban collector or arterial road¹⁷.

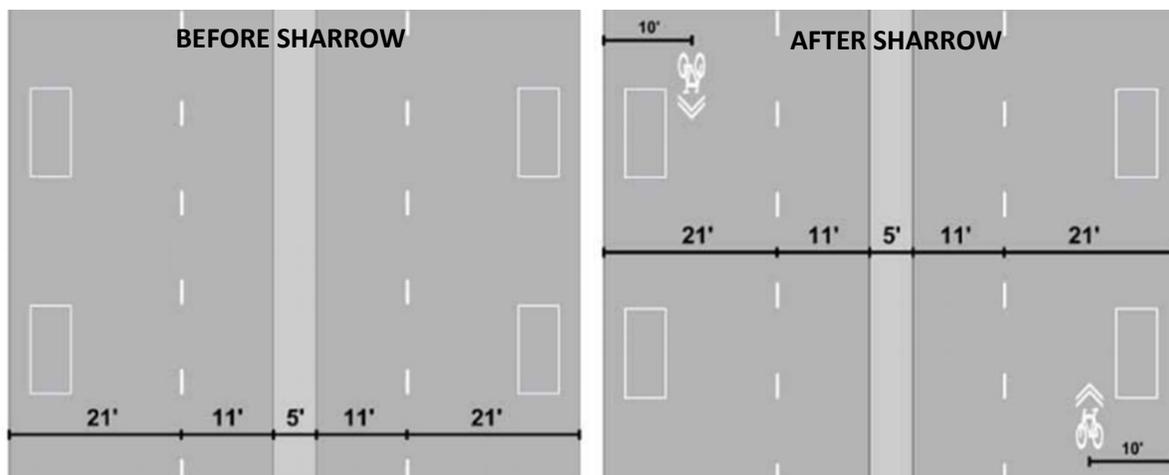
While the long-term complete streets program for Broadway includes a fully marked bicycle lane, the short-term scenario includes provisions only for a sharrow. The sharrow will be installed with the typical marking of a painted bicycle and arrow insignia, with complimentary signage to notify all users of the shared right-of-way.

Sharrows have been hailed as an important tool for promoting shared roads and increasing safety for all street users. However, their utilization has also been met with concerns. The most common concern regarding the installation of sharrows is their appropriateness and ability to significantly improve safety on varying street typologies. One concern that is often raised suggests that sharrows may in fact make streets unsafe by encouraging cycling without proper space and protection from vehicular traffic. In an attempt to address this concern, the Federal Highway Administration conducted an evaluation of shared lane markings in 2010. The study looked at longitudinal data from three cities before and after the installation of sharrows: Cambridge, MA; Chapel Hill, NC; and Seattle, WA. The findings from Cambridge and Chapel Hill are particularly relevant to the case of Newburgh. Their findings, followed by a case study of super sharrows in Long Beach, California, are discussed below.

Case Study: (Cambridge, Massachusetts)

The case study of Massachusetts Avenue in Cambridge was chosen for its many similarities to Newburgh's Broadway. The two roadways share a similar street configuration in regards to width and parking, experience light to medium traffic flow, and have similar designated speed limits. Furthermore, Massachusetts Avenue in Cambridge underwent similar reconfigurations to those proposed in the short-term program for complete streets on Broadway.

Figure 30. Right-of-way Configuration on Massachusetts Avenue



Source: Federal Highway Administration ¹⁸

¹⁷ AASHTO, *A Policy on Geometric Design of Highways and Streets*.

¹⁸ <https://www.fhwa.dot.gov/publications/research/safety/pedbike/10041/10041.pdf>

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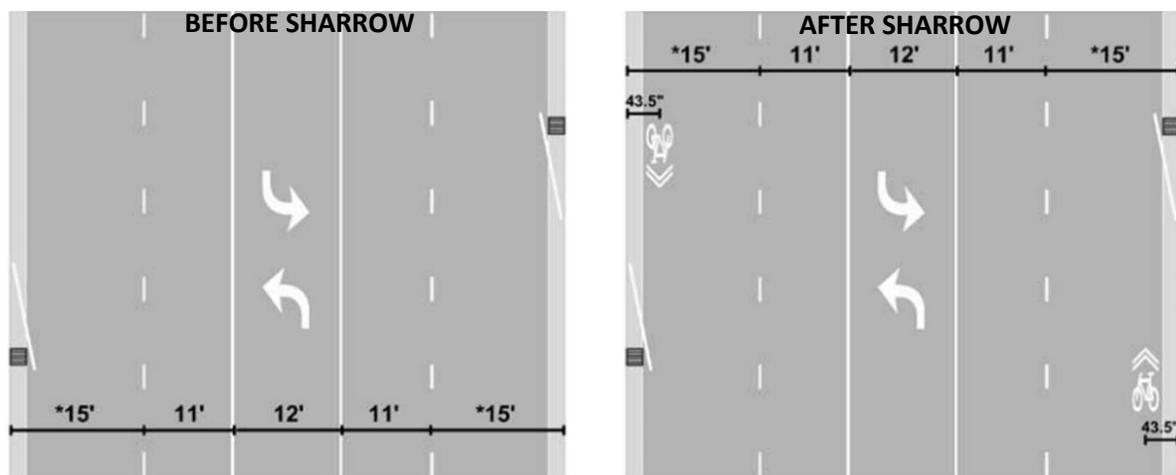
In Cambridge, the installation was conducted on Massachusetts Avenue, a four-lane divided street with approximately 29,000 vehicles per day, parallel parking on both sides of the street, and a speed limit of 30 mph. The sharrow markings were placed 10ft from curb, allotting approximately 7-feet for parked vehicles, and 14-feet for a shared bicycle and vehicle operating lane. The focus of the study was to determine whether the previously stated spacing configuration would have a positive effect on the positioning of vehicles and cyclists when compared to their positioning in the absence of sharrows. Thus, the findings of the study revolve mainly around perceived safety and comfort for both cyclists and motorists.

In the absence of sharrows or alternative bike infrastructure, cyclists have an observed tendency to ride dangerously close to parked vehicles in an attempt to position themselves further from moving traffic. Thus, one of the most important findings in the Cambridge study was an increase of 14-inches between motor vehicles in the travel lane and parked vehicles after the installation of sharrows. A 14-inch increase translates into a widening of the operating space available for bicyclists. Additionally, despite cyclists having more operating space and riding a more comfortable distance from parked vehicles, the study also found that the percentage of motorists who made no movement to change lanes when overtaking a bicycle increased from 27 to 66 percent. Meaning, nearly 40% more vehicles were able to operate farther from parked vehicles without moving into adjacent lanes. This finding suggests that after the installation of a sharrows motorist felt comfortable passing cyclist without difficulty or excessive maneuvers.

Case Study: Chapel Hill, NC

In Chapel Hill, NC sharrows were placed on Martin Luther King Jr. Boulevard, a four-lane undivided route with a center two-way left-turn lane. The Boulevard experiences a traffic flow of 27,000 vehicles per day, maintains a posted speed limit of 35 mph, and prohibits parking along both sides of the street. Due to its proximity to University of North Carolina, MLK Jr. Boulevard serves as a major corridor for commuters. Prior to the introduction of sharrows, approximately 40-70 bicyclists commuted along the Boulevard per day, one third of which were recorded riding illegally on the sidewalk rather than with traffic.

Figure 31. Right-of-way Configuration on Martin Luther King Jr. Boulevard



Source: Federal Highway Administration

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Overall, findings from the case study suggest that the installation of sharrows enhanced the safety of bicyclists as well as the flow of traffic. The introduction of sharrows increased the percentage of riders who rode on the roadway rather than the sidewalk, placing riders in a more expected position with respect to motor vehicles entering and exiting the street via curb cuts. Similar to Cambridge, the sharrows improved recognition of riding space for cyclists. Motorists drove 7-inches farther from the curb after the introduction of sharrows, and passed bicyclists 3-inches closer on average. The impacts of this lateral shift may have been two-fold. One impact is a smoother operating traffic stream, especially from the perspective of motorists, with motorist feeling more comfortable passing bicyclist on the outside lane without having to change lanes. However, it is important to consider that this shift may also have resulted in decreased comfort level of cyclist. Unfortunately data was not collected regarding the perceptions of cyclists

The installation of sharrows in Chapel Hill was coupled with a strong marketing campaign and prominent signage for shared streets. Sharrows have the ability to increase safety in terms of driver awareness and comfort, but they must be strategically paired with proper signage and education of the public, law enforcement, and cyclist to ensure they are utilized properly. Following their shared streets campaign, Chapel Hill received designation as a Bicycle Friendly Community at the bronze level from the League of American Bicyclists, further proving that a city does not need to lay down miles of protected bike lanes in order to be recognized as a bike friendly community.

Figure 32. Share the Road Signage from Chapel Hill's "Watch for Me NC" Campaign



Source: WatchForMeNC.org

Case Study: Long Beach, CA

In 2009, the City of Long Beach installed green super sharrows, continuous green lanes painted in the middle of a regular shared traffic lane (see Figure 34). Super sharrows are intended to emphasize a cyclist's right to ride in the middle of the lane on streets where there is not adequate space for a separated bike lane. Although super sharrows have recently been discontinued by the Federal Highway Administration due to complaints of increased confusion as to the rules of the road amongst motorists and cyclists alike, they provide a beneficial case study in the safety benefits of enhanced sharrows and bike infrastructure.

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Following the installation of the super sharrows along Belmont Avenue in Long Beach, total crashes, including car, bike and pedestrian, fell from a high of 43 in 2009 to a total of 12 in 2012. Of the 12 documented crashes on the Avenue, none involved bicyclist or pedestrian collisions. Especially interesting is the recorded decrease in vehicle on to vehicle collisions. Although evidence has not been collected to support the hypothesis, it has been suggested that the installation of super sharrows may have played a traffic calming role by reducing vehicle speeds along the Avenue.

The research indicates that sharrows can be used in a variety of situations. Installation of sharrows has been shown to increase motorists' awareness of bicycles in the traffic stream, increase operating space for bicyclists, and reduce the occurrence of sidewalk riding. However, hard evidence that sharrows can have a significant effect on decreasing collisions amongst cyclists and motorists is limited at best. Sharrows are not a revolutionary intervention, and as such, have limited capacity to transform the safety of a shared street. Crash data from the Long Beach study implies that more dedicated and enhanced treatments have a bigger impact on safety for all road users. While the installation of sharrows does not decrease safety on a shared street, the safety benefits associated with dedicated bike lanes are more thoroughly researched and documented. In the case of Newburgh, sharrows will play a beneficial role in increasing the awareness of existing riders and shared streets. However, dedicated bike lanes will need to play a significant role in the long-term program for Broadway in order to increase the number of cyclists and overall safety along the thoroughfare.

Figure 33. Super Sharrow in Long Beach, California



Source: Bike Long Beach

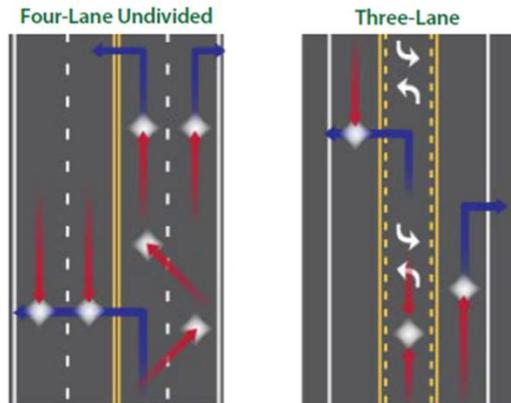
Effects of a 'Road Diet' on Congestion

The phrase 'road diet' is colloquially used within the transportation planning and engineering field to refer to a reduction of travel lanes or road re-channelization. The benefits are varied, but road diets are typically sited as interventions to improve road safety and relieve congestion by reducing vehicle speeds and

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encouraging alternative modes of transportation¹⁹. The most commonly utilized road diet is the reconfiguration of a four-lane road to three lanes, in which the right-of-way is divided into one travel lane in each direction and a center turn lane. This reconfiguration reduces the number of “crash points” where accidents are most likely to occur (see Figure 35).

Figure 34. Crash Points on Four-Lane and Three-Lane Roads



Source: Federal Highway Association ²⁰

According to the NACTO Urban Street Design Guide, the portion of Broadway that runs through downtown Newburgh is classified as a Neighborhood Main Street. In streets of this classification the four-lane configuration has been shown to increase rear-end and sideswipe vehicle crashes and pose higher pedestrian crash risk²¹. These statistics are due in large part to idling and double-parked vehicles in the outer lanes, and the subsequent weaving required of moving vehicles to navigate around them.

A reconfiguration of Broadway is not proposed within the short-term complete streets program. The sole alteration to travel lanes along Broadway will be the addition of sharrows to indicate a shared right-of-way. The long-term proposal for Broadway, however, suggests multiple scenarios with varying degrees of road reconfiguration, including the reduction of Broadway’s four-lanes to three-lanes with one travel lane in each direction and a planted pedestrian refuge with turning bays.

Despite the demonstrated safety improvements that can result from a road diet, the suggested removal of a traffic lane is often met with concerns of increased congestion. Under the assumption that traffic demand is fixed, concerns are raised that traffic which once utilized two lanes will now be forced onto a single lane, thereby increasing congestion on the remaining lane or resulting in a spillover effect whereas vehicular traffic is shifted to nearby side roads that are not designed to accommodate increased flow. The concern of increased congestion as a result of lane removal is largely a misconception stemming from the convolution of two separate effects: the slowing of vehicles versus congestion of a roadway. Studies of both road widening and road removal suggest that traffic demand is largely flexible, and equilibrates with

¹⁹U.S. Department of Transportation, Federal Highway Administration, Center for Accelerating Innovation “Improved safety and congestion relief on public roadways are high-priority national goals. Innovative reconfigurations such as Road Diets can help achieve these goals for motorists and non-motorists on mixed-use streets by reducing vehicle speeds and freeing space for alternative modes. Road diets can reduce collisions, increase mobility and access, and improve a community’s quality of life.”

²⁰ FHWA Road Diet Informational Guide

²¹ NACTO Urban Street Design Guide

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the supply provided, rather than being a fixed number based on population or land uses²². This flexibility enables road diets to potentially improve traffic flow and reduce conflicts with turning vehicles. In a study by the FHA, findings suggest that streets designed with either 2-lanes or a 2-way left-turn lane can cut risk of collisions by nearly half²³. In fact, the addition of a properly designed turn lane can have the effect of alleviating congestion if the appropriate amount of space is provided for cars queuing. The following case studies support the conclusion that while congestion is not typically an effect of road diets, improved safety and reduced traffic incidents are.

Case Study: Baxter Street, Athens, GA²³

In 1999, the City of Athens, GA used the opportunity of a scheduled road resurfacing to place Baxter Street on a road diet. With a light traffic volume of 18,000 – 20,000 VPD, it was deemed appropriate to restripe the existing 4-lanes into a 3-lane roadway with a shared bike lane in both directions. The placement of sharrows within the outer 14-foot travel lanes was chosen due to limited roadway width.

The findings of the case study are two-fold. Firstly, traffic volume on Baxter Street decreased by 3.7 percent. Observations recorded some relocation of traffic volume onto neighboring streets, but without introducing dramatic vehicle congestion or safety problems along those corridors. In addition to decreased traffic volume, collisions on the corridor declined by 52 percent year-to-year. Additionally, the study indicated that without adequate bus pull-off locations, it was observed that buses would sometimes block the remaining travel lanes for through traffic. As a solution, it was suggested that future converted corridors include bus pull-off bays to keep travel lanes open, and that the placement of bays should be carefully considered to effectively allow for all types of traffic using the roadway.

Case Study: Valencia Street, San Francisco, CA²⁴

The Valencia Street road diet is a success story that has become a national model for traffic engineers. Valencia Street in San Francisco was once a four-lane roadway. In March 1999 the former Department of Parking and Traffic re-striped the street to its current configuration, with two travel lanes, a center median with left-hand turn bays, and designated bike lanes.

Similar to many cities, the reconfiguration of Valencia Street raised concerns of spillover onto surrounding residential streets and a potential for increased collisions. To the contrary, in the year after the lanes were striped, total bicycle and pedestrian collisions along the corridor declined, and overall bicycle use along the corridor increased by 144 percent²⁴. Additionally, vehicle volume on Valencia decreased slightly, but without a significant increase in traffic volume on Guerrero Street, where traffic engineers had initially expected it to shift.

While spillover is an often voiced concern, the traffic counts reported in Section I: Existing Conditions suggest that congestion along Broadway in downtown Newburgh, and specifically within the study area, is not a significant issue under current traffic volume conditions. At no time during the three observation

²² Hunt, J. D. , Kriger, D. S. and Miller, E. J.(2005) 'Current operational urban land-use-transport modelling frameworks: A review', Transport Reviews, 25: 3, 329 – 376

²³ FHA, HSIS, 2011. Evaluation of Lane Reduction 'Road Diet' Measures and Their Effects on Crashes and Injuries; Washington D.C.

²⁴ SF Streets Blog <http://sf.streetsblog.org/2010/03/31/san-francisco-planners-proud-of-long-list-of-road-diets/>

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periods was queuing observed in the study area. However, as more significant road reconfigurations are considered for the long-term complete streets program for Broadway, a more comprehensive and detailed traffic study will be useful in its capacity to fully investigating existing traffic volumes along Broadway, explore potential spillover effects, and create mitigation measures if necessary.

Parallel Parking vs. Diagonal Parking

The Long-term complete streets program for Broadway includes the conversion of existing angled parking into parallel parking in order to free up right-of-way width for better use. Angled parking along Broadway is currently at a 45-degree angle, consuming approximately 16 feet of the roadbed on both the northern and southern edge of the street. Parallel parking generally consumes 7-9 feet of roadbed. This conversion of angle into parallel parking will result in a reduction of 5-8 feet in the current amount of space consumed by parking along Broadway. This reduction will open up potential space for bike lanes, a pedestrian refuge, and other road reconfigurations shown in Section III: Conceptual Plans. Concerns surrounding the reconfiguration of parking on Broadway include the convenience and safety of parallel parking, as well as, the reduction in the total number of available spaces.

Much of the research on angled versus parallel parking was completed prior to the 1980's, with only a handful of studies conducted after 1990. The most recent report is a literature review of existing parking studies carried out by Oregon State's Department of Transportation in the early 2000s. The findings from the literature review highlight that the conclusions of existing studies are consistent in their agreement that "urban sections with angle parking experience higher crash rates than comparable sections with parallel parking." The majority of the cities examined through the literature review saw anywhere from 20-60% reduction in crash rates when converting to parallel parking.²⁵ The review concludes that "parallel is preferable to angle parking whenever possible." Leading technical guidebooks such as AASHTO's A Policy on Geometric Design of Highways and Streets further supports this conclusion²⁶. The limited visibility of angle parking is the most commonly cited reason for the configurations inferior safety.

While parallel parking is generally preferred for safety and operational considerations, the drawbacks should also be identified and considered. Drawbacks of parallel parking configurations include: 1) driver and passengers may have to exit vehicle into the traveled way; 2) the parking maneuver takes more time than angle; and 3) parallel parking configurations allow for a lesser number of stalls than angle configurations. In exchange for opening up roadway width for better use, the conversion of 45-degree angle parking into a parallel parking configuration will generally reduce the total number of parking spaces by 50%²⁶. Parking utilization data should be collected and analyzed to ensure that a reduction in the total number of parking stalls will still adequately accommodates parking demand. Regarding the parking utilization data presented Section I: Existing Conditions, peak utilization never reached above 32% during the morning or evening observation periods, suggesting that a 50% reduction in on-street parking supply would not have a detrimental effect during those periods. During the midday observation period, peak

²⁵ http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/comparison_of_angle_and_parallel_parking.pdf

²⁶ *A Policy on Geometric Design of Highways and Streets, 6th Edition, 2011*, commonly referred to as the "Green Book," contains the current design research and practices for highway and street geometric design. The document provides guidance to highway engineers and designers who strive to make unique design solutions that meet the needs of highway users while maintaining the integrity of the environment.

parking utilization reached 69%. Further research and mitigation measures would need to be explored to ensure that a reduction in parking supply can be accommodated during the midday period.

Maintenance Barriers

Once a municipality has chosen a safe and convenient complete street design, the questions arise as to who will maintain the new and improved streets. The addition of new landscape features, street furniture, and road reconfiguration comes with additional responsibilities regarding maintenance. In localities that experience extreme weather and snow, city officials are often concerned with issues of snow storage and removal associated with new street configurations and protected bike lanes. Parklets are an increasingly common complete street feature that also requires new responsibilities and maintenance agreements. Finally, the addition of planters and landscaping to improve the safety and aesthetics of the pedestrian environment will also add to the list of city assets that need to be maintained. The following sections provide information regarding the extent to which concerns of maintenance have come to fruition in localities navigating complete streets implementation, and where they have, the standards and tools utilized to overcome these challenges.

Snow Storage and Removal

The excess right-of-way along Broadway is currently used as space for snow storage during colder winter months. The proposed reconfigurations of the right-of-way included bike infrastructure, pedestrian island refuges, and other improvements to make better use of the roadway space. Concerns have been voiced that a reduction in the excess roadway space, which is underutilized during warmer months, will incur issues of snow storage in months that experience snowfall. Additionally, the construction of protected bike lanes may create narrower street widths in which existing snow removal vehicles cannot access.

Numerous cities located in cold climates have in fact utilized the space created by complete streets to accommodate snow storage in winter months. Boston, a city known to have its fair share of snow storage troubles, specifically identifies the storage opportunity created by vegetated medians in their operations manual²⁷. The Boston Complete Streets Manual indicates the potential for snow storage on wide greenscapes, furnishing zones, and curb extensions and urges both sidewalk and roadway snow clearance operations to take advantage of this storage area. Similarly, in Burlington, Vermont, the city has assured the preservation of space for snow storage by including it within the design guidelines for all street classifications, including complete streets. The Burlington Street Design Guidelines document requires that “tree belts should have a minimum width of 5’ with a minimum of 2’ for snow storage.”²⁸

The cities of Boston and Burlington, and numerous others, have shown that snow storage and removal is not a real barrier to complete streets implementation. With proper design standards, complete streets interventions can be made to improve a roadway while simultaneously preserving space to accommodate snow. Suggested considerations include tree spacing in medians and sidewalk planters, climate appropriate vegetation that can withstand extended periods of snow coverage, and painted buffers with

²⁷ Boston Complete Streets Guidelines. Chapter 6: Implementation, Maintenance: Snow Storage and Clearance (p.267). <http://bostoncompletestreets.org/>

²⁸ Street Design Guidelines. Burlington Transportation Plan (p.6).

https://www.burlingtonvt.gov/sites/default/files/DPW/TransportationPlan/BTP_Appendix_2_StreetDesign.pdf

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a suggested minimum width of 5 feet between travel lanes and bicycle lanes to serve as snow storage, as well as protection for bicyclists.

Regarding snow removal, certain complete streets strategies, such as protected bike lanes, may require greater maintenance. However, numerous cities have utilized a variety of tactics to overcome these challenges. Some solutions may be cost-restrictive or unrealistic for Newburgh, but it is important to acknowledge that a range of potential solutions exists.

Figure 35. Opportunities for Snow Storage and Removal on Bike Lanes



Source. Alta Planning & Design

Parklet Responsibilities and Maintenance

Parklets are essentially the conversion of on-street parking spaces into community gathering places. The purpose of a parklet is to add vibrancy and draw life into a commercial district by creating interesting and unique spaces for residents and patrons to mix and socialize. Local businesses and organizations in cities across the U.S. have requested the establishment of such programs in order to encourage patronage and revitalization of main streets and commercial districts²⁹.

Initial steps to establish a parklet program in Newburgh have already been taken by the Newburgh Land Bank through the establishment of the pilot parklet exercise. Pilot programs are a recommended best practice that assists in identifying issues and hurdles specific to a community that may need to be overcome in order to establish a successful parklet program. The pilot parklet erected within the study area was well visited by residents and highlighted minor engineering aspects to be improved. A standardized parklet design guideline will be produced by the Newburgh Land Bank in the next phases of the short-term complete streets program for Broadway. Following best practices, the standardized parklet design will take into account slope of the street, drainage needs, materials costs, and the ease of installation. A standardized design guideline provides applicants with the necessary technical information to streamline parklet installation so that efforts by applicants can be better directed towards place-making and programming of the space.

With the standardized design guideline underway, this section aims to provide guidance as to best practices for the promotion, regulation, and maintenance of parklet programs. As a relatively new addition to the complete streets toolkits, parklets require greater outreach and guidance in comparison to other more established interventions. Initial outreach and education to local businesses and other potential sponsors is extremely important for garnering the necessary support for parklets. Although the

²⁹ San Francisco, Boston, Philadelphia, Sacramento, Los Angeles, and Oakland are just a few of the cities across the U.S. that boast parklet programs that have proven successful to varying degrees.

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idea of parklets only began gaining popularity in 2010, there are a multitude of studies highlighting the benefits of such interventions. In addition to the creation of promotional materials to highlight the benefits of parklets, the formation of parklet program team can become extremely beneficial in identifying and reaching out to stakeholders and potential sponsors. Potential sponsors may include merchant and neighborhood associations, area residents and businesses, public utilities, and municipal departments.

In addition to stakeholder identification and initial outreach, localities can further support their parklet programs by clearly identifying the parklet application approval process, indicating the various agencies whose review is required for application approval and parklet design. The creation of an interagency team or council responsible for guiding applicants and coordinating responsible departments is a recommended best practice for making the parklet approval process easy and efficient. In Newburgh, existing agencies such as the Planning Board or Conservation Advisory Council could also take on these responsibilities. Similarly, clear and comprehensible policies and procedures are crucial for encouraging parklet sponsorship. Lack of clarity and additional roadblocks can frustrate the good intentions of area business and squander opportunities for building goodwill.

The City of Seattle provides an ideal example for a clear process flow chart of all needed approvals and paperwork³⁰. Similarly, Philadelphia has created a successful user-friendly checklist for parklet sponsors³¹. A leading example of sponsor procurement is San Francisco, home of the original and most commonly cited parklet program. In the San Francisco parklet program applicant's reply to a Request for Proposal (RFP) set out by an interagency team, facilitated and led by the City Planning Department. Storeowners, community organizations, residents, business improvement districts (BID), and non-profits are all potential parklet sponsors that the City program encourages to apply. Once approved, sponsors are responsible for community outreach, parklet design, construction, maintenance, and the acquisition of liability insurance for their approved parklet.

The establishment of appropriate charges and payment policies can likewise significantly impact the success of a parklet program. Standards regarding issued charges for parklet installation span a broad range of options, including everything from models that are highly subsidized by governmental resources to those that produce marginal revenue generation. The following sections provide examples as to how several cities have approached cost structure and the distribution of maintenance responsibilities for parklets.

Case Study: Cedar Rapids, Iowa

The City of Cedar Rapids owns and leases installed parklets to local organizations for \$60 per year³². This cost includes all permits and allows sponsoring businesses to offer table and alcohol service. In general, the City of Cedar rapids approached the creation of parklets as an extension of their sidewalk space. In

³⁰ City of Seattle. *How to Build a Parklet or Streatery*. http://www.seattle.gov/transportation/parklets_howTo.htm

³¹ City of Philadelphia. Philadelphia Streets Department. Parklet Application. http://philadelphiastreet.com/images/uploads/resource_library/City-of-Philadelphia-Parklet-Application.pdf

³² City of Cedar Rapids. 413-244 Sidewalk Extension System. www.cedar-rapids.org

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the pilot year, the city charged the same price as a sidewalk café permit. In subsequent years they increased charges slightly, but continue to shoulder a substantial amount of the cost.

In Cedar Rapids, city officials specify parklet design guidelines, conduct the contractor bids, and manage the construction, installation and removal of each parklet platforms. The city coordinated discussions with state and local officials to enable restaurants to provide alcohol and table service. Since the establishment of the parklet program, some business owners indicated that by using the parklet their business increased by 70%.³³

Case Study: Bellingham, Washington

In Bellingham, Washington, parklet sponsor responsibilities include the clearing of debris and graffiti, maintenance of landscaping and plantings, addressing damage and repairs, storage of movable tables and chairs, removal of impediments to drainage of stormwater. On top of maintenance, sponsors in Bellingham are required to cover payments for design, construction, installation and removal of the parklet structure. Additionally, sponsors pay \$6 per day for lost meter revenue (excluding weekends and holidays), \$45 for parking meter removal (if applicable), and Temporary Right-of-Way Use Permit fees (determined by the city)³⁴. When entering into a parklet agreement with a local business or organization, the city's responsibilities include: design, siting, and installation guidelines and requirements; site inspection upon citizen complaints; issuance if warning or revocation of permit in cases of noncompliance; and approval of proposed changes to design, appearance or equipment.

It is important to note that the parklet program in Bellingham has not been as successful as the City had hoped it would be. At the time the research was collected, no parklet applications had been filed. In smaller towns such as Bellingham and Newburgh, permits and parking fees in addition to the cost of design and construction may be cost prohibitive for most small business owners. In the case of Newburgh, it is recommended that creative funding mechanisms be explored, such as grant funding to support the initial installation parklets, corporate sponsorship, and the potential for BID organization and sponsorship. Additionally, ensuring that the standardized design guideline takes advantage of low costs materials and streamlines installation will also aid in reducing total cost.

Weeding and Maintenance

Landscaping elements are a prominent component of complete streets due to the varied and important services they provide, including stormwater management, beautification, and crash reduction. Interventions such as bioswales, planters, rain gardens, and street trees alleviate the negative environmental impacts of stormwater via filtering and retaining runoff. These same landscaping measures are often a large component of various traffic-calming elements like chicanes, islands, and curb extensions, which are important deterrents of crashes and injuries. Finally, it is largely recognized that

³³ KCRG News. (April 2014). Cedar Rapids Council to Consider Adding More Parklets. <http://www.kcrg.com/news/local/Cedar-Rapids-Parklets.223891441.html>

³⁴ City of Bellingham, WA. Parklets. <https://www.cob.org/services/planning/downtown/parklet.aspx>

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these same green interventions contribute to a more comfortable and visually stimulating environment for all street users.

Despite the multifaceted benefits of landscaping elements, many municipalities are hesitant to add additional maintenance responsibilities to already under-staffed and over-worked departments and agencies. If such maintenance can truly not be shouldered by existing department, potential alternatives for caretakers include citizen organizations and Business Improvement Districts (BIDs). Additionally, many cities have surpassed the issue of overwhelming maintenance requirements by opting to install low maintenance plant species and planters.

Institutional Barriers

Altering the requirements and traditional assumptions that guide local government decision-making processes is at the heart of the complete streets movement. Changing the way planners and engineers do their jobs on a day-to-day basis is challenging, but essential if a complete streets policy or design manual is going to do more than sit on a shelf collecting dust. The three institutional barriers highlighted in the case of Newburgh include: 1) the city's capacity to complete design review for various complete streets interventions, 2) coordinated governance, and 3) identification of the appropriate performance evaluation measures to track the success and shortcomings of complete street improvements.

Governance

The interventions of complete streets span the purview of a range of municipal departments. As such, successful implementation requires extensive cooperation and inter-agency coordination, areas that have long been a weaknesses for governing bodies at all levels of jurisdiction. To make the implementation as navigable and efficient as possible, cities have experimented with a variety of governance structures to facilitate the implementation of completes streets.

Case Study: Kingston, NY

In 2010, the City of Kingston's Common Council created the Complete Streets Advisory Council in tandem with the City's adoption of a Complete Streets Policy. The council is comprised of nine voting members selected from the public, and a contingent of non-voting members from various city agencies, including City Council, Public Works Department, and Ulster County Transportation Council. Membership of the Advisory Council is entirely volunteer based.

The Complete Streets Advisory Council is charged with advising the City on ways Kingston can implement complete streets principles in its planning, design and construction activities. With grant funding awarded by the Cornell Cooperative Extension, the Council undertook an in-depth policy analysis in order to investigate the potential for complete streets initiatives to catalyze changes in Kingston's capital spending. The Council is also responsible for creating documents and letters of support to provide recommendations on how to best include complete streets principles in various initiatives, such as comprehensive plan updates and capital projects. Utilizing complete streets policy and supportive documentation from the Advisory Council, the City of Kingston was recently awarded over 4 million in external funding to improve Broadway, their main arterial road, with a protected bike lane, bump-outs, road reconfiguration, beautification measures, and new signalization technology. The Advisory Council was responsible for

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submitting the project to various state funding agencies, and will now play a crucial role in coordinating implementation by various city departments.

Case Study: Morristown, NJ

Morristown, NY utilizes a project-level inclusive decision making process. Morristown's Complete Streets Policy³⁵ calls for the establishment of a Priority Action Plan and Project Checklist to address pedestrian, bicyclist and transit-friendly accommodations within transportation projects. For key objectives and the Complete Streets Priority Action Plan see Appendix 2: Complete Streets Standards.

The Complete Streets Project Checklist was created with the intention of clarifying a project's congruence with the Complete Streets Policy as developers, planners and engineers navigate the site plan and development review process. The Checklist is required to be used for all publicly funded land use or transportation projects, with the exception of sidewalk repairs, street furniture installation, roadway markings (e.g. bike lanes) or ADA-accessible ramps. The Project Checklist requires a series of approvals from several decision-makers before a project may proceed. Approvals include the Town Planner's endorsement of concept development, the Town Engineer's authorization of preliminary engineering, a construction official's assessment of construction impacts, and Public Works commitment to ongoing maintenance requirements. With regard to snow removal, the Project Checklist's Maintenance section asks applicants to identify the party responsible for snow removal as well as determine whether snow removal will force snow onto crosswalks, potentially blocking clear access.

The Policy assumes that Complete Streets features will be included in any transportation and land use project that utilizes public funds, unless supporting documentation provides sufficient justification against their inclusion. Other examples of cities that use this model are Seattle, Washington and Duluth, Minnesota.

Performance Evaluation for Success

Outdated and unsuitable performance measures lack the ability highlight the many and varied benefits of complete streets. A failure to capture and report benefits leads to an under-appreciation of complete streets. New measurements and benchmarks are needed to forecast and report the potential economic, health, and quality of life benefits of Complete Street projects. It is especially important to record and document the effects of complete streets trial measures and pilot programs in order to move inform and progress with long term proposals and implementation. The evaluation of success can also play an important role in positioning a municipality for competitive funding.

Performance evaluation can be addressed in part by instituting Health Impact Assessments for individual projects, plans, or policies. This approach is being taken by some leading California cities including Richmond and Encinitas. Other solutions for performance evaluation include supplementing a traditional Level of Service measurement with the number of auto-trips generated when taxing developers to

³⁵ Town of Morristown. Morristown Complete Streets Policy, Pub. L. No. Resolution R-105-12 (2012). Retrieved from http://www.townofmorristown.org/vertical/sites/%7B0813EA2E-B627-4F82-BBB0-DDEE646947B5%7D/uploads/Morristown_Complete_Streets_Policy_revised_draft_6-19-12.pdf

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incentivize reduction in vehicle trips; utilization of the new Multimodal Level of Service Analysis manual³⁶; or a combination of alternative indicators listed in the table below. See also Retail Activity and Economic Indicators in the Existing Conditions section of the report for additional economic vitality metrics.

Figure 36. Indicators to Evaluate Success of Complete Streets Improvements

Quality of Life	Economic Benefits	Active Living	Safety	The Environment
<ul style="list-style-type: none"> • blocks of new or repaired sidewalks • number of bus stops with shelters • installation of pedestrian countdown signals • Housing + transportation affordability 	<ul style="list-style-type: none"> • Decrease in business vacancies • Transit operating costs and farebox recovery ratio • Increased patronage 	<ul style="list-style-type: none"> • miles of new bicycle facilities • Pedestrian counts • Bicycle counts • walkscore • Pedestrian & Bicyclist LOS 	<ul style="list-style-type: none"> • reduction in speeding • reduction in crashes • repainted bicycle lanes or crosswalk 	<ul style="list-style-type: none"> • Improved air quality • Reduced automobile trips generated

Case Study: State of Vermont

The State of Vermont has included an appendix regarding performance measures within the state-wide Complete Streets Guide³⁷. The document recognizes that “an effective means of gauging the success of a community’s complete streets program is a foundation of the entire process.” In addition to “measures of effectiveness” (MoEs) set out by the National Complete Streets Coalition (NCSC), the state of Vermont lists additional facilities measures that link directly to complete streets implementation. The measures include the following:

- % of residences served directly by walkway(s) or paths
- % of jobs served directly by walkway(s) or paths
- % of residences/business jobs accessible to transit (within ½ mile)
- % of intersections on high volume roads with pedestrian crossings
- % eligible road miles supporting bicycles (bike lane/path, paved shoulder, shared lanes on slow streets)

³⁶ Transportation Research Board, http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_616.pdf

³⁷ <http://vnrc.org/wp-content/uploads/2013/01/complete-streets-a-guide-for-vermont-communities-aarp-optimized.pdf>

APPENDICES

Appendix 1: Complete Streets Toolkit

- Identifies, describes, and evaluates the benefits of a range of complete streets design interventions. Interventions include curb extensions, medians, bikeways, and parklets.

Appendix 2: Complete Streets Standards

- Identifies standards and provides guidelines for specific complete streets interventions. Topics include: examples of complete streets implementation plans and pilot projects in small communities; standards for integrating green infrastructure policy into complete streets implementation; and best practices for the design of street and transit furniture.

Appendix 3: Complete Streets Legislation

- Reviews existing New York State initiative and recommendations regarding complete streets policy.

Appendix 4: Complete Streets Policy Statements

- Offers a template for local complete streets policy language

Appendix 5: Economic Benefits of Complete Streets

- Presents statistics regarding successful outcomes of complete streets programs from around the country.

APPENDIX 1: COMPLETE STREETS TOOLKIT

As complete streets are adopted by municipalities across the nation and become part of the common repertoire of forward thinking planners and engineers, much thought has been put into what actually makes a complete street and best practices for design. The solutions are out there in the form of various manuals and guideline documents that go into detail of the different designs, benefits, and constraints for various complete streets interventions. The purpose of the toolkit is simply to identify and briefly explain the benefits and various design options for a range of interventions. All unit cost information was provided by the Federal Highway Administration³⁸.

Curb Extensions

Curb extensions are as their name implies an expansion of a curb into an existing roadway. The goals of such expansions are almost always to increase pedestrian safety and comfort while facilitating walkable street environments. The extension of a curb serves to reduce the physical and visual distance occupied by the roadway in order to make it easier for pedestrians to cross and be seen by motorists³⁹. When curb extensions are completed in the middle of a block, they may feature pinch points, chicanes, or bus bulbs, whereas curb extensions at the end of blocks may be gateways or pedestrian crossings with reduced curb radii.

Pinchpoints

Pinchpoints (also known as chokers) are areas in the middle of a block in which a curb is extended into the street often residing in up to one lane per side of the street. The goals of these areas are often to reduce the speed of through-traffic, facilitate midblock crossings, increase public space, and help carve out space for street parking⁴⁰. Because a pinchpoint is inherently a narrowing of street space, drivers typically reduce speed to maintain a safe distance from other cars and objects. In addition, the narrower street space reduces the distance to cross and puts pedestrians on the edge of the sidewalk within view of drivers thereby increasing the safety of a potential mid-block crossing which may be enhanced by a gateway⁴¹. Due to an increased amount of sidewalk space available, there may be more space for trees, planters, or benches which contribute to the attractiveness of the street environment. Finally, the reduced number of lanes of through traffic helps designate or increase the number of spaces for street parking. In addition to creating curbside parking, cars parked between the roadway and the sidewalk serve as a barrier between pedestrians and traffic which contributes to the overall sense safety of the street⁴².

³⁸ Costs for Pedestrian and Bicyclists Infrastructure Improvements. (October 2013). UNC Highway Safety Research Center. http://vtransengineering.vermont.gov/sites/aot_program_development/files/documents/ltf/UNCReportOnCosts.pdf

³⁹ National Association of City Transportation Officials, 2015. "Curb Extensions". <<http://nacto.org/publication/urban-street-design-guide/street-design-elements/curb-extensions/>>

⁴⁰ National Association of City Transportation Officials, 2015. "Curb Extensions". <<http://nacto.org/publication/urban-street-design-guide/street-design-elements/curb-extensions/>>

⁴¹ New York City Department of Transportation, 2013. "Street Design Manual" <<http://www.nyc.gov/html/dot/downloads/pdf/nycdot-streetdesignmanual-interior.pdf>>

⁴² Duany, Andres, Speck, Jeff, & Lydon, Mike, 2010. "The Smart Growth Manual", McGraw Hill.

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Figure 37. Pinchpoints at Midblock Pedestrian Crossing



Image Source: NACTO

Figure 38. Unit Cost for Pinch Point Infrastructure

Infrastructure	Description	Median	Average	Min	Max	Cost Unit	Number of Sources (Observations)
Pinchpoint	Curb extension/ choker/ bulb-out	\$10,150	\$13,00	\$1,070	\$41,170	Each	19 (28)

Source: Federal Highway Administration

Chicanes

Chicanes are curb extensions that are offset in order to reduce vehicle speed and increase the amount of public space. On lower volume downtown streets, chicanes can be used to significantly increase the amount of space on the sidewalk because it is extended for large portions of a block. Because motorists must make a slight turn to continue with the road, they must slow down. Typically additional signage or striping must be added to make drivers aware of the slight turn in the roadway.

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Figure 39. Unit Cost for Chicane Infrastructure

Infrastructure	Description	Median	Average	Min	Max	Cost Unit	Number of Sources (Observations)
Chicanes	Chicanes	\$8,050	\$9,960	\$2,140	\$25,730	Each	8 (9)

Source: Federal Highway Administration

Bus Bulbs

Bus bulbs are curb extensions at and around the location of bus stops which increase the efficiency and safety of such stops. When a bus bulb is in place, the curb is extended so that a bus never has to leave the travel lane thereby reducing the time and risks associated with merging in and out of traffic. These bus bulbs also increase the amount of available sidewalk space which can be used to install bus shelters. For unit cost estimates see pinchpoints.

Figure 40. Bus Bulb on Two-Lane Street



Image Source: NACTO

Gateways

Gateways are curb extensions that facilitate pedestrian crossings by reducing the distance to cross the roadway, increasing visibility of pedestrians to drivers and by increasing sidewalk space. In addition to limiting the distance and amount of time need to cross a roadway, gateways also provide additional space for pedestrians to queue before entering the street. This specific space for queuing helps drivers distinguish pedestrians that wish to cross the street from those that are just passing by. Like typical pedestrian crossings, gateways may include markings on the roadway and tactile paving to indicate the start and end of a crossing. These are important features of gateways because they demarcate where pedestrians have priority movement on the roadway³². The increase in sidewalk space may be used for greenery, drainage, benches, or other public amenities. For unit cost estimates see pinch points.

Curb Radii

In many areas, curb radii around corners have been increased to make turns easier and faster for vehicles, especially larger trucks. While motorists do not need to slow down as much to make turns, pedestrians have a substantially larger distance to cross a roadway as well as a lack of perceived safety due to

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increased traffic speeds. By tightening curb radii and adding the aforementioned curb extensions, pedestrian safety and use can be increased in urban areas³³.

Curb Extension Challenges

Although there are many benefits to curb extensions, there are also several challenges and considerations. The most obvious of these considerations is the cost of installation for the infrastructural elements such as cement for sidewalks, paint for roadways, and amenities such as street trees and benches. In order to ensure safety around these features, there must be sufficient signage for drivers and clarity for pedestrians. Another possible consideration is that many of these curb extensions require on-street parking and may slow down traffic due to narrowing the street and reducing the number of lanes.⁴³ Finally, all of the features installed on the roadway may need some degree of regular maintenance.

Medians

A median strip is a raised area that separates lanes of a roadway, often those travelling in opposite directions. Raised medians both physically and visually narrow a roadway which slows down traffic and reduces the distance pedestrians must walk at one time to cross a street. They allow pedestrians to cross half a street at a time which gives pedestrians the added perception of safety.⁴⁴ Medians frequently include features such as street trees, planters, and street lights which can beautify the road way and help with drainage. Furthermore, the risk of head on collisions is reduced and cut-through traffic and improper turns are eliminated entirely³².

Figure 41. Unit Cost for Median Infrastructure

Infrastructure	Description	Median	Average	Min	Max	Cost Unit	Number of Sources (Observations)
Median	Narrow Median	\$6.00	\$7.26	\$1.86	\$44	Square Foot	9 (30)
Median	Island	\$9.80	\$10	\$2.28	\$26	Square Foot	6(15)

Source: Federal Highway Administration

Median Challenges

There are not many issues to consider regarding medians in a streetscape. Regardless of what elements are installed on the median, they will require some maintenance. Stormwater management features may be vulnerable to overflow under certain circumstances and could necessitate attention. Outside of the costs of installation and maintenance, ensuring that emergency vehicles are able turn around through or past medians and reach calls in a timely manner may be the largest concern regarding the installation of medians³².

⁴³ Ada County Highway District of Idaho, 2012. *Pedestrian Treatment Options* from the "Kuna Downtown Corridor Plan". <https://www.achdidaho.org/projects/Media/225/1358_Pedestrian.pdf>

⁴⁴ Laplante, John, & McCann, Barbara, 2008. "Complete Streets: We Can Get There from Here". <<http://smartgrowthamerica.us/documents/cs/resources/cs-ite-may08.pdf>>

Bikeways

Bike Paths

Bike Paths are typically physically separated from the roadway either by some type of barrier such as a median, parked cars, or simply not adjacent to the street. These paths, often known as greenways, are completely divorced from the roadway and are widely considered the safest cycling facilities for that reason. Cyclists tend to be most comfortable on these paths which encourage cycling, especially when they are part of a larger cycling infrastructure network. Cyclists may even be willing to travel as much as three-quarters of a mile to get to bike paths even if it increases their travel time. Despite the benefits in real or perceived safety gained from greenways, they must have appropriate origins and destinations to be attractive to cyclists⁴⁵. These bike paths are particularly important for cyclists who are less comfortable cycling on roads and often help to boost the ridership and mode share of people cycling. While they are usually not physically on streets, they are critical to improving cycling ridership and complementing cycling infrastructure that is on the roadway.

Figure 42. Unit Cost for Bike Path Infrastructure

Infrastructure	Description	Median	Average	Min	Max	Cost Unit	Number of Sources (Observations)
Path	Multi-use Trail Paved	\$261,000	\$481,140	\$64,710	\$4,288,520	Mile	5(5)
Path	Multi-use Trail Unpaved	\$83,870	\$121,390	\$29,520	\$412,720	Mile	3(7)

Source: Federal Highway Administration

Bike Path Challenges

Even though they are often separate from the roadway, safety must be considered when they do cross roads in terms of ensuring mutual visibility between cyclists and drivers. If these paths are expected to be shared with pedestrians, there must also be enough space on such paths to accommodate both speeds of users during times of peak volume³³. In addition, bike paths are the most expensive and resource consuming bicycle infrastructure because they often require the installation of paved pathways or a large consumption of space on the street including dividers.

Bike Lanes

Bike lanes are street features designated solely or primarily to cyclists. While bike paths have a technical designation as a Class 1 bike lane, they are described in the aforementioned section, "Bike Paths". Class 2 bike lanes are within the roadway and demarcated with signs or markings on the road whereas Class 3 bike lanes share space with either automobiles or pedestrians. Bike lanes mainly serve to increase cyclists' comfort on the road and often help increase the mode share of bicycles.

⁴⁵ Tilahun, Nebiyu, Levinson, David, & Krizek, Kevin, 2007. "Transportation Research Part A: Policy and Practice". < <http://www.sciencedirect.com/science/article/pii/S0965856411000127> >

Figure 43. Class 2 Bike Lane on Rosemead Blvd in Temple City



Source: LA Streetsblog

Class 2 Bike Lanes

These bicycle lanes are on the roadway and marked with signs and paint. Because traffic runs immediately adjacent to or through Class 2 bike lanes at intersections, they are considered less safe than bike paths, but more safe than a Class 3 bike lane or no lane at all. Sometimes these lanes are painted green to emphasize that automobile traffic should not be in these bike lanes. Having an unshared lane increases safety and cyclist comfort on the roadway. Class 2 bike lanes offer a decent degree of freedom for cyclists to make turns and access the curb when needed³³.

Class 3 Bike Lanes

Class 3 bike lanes are traffic lanes shared with cyclists marked with signs or street markings often called sharrows. These lanes offer only awareness to drivers that the roadway may be shared with cyclists and a sense of which lane the cyclist might occupy. The other main advantage of Class 3 bike lanes is that they require minimal infrastructure to create and usually do not displace parking or travel lanes. They may have the effect of calming traffic when motorists slow down to maintain safe distances from cyclists³³.

A bike lane is assumed to have a general width of 5 feet. Bicycle treatments will vary greatly due to road conditions, differences in scale and improvements, and length of treatment. Cost of shared bicycle markings will vary based on type of paint, size of marking, and whether or not the symbol is added at the same time as other road treatments

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Figure 44. Unit Cost for Bikeway Infrastructure

Infrastructure	Description	Median	Average	Min	Max	Cost Unit	Number of Sources (Observations)
Bikeway	Bicycle Lane	\$89,470	\$133,170	\$5,360	\$536,680	Mile	6(6)
Bikeway	Shared Lane /Bicycle Marking	\$160	\$180	\$22	\$600	Each	15(39)

Source: Federal Highway Administration

Figure 45. Shared Bike Land with Signage



Source: Bike Jax Info

Bike Lane Challenges

Class 2 bike lanes are less safe than bike paths and Class 3 bike lanes more dangerous still. While safety concerns such as collisions with moving or stationary cars (such as crashing into carelessly opened door) are the primary concern for bike lanes, risk can be minimized if adequate barriers and signage are installed. Perceptions of danger are a critical issue for bike lanes because they will not be used if they are believed to be dangerous. In addition to safety matters, Class 2 bike lanes may consume street parking and space on the street as well as resources for installation and maintenance³³.

Parklets

Parklets are generally temporary platform installations which utilize curbside parking spaces to expand the pedestrian realm of the sidewalk. They provide amenities such as extra seating, bicycle parking and visual interest in spaces where a more pedestrian-oriented streetscape is desired. The space must allow free public access, but in some cases table and/or alcohol service is allowed for an additional charge. Alternative terms include “Curbside Public Seating Platforms”, “Pop-up Cafes”, “Street Porches”, or “Street Plazas”.

There is growing interest in the Parklet as part of the toolbox of “Complete Street” interventions. For this document, the Parklet policies of 10 American municipalities were reviewed:

- Bellingham, WA
- Cedar Rapids, IA
- Grand Rapids, MI
- Los Angeles, CA
- Morristown, NJ
- Philadelphia, PA
- Phoenix, AZ,
- Salt Lake City, UT
- San Francisco, CA
- Seattle, WA

Of the municipalities listed, San Francisco has been the pioneer, with the first installations in 2010. The programs in each of these cities have highly similar attributes with minor variations on how the policies are defined. This document will outline those attributes and highlight the similarities and differences.

Design Guidelines

- **Temporary Nature:** In general parklet installations are designed to be temporary, usually with permits available on a renewable basis.
- **Renewable Permits:** In northern climates, they are permissible from April until November (to accommodate snow removal needs), and in milder climates, they are given renewable permits.
- **Moveable Platforms:** Virtually all municipalities surveyed specify that the parklets must rest on top of the pavement surface and can NOT damage the pavement where they are located.

Economic Benefits

There have been several studies conducted on the economic benefits of parklets in cities. Below are highlights of the primary findings:

- Chicago’s Metropolitan Planning Council studied nine of their “People’s Spots” in July 2014 and they found:
 - 80% of area business owners agreed that the “People Spot brought more foot traffic and customers”
 - Some businesses found a people spot caused a 10% to 20% increase in their business.
 - 34% of visitors made unplanned food or beverage purchases
 - Generated unexpected publicity for local businesses (one unique spot was “Instagram heaven”)
- Oregon Transportation Research and Education Consortium studied the shopping behavior of pedestrians and cyclists compared to automobile drivers and found:
 - The literature review pointed out that though bicyclists and pedestrians spend less per visit, they become more frequent visitors and spend more over time than automobiles.
 - This study had similar findings.

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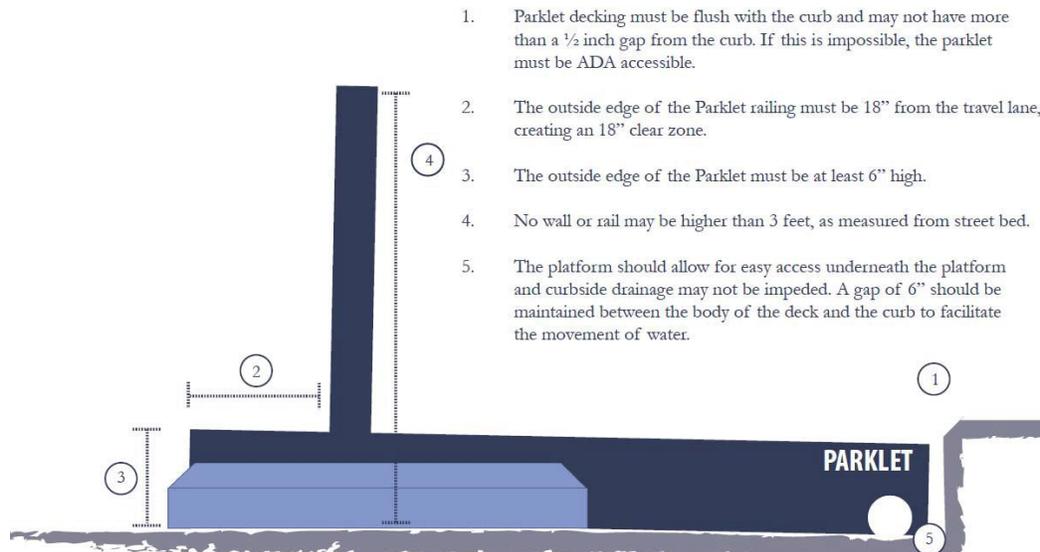
- San Francisco’s impact study found that:
 - No businesses complained of less foot traffic, and several saw increases.
 - Pedestrian counts indicated some increased traffic.

Safety

Ensuring safe installation requires cross-departmental and stakeholder cooperation. It is very important that there are clear and easily comprehensible policies and procedures which organizations interested in sponsoring a parklet can follow. Lack of clarity and additional roadblocks can frustrate the good intentions of area business and squander opportunities for building goodwill. All municipalities specified design features to ensure driver visibility and pedestrian safety.

- Speed Zone: Municipalities generally restrict the placement of the platforms to areas where the maximum legal speed is between 25 and 30 mph.
- Engineering of Platforms
 - On equal grade with sidewalks and handicap accessible
 - Allow proper drainage of storm water
 - Consist of easily maintained long-lasting materials
 - In some cases, where lighting is required, it must be provided from self-sufficient solar and battery arrays.

Figure 46. Design Guidelines to Address Drainage



Source: Philadelphia Parklet Program Guidelines, p.12

APPENDIX 2: COMPLETE STREETS STANDARDS

Complete Streets Implementation Plans & Pilot Projects in Smaller Communities⁴⁶

Overview

While larger American cities have often been the earliest adopters of complete streets policies, smaller municipalities have a great deal of potential to reap the benefits of complete streets without exceeding their slimmer capital budgets. From official policies and ordinances to on-the-ground implementation, smaller communities are increasingly adopting complete streets actions and seeing tangible benefits: safer roadways, improved vehicle throughput and economic growth, among others. After engaging relevant stakeholders and performing community outreach, setting official policies, ordinances and resolutions at the municipal level is a first step towards achieving Complete Streets. These actions help to create legislative pressure to incorporate the needs of all road users in the local planning and development process. An important next step beyond municipal policy, especially for smaller communities facing lean capital budgets, is the implementation of inexpensive, tactical complete streets pilot projects. Such projects use inexpensive, often temporary materials and generally avoid full-scale street reconstruction to avoid larger expenditures. The temporary nature of pilot projects and their high benefit/cost ratio may help communities build political support for more permanent complete streets projects. Below are some highlights of Complete Streets policies and pilot projects in smaller communities.

Policies, Ordinances and Resolutions

Morristown, NJ

Morristown's Complete Streets Policy⁴⁷ contains ten main objectives and calls for the establishment of a Priority Action Plan and Project Checklist to address pedestrian, bicyclist and transit-friendly accommodations within transportation projects. Key objectives include:

- Providing safer environments for cyclists and pedestrians
- Promoting non-motorized access to employment, services and other destinations
- Incorporating bike and pedestrian infrastructure into the site plan and development review process
- Compliance with the requirements of existing AASHTO roadway design standards, the municipal Safe Routes to School program and the Americans with Disabilities Act (ADA).

The Complete Streets Priority Action Plan identifies functional and geographic areas for stakeholders to prioritize Complete Streets projects likely to have the greatest impact. These include the Morristown

⁴⁶ Defined as communities of 50,000 people or less.

⁴⁷ Town of Morristown. Morristown Complete Streets Policy, Pub. L. No. Resolution R-105-12 (2012). Retrieved from http://www.townofmorristown.org/vertical/sites/%7B0813EA2E-B627-4F82-BB80-DDEE646947B5%7D/uploads/Morristown_Complete_Streets_Policy_revised_draft_6-19-12.pdf

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Bicycle Plan (2010), implementing a Safe Routes to School Program and implementing complete streets accommodations to streets known to have particularly challenging crossings for cyclists or pedestrians.

The Complete Streets Project Checklist, meanwhile, was intended to clarify a project’s congruence with the Complete Streets Policy as developers, planners and engineers navigate the site plan and development review process. The checklist is required to be used for all publicly funded land use or transportation projects, with the exception of sidewalk repairs, street furniture installation, roadway markings (e.g. bike lanes) or ADA-accessible ramps. The checklist requires a series of approvals from several decision-makers before a project may proceed. These approvals include the Town Planner on concept development, the Town Engineer on preliminary engineering, Construction Official on construction impacts, and Public Works on ongoing maintenance requirements. With regard to snow removal, the checklist’s maintenance section asks applicants to identify the party responsible for snow removal as well as determine whether snow removal would force snow onto crosswalks, blocking clear access.

The Policy assumes that complete streets features will be included in any transportation and land use project that utilizes public funds, unless supporting documentation provides sufficient justification against their inclusion.

Pilot Projects and Implementation

Community	Project Description	Cost (\$ in thousands)	Notes
Athens, GA ⁴⁸	In 1999, Athens-Clarke County Traffic Engineering Department re-striped a four-lane arterial, Baxter Street, into a three-lane roadway with shared lane for bicycles. Previous configuration was four 10’ travel lanes, two in each direction. New configuration was three 11’ travel lanes (two in each direction, one center left-turn lane) with a 3’ shared auto/cyclist striped travel lane. Collisions on the corridor declined 52 percent year-to-year. Traffic volumes declined six percent during the same period.	186	Bicycle usage was reported to be low along the Baxter Street corridor, as few as 20 cyclists per day. Pedestrian safety islands were included in the design.
Decatur, GA ⁴⁹	The City of Decatur’s community outreach process in its Community Transportation Plan (CTP) can be seen as a model for other small municipalities in Complete Streets projects. Outreach events included a kickoff meeting attended by 100 people, community mapping exercises, an active living fair with a children’s scavenger hunt, and bike and pedestrian Workshops. The City conducted stakeholder meetings with local institutions, small businesses, residents, senior citizens’ groups, and the public housing community. The results of the CTP were used to propose comprehensively reducing local speed limits on local residential and arterial streets, to below 25mph and below 30mph, respectively.	N/A	Decatur’s Speed Limits Proposal is currently pending approval from Georgia Department of Transportation.
Dubuque, IA ⁵⁰	In 2012, the City of Dubuque implemented a complete streets pilot program after receiving federal TIGER grant funding as	5,600 for roadway	This project was one of 37 featured in a national

⁴⁸ Clark, D. E. (2001). *Road Diets: Athens-Clarke County’s Experience in Converting 4-lane Roadways into 3-lane Roadways*. Athens, GA: Athens-Clarke County. Retrieved from <http://completestreetsprince.org/docs/ACC-Experience-Converting-Roadways-Clark-2001.pdf>

⁴⁹ City of Decatur. (2013). *Speed Limits Study and Proposal*. Decatur, GA. Retrieved from <http://www.decaturga.com/Modules/ShowDocument.aspx?documentid=4365>

⁵⁰ Bachman, B. (2015, March 24). Results released from national study, Dubuque project part of the study | KCRG-TV9 | Cedar Rapids, Iowa News, Sports, and Weather. Retrieved June 11, 2015, from <http://www.kcrg.com/subject/news/results-released-from-national-study-dubuque-project-part-of-the-study-20150324>

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	part of the Master Plan for a mixed-use, livable, walk-able Millwork District near the central business district. The Millwork District Complete Streets design, along Washington, Jackson, Elm, 8th, 9th, and 10th Streets, used locally-sourced recycled brick to make sidewalks and crosswalks more visible to drivers as well as highlight the area’s architectural heritage. Several intersections used corner bulbouts to reduce pedestrian crossing distances and permeable pavers to manage storm water runoff in the streets. Energy-efficient lighting is being installed in historic lampposts that honor the district’s industrial past. An additional \$150,000 from an Iowa Great Places Grant is being used for streetscape beautification with artistically designed benches, waste receptacles, planters, bike racks, and other design elements.	redesign (federal TIGER grant), 150 for street furniture	Complete Streets study by Smart Growth America, showing that Complete Streets helped avoid \$18 million in annual safety and injury costs and promoted growth in employment and property values.
Ferndale, MI ⁵¹	Livernois Street, a main arterial, was reduced from five travel lanes to two. In place of the former three travel lanes, Ferndale installed on-street parking and buffered bike lanes with a striped pattern to give cyclists greater visibility. Bike racks were provided in several on-street parking spaces to encourage cycling in a highly visible way. Mid-block crossings and flashing beacons were added as pedestrian safety measures. Bright green paint was used to show "conflict points" on the roads where bikes and cars might run into each other, especially at intersections. On West Nine Mile Road, the roadway was slimmed from four travel lanes to three. Sharrows were installed in lieu of bike lanes due to space constraints. Both bike and car parking were paved with a porous pavement that allows water to soak right into the ground, a valuable tool for stormwater management. Curb bulbouts and pedestrian safety islands were also placed on Nine Mile as traffic calming measures.	1,080 for West Nine Mile Road project (State DOT, federal SAFETEA grant), 118 for Livernois project (local MPO grant)	Ferndale Downtown Development Authority, a local development corporation, was a key partner in this project. More information available at http://ferndalemoves.com/projects/
Los Gatos, CA ⁵²	The City of Los Gatos has identified \$100,000 for a complete streets pilot project, at a location still to be determined. The Complete Streets pilot was incorporated into the City’s five-year Capital Improvement Plan in May, 2014 and funding allocated for the 2014/2015 fiscal year. It is likely that the project will include an enhanced bike lane in a high-need corridor such as Winchester Street or Los Gatos Boulevard.	100 (city capital funding)	Safe Routes to School (SRTS) programs may be one way to promote Complete Streets pilot projects. Elementary and middle school students in the Los Gatos SRTS program found that traffic calming and pedestrian safety measures reduced local ozone pollution by 60 percent .
Morgan Hill, CA ⁵³	The City of Morgan Hill contracted with Alta Planning to create a six-month Complete Streets pilot project on Monterey Road, from February 2015 to July 2015. Monterey Road serves as Morgan Hill’s Downtown Main Street and was narrowed from five travel lanes to three, including the center turning lane. The reduced car travel lanes were replaced with buffered bike lanes. After a two-day, weekend trial period, 54 percent of residents surveyed supported extending the project for a six-	251 (city capital funding)	In July 2015, final results on the project’s performance will be presented to the City Council, which will decide whether to make the project permanent.

⁵¹ Colling, B. (2013, April 26). Ferndale streetscape improvement project begins May 1. Retrieved June 10, 2015, from <http://wearemodeshift.org/ferndale-streetscape-improvement-project-begins-may-1>

⁵² Town of Los Gatos. (2014). *Capital Improvement Program*. Retrieved from <http://losgatosca.gov/DocumentCenter/Home/View/42>

⁵³ Cheek, M. (2015, May 27). Complete streets pilot reports on traffic, bike use in MH downtown district. Retrieved June 11, 2015, from <http://morganhilllife.com/complete-streets-pilot-reports-traffic-bike-use-mh-downtown-district/>

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	month pilot. During the project’s first three months, average vehicle travel speed on the corridor increased four percent, while bicyclist traffic increased 116 percent.		
Redwood City, CA ⁵⁴	In January 2015, the Redwood City Council approved a one-year pilot road diet for Farm Hill Boulevard, narrowing the roadway from four travel lanes to three. Bike lanes in each direction will take the place of one of the missing car travel lanes. This project is notable because it was rejected twice in 2009 and 2012 due to community opposition. It is thought that a car crash on Farm Hill Boulevard in 2014, in which two 19-year-old residents were critically injured, helped shift public opinion. The project is consistent with the city’s General Plan, which endorses a Complete Streets policy.	N/A	Construction is expected to be complete by July 2015.
Reston, VA ⁵⁵	In 2009, the Virginia Department of Transportation implemented a road diet on a two-mile segment of Lawyers Road, a rural arterial. The roadway was reduced from four lanes to three (including a center turning lane), with shoulder areas re-striped as bike lanes. The speed limit was reduced from 45 to 40 mph. Collision rates on Lawyers Road declined 70 percent as a result of the project. By 2010, 74 percent of surveyed residents agreed the project made the community safer while 71 percent voiced support for similar complete streets projects elsewhere in Reston.	Project costs included as part of scheduled roadway repaving.	As a result of strong community support for this project, a second road diet was implemented at Soapstone Road in 2011. More information on this project is available here: http://safety.fhwa.dot.gov/road_diets/brochure/roaddietbrochure.pdf

Figure 47: Athens, GA | Baxter Street Road Diet



Image Source: Complete Streets Prince Avenue

⁵⁴ City of Redwood City. (2015). *Farm Hill Boulevard Pilot Street Improvement Project*. Retrieved from http://www.redwoodcity.org/bit/transportation/Farm_Hill_Boulevard/Farm_Hill_Boulevard.html

⁵⁵ Crowe, R. (2013). *Road Diets*. Federal Highway Administration. Retrieved from http://safety.fhwa.dot.gov/road_diets/brochure/roaddietbrochure.pdf

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Figure 48: Ferndale, MI | Livernois Avenue Buffered Bike Lane with Green Conflict Points and Pedestrian Safety Island



Image Source: Mode Shift: Move Together

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Figure 49: Dubuque, IA | Millwork District Complete Streets with corner bulbouts, permeable brick paving and contextual street furniture



Image Source: Planetizen

Figure 50: Reston, VA | Roadway configurations before and after 2009 road diet on Lawyers Road



Image Source: Randy Dittberner, Virginia DOT

Figure 51: Morgan Hill, CA | Cyclists on new Monterey Road buffered bike lane in Downtown Morgan Hill



Image Source: City of Morgan Hill

Integrating Complete Streets and Green Infrastructure

Overview

Complete Streets projects generally involve re-allocation of roadway space away from vehicular traffic and towards accommodations for pedestrians, cyclists and other road users. The process of roadway reconstruction to meet these goals offers communities numerous opportunities to incorporate additional elements of green infrastructure – stormwater management and urban forestry – into roadway design.

Stormwater Management

As cities begin to adapt to the impacts of climate change such as flooding and other extreme weather events, roadway stormwater management has become a significant concern for transportation planners. Effective stormwater management increasingly seeks to limit water pollution and runoff, reduce the extent of impervious surfaces in the environment and integrate natural stormwater infiltration mechanisms into the urban environment whenever possible. Roadway features falling under the general framework of “[Low Impact Development](#),” such as permeable paving, bioretention ponds and swales, vegetated buffers and gutters, and roadside infiltration trenches enable communities to achieve the objective of environmental protection considered essential to the complete streets approach. Low-Impact Development (LID) refers to “stormwater management that prioritizes the use of distributed control facilities that are typically landscape-based tools to not only reduce stormwater pollution and volume on-site, but also to provide ancillary benefits of improved greenery, place-making, and other aesthetic and quality of life related improvements.”⁵⁶ Figure 52 shows the suitability of Low-Impact Design alternatives

⁵⁶ City and County of San Francisco. (2015). *SF Better Streets* (No. Chapter 6). San Francisco, CA: City and County of San Francisco. Retrieved from <http://www.sf-planning.org/ftp/BetterStreets/index.htm>

that may be incorporated into a Complete Streets project for various roadway typologies. Figure 53 describes the suitability of these approaches by their location in the right of way. In addition, the cities of Philadelphia and Seattle provide an in-depth resource for designing and implementing LID as part of a Green Streets strategy.

Urban Forestry

Urban forestry is defined as any landscaping planted in the public right of way such as trees, understory plantings or above-ground plantings. Plantings in the public right-of-way enhance the urban environment through a wide range of community benefits, including but not limited to:

- Environmental – Urban plantings contribute to environmental protection by sequestering atmospheric carbon, mitigating local air pollution, improving hydrology and reducing the urban heat island effect.
- Economic – Street trees improve nearby property values and may reduce the ongoing maintenance costs of adjacent roadway infrastructure by limiting exposure to the elements.
- Safety – Consistent street trees narrow the perceived width of streets, causing drivers to reduce their speed and increase their awareness of pedestrians.
- Aesthetic – The visual characteristics of street trees and plantings help to create a beneficial identity of place, which improves quality of life.

A variety of constraints – climate, location and spacing, slope and ongoing maintenance costs, among others – affect the suitability of various trees, understory plantings or above-ground plantings in the public right of way. The cities of San Francisco, San Mateo, and New York have each developed detailed urban forestry guidelines in the context of Complete Streets.

When complete streets projects are implemented in tandem with stormwater management (typically LID) and urban forestry features, this integrated approach is often termed “green streets” or “complete green streets.” A series of case studies showcasing integrated complete streets and green infrastructure methodologies is shown below.

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Figure 52: Approaches to Integrated Complete Streets and Stormwater Management

STREET TYPE		PAVING	BIORETENTION			CONVEYANCE		OTHER		
		Permeable Paving*	Rain Garden	Flow through and infiltration planter	Infiltration Boardwalks	Swales	Channels and Runnels	Infiltration and Soakage Trenches	Vegetated Buffer Strip	Vegetated Gutter
COMMERCIAL	Downtown Commercial	○	○				○	○		
	Commercial Throughway	○	○	○	○		○	○		
	Neighborhood Commercial	○	○	○	○		○	○		
RESIDENTIAL	Downtown Residential	○	○	○		○	○	○		○
	Residential Throughway	○	○	○		○	○	○		○
	Neighborhood Residential	○	○	○		○	○	○		○
INDUSTRIAL AND MIXED-USE	Industrial	○	○	○		○	○	○		
	Mixed-Use	○	○	○	○		○	○		
SPECIAL	Parkway	○	○	○		○	○	○	○	○
	Park Edge	○	○	○		○	○	○	○	○
	Multi-Way Boulevard	○	○	○		○	○	○	○	○
	Ceremonial (Civic)	○					○	○		
SMALL	Alley	○	○	○			○	○		
	Shared Public Way	○	○	○			○	○		
	Paseo	○	○	○	○		○	○		

Source: City and County of San Francisco, "Better Streets," Chapter 6.2: Stormwater Management, Figure 6.5, p.190

Figure 53: Stormwater Facilities by Location in the Right of Way

PLACEMENT	PAVING	BIORETENTION			CONVEYANCE		OTHER		
	Permeable Paving*	Rain Garden	Flow through and infiltration planter	Infiltration Boardwalks	Swales	Channels and Runnels	Infiltration and Soakage Trenches	Vegetated Buffer Strip	Vegetated Gutter
Private Driveway or Yards	○	○	○	○	○	○ (covered)	○		
Sidewalk	○	○	○	○	○	○	○		
Curb Extension	○	○	○	○	○	○	○		
Parking Lane/Gutter	○	○	○		○	○ (covered)	○		○**
Bike Lane									
Through Lane									
Median	○	○*	○		○*	○	○*	○	
Traffic Circles	○	○*	○	○	○*	○*	○*		

Source: City and County of San Francisco, "Better Streets," Chapter 6.2: Stormwater Management, Figure 6.6, p.190

Pilot Projects and Implementation

Community	Project Description	Cost (\$ in thousands)	Notes
West Union, IA	The Iowa Green Streets Pilot project included the complete renovation of six downtown blocks in West Union, IA. The project showcases innovative green streets strategies as a model for such as permeable pavements, pedestrian crosswalk treatments, rain gardens, energy-efficient street lighting, and a district-wide geothermal heating and cooling system.	11,500	Project cost includes all aspects: street surface, sidewalks, amenities, sanitary sewer, stormwater, street furniture, snowmelt system and project management. More information available here: http://www.westunion.com/uploads/PDF_File_24604713.pdf
Portland, OR	SW 12 th Avenue Green Street was Portland’s first Green Street installation in 2005, capturing runoff from 7,500 square feet of asphalt through stormwater street planters ⁵⁷ .	38	
Portland, OR	Portland’s SE Spokane Street Bicycle Boulevard Project integrated green infrastructure with complete streets bicycle features. The project removed 282 square feet of asphalt (replaced with stormwater planters), with a coverage area of 7,000 square feet ⁵⁸ .	141	
Portland, OR	The City of Portland’s Sandy Boulevard Green Street captures runoff from 8,500 square feet of asphalt and consists of green stormwater planters and bioswales. These plantings save the city an estimated 1.3 million gallons of stormwater from the sewer system annually.	350	This project was especially innovative for its use of Silva Cells, an underground framework that gives plants access to an unusually large soil area, enhancing stormwater retention capacity.
New York, NY	The New York City Department of Parks & Recreation Greenstreets program converts areas of paved roadway into green spaces (e.g. bioswales, vegetated medians and gutters) filled with trees, understory shrubs, and groundcover. As part of Mayor Bloomberg’s PlaNYC 2030, the NYC Department of Parks & Recreation aimed to create 80 Greenstreets per year, beginning in 2007. There are now more than 2,000 Greenstreets citywide, and the program is highly popular ⁵⁹ . The City receives nearly 50 requests for	15,000	Project cost includes all NYC Greenstreets projects for the period 2007-2017. The City received \$2 million in ARRA stimulus funding to help defray project costs.

⁵⁷ City of Portland. (n.d.). *SW 12th Avenue Green Street Project*. Portland, OR: City of Portland Bureau of Environmental Services. Retrieved from <http://www.portlandoregon.gov/bes/article/167503>

⁵⁸ City of Portland. (2010). *SE Spokane Green Street Bicycle Boulevard Project*. Portland, OR: City of Portland Bureau of Environmental Services. Retrieved from <http://www.portlandoregon.gov/bes/article/302372>

⁵⁹ New York City Global Partners. (2010). *Best Practice: New York City Greenstreets*. New York, NY. Retrieved from <http://www.nyc.gov/html/ia/gprb/html/bphome/home.shtml>

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	Greenstreets monthly from neighborhood stakeholders.		
Seattle, WA	Seattle’s Street Edge Alternatives Pilot Project was completed in 2001. The project took place on 2 nd Ave NW between NW 117 th and 120 th Streets and replaced a traditional residential roadway design with green infrastructure elements. The project achieved an 11 percent reduction in local runoff and added over 1,100 trees and shrubs to the area.	850	
Shoreline, WA	The City of Shoreline’s 17 th Ave NE Green Street Demonstration was implemented in 2011 along a five-block roadway segment ⁶⁰ . It included stormwater bioswales and plantings as well as crosswalk improvements and traffic calming features such as bulbouts.	418	\$269,000 in city funding, \$179,000 in grant funding.
Chicago, IL	Chicago’s 2006 Green Alley Demonstration Pilot Project implemented permeable paving and bioswales at six locations in public alleyways and parking lots. The purpose of the project was to reduce the city’s urban heat island effect, reduce ongoing maintenance cost and improve drainage. The City has since undertaken more than 100 similar alleyway green infrastructure projects ⁶¹ .	N/A	The City of Chicago has published a Green Alley Handbook detailing its site selection, design and implementation guidelines.
Lansing, MI	In Lansing’s Michigan Avenue Green Street project, the City of Lansing invested \$1 million to install bioswales embedded in a brick-paved sidewalk in a prime commercial corridor ⁶² .	1,000	Further pilot projects achieved cost reductions of nearly \$150 per linear foot.
San Francisco, CA	San Francisco’s Leland Avenue Green Street project in 2009 redesigned the “main street” of the city’s lower-income Visitacion Valley neighborhood. Key features included permeable paving along sidewalks and on-street parking, infiltration planters at corner bulbouts, and rainwater collection cisterns at primary intersections ⁶³ .	6,000	

⁶⁰ City of Shoreline. (2011). *Green Streets Demonstration Project*. Shoreline, WA. Retrieved from <https://www.youtube.com/watch?v=XMavo2oFaSo>

⁶¹ Newell, J., Seymour, M., Yee, T., Renteria, J., Longcore, T., Wolch, J., & Shishkovsky, A. (2012). Green Alley Programs: Planning for a sustainable urban infrastructure? *Cities*. Retrieved from http://nacto.org/docs/usdg/green_alley_programs_planning_for_a_sustainable_urban_infrastructure_newell.pdf

⁶² Streetsblog. (2008, December 5). Green Streets Growing in Lansing, MI | Streetsblog.net. Retrieved from <http://streetsblog.net/2008/12/05/green-streets-growing-in-lansing-mi/>

⁶³ Varack, A. (n.d.). *Leland Avenue Streetscape Design*. San Francisco, CA: San Francisco Planning Department. Retrieved from http://www.vmw.com/projects/pdfs/leland_ave.pdf

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Figure 54: West Union, IA | Iowa Green Streets Pilot Project



Image Source: Conservation Design Forum

Figure 55: Chicago, IL | Green Alley with Permeable Paving



Image Source: Newell et al, 2012, p.10

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Figure 56: Portland, OR | Integrated Stormwater and Bicycle Infrastructure at SE Spokane Street



Before



After

Image Source: City of Portland

Figure 57: Portland, OR | Stormwater Street Planters installed at SW 12th Street and Montgomery



Image Source: City of Portland

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Figure 58: Seattle, WA | Street Edge Alternatives Pilot Project incorporates permeable pavement and bioswales



Image Source: Seattle Public Utilities

Figure 59: San Francisco, CA | Leland Avenue Green Street corner bulbouts



Image Source: San Francisco Planning Department

Street Furniture in Complete Streets

Overview

For Complete Streets to achieve improved outcomes of safety, economic development, environmental protection or quality of life, it is necessary to establish robust street furniture policies and design guidelines that integrate into any municipal Complete Streets actions. Street furniture is an especially important in Complete Streets project that may be overlooked in other phases of a project’s policy, design and implementation. Street furniture provides valued amenities for pedestrians by adding functionality and vibrancy to pedestrian space. Street furniture provides clear visual indicators to pedestrians and other road users that a street is a comfortable and inviting place to be. Pedestrian amenities should be considered a compulsory public expenditure like other necessary elements of the street, such as traffic signals and drainage. Improved street furniture has been shown to improve public perceptions of safety and comfort, local business performance, local real estate value and transportation habits. Street furniture may be defined as any of the following on-street amenities:

- Benches and other public seating
- “Parklets” – public seating occupying former on-street parking spaces
- Public art
- Bicycle racks
- On-street bicycle parking (also known as “bike corrals”)
- Banners
- Street lamps
- Trash and recycling receptacles
- News racks
- Newsstands and concessions
- Public toilets
- Wayfinding and signage
- Community information kiosks
- Transit shelters (addressed in Part 4)

As a general rule, permanent (not “pilot”) street furniture elements may cost between \$1,000 and \$1,500 per linear foot of project area⁶⁴. For detailed recommendations, the cities of New York, San Francisco, Dallas, TX, Alexandria, VA and San Clemente, CA, provide excellent resources on street furniture design, implementation and maintenance within the context of broader Complete Streets strategy.

⁶⁴ Attarian, J. (2003). *Streetscape Guidelines*. Chicago, IL: City of Chicago. Retrieved from http://www.cityofchicago.org/dam/city/depts/cdot/Streetscape_Design_Guidelines.pdf

Pilot Projects and Implementation

Community	Project Description	Cost (\$ in thousands)	Notes
New York, NY	Broadway Boulevard is among the highest-profile street furniture projects in the United States. Beginning with a two-mile stretch of the famed Broadway, this complete streets project converted two vehicle travel lanes into a pedestrian promenade and protected bicycle lane. Using an inexpensive epoxy paving treatment, planters as barriers, and low-cost street furniture (movable tables and chairs), the project cost just \$700,000 for its 36-block length ⁶⁵ . Its most prominent feature was the creation of a new pedestrian plaza at Times Square, where Broadway was closed to vehicular traffic for several blocks. The project created over 60,000 square feet of pedestrian space for the over 300,000 pedestrians crossing through the area daily. Most importantly, the project led to a 35 percent reduction in vehicle/pedestrian collisions in the area and improved vehicle travel speeds by four percent.	700	In response to public opinion favoring this project by an overwhelming margin (76 percent of New Yorkers in favor), many elements of this project, such as the Times Square pedestrian plaza, have since been upgraded using more robust, permanent materials. The project is the most successful example of NYC Department of Transportation’s Pedestrian Plaza program, which has implemented dozens of such projects citywide. The Department also partners with local nonprofit organizations to perform maintenance on the plazas.
San Francisco, CA	The City of San Francisco’s Parklets Program repurposes on-street automobile parking spaces as miniature pedestrian public spaces, often incorporating bench seating, landscaping and public art. Originally implemented by local complete streets activists on an ad hoc basis in 2010, the program is now official City policy ⁶⁶ . The parklets program is a community-driven initiative in which local nonprofits, neighborhood groups or merchants apply for city approval to install temporary Parklets using inexpensive materials along local retail corridors. After evaluating the results of the pilot project, the city may determine to make the temporary Parklet permanent. As of 2015, the city has created 50 permanent parklets.	20-50	In many cases local merchants covered the cost of permanent parklet installation, as well as the City’s required liability insurance.
Morgan Hill, CA	In January 2015, the City of Morgan Hill, CA, approved the installation of \$96,000 of public art from various artists as part of its Placemaking Art Mini-Grant Pilot Program ⁶⁷ . The city approved the Pilot Program in recognition of the benefits the public art (much of it accompanying street furniture) would have for the vibrant place identity of the downtown Main Street.	96	The City Council has proposed to make several of the 12 approved public art pieces permanent acquisitions as part of the community’s streetscape.

⁶⁵ Times Square Alliance. (2015). Broadway Bowtie. Retrieved from <http://www.timessquarenyc.org/about-the-alliance/public-space-projects/index.aspx#.VXs-CYe3iDo>

⁶⁶ City and County of San Francisco. (2015). *Pavement to Parks: The San Francisco Parklet Manual*. San Francisco, CA. Retrieved from http://pavementtoparks.sfplanning.org/docs/SF_P2P_Parklet_Manual_2.2_FULL.pdf

⁶⁷ City of Morgan Hill. (2015). *City Council Staff Report* (No. 14-495). Morgan Hill, CA. Retrieved from <http://www.morgan-hill.ca.gov/DocumentCenter/View/15355>

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Figure 60: San Francisco, CA | Example of a Parklet Providing Vibrant Pedestrian Space in the Public Right of Way



Image Source: City and County of San Francisco

Figure 61: Seattle, WA | “Pop-up Parklet” Using Low-Cost, Temporary Materials



Source: Loukaitou-Sideris et al, 2012⁶⁸

Transit Furniture in Complete Streets

Overview

Access to multiple modes of travel within a walking-distance radius of one’s location is a defining element of a Complete Streets environment. Creating Complete Streets, therefore, requires consideration of transit infrastructure as well as the pedestrian and cyclist environments. Known together as “multi-modal transportation,” the interactions between pedestrians, cyclists and transit riders are strong and complementary. The Complete Streets methodology is based on the premise that public space; safer conditions for all road users; and public transit ridership are inextricably linked. Safe, comfortable walking and cycling conditions improve both local quality of life as well as the performance of public transit systems. In designing and implementing Complete Streets pilot projects, communities should consider incorporating transit furniture elements into roadway designs to maximize the project’s range of benefits, just as green infrastructure components are included in “Green Streets” projects. Transit furniture may encompass any of the following elements located outside of the vehicular roadway but within the public right of way:

- Transit wayfinding and signage
- Boarding & alighting areas (wheelchair access required by ADA)
- Transit shelters

⁶⁸ Loukaitou-Sideris, A., Brozen, M., & Callahn, C. (2012). *Reclaiming the Right-of-Way: A Toolkit for Creating and Implementing Parklets*. Los Angeles, CA: Luskin School of Public Affairs. Retrieved from <http://innovation.luskin.ucla.edu/sites/default/files/parklettoolkit.pdf>

- Transit information boards
- Bicycle racks
- Sidewalk vendors
- Benches
- Trash & recycling receptacles
- Landscaping
- Public art

To create effective guidelines on the site selection, placement, installation and maintenance of transit furniture, some measure of collaboration is necessary between municipalities, transit agencies and private landowners. Given the complex interactions between transit operators and other aspects of Complete Streets (e.g. curb extensions, stormwater street planters or bike lanes), transit furniture must be designed and situated in a way that complements, rather than detracts from, other features of the public right of way. Transit furniture should enhance the experience of waiting for and boarding transit vehicles. Successful transit furniture is well connected to the local network of sidewalks and pedestrian routes, and provides convenient connections to homes, workplaces and other destinations. Streetscape elements and pedestrian facilities should be designed to support transit operations.

Design Guidelines

- **Policy Guidance:** The City of Burlington, VT, provides an easy-to-use complete streets guide structured in a series of checklists that may be the most approachable format for smaller communities⁶⁹. The document includes checklists tailored for general complete streets designs and “Transit Streets,” with stronger requirements for transit furniture.
- **Americans with Disabilities Act compliance:** To ensure the effective mobility and circulation of all types of pedestrians, the Americans with Disabilities Act (ADA) requires all pedestrian pathways, transit services and transit furniture to provide for the equal access of persons with disabilities, especially those with limited vision or mobility. The Transit Authority of River City’s *Transit Design Manual Standards* establishes clear guidelines for the placement and design of these features within the requirements of ADA⁷⁰.
- **Transit stop placement and design:** Generally, transit stops should be highly visible and well-lit to encourage ridership. Bus stops should be located in a curb extension or bus bulb wherever possible to minimize pedestrian crossing distances, and away from driveways to avoid automobile/bus conflicts in traffic. As a rule, transit stops should be located on the far side of intersections, whenever possible, to reduce congestion. Transit stops may be distinguished from the adjacent sidewalk through the use of special paving treatments, curb extensions or bus bulbs, or a row of trees or planters, where space allows. Bicycle racks, newsstands, additional seating or wayfinding signage should be prioritized in commercial corridors or areas with higher pedestrian circulation or transit ridership. Whenever possible, transit stops should be functionally integrated

⁶⁹ City of Burlington. (2013). *Burlington Complete Streets Guidance: Navigating the Mandatory Reporting Requirement of Act 34*. Burlington, VT: City of Burlington Public Works Department. Retrieved from <http://www.burlingtonvt.gov/sites/default/files/DPW/CompleteStreets/CompleteStreets-Reporting-v2.2.1-workingdraft.pdf>

⁷⁰ Transit Authority of River City. (2013). *Transit Design Standards Manual: A Reference Guide*. Louisville, KY. Retrieved from http://www.ridetarc.org/uploadedFiles/TARC_TDSM_FINAL_091613web.pdf, pp. 14-48.

with other nearby activity centers to create safe and lively street environments. Other transit furniture should be tailored according to the transit mode, frequency of service and pedestrian circulation levels, such as in Figure 64. The City of San Francisco’s *Better Streets* guide delineates transit furniture standards in greater detail⁷¹. Specific recommended dimensions of transit shelters and furnished areas is available on their website.

- **Transit furniture selection:** Investment in transit furniture should correlate with the ridership present at affected transit stops. Higher-ridership transit stops should feature the broadest range of transit furniture, while even low-ridership stops should have some level of amenities to provide riders with a comfortable boarding and alighting environment. The City of Los Angeles’ *Complete Streets Manual*⁷² provides more detailed transit furniture distribution guidelines, briefly shown in Figure 62. Meanwhile, the City of Fort Meyers, FL, recommends transit furniture based on the frequency of transit service. Benches are recommended at bus stops with service headways of less than five minutes, while bus shelters are recommended for stops with service headways of less than ten minutes⁷³.
- **Bus stop clear zones:** Bus stops need to have clear and accessible paths to and from the bus, including an Accessible Front Door Zone, a Through Walk Zone, and a Back Door Zone⁷⁴. The Accessible Front Door Zone must be at least 5’ by 8’ and should be provided outside of the transit shelter. A Through Walk Zone is recommended at 6’ by 1.5’ to allow for unconstrained pedestrian circulation. Finally, the Back Door Zone should be provided no more than 20’ from the lower edge of the Accessible Front Door Zone to allow passengers to exit smoothly from the back of the bus. This measurement should be adjusted for articulated bus vehicles. Shelters should be placed within the “furniture zone” to avoid conflicts with sidewalk pedestrian circulation. The City of Minneapolis has more detailed recommendations on this topic, such as the example in Figure 69.

Figure 62. Minimum Transit Furniture Guidelines

Ridership Level	Transit Furniture Recommendations
Low	1 sign, 1 trash receptacle, 1 shade tree, lean bar where possible.
Medium	1 sign, 1 bench, 1 trash receptacle, 2 shade trees, 1 pedestrian light, lean bar and second lean bar where possible
High	1 sign, 1 shelter with bench, 1 bench or lean bar, 2 trash receptacles, 3 shade trees, 3 pedestrian lights

Source: City of Los Angeles, 2014, p. 249

⁷¹ City and County of San Francisco. (2015). *SF Better Streets* (Chapter 5). San Francisco, CA: City and County of San Francisco. Retrieved from http://www.sf-planning.org/ftp/BetterStreets/docs/FINAL_5_Street_Designs.pdf, pp. 30-37

⁷² City of Los Angeles. (2014). *Complete Streets Manual* (No. CPC-2013.910.GPA.SP.CA.MSC). Los Angeles, CA: City of Los Angeles Department of Planning. Retrieved from <http://planning.lacity.org/Cwd/GnIPIn/MobilityElement/Text/CompStManual.pdf>, pp. 245-252.

⁷³ City of Fort Myers. (n.d.). *City of Fort Myers Complete Streets Guidelines: Transit Accommodations*. Fort Myers, FL: City of Fort Myers. Retrieved from <http://www.cityftmyers.com/DocumentCenter/Home/View/600>

⁷⁴ City of Minneapolis. (2009). *Chapter 10: Pedestrian Facility Design* (Access Minneapolis: Design Guidelines for Streets and Sidewalks). Minneapolis, MN: City of Minneapolis. Retrieved from http://www.minneapolismn.gov/www/groups/public/@publicworks/documents/webcontent/convert_256028.pdf, pp. 39-46.

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Figure 63: Placement Guidelines for Curb-side Transit Infrastructure

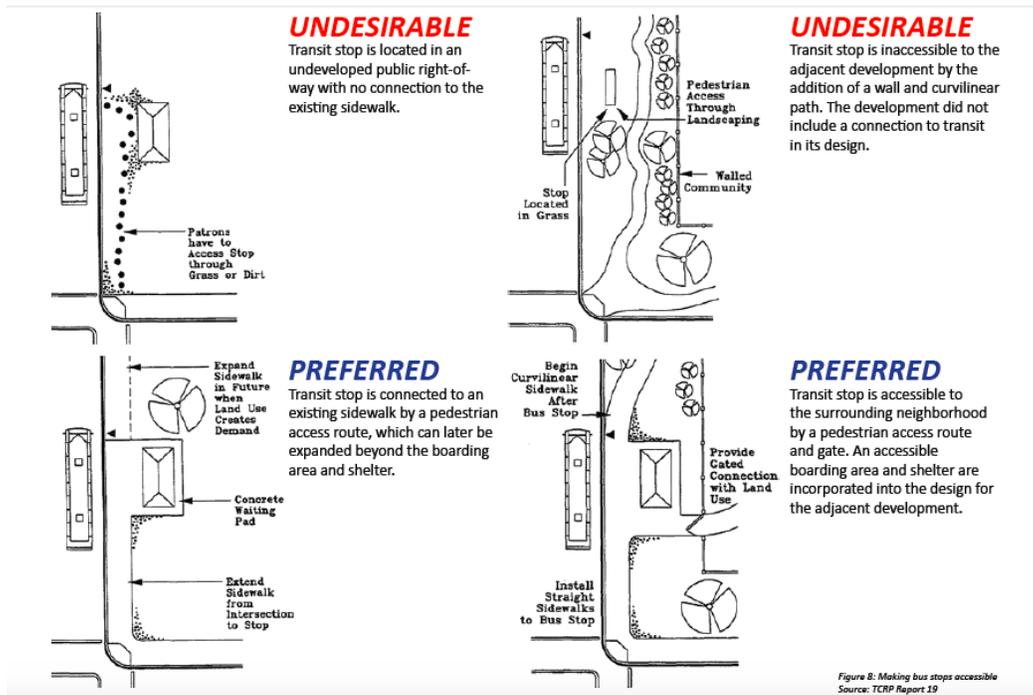


Image Source: Transit Authority of River City, 2013, p.30

Figure 64: Streetscape Amenities by Type of Transit Route

TYPE OF TRANSIT ROUTE	APPROPRIATE AMENITIES (GENERAL)
LRT, BRT, RAPID NETWORK	Flag sign, trees or containerized planters, lighting, special paving, seating (formal or informal), trash cans, bicycle racks, wayfinding information, real-time transit information, transit shelters and seating (at major transfer points)
LOCAL NETWORK	Flag sign, transit shelter, real-time transit information, trees or containerized planters, lighting, trash cans
COMMUNITY NETWORK	Flag sign, trees or containerized planters, lighting, trash cans
SPECIAL SERVICES	Share stations with above

Image Source: City and County of San Francisco, 2015, p.34

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Figure 65: Transit Furniture Guidelines

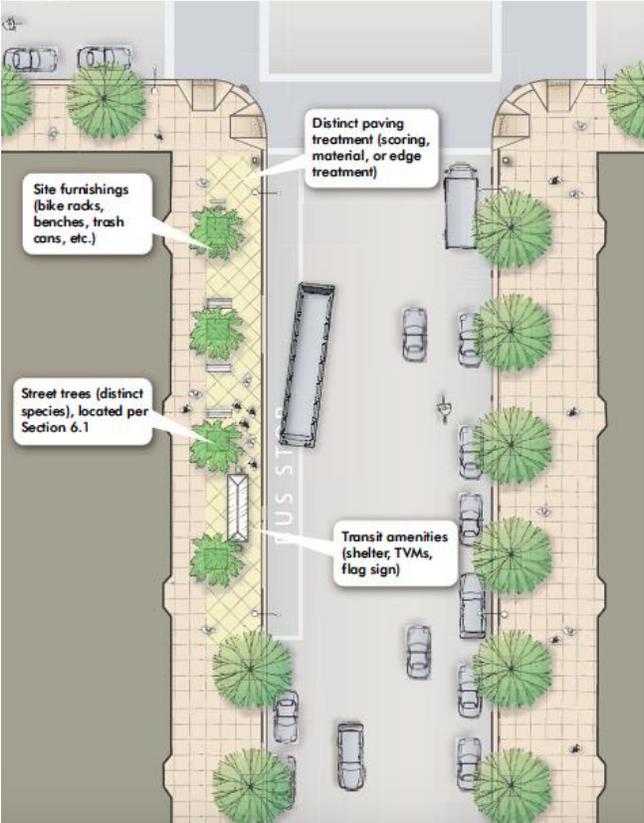
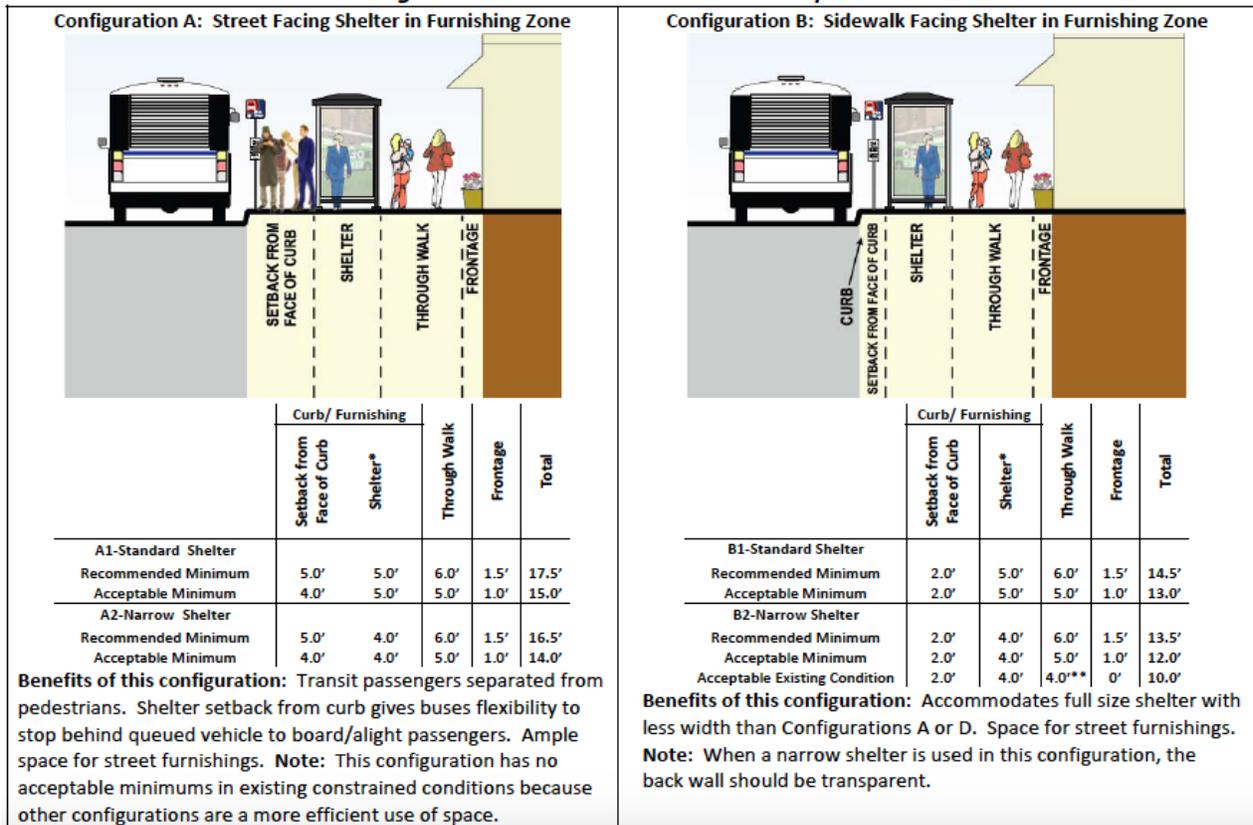


Image Source: City and County of San Francisco, 2015, p.33

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Figure 66: Bus Shelter Configuration Guidelines



Source: City of Minneapolis, 2009, p.42

APPENDIX 3: COMPLETE STREETS LEGISLATION

The following is a review of existing New York State initiative and recommendations regarding complete streets policy. The review was originally completed in March of 2014 by Pace Land Use Law Center on behalf of the former Mayor of Poughkeepsie, John Tkazyik, and the Poughkeepsie City Council. The review was authored by Conor Walline, Litigation Associate at Cuddy & Feder LLP.

I. Introduction

In August 2011, New York State enacted the Complete Streets Act, N.Y. Hwy Law § 331, (the “Act”) in an effort to “achieve a cleaner, greener transportation system.” The Act requires the consideration of the needs of all roadway users—including pedestrians, cyclists, public transit riders, motorists, and citizens of all ages and abilities—in the planning, design, construction, reconstruction, and rehabilitation of roadways. Its intent is to encourage balanced and thoughtful planning to reduce greenhouse gas emissions and traffic congestion, better connect communities and regions with one another, and create healthier and happier communities with more vibrant local economies.

The Act defines complete streets by reference to the numerous and varied users involved and the potential for increased mobility, safety, accommodation, and convenient access for all. Examples of design features associated with complete streets include “sidewalks, paved shoulders suitable for use by bicyclists, lane striping, bicycle lanes, share the road signage, crosswalks, road diets, pedestrian control signalization, bus pull outs, curb cuts, raised crosswalks and ramps and traffic calming measures.”

The Act’s requirements apply primarily to those projects undertaken by the New York State Department of Transportation (the “NYSDOT”) or that receive federal or state funding subject to United States Department of Transportation (the “USDOT”) or NYSDOT oversight. However, in an effort to balance costs and benefits, the Act excepts from its requirements projects where public safety would be adversely impacted by the inclusion of complete streets features or where the cost of implementation would be disproportionate to the need of the particular community (as determined by considering the context of the land use system, current and projected traffic volumes, population densities, and levels of community support).

Ultimately, the City of Poughkeepsie must comply with the requirements of the Act to be successful with its New York State Consolidated Funding Application (“CFA”). What follows is an overview of complete streets initiatives already implemented by communities around New York and recommendations for Poughkeepsie to consider when implementing its own complete streets policy. By learning from existing policies and adopting those provisions that have been successful, the City of Poughkeepsie has an opportunity to implement a complete streets program capable of transitioning a community with great potential into one with a thriving economic, cultural, and social center.

II. New York State Complete Streets Initiatives

With nearly one thousand cities, towns, and villages, New York State exemplifies economically and socially diverse communities. Of these communities, however, only about 6%, or 64 total, have adopted and implemented official complete streets policies despite the fact that the State has the highest fatality rate

across the nation for pedestrians and cyclists. The following is a brief overview of a handful of these communities' complete streets policies, with particular attention being paid to the creative means employed to best achieve the environmental, social, and health and welfare objectives identified.

- **Town of Babylon**, (July 14, 2010)

https://www.dot.ny.gov/programs/completestreets/repository/Babylon_Complete_Streets_Policy.pdf.

The Town of Babylon's Sustainable Complete Streets Policy seeks to reverse the effects of post-war sprawl—and its influence on the creation of automobile-dependent, unsafe roads—by fully integrating all modes of travel in the design and construction of new, complete streets. The Policy defines complete streets as “roadways designed to safely and comfortably provide for the needs of all users, including, but not limited to, motorists, cyclists, pedestrians, transit and school bus riders, movers of commercial goods, persons with disabilities, seniors, and emergency users,” and throughout makes an effort to consider each of these stakeholders' interests in the decision making process. Ultimately, the policy—through balanced, responsible, and equitable design and execution of projects—seeks to increase roadway capacity and efficiency, reduce congestion, limit greenhouse gas emissions, and improve overall quality of life. By using all transportation improvement projects as opportunities to “improve safety, access and mobility for all travelers,” the Policy ensures that future redevelopment will better provide for the community as a whole.

Noting that New York State's roadways are almost twice as dangerous for cyclists as anywhere else in the United States, the Policy sets forth an objective to create a safer and fully connected transportation network that accommodates all modes of transit. In particular, the Policy applies to “all roads under the jurisdiction of the Town of Babylon, as well as the roadways of private developments within the Town of Babylon.” It also includes a statement of intent to coordinate, when possible, with other jurisdictions and utilities to implement complete streets on roadways outside the jurisdiction of the Town. Excepted from compliance with the Policy are roadways, like limited-access highways, where access by non-motorized users is prohibited by law. Because pedestrian and cyclist error and confusion contribute to nearly 20% of all vehicle-pedestrian accidents, Babylon's Policy includes best practices designed to provide clearer and more obvious transportation channels. For example, the Policy recommends the inclusion of medians, narrower vehicle travel lanes, secure bicycle storage facilities, on-street parking situated between roadways and bicycle and pedestrian paths, decreased speed limits, and more functional streetscaping and lighting. Moreover, the Policy is designed to facilitate transfer between modes of transit and promote the concept of streets as “open space corridors forming a comprehensive open space system.” Finally, the success of the Policy will be gauged by an array of metrics, including roadways' enhanced ability to accommodate all users, any attendant increase in cyclist and pedestrian use, amount of bike lanes and shared-use lanes installed, and, most crucially, “the *quality* of the street experience.”

- **Town of Bethlehem**, (August 12, 2009)

https://www.dot.ny.gov/programs/completestreets/repository/CompleteStreetsResolution_bethlehem.pdf.

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Adopted in 2009, the Town of Bethlehem’s Complete Streets Resolution seeks to improve mobility of all people, regardless of age or status, maintain and enhance bicycle and pedestrian connections within and between neighborhoods, increase access to safe and efficient channels of transportation, reduce traffic congestion and greenhouse gas emissions, and improve general quality of life. In furthering these objectives, the Town has established a “pathways committee” to explore the design and implementation of bicycle and pedestrian facility connections, improvements that ultimately contribute to community health, fitness, neighborhood vitality, social interaction, and economic development.

The Resolution defines complete streets as “facilities that are designed and operated to enable safe and efficient access for all users,” including “persons with disabilities, pedestrians, bicyclists, motorists and transit riders.” In recognizing, during the planning and implementation process, that bicyclists and pedestrians are equally important as motorists, the Resolution ultimately seeks to change the mindset of all users of roadways through educational means. It also directs the Highway Superintendent to consider the addition of safe cyclist and pedestrian facilities—such as curb cuts and ramps, marked crosswalks, pedestrian actuated signals, paved shoulders, bicycle route signing and lanes, and shared use paths—as well as traffic calming applications in the design and construction of new roadways provided the associated expenses are not disproportionate to the cost of the larger project.

While the Resolution applies primarily to principal Town roads that experience high vehicle volumes and speeds of travel, it also encourages the NYSDOT and Albany County to consider complete streets objectives when constructing or reconstructing roadways under their jurisdiction within the Town. Finally, in an attempt to increase the safety of roadways, the Resolution provides for balanced enforcement of the New York State Vehicle and Traffic Law provisions for all users: motorists, cyclists, and pedestrians alike.

- **City of Binghamton, (July 20, 2011)**

<https://www.dot.ny.gov/programs/completestreets/repository/CS%20policy%20Binghamton%20Sustainable%20Complete%20Street.pdf>.

The City of Binghamton adopted its complete streets policy on July 20, 2011, to address roadway inefficiency, traffic congestion, limited mobility, greenhouse gas emissions, and the overall decline in the general quality of life. Citing studies that have shown complete streets significantly increase the number of pedestrians and cyclists who utilize them, the Policy seeks to anticipate and provide for this future demand for cycling, walking, and other forms of transportation. The Policy requires the City, in all construction and reconstruction of streets, to design “roadways that enable safe and convenient access for all users, including bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation and seniors.”

To this end, the Policy requires all new street projects—including planning, reconstruction, rehabilitation, maintenance, and operations— be “designed and executed in a balanced, responsible and equitable way to accommodate and encourage travel” by all users of roadways. All transportation projects are to be viewed as opportunities to improve safety and facilitate access and mobility for all travelers. The Policy

appears to apply only to roadways under the jurisdiction of the City, and no state or federal roads are explicitly included in its purview.

- **Town of Brookhaven**, (September 21, 2010)
https://www.dot.ny.gov/programs/completestreets/repository/brookhaven_cs_resolution.pdf.

Brookhaven’s Town Council passed its complete streets resolution in 2010 “to ensure future design and construction of new roads within the Town of Brookhaven for all users,” including “bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation, and seniors.” Interestingly, the Resolution defines complete streets in reference to sustainable design, construction, and operation, and as places “more conducive to public life and efficient movement of people” than traditional streets. The Resolution had no projected cost, and was not passed in an effort to secure any external source of funding. Similar to other policies, Brookhaven’s appears only to apply to Town—and not county, state, or federal—roadways.

- **City of Buffalo**, (June 11, 2008) http://buffalocompletestreets.org/docs/BFLO_Adopted_CompleteStreets.pdf

In an effort to combat the rising health care costs associated with obesity and the many diseases it contributes to, the City of Buffalo passed its complete streets ordinance in 2008. The Policy cites data on those costs (New York State spends over \$6 billion on medical expenditures related to obesity), as well as costs associated with climate change and traffic accidents, to establish the need for a complete streets program. It defines complete streets as providing for “safe, convenient and comfortable travel by foot, bicycle, transit, vehicle, car and truck.”

Of particular interest is the section of the proposed Policy that commits the City to create and maintain bicycle and pedestrian facilities at City offices and public buildings. These facilities include secure bicycle parking, lockers, and showers—the availability of which encourages people to commute to work by foot or bicycle—and the Ordinance requires that they be provided unless prohibited by law. In that case, the Ordinance requires alternative facilities and accommodations to be provided in the same transportation corridor. The proposed Policy and Ordinance do not specify which roadways they apply to.

- **Town of Colton**, (February 13, 2013)
https://www.dot.ny.gov/programs/completestreets/repository/CS%20Policy_Colton.pdf

Resolution 3-2013, passed by the Town of Colton in February 2013, is intended to provide safe and accessible streets and sidewalks for pedestrians, cyclists, motorists, children, seniors, and people with disabilities. Passed in coordination with the Local Waterfront Revitalization Program, the Resolution addresses complaints of excessive speed and unsafe driving on State Highway 56, Gulf Road, and Cold Brook Drive. The reasons given for its passage are similar to those given by other towns: it will make roadways safer for all users, reduce greenhouse gas emissions, increase healthful activities like walking and cycling, and revitalize business districts.

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The requirements apply only to streets under the jurisdiction of the Town, and there is an exception built in for those circumstances where the costs of implementing complete streets features would be disproportionate with the costs of the larger project. Some features expressly included as those exemplary of complete streets are pedestrian crossing signage, audible pedestrian signals, and sidewalk snow removal and routine shoulder and bike lane maintenance. Though, as noted, the Town's complete streets policy applies only to local roadways, it explicitly encourages the New York State DOT and St. Lawrence County to consider complete streets when constructing and reconstructing highways, roadways, and streets in and near the Town. Finally, the Resolution also includes an enforcement provision committing the balanced enforcement of traffic laws with respect to all users of the roadways, and commits the Town to reevaluate its complete streets policy and commitment every four years.

- **Town of Elizabethtown, (2010)**

https://www.dot.ny.gov/programs/completestreets/repository/cs_elizabethtown_resolution.pdf

The Town of Elizabethtown has adopted a Resolution of Commitment to Complete Streets, which differs from an official complete streets policy in that it commits the Town to add the complete streets policy to its comprehensive plan "once acted upon." At this time, it is unclear whether the Resolution was ever passed, since there is not a version available with signatures and a date. However, in passing the Resolution as written, the Town would recognize the opportunity for incorporating complete streets features as part of the larger Town Wastewater Treatment Plant and Sanitary Sewer System project. The areas of concern and complete streets features cited in the Resolution are similar to those cited elsewhere. The Resolution would also require the Town to "draw upon all possible funding sources to plan and implement Complete Streets elements to make implementation economically feasible," though no additional information is included regarding which funding sources would be explored. Also absent from the Resolution is any indication of which roadways the Resolution applies to, though it does refer to "principal Town roads" that would be included in its purview.

- **Town of Fishkill, (September 4, 2013)**

https://www.dot.ny.gov/programs/completestreets/repository/cs_resolution_fishkill.pdf

The Town of Fishkill's complete streets resolution requires the Town to incorporate complete streets policies and principles into the next substantial revision of the Town Zoning Code, Subdivision Regulations, and Highway/Street Standards. Of particular interest is the commitment in the Resolution to maintaining a "strong sense of place" with the implementation of complete streets features. To ensure that this occurs, the Resolution requires that the Town "maintain sensitivity to local conditions in both residential and business districts as well as urban, suburban, and rural areas" and "work with residents, merchants, and other stakeholders" in the process of implementing complete streets principles.

All relevant departments and agencies of the Town, as well as the New York State DOT, County Department of Public Works, City of Beacon, and Village of Fishkill, are directed to coordinate plans and

policies to maximize connectivity. Should the Town create a Bicycle and Pedestrian Advisory Committee (which the Resolution does not require, but instead recommends), it will serve as a panel to consider deviations from the complete streets policy and provide comments and recommendations. The Committee would also sit to determine whether locally-funded projects substantially comply with the policy as set forth and encourage other transportation agencies to share planned projects in an effort to increase coordination. Similar to the Town of Colton, the Town of Fishkill requires evaluation of complete streets projects every three years.

- **Village of Great Neck Plaza**, (February 1, 2012)

https://www.dot.ny.gov/programs/completestreets/repository/cs_great%20neck%20plaza_policy_guide.pdf

The Village of Great Neck Plaza's Complete Streets Policy Guide sets forth a number of current needs to be addressed and benefits to be achieved by implementation of complete streets design principles into roadway projects. Among the reasons for implementing the policy were safety—for pedestrians, cyclists, and school children—senior mobility, congestion, and economic activity. The Guide also explores several local examples of complete streets and their tangible impacts. As anticipated, these case studies all involved increasing safety for non-motorists by implementing such design features as bulb-outs and corner extensions, shortened pedestrian crosswalks, wider sidewalks, and increased signage. All of these help to slow vehicles and prevent rolling stops and turns.

Setting the Guide apart from other complete streets documents reviewed is the level of detail of recommended design principles (e.g., the Guide recommends implementing on local streets 10'-12' travel lanes with 7'-8' parking lanes and 4'-6' sidewalks equipped with ADA-compliant curb ramps). Moreover, the categorization of the roadways within the jurisdiction as local, collectors, and minor arterials should help promote more tailored approaches to each type of roadway. Like many other resolutions, however, the Village's exempts from coverage roadways not within its jurisdiction, specifically those roads administered by NYSDOT, Nassau County Department of Public Works, and the Town of North Hempstead. Finally, the Village commits to continue pursuing grants at the local, state, and federal levels to fund projects, but provides no additional details into what steps it will take in those efforts.

- **City of Kingston**, (November 9, 2010)

http://www.kingston-ny.gov/filestorage/76/6654/7596/Common_Council_Authorizing_Resolution-CSAC_11-9-2010.pdf;

http://www.kingston-ny.gov/filestorage/76/6654/7596/CSAC_3-year_Strategic_Plan_2011_by_David_Gilmour.pdf

The City of Kingston applied in 2013 for Transportation Enhancement Program ("TEP") funding from NYSDOT, and was awarded over \$2 million for its complete streets Connectivity Project in early 2014. TEP, a federal reimbursement program administered by NYSDOT pursuant to New York law, provides funding for certain kinds of roadway projects, including those implementing complete streets features. Kingston's Connectivity Project involves creating bicycle lanes, installing new lighting and sidewalks, and constructing a rail trail from Midtown to Kingston Point, all by 2016. Specifically, the City plans to design and

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reconstruct it Broadway Corridor in an effort to enhance walkability and bikeability and facilitate transit investment and development, with a projected project budget of over \$4.7 million.

Prior to engaging in the TEP funding process, the City passed a complete streets policy citing its historical character and increased health and economic opportunities as significant reasons for making its roadways more equitable. Kingston's resolution, adopted in November 2010, creates a Complete Streets Advisory Council made up of 11 voting members from all areas of the community. The Council serves as a resource and partner to elected City officials on all complete streets oriented projects, and is tasked with identifying project opportunities and "options for achieving a quality community and street environment, including improved accessibility," and providing recommendations on proposed policies and priorities.

Under this directive, the Council proposed in September 2011 its Complete Streets Strategy Recommendations & Sustainability Plan, wherein it suggested that the City commence various projects comprising the Kingston Connectivity Project. During this same period, the City of Kingston also developed and adopted a Climate Action Plan in 2012 and a Climate Smart and Green Jobs Community Pledge in 2009, and is currently in the process of drafting and finalizing its new Comprehensive Plan 2025, expected to be completed mid-2014. To fund its projects, the City has applied for and received several grants and awards, including a grant from the Robert Wood Johnson Foundation to address obesity and other health concerns in children and Federal Development Block Grants annually since 2008. It also received in 2013 a Consolidated Funding Application ("CFA") Heritage Area Grant of \$500,000. It's most recent achievement, the 2014 TEP funding, was the culmination of years of planning and preparing for complete streets in the City.

- **Other Notable Complete Streets Policies**

Several localities have adopted complete streets resolutions and policies with unique features and provisions for achieving commonly cited health, safety, and environmental objectives. For example, the Town of Islip (August 5, 2010) and City of New Rochelle (March 20, 2012) have adopted sustainable complete streets policies under which all street projects are to be designed and executed in a balanced, responsible, and equitable way to accommodate all stakeholders. These localities' focus on sustainability is evident in their policies' orientation towards realizing environmental benefits and providing for future generations.

Interestingly, the City of New Rochelle and the Town of Newcomb's resolutions include a requirement that, for every project involving roadwork, a written explanation must be submitted to the City Manager listing the reasons for including or excluding complete streets design features. Attached to the City of New Rochelle's resolution is an appendix identifying the most common features and leaving space for an explanation as to why each particular feature was or was not included. The Town of Newcomb also seeks to solicit citizen participation through the creation of an advisory board that is tasked with making recommendations on planning, design, budgeting, and implementation of complete streets design features.

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The City of Jamestown’s complete streets resolution (June 25, 2012) similarly makes a general commitment to implementation of design principles and features into public works projects, but also incorporates a lengthy list of exemptions that includes, for instance, a cost-benefit analysis component. Where the costs of implementing complete streets features would be “excessively disproportionate” to the need—as determined by reference to population density, land use, current and projected traffic patterns, and bicycle and pedestrian use—the City’s resolution does not require the implementation of such features.

Also noteworthy are the complete streets resolutions passed by the Towns of Lewis (June 14, 2011), Newcomb (December 11, 2012), Westport (January 24, 2012), Willsboro (February 13, 2013), and Wilmington (November 13, 2012) which commit the Towns to partnering with the Essex County Complete Streets Coalition to educate the community about the potential of complete streets projects. Included in the education objectives of the Town of Lewis’s resolution is an effort to teach the community about roadway laws, safety, and etiquette. Not only will this help decrease fatal roadway incidents, but it also should engender community support for complete streets projects. The Town’s resolution also generally commits to seeking funding from all possible sources, but like many of the others (excluding the City of Kingston, *see supra*), it does not identify any source in particular.

Similarly, the Village of Malone commits in its complete streets resolution to working with the Malone Complete Streets Partnership to provide safe and accessible streets for all. The Partnership’s mission is to “coordinate and advocate for development and implementation of Complete Streets plans and policies in the Town and Village [] that promote a multi-modal transportation network for all users.” As part of this effort, the Village lists several design features to be implemented and actions to be taken, including sidewalk snow removal and routine shoulder and bike lane maintenance. Though these two features are fairly straightforward, no other resolution has committed to snow removal and maintenance of rights of way as part of an overall complete streets plan.

Also partnered with a local coalition in its efforts to implement complete streets policies is the City of Saratoga Springs (May 1, 2012). Shared Access Saratoga, a local organization “focused on promoting and encouraging access for all modes of transportation for all users throughout the City,” has helped the City spearhead community outreach efforts to generate support for sustainable roadway policies. Unique to the City’s policy is its breakdown of recommendations into immediate, short-term, mid-term, and long-term action items. For instance, one immediate action item identified is the appointment of a Shared Access Advisory Board tasked with advising the City on complete streets “philosophy.”

Taking a similar approach, the Village of Schoharie adopted a complete streets policy (February 20, 2013) with several guiding principles for implementation of design features. Included among these principles are keeping projects simple by implementing easy and low cost solutions first, focusing on problems as they relate to specific kinds of roadway classifications, identifying longer-term improvement needs, and providing recreational opportunities through implementation of complete streets principles into roadway development projects.

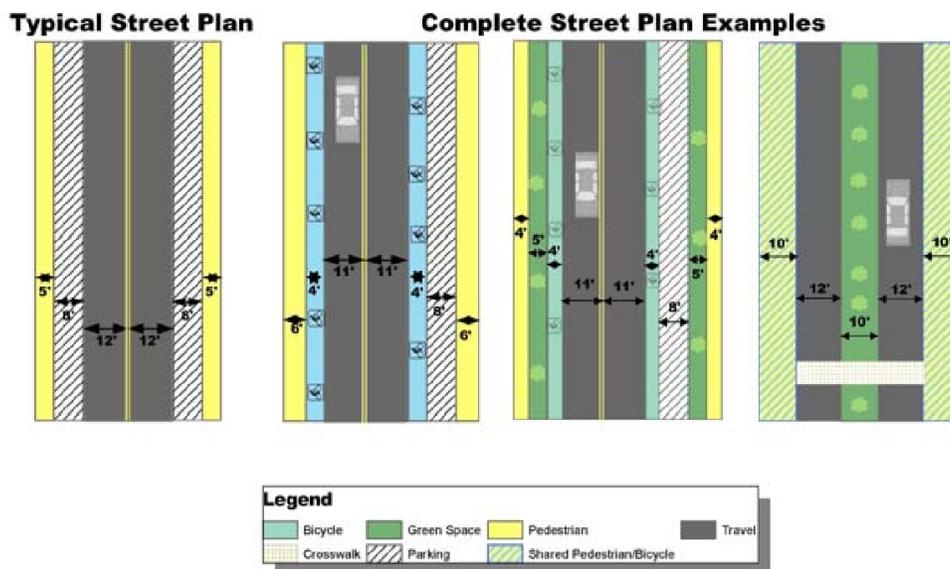
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Additionally, the Village identified components of its current comprehensive plan (last updated in 1997) that are supportive of complete streets concepts and objectives. This unique effort to identify supportive provisions in the current comprehensive plan—an approach that is different from that taken by those communities that have simply adopted new provisions for their plans—is a cost-effective way to ensure that, should any project be subject to judicial review, it will stand a better chance of being sustained. Beyond this, though, the Village obtained, from an independent engineering and architecture firm, a comprehensive plan audit and set of recommendations for adopting a Transportation Vision Statement.

The Village of Sharon Springs (December 2012) similarly identified supportive provisions in its current comprehensive plan and then detailed a list of transportation-related objectives to include in the plan’s next revision. The Village also undertook in its complete streets policy to amend the applicable zoning law and subdivision regulations in several ways. For instance, one recommendation relating to the zoning law was to add general language in the purposes section stating the Village’s goal of making streets more accommodating to all users. Another suggestion involved increased flexibility in satisfying parking requirements by encouraging rear and shared parking.

Also unique is the Town of North Hempstead’s complete streets policy guide (January 25, 2011), which provides a visual representation of ideal complete streets design in its definitions section. Figure 70 details what the Town seeks to achieve through its implementation of complete streets design features and principles, and includes specifics such as width and orientation of lanes, medians, and sidewalks. Similar to the Village of Great Neck Plaza’s policy guide, North Hempstead’s includes several case studies and categorizes its roadways into local streets, collectors, and minor arterials.

Figure 67. Town of North Hempstead's Complete Streets Design



Further, the Town of North Hempstead has already obtained “Safe Routes to School” grants for several projects and is committed to “vigorously pursue” additional federal, state, and local sources of funding.

The Village of Pittsford, like other localities, identifies among the chief concerns to be addressed by its complete streets resolution (2011) is declining property values and loss of community charm. Because Pittsford recognizes that “[p]leasant walkable streets are required to attract and sustain compatible community development,” the Village adopted a complete streets component into its Comprehensive Plan as early as 2002.

III. Recommendations

Based on the above review of complete streets policies and resolutions in New York State, the author makes the following recommendations to the City of Poughkeepsie for its planning and adoption of a complete streets policy:

1. The City should conduct a comprehensive plan audit to determine which provisions currently support complete streets policies and initiatives, and to identify where improvements can be made to that plan. Once deficient areas have been identified, the plan must be supplemented with language that sets forth the City’s desire to implement complete streets projects to achieve its planning and development goals. For example, the following language would achieve this: “...to ensure that the existing and future built environment promotes healthy active lifestyles, and provides optimal transportation accessibility and choices for its residents and visitors.” Not only does including a provision like this in the comprehensive plan help to insulate projects from attack in court, but it also shows a level of coordination that can make applications for external funding more competitive.
2. The City should incorporate a general statement of its complete streets policies and purposes into the Zoning Code and Subdivision Regulations while those codes are currently being revised. This will ensure that consideration of future projects takes into account whether they advance complete streets policies and principles, and will more effectively lead to the benefits sought.
3. Similar to the City of New Rochelle, the City of Poughkeepsie should require a written explanation for every decision to include or exclude complete streets design features into roadway projects. Written rationales help to clarify objectives and costs, and allow the public to evaluate their representatives’ decisions in a transparent way. Allowing this kind of stakeholder involvement should help resolve any community opposition and make the policy effort more fruitful.
4. Instead of simply listing objectives and action steps without any reference to a timeframe, the City should identify immediate, short-term, and long-term goals and action items. Breaking down these efforts into more manageable pieces increases the likelihood of a successful outcome by eliminating the appearance of overwhelmingly complex problems and solutions.
5. The City should include specific commitments to design features, including where applicable, street and sidewalk dimensions, crosswalk lengths, parking distances and widths, and bump-out distances. Providing details like this exhibits the feasibility of integrating these features into roadway projects and thus increases the likelihood of their implementation.
6. When a complete streets policy is successful, motorists, cyclists, and pedestrians come into close contact more frequently. Typically, cyclists and pedestrians are less closely policed than motorists, but their failure to follow basic traffic safety laws (including, for example, stopping at red lights and stop signs) endangers everyone. Therefore, Poughkeepsie should include an enforcement provision

in its complete streets policy committing to the equal enforcement of traffic laws. For instance, the following language would achieve this objective: “The City of Poughkeepsie, in cooperation with [insert cooperating law enforcement agencies] will encourage and promote a balanced enforcement of the New York State Vehicle and Traffic Law for motorists, pedestrians, and cyclists. This will include enforcement of, among other things, pedestrians’ right-of-way in crosswalks, cyclists riding with traffic, and all modes sharing roadways safely.” This type of provision will engender community support for complete streets by officially endorsing the notion that no one form of transportation should be treated specially or differently with respect to safe and efficient maintenance of traffic laws.

7. The City should include a provision in its policy requiring construction and maintenance of pedestrian and cyclist facilities (including secure bicycle parking, lockers, and showers) in each distinct transportation corridor, but allow flexibility in where these facilities are sited (for example, through allowing placement in different corridors when facilities are prohibited by law in another). This will promote cycling and walking to and from work, decrease vehicle miles travelled, and contribute to the overall health and welfare of the community.

IV. Conclusion

Adopting and implementing complete streets policies is a trend in New York State that appears to be on the rise. As recently as 2008, there were only three such policies in existence in the State; as of 2014, there are over 60, with almost half of these being adopted in the last three years alone. This trend reveals overwhelming opportunity to create positive change at the local level through implementation of similar policies.

The City of Poughkeepsie is uniquely situated to capitalize on these opportunities by learning from those programs that have already been developed and put into action. Many of the current New York State complete streets policies do not include recommended performance measures to assess implementation or next steps for implementation, and few provide education and training programs to overcome negative attitudes in the community towards alternative methods of transportation. By including specific implementation goals in the policy and educating the public during the process of adopting it, the City can ensure future action on complete streets and avoid significant community opposition and the costs associated with it. Most importantly, by exhibiting a commitment to a safer, healthier, and more connected community, the City will position itself to receive state and federal funding to carry out its mission.

APPENDIX 4: COMPLETE STREETS POLICY STATEMENTS

Resolution in Support of Planning

The text below by ChangeLab Solutions offers a template for local complete streets policy language that can be used as a basis for a resolution in support of further planning Newburgh’s complete streets network.⁷⁵

Resolution Initiating Complete Streets Planning for [Jurisdiction]

Preamble/Whereas Clauses

SEE APPENDIX A: FINDINGS

A draft resolution based on this model should include a preamble that contains “findings” of fact (“whereas” clauses) that support the need for the jurisdiction to pass the resolution. The preamble contains factual information supporting the need for the resolution – in this case, documenting the need for complete streets. A list of findings supporting this model resolution appears in “Appendix A: Findings.” Findings from that list may be inserted here, along with additional findings addressing the need for the resolution in the particular community.

The Resolution

NOW, THEREFORE, LET IT BE RESOLVED that [Jurisdiction / Adopting body] hereby recognizes the importance of a transportation system that encourages healthy, active living, promotes transportation options and independent mobility, increases community safety and access to healthy food, reduces environmental impact, mitigates climate change, and supports greater social interaction and community identity by providing safe, comfortable, and convenient travel along and across streets through a comprehensive, integrated transportation network for all users, including bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation, seniors, youth, and families [*insert other significant local users if desired, e.g. drivers of agricultural vehicles, emergency vehicles, freight, etc.*].

COMMENT: Communities may add new language to capture another vision, and may delete any of the concepts that do not represent the community’s vision. BE IT FURTHER RESOLVED that [*insert appropriate agencies, such as Department of Transportation, Department of Public Works, Department of Planning*] should work towards making Complete Streets practices a routine part of everyday operations, should approach every transportation project and program as an opportunity to improve public [and private] streets and the transportation network for all users, and should work in coordination with other departments, agencies, and jurisdictions to include Complete Streets in proposed civic improvements.

COMMENT: By looking at every transportation project as an opportunity to make the streets safe for travel by all users, jurisdictions can move in a measured and incremental way towards achieving complete streets.

⁷⁵ <http://changelabsolutions.org/sites/changelabsolutions.org/files/documents/CalLocalResCompleteStreets.pdf>

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BE IT FURTHER RESOLVED that [insert appropriate agency] should evaluate how well the streets and transportation network of [Jurisdiction] are serving each category of users.

COMMENT: Communities should look at collision statistics, bicycle and pedestrian injuries and fatalities, existing levels of service for different modes of transport and users, latent demand, and so on. Such evaluations can be very thorough or more succinct.

BE IT FURTHER RESOLVED that the Planning Commission (“Commission”) is hereby directed to develop amendments to the General Plan and to identify additional steps to assist in creating a comprehensive and integrated transportation network serving the needs of all users; to assess potential obstacles to implementing Complete Streets in [Jurisdiction]; and to recommend proposed revisions to all appropriate plans, zoning and subdivision codes, laws, procedures, rules, regulations, guidelines, programs, templates, and design manuals to integrate, accommodate, and balance the needs of all users in all projects.

COMMENT: As an alternative to the planning commission, some communities may wish to have policies initially developed by a community task force or some other community planning process. In such cases, the resolution should be revised to describe the desired process and direct that the results of the planning effort be submitted to the planning commission to review and make a recommendation to the city council or board of supervisors. While local considerations will dictate committee composition, jurisdictions should consider including representatives of key departments or agencies, such as the transit agency, public works department, planning department, public health department, and others, as well as the city manager, advocacy groups, and a representative from the school district.

BE IT FURTHER RESOLVED that the Commission should report on the matters within its purview to the [Adopting body] within one year following the date of adoption of this Resolution, and upon receipt of this report the [Adopting body] will hold a hearing to determine further implementation steps.

Resolution for a Local Complete Streets Policy

The sample language below from Lancaster County may be used in order to adopt an official complete streets policy, link it to supporting plans and policy programs, and specify consideration of complete streets in all facets of street design.⁷⁶

WHEREAS “Complete Streets” are streets that are safe and convenient for all users, including pedestrians, bicyclists, public transportation riders and motor vehicle drivers of all ages and abilities; and

WHEREAS, [Municipality] recognizes that streets are a key factor in the way people experience the public realm and play a vital role in promoting economic development, public safety, health and quality of life; and

⁷⁶ <http://www.lancastercountyplanning.org/DocumentCenter/View/328>

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WHEREAS, the design and function of our streets has often favored the motorist over the needs and safety of other users of the transportation network, particularly pedestrians, bicyclists, transit users and persons with disabilities; and

WHEREAS, [Municipality] is committed to providing increased mobility choices and improved safety for all its residents, as embodied in the goals and policies of the Municipality's Comprehensive Plan; and

WHEREAS, investments in pedestrian, bicycle and transit infrastructure will help promote "active transportation" and bring physical activity into the daily lives of the citizens of [Municipality] which will improve their health, reduce the incidence of diseases related to inactivity such as obesity and heart attacks and improve air quality and limit greenhouse gas emissions by reducing traffic congestion; and

WHEREAS, [Municipality] seeks to create an interconnected network of transportation facilities that accommodate all modes of travel in a manner consistent with the community context and goals and that incorporate green infrastructure measures, where appropriate;

NOW THEREFORE BE IT RESOLVED that [Municipality], Pennsylvania commits to a Complete Streets Policy that will incorporate Complete Streets into the planning, design and operation of all future street, sidewalk, trail and other transportation projects, whether new construction, reconstruction, rehabilitation or pavement resurfacing and restoration; and

BE IT FURTHER RESOLVED that municipal staff are directed to review and update, as needed, language in the [Municipality] Comprehensive Plan, SALDO, zoning ordinance, other codes and Capital Improvement Plan, to incorporate the intent of this Complete Streets Policy and use best practice design guidelines as set forth in the attached Municipality Complete Streets Policy, which shall be effective immediately upon the enactment.

APPENDIX 5: ECONOMIC BENEFITS OF COMPLETE STREETS

Besides improvements to non-motorized transportation services, complete streets also offer an opportunity for revitalizing downtown districts. Presented below are successful outcomes of complete streets programs from around the country.

- San Francisco converted Central Expressway to Octavia Boulevard, a 4-lane boulevard featuring two separated lanes for bicycle and pedestrian traffic, and as a result there was a neighborhood renaissance in Hayes Valley. Revenue from land sales allowed the city to create a new park.
- San Francisco also converted the double-decker Embarcadero freeway to a landscaped boulevard and pedestrian promenade. Property value of adjacent land shot up by more than 300% and former warehouses south of Market Street were converted into apartments and condos.
- Cleveland will begin construction in 2014 to convert the Shoreway freeway to a tree-lined boulevard with bicycle and pedestrian lanes. In anticipation of the project, there has already been \$500 million private investment in new development around the boulevard.
- New Haven is in the process of converting Rt. 34 from a limited access freeway to a pedestrian and bike-friendly boulevard. A \$360 million mixed-use development project has already been approved to be located off the boulevard.
- Lancaster, CA implemented wider sidewalks, landscaping features, and traffic calming along Lancaster Boulevard and the result was \$125 million in private investment, 26% increase in sales tax revenue, and 800 new jobs. The city's investment was just 10.6 million.
- Louisville's West Market Street was transformed into complete street as part of an economic development plan for the downtown. There has been a significant resurgence in development including a \$261 million mixed-use development and a large sports/concert arena. The entire city of Louisville has adopted a comprehensive complete streets policy and Louisville now has 3,047 miles of bike lanes.
- New York City transformed portions of 8th and 9th Avenues with parking protected bike lanes and pedestrian islands. As a result there was a 49% increase in retail sales and a 58% decrease in injuries to all street users in this area.
- West Palm Beach's Clematis Street was 70% vacant when the city converted the one-way road to two-way and used a variety of measures to slow traffic. The project attracted \$350 million in private investment, property values more than doubled, and within 5 years more than 80% of space was occupied.

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- Lodi, CA invested \$4.5 million in a pedestrian-oriented project over 5 main downtown blocks by widening sidewalks, extending curbs, and adding streetscaping amenities. Sixty new businesses came to the area resulting in a 40% increase in sales tax revenue.
- Valencia Street in San Francisco's Mission District added bike lanes and slowed traffic. Forty percent of local business reported increased sales and 60% increased shopping traffic.
- Washington DC's Barracks Row invested \$8 million in streetscape improvements and 44 new businesses were established and 200 new jobs. The neighborhood has seen economic revitalization.
- San Diego reduced La Jolla Boulevard from 4 lanes to 2, added bike lanes and sidewalks, and lowered traffic speeds. The boulevard was transformed into a vibrant commercial center and sales increased by 20%.
- Edgewater Drive in Orlando was converted from 4 lanes to 2 lanes with the addition of bicycle lanes and left turn lanes. The result was reduced speeding and accidents, increased pedestrian use, and a number of new businesses.
- Santa Monica added bicycles lanes and a right turn lane to Ocean Boulevard and saw a 65% decrease in traffic accidents in the first 9 months after making the changes.
- A study from CEOs for Cities found that in 13 of 15 cities studied, an increase in walkability was directly related to higher home values.