

# traffic analysis

## Traffic Operations

To fully understand traffic operations along the corridor, peak period turning movement volumes were collected on September 9, 2014. Morning peak data was collected from 7:00 to 10:00 a.m.; noon peak data was collected from 11:00 a.m. to 2:00 p.m.; and evening peak data was collected from 3:00 p.m. to 6:00 p.m. Data was collected at four major intersections along the corridor including:

### DATA COLLECTION:

1. Clark Avenue & West 14th Street
2. Clark Avenue & Scranton Road
3. Clark Avenue & West 25th Street
4. Clark Avenue & Fulton Road

The morning and evening peak hour traffic volumes are illustrated in Figures 1 and 2, respectively. Traffic counts indicate that the AM peak hour is between 7:45 AM and 8:45 AM and the PM peak hour is between 4:30 PM and 5:30 PM. Average Daily Traffic (ADT) was calculated from the traffic count data. ADT along Clark Avenue varies from 7,000 to 9,200 vehicles per day. It is interesting to note that the travel patterns do not reflect any inbound or outbound trends. Rather, the AM and PM peak patterns are very similar to each other.

The AM and PM peak hour traffic volumes were analyzed to assess intersection operations and to determine the performance of the corridor with the existing conditions. The traffic analysis is based on the existing traffic volumes, as recorded by the traffic data collection, and existing signal timings and phasing provided by the City of Cleveland. The traffic data was analyzed using Synchro, to

assess the traffic performance and operational efficiency at each intersection. The analysis results include the approach delay (measured in seconds of delay), volume-capacity (v/c) ratio, and level of service (LOS) for each approach as well as the overall intersection. Average delay is an indication of the expected delay that would typically be experienced in the lane, on the approach, or at the Highway Capacity Manual, as shown in Table 1. LOS D is considered the acceptable performance level for urban areas such as the Clark Avenue corridor intersection. A v/c ratio that is less than 1.0 indicates that the lane is operating below capacity. A v/c ratio of 1.0 indicates that the lane is operating at capacity and a v/c greater than one indicates over-capacity conditions. Level of service (LOS) is a grading scale based upon average delay, with LOS A representing free-flow conditions, LOS E representing operational capacity, and LOS F being over-capacity. The specific delay thresholds for assessing intersection performance are provided by the Transportation Research Board in the Highway Capacity Manual, as shown in Table 1. LOS D is considered the acceptable performance level for urban areas such as the Clark Avenue corridor.

An overview of the capacity analysis results are shown in Table 2 on the following page. The analysis results show that AM and PM peak hour operations at all four intersections perform at acceptable levels, with all intersections functioning at LOS C or better. In addition, all approach movements also operate at LOS D or better, with the exception of the eastbound left at the West 25th Street during both AM and PM peaks.

TABLE 1: LEVEL OF SERVICE (LOS) (HIGHWAY CAPACITY MANUAL, 2010)

LOS	Signalized Intersection	Unsignalized Intersection
	AVERAGE DELAY (SEC/VEH)	AVERAGE DELAY (SEC/VEH)
A	$x < 10$	$x < 10$
B	$10 < x < 20$	$10 < x < 15$
C	$20 < x < 35$	$15 < x < 25$
D	$35 < x < 55$	$25 < x < 35$
E	$55 < x < 80$	$35 < x < 50$
F	$80 < x$	$50 < x$

FIGURE 1: EXISTING TRAFFIC VOLUMES – AM PEAK HOURS

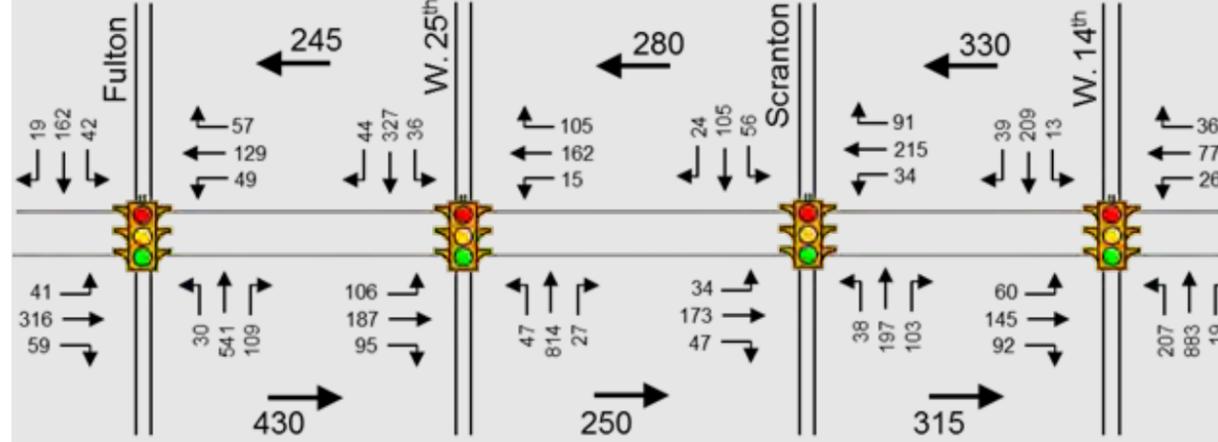
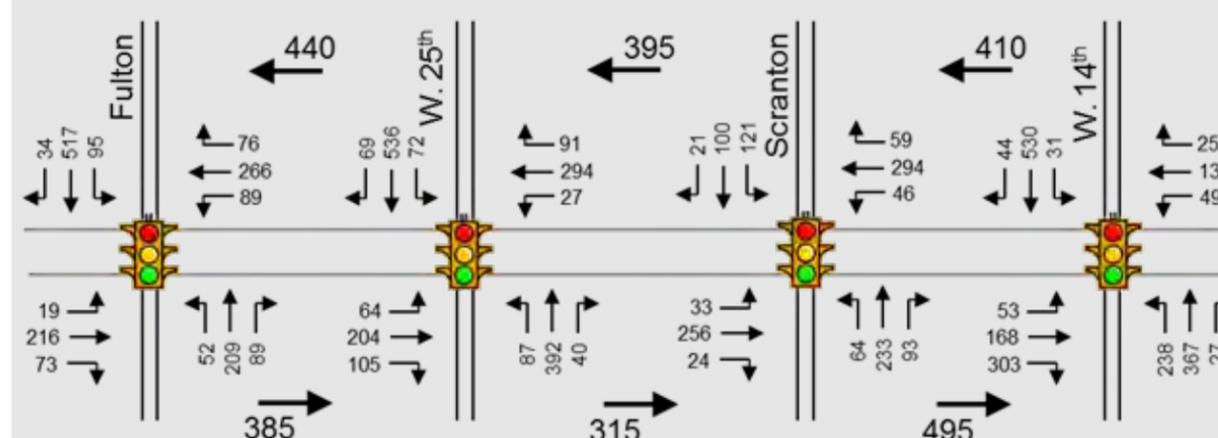


FIGURE 2: EXISTING TRAFFIC VOLUMES – PM PEAK HOURS



# traffic analysis

## AM TRAFFIC OPERATIONS



## PM TRAFFIC OPERATIONS



TABLE 2: CAPACITY ANALYSIS RESULTS FOR 2014 EXISTING CONDITIONS

INTERSECTION / APPROACH / DIRECTION		EXISTING YEAR 2014								
		Cycle	AM Peak			Cycle Length	PM Peak			
			LOS	DELAY	V/C		LOS	DELAY	V/C	
CLARK AVENUE @ WEST 14TH STREET	EASTBOUND LEFT	90	B	15.4	0.13	90	B	15.3	0.12	
	THRU-RIGHT		C	21.6	0.41		D	37.0	0.84	
	WESTBOUND LEFT		B	14.9	0.06		B	17.1	0.23	
	THRU-RIGHT		C	20.2	0.23		C	24.7	0.32	
	NORTHBOUND LEFT		B	17.9	0.45		D	39.4	0.80	
	THRU-RIGHT		B	19.8	0.61		C	21.2	0.32	
	SOUTHBOUND LEFT		C	23.4	0.09		B	13.5	0.08	
	THRU-RIGHT		C	20.8	0.25		C	27.2	0.58	
<b>OVERALL</b>		<b>B</b>	<b>19.8</b>	--		<b>C</b>	<b>28.8</b>	--		
CLARK AVENUE @ SCRANTON AVENUE	EASTBOUND LEFT-THRU-RIGHT	75	A	9.5	0.22	75	B	11.3	0.26	
	WESTBOUND LEFT-THRU-RIGHT		A	9.0	0.28		B	11.5	0.34	
	NORTHBOUND LEFT		B	10.3	0.08		B	10.8	0.13	
	THRU-RIGHT		B	11.8	0.42		B	12.8	0.45	
	SOUTHBOUND LEFT		B	11.4	0.15		B	14.4	0.35	
	THRU-RIGHT		A	9.5	0.18		A	9.5	0.17	
<b>OVERALL</b>		<b>B</b>	<b>10.1</b>	--		<b>B</b>	<b>11.8</b>	--		
CLARK AVENUE @ WEST 25TH STREET	EASTBOUND LEFT	120	E	60.7	0.70	120	E	56.1	0.60	
	THRU		D	38.0	0.45		C	32.9	0.43	
	RIGHT		A	7.4	0.22		A	6.5	0.22	
	WESTBOUND LEFT		C	31.6	0.07		C	29.1	0.11	
	THRU-RIGHT		D	40.3	0.65		D	47.4	0.82	
	NORTHBOUND LEFT-THRU-RIGHT		B	11.3	0.51		C	33.2	0.68	
	SOUTHBOUND LEFT-THRU-RIGHT		C	23.0	0.39		B	13.9	0.53	
	<b>OVERALL</b>			<b>C</b>	<b>22.8</b>		--		<b>C</b>	<b>28.6</b>
CLARK AVENUE @ FULTON ROAD	EASTBOUND LEFT-THRU-RIGHT	90	C	22.4	0.59	90	B	15.9		
	WESTBOUND LEFT-THRU-RIGHT		B	16.3	0.37		C	21.3	0.62	
	NORTHBOUND LEFT		A	6.8	0.05		A	9.8	0.17	
	THRU-RIGHT		B	13.5	0.68		A	8.6	0.29	
	SOUTHBOUND LEFT		A	8.6	0.16		A	9.1	0.18	
	LEFT-THRU		A	7.0	0.19		B	13.1	0.60	
<b>OVERALL</b>		<b>B</b>	<b>15.3</b>	--		<b>B</b>	<b>14.6</b>	-		

## Truck Operations

The Clark Avenue residents have expressed concern regarding truck traffic along the corridor, particularly between W.25th Street and Quigley Road. As part of the traffic count survey that was conducted, trucks were specifically counted along the corridor to determine the actual percentage of trucks using the corridor. The count data shows that during the AM peak hour the corridor is carrying on average 6% trucks and during the PM peak hour the corridor is carrying an average of 1.5% trucks. Trucks are more prevalently found on the east end of the corridor near West 14th Street heading down to Quigley Road, with truck amounts nearing 12%. Residents have indicated that truck traffic has significantly increased with peak periods being between 5:00 AM to 7:00 AM and between 7:00 PM and 9:00 PM since the opening of Steelyard Commons in 2007.

In addition to the traffic count survey that was conducted at various intersections within the study area, a specific truck traffic count was performed at the intersection of West 14th Street and Clark Avenue. This intersection was selected due to its proximity to both the residential section of Clark Avenue and Steel Yard Commons. At Public Meeting #1, residents along Clark Avenue, between West 25th Street and West 16th Street, provided feedback indicating that truck traffic is heaviest during the AM hours, as early as 5:00 AM. Since the traffic survey data collected began at 7:00 AM, additional truck data was collected on Wednesday, January 14th, 2015 from 5:00 AM to 10:00 AM to ensure a complete understanding of truck movements along Clark Avenue.

The results of the truck traffic count indicate that during a 5 hour period (5:00 AM to 10:00 AM) a combined (both eastbound and westbound) 38 single unit trucks and 11 tractor trailer trucks traveled the Clark Avenue corridor between West 25th Street and West 16th Street. The turning movement data collected at the intersection of West 14th Street and Clark Avenue indicates that during the morning hours the primary movement for trucks is northbound along West 14th Street and the secondary movement is southbound along West 14th Street.

A GPS mapping exercise was also completed to determine the shortest routes from major freeways to Steelyard Commons. As seen on the figure to the right, all routes to Steelyard Commons use either the Quigley Road or Jennings Road for freeway access except for the I-90 eastbound movement. It is expected that some of the truck traffic along Clark Avenue can be contributed to trucks exiting I-90 eastbound at West 25th Street and using Clark Avenue and West 14th Street for Steelyard Commons access.

Although Clark Avenue is not the primary truck movement during the morning hours, the 49 trucks that traveled the corridor in a 5 hour period equates to about 10 trucks an hour and once every 6 minutes. Residents along this section report that during summer months truck traffic is more prevalent due to construction activities. Residents also reported that overall truck traffic along the corridor may be slightly decreased since the closure of the West 14th Street entrance ramp to I-90 eastbound. Residents anticipate that when that entrance ramp re-opens additional truck traffic will return.

In 2009, residents along Clark Avenue recognized that truck traffic (and overall traffic numbers) had been increasing and associated most of the increase to the opening of Steelyard Commons. The residents in this area developed a plan that was presented to the City to begin possible mitigation of the traffic. The primary focus of this plan was to increase way finding signage to Steelyard Commons. The residents plan called for proposed signage along Quigley Road, West 3rd Street, West 14th Street, I-90 Eastbound, I-490 Westbound and I-71 north and southbound.

As part of this study it is recommended that a combination of strategies be implemented to mitigate the truck traffic along the corridor.

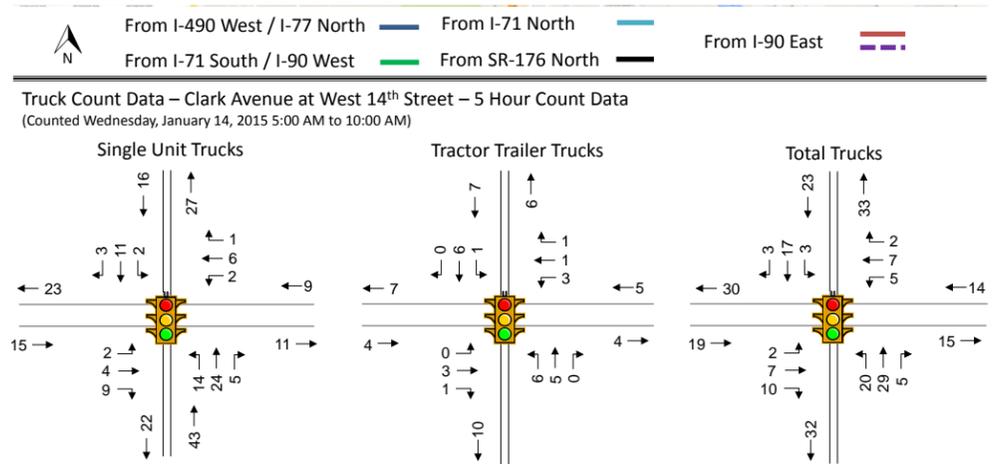
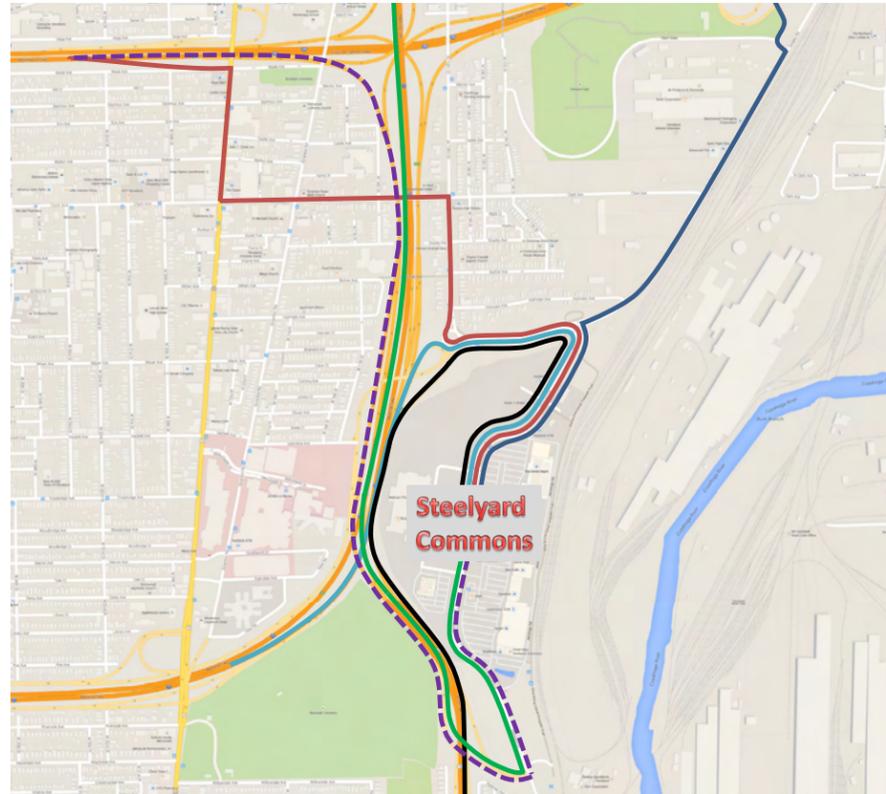
- Inform Steelyard Commons and other flats industry on desired truck routes to access their facilities. These routes would primarily use Quigley Road and Jennings Road.
- Along the residential section of Clark Avenue, between West 25th Street and West 16th Street, create a road that feels more like a residential street and less inviting for trucks. Increasing green space, narrowing the roadway width and constructing parking bump outs when feasible will change the functional feeling of the road and may reduce truck traffic.
- Coordinate with the City of Cleveland and ODOT on the potential for increasing the number of wayfinding signs to Steelyard Commons.

# traffic analysis

## TRUCK PERCENTAGES

Summary	Clark Ave. Eastbound				Clark Ave. Westbound				Scranton Rd. Northbound				Scranton Rd. Southbound				TOTAL
	Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total	
	AM Peak Hour: 7:45 AM To 8:45 AM																
Total Volume	47	173	34	254	91	215	34	340	103	197	38	338	24	105	56	185	1117
PHF	0.78	0.92	0.85	0.95	0.91	0.93	0.94	0.92	0.83	0.79	0.63	0.93	0.86	0.69	0.74	0.73	0.92
Truck Volume	1	9		10	3	10	6	19	7	4	1	12	2	2	5	9	50
Truck Percentage	2%	5%	0%	4%	3%	5%	18%	6%	7%	2%	3%	4%	8%	2%	9%	5%	4%
PM Peak Hour: 4:30 PM To 5:30 PM																	
Total Volume	24	256	33	313	59	294	46	399	93	233	64	390	21	100	121	242	1344
PHF	0.86	0.88	0.75	0.93	0.87	0.90	0.72	0.95	0.93	0.84	0.73	0.86	0.66	0.66	0.92	0.81	0.95
Truck Volume		2		2	3	5	1	9	3	1	1	5					16
Truck Percentage	0%	1%	0%	1%	5%	2%	2%	2%	3%	0%	2%	1%	0%	0%	0%	0%	1%

## TRUCK ROUTES, PER GPS MAPPING



## Lane Configuration Concept Development

In order to determine feasible lane configuration along the Clark Avenue corridor, additional traffic analysis was conducted to determine the minimum capacity requirements for Clark Avenue's four major intersections. This analysis was used to determine if it would be possible to reduce the east/west capacity of the intersections (and associated adjacent roadway and intersections in between,) while maintaining an acceptable level of service. The capacity of the north/south approaches was not changed, and remained the same as existing at all intersections. The analysis determined whether or not eastbound and westbound left turn lanes are needed at the four major intersections. An overview of the reduced capacity analysis results and reduced lane use are shown in Table 3 (to the right,) and Figure 4, on the following page.

The analysis results show that AM and PM peak operations for the reduced capacity roadway would operate at LOS D or better for all eastbound and westbound approach movements at the West 14th Street, Scranton Road and Fulton Road intersections, with a majority of movements operating as LOS C or better. These results indicate that acceptable LOS would be provided at these intersections with a reduction in east/west capacity.

Without an exclusive eastbound left turn lane, the level of service at the intersection of West 25th Street and Clark Avenue results in unacceptable LOS on the eastbound approach (LOS F in the AM and LOS E in the PM). Although the overall intersection operates at LOS D in the AM and PM peak periods, it is expected that a reduction in

east/west capacity would result in unacceptable delays for commuters using Clark Avenue.

### Recommended Lane Use

Optimal east-west approach configurations were developed for the four major intersections on Clark Avenue based on the assessment of the existing and reduced east/west intersection capacity. The analysis showed that reduced capacity on the east-west approaches with standard single lane approaches would provide acceptable operations at the West 14th Street, Scranton Road and Fulton Road intersections. The intersection of West 25th Street and Clark Avenue should be configured with two lanes on the eastbound and westbound approaches (exclusive left and through/right). The four major study area intersections, together with the adjacent roadway segments, should be configured as described above to optimize corridor operations with the appropriate capacity, providing opportunity for other amenities, and to provide a better balance between all travelers on the corridor. Figure 5 depicts the capacity analysis for the proposed intersection configuration at the four major intersections along the Clark Avenue corridor.

TABLE 3: CAPACITY ANALYSIS RESULTS FOR 2014 REDUCED LANE USE

INTERSECTION / APPROACH / DIRECTION		EXISTING YEAR 2014							
		Cycle Length	AM Peak			Cycle Length	PM Peak		
			LOS	DELAY	V/C		LOS	DELAY	V/C
CLARK AVENUE @ WEST 14TH STREET	EASTBOUND LEFT-THRU-RIGHT	90	C	26.3	0.61	90	D	35.7	0.87
	WESTBOUND LEFT-THRU-RIGHT		B	18.8	0.28		C	22.2	0.46
	NORTHBOUND LEFT		B	11.6	0.37		C	22.9	0.66
	THRU-RIGHT		B	13.4	0.53		B	17.4	0.28
	SOUTHBOUND LEFT		C	21.2	0.08		B	13.0	0.09
	THRU-RIGHT		B	18.7	0.24		C	27.4	0.58
<b>OVERALL</b>			<b>B</b>	<b>16.5</b>	--		<b>C</b>	<b>26.3</b>	--
CLARK AVENUE @ SCRANTON AVENUE	EASTBOUND LEFT-THRU-RIGHT	75	B	13.1	0.39	75	B	14.6	0.47
	WESTBOUND LEFT-THRU-RIGHT		B	14.5	0.51		B	16.9	0.60
	NORTHBOUND LEFT		B	10.3	0.08		B	11.4	0.13
	THRU-RIGHT		B	11.8	0.42		B	13.3	0.45
	SOUTHBOUND LEFT		B	11.4	0.15		B	15.2	0.36
	THRU-RIGHT		A	9.5	0.18		A	10.0	0.17
<b>OVERALL</b>			<b>B</b>	<b>12.6</b>	--		<b>B</b>	<b>14.5</b>	--
CLARK AVENUE @ WEST 25TH STREET	EASTBOUND LEFT-THRU-RIGHT	120	F	92.1	1.03	120	E	57.3	0.89
	WESTBOUND LEFT-THRU-RIGHT		C	34.1	0.53		D	42.5	0.76
	NORTHBOUND LEFT-THRU-RIGHT		B	18.2	0.60		D	38.0	0.71
	SOUTHBOUND LEFT-THRU-RIGHT		C	29.6	0.44		B	17.9	0.59
	<b>OVERALL</b>				<b>D</b>		<b>37.4</b>	--	
CLARK AVENUE @ FULTON ROAD	EASTBOUND LEFT-THRU-RIGHT	90	C	31.4	0.78	90	B	20.0	0.51
	WESTBOUND LEFT-THRU-RIGHT		C	21.8	0.52		C	34.2	0.83
	NORTHBOUND LEFT		B	11.3	0.06		B	16.4	0.24
	THRU-RIGHT		C	21.6	0.76		B	13.4	0.34
	SOUTHBOUND LEFT		B	15.4	0.22		B	14.2	0.21
	LEFT-THRU		B	11.2	0.21		C	20.8	0.68
<b>OVERALL</b>			<b>C</b>	<b>22.7</b>	--		<b>C</b>	<b>22.4</b>	-

# traffic analysis

FIGURE 4: CAPACITY ANALYSIS RESULTS FOR 2014 REDUCED LANE USE

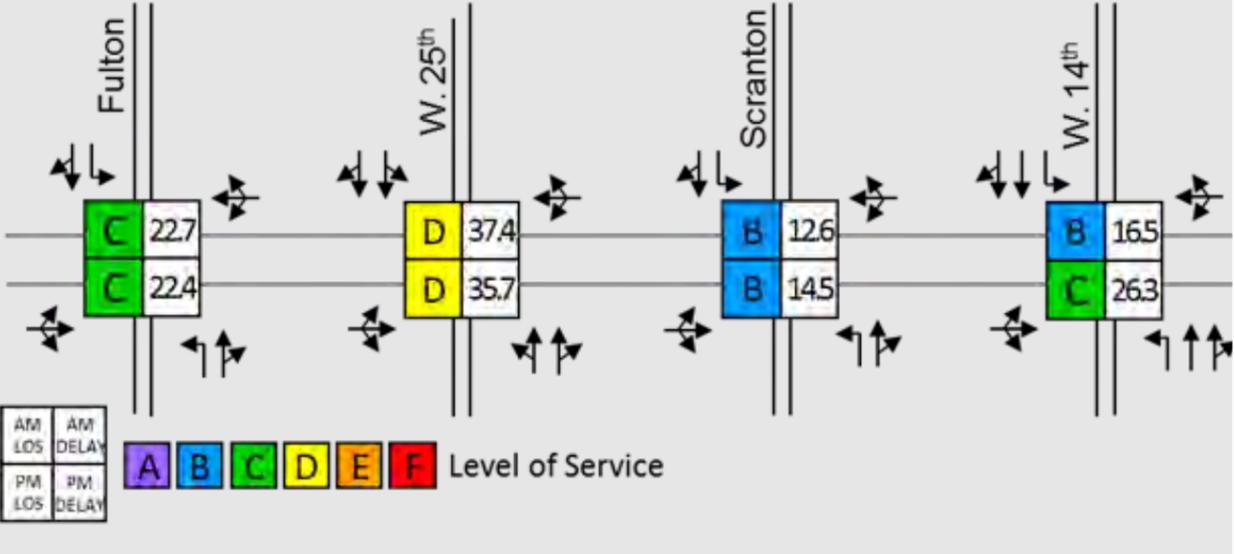
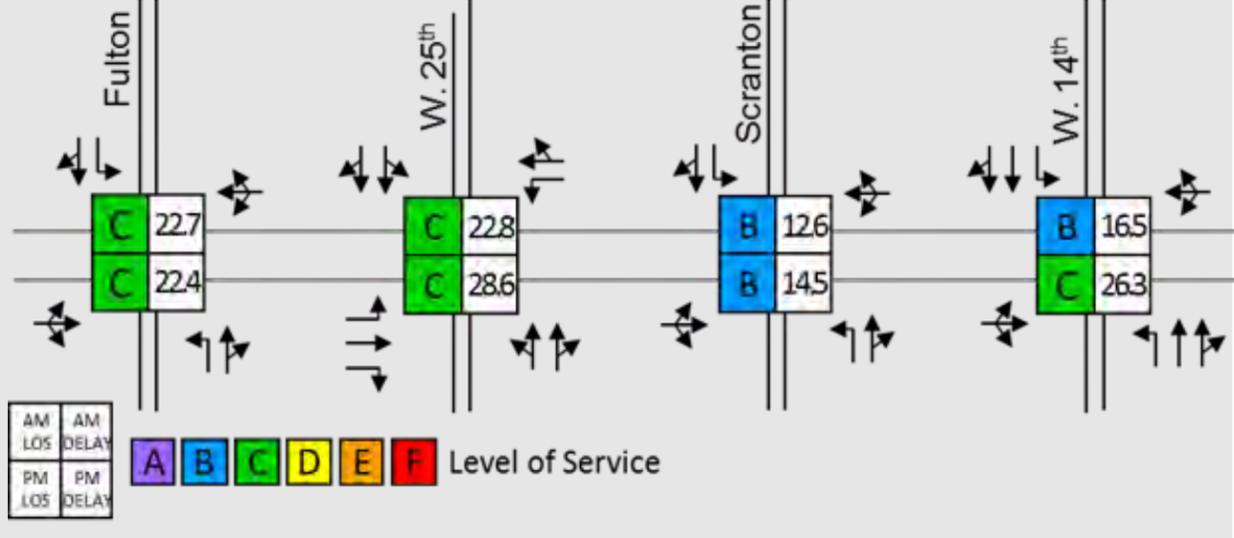


FIGURE 5: CAPACITY ANALYSIS RESULTS FOR 2014 PROPOSED LANE USE

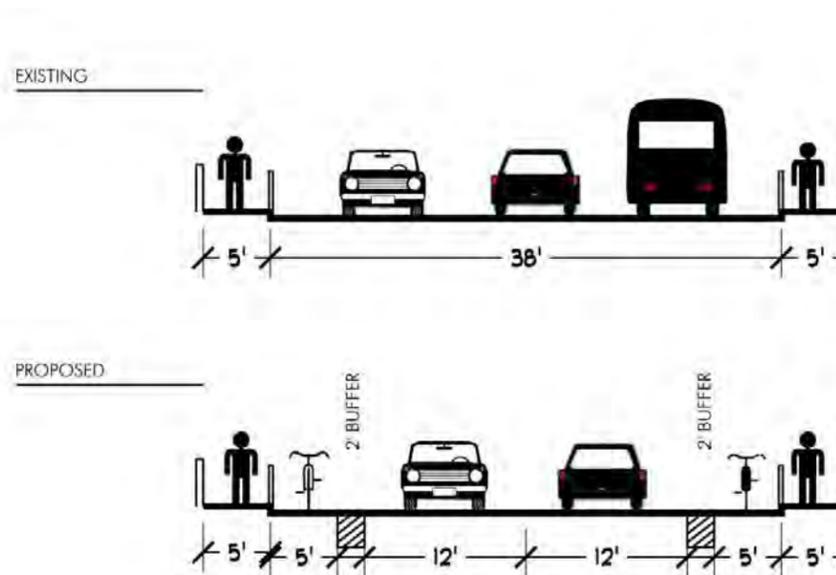


# chapter 4: concepts & recommendations

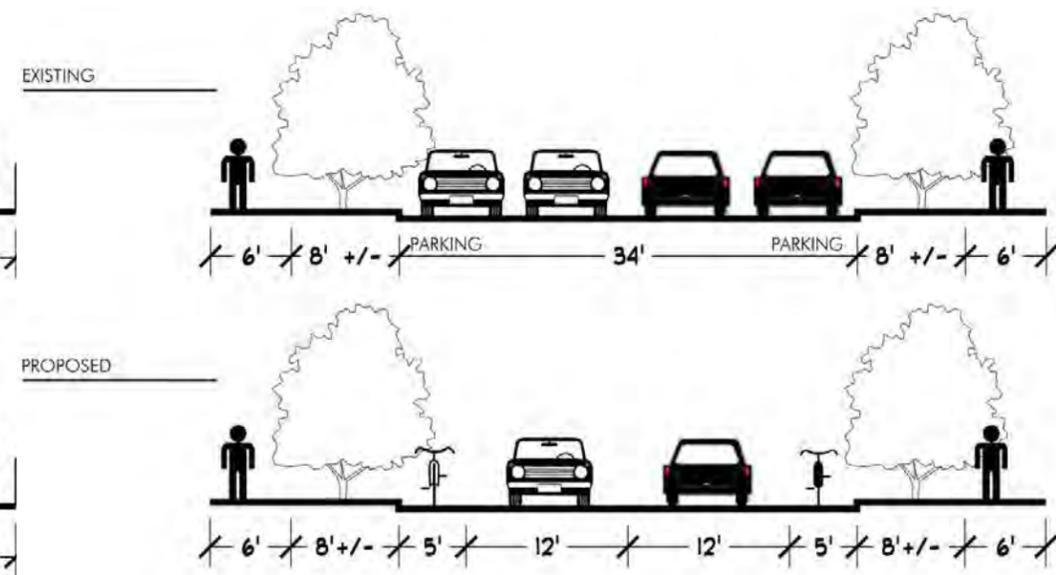
## ULTIMATE STREETS

Make Clark Avenue a destination, a memorable place, and an economic success by making it an Ultimate Street:

- Balance the priorities of all corridor users: pedestrians, cyclists, public transit, motorists, merchants, and residents.
- Create space for people to walk at a leisurely pace and beautiful places for people to gather.
- Provide physical comfort for pedestrians, through shade in the summer, protection from the elements where possible, and traffic calming measures.
- Define the street edge, to direct and engage people's eyes.
- Are transparent, to invite people beyond the street edge, and to foster a feeling of security.
- Foster complementarity between the architecture and the streetscape design and materials.
- Reduce solar heat gain and reduce the impact of rainwater on the local and regional environment.
- Are maintainable, to promote a sense of cleanliness and to reduce the burden on the owner and stakeholders.
- Employ high quality design, details, and construction.



**A** Quigley - W. 11th Street  
In order to make this segment more complete, the width of one of the two existing westbound lanes will be replaced with bike lanes. There is room for 2' buffers between the travel and bike lanes, to separate cyclists from truck traffic.

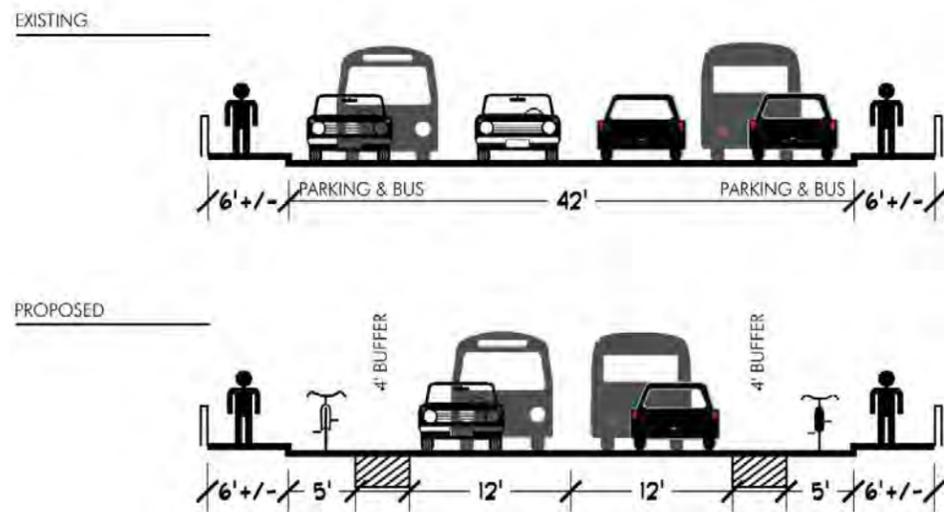
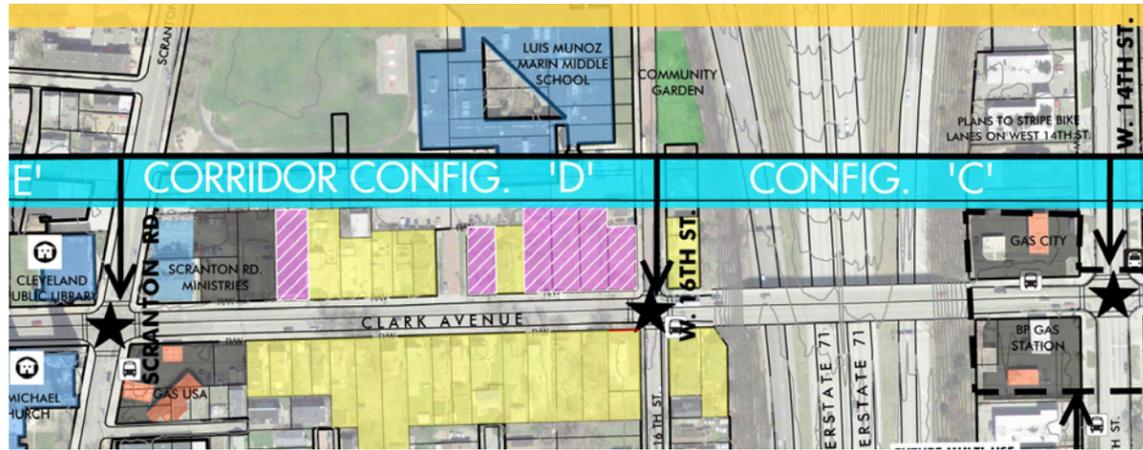


**B** W. 11th Street - W. 14th Street  
This segment, with mixed residential, commercial, and industrial uses, features bike lanes, to connect the future Towpath Trail neighborhood connector to West 14th, and to calm traffic.

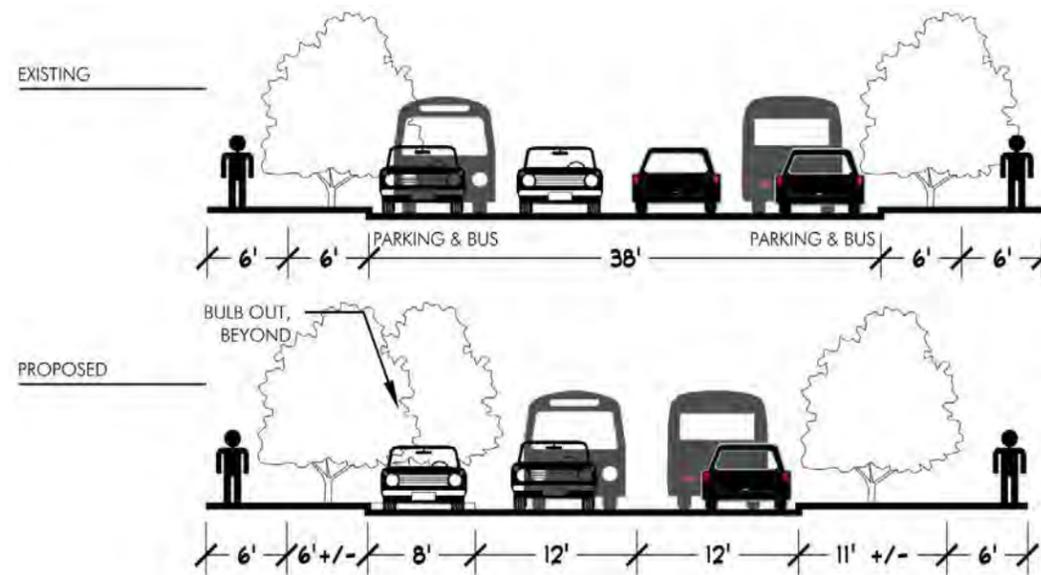
## CORRIDOR CONFIGURATIONS

Utilizing the planning process described earlier, the planning team arrived at the following recommended corridor configurations.

# concepts & recommendations

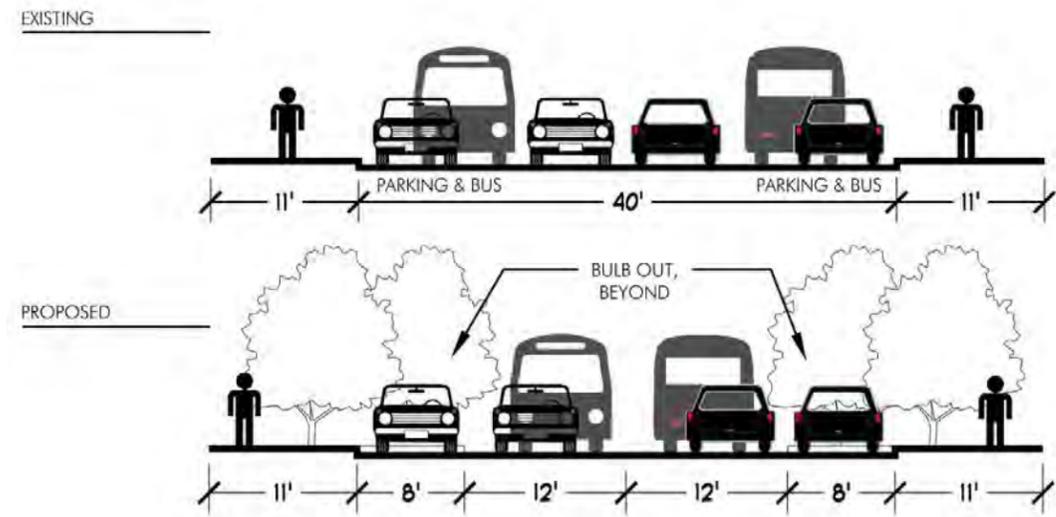
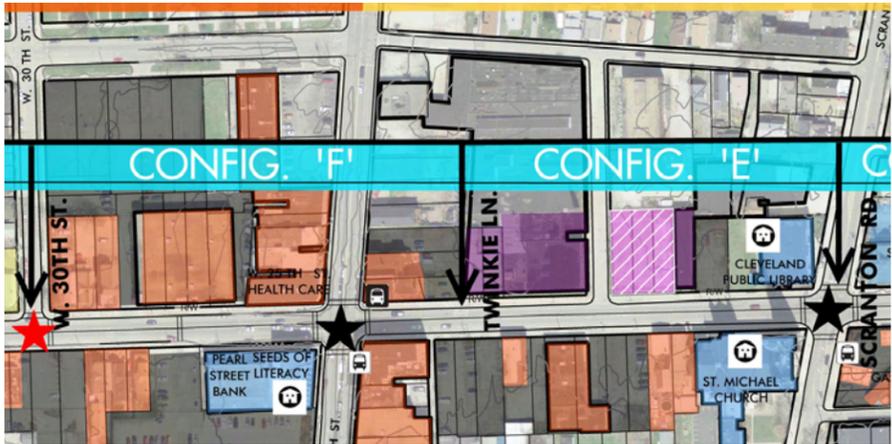


**C** **W. 14th Street - W. 16th Street**  
 Buses enter the corridor at West 14th Street. The majority of this segment consists of the bridge over Interstate 71, which provides enough width for a 4' buffer for each bike lane.

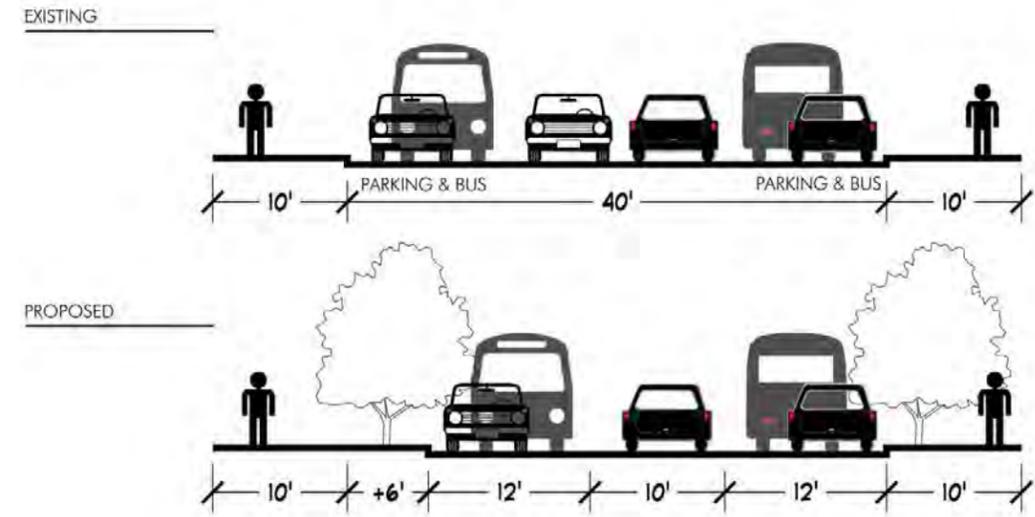


**D** **W. 16th Street - Scranton Road**  
 The focus of this highly residential section is to calm traffic as much as possible. Bulbouts and a narrowed cartway are critical for achieving this goal. Bike lanes end at West 16th Street; sharrows continue for the remainder of the corridor, to West 65th.

# concepts & recommendations

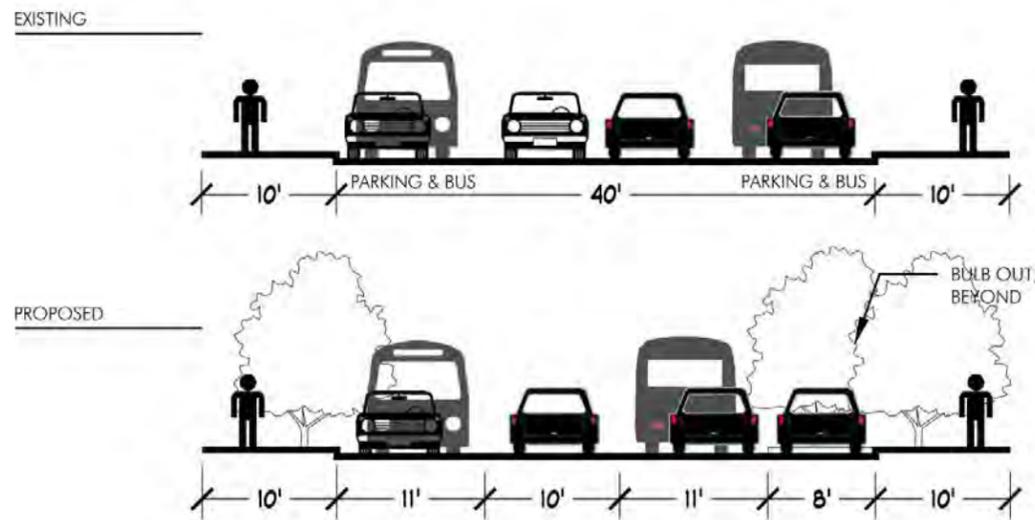


**E** **Scranton Road - Twinkie Lane**  
 On-street parking on both sides is important here, to serve the St. Michael's Church community and the future use of the library building. Bulbouts are also essential, to calm traffic.



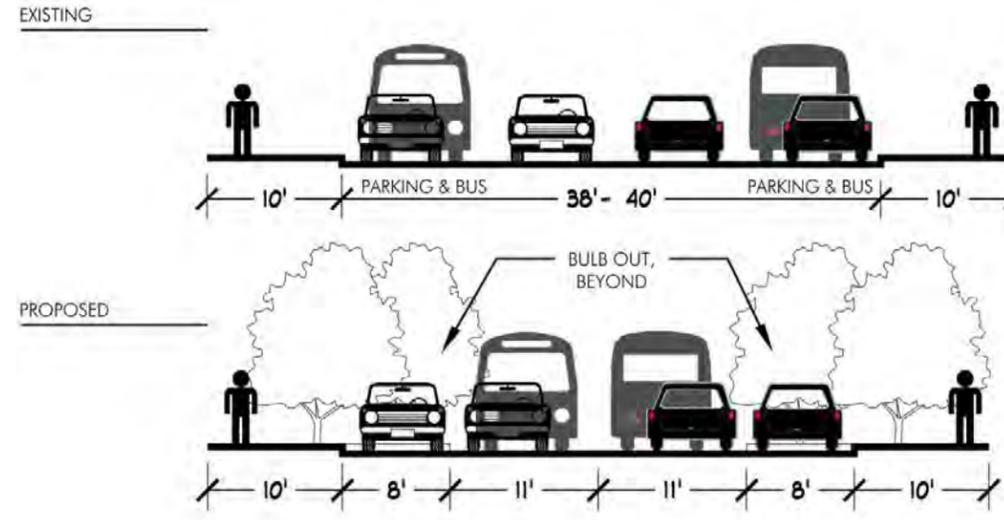
**F** **Twinkie Lane - W.30th**  
 West 25th is the busiest vehicular and pedestrian intersection along the corridor, and one of only two intersections recommended by this study for left turn lanes. On-street parking spaces should be implemented, west of and as close as possible to West 25th, to support retail businesses on Clark Avenue.

# concepts & recommendations



## G W. 30th Street - W. 38th Street

The presence of many in-out businesses in this segment, such as fast food establishments, calls for a continuous center turn lane. On-street parking should be located on the side of Clark that has the fewest drive aprons (after apron consolidation) and fire hydrants, to maximize parking spaces. Bulb outs will calm traffic and discourage motorists from using the parking lane as a passing lane.



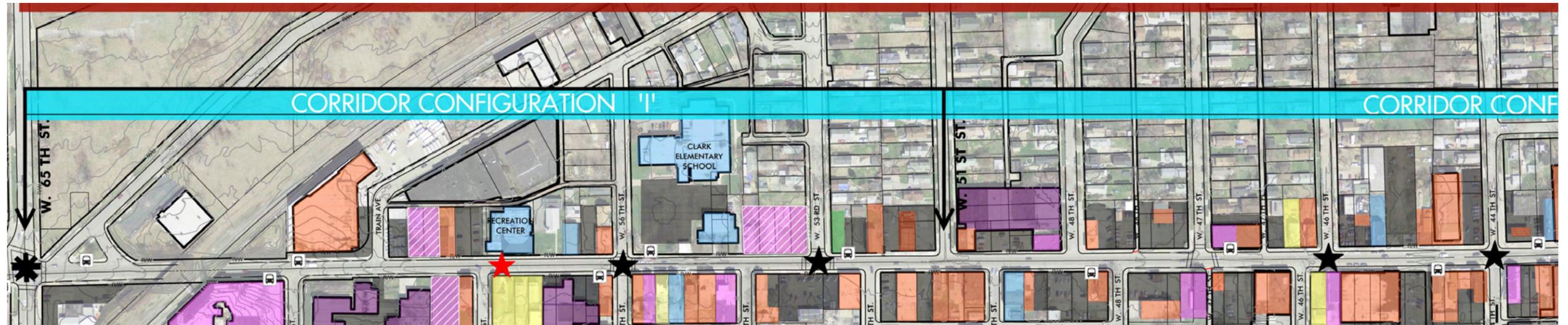
## H W. 38th Street - W. 51st Street

This segment is wide enough for parking on both sides; the corridor parking study recommended by this plan will determine if parking on both sides is needed. If parking is needed on only one side, the street should be narrowed on the non-parking side, to create a wider buffer/amenity strip between pedestrians and the street. Bulb outs on the parking side(s) will calm traffic and discourage motorists from using the parking lane as a passing lane.

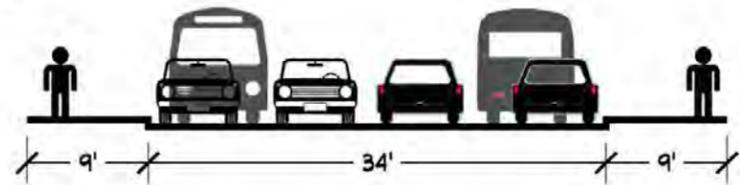
There are two exceptions to configuration H:

1. Between 38th and 41st, regardless of the future parking study's recommendations, the street should be narrowed on the north side, along the length of the cemetery, since the cemetery does not require parking.
2. Left turn lanes are recommended at West 44th Street, based on stakeholder input. Traffic counts and analysis of this intersection were not part of this study, and should be included in the design and engineering stage of Clark Avenue's rehabilitation.

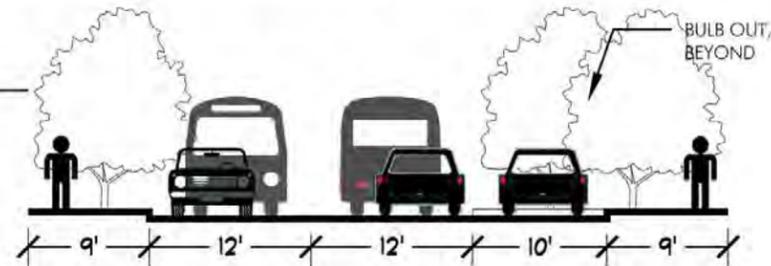
# concepts & recommendations



EXISTING



PROPOSED



## 1 W. 51st Street - W. 65th Street

Clark narrows in this segment to 34', allowing only one on-street parking lane. Two exceptions to the recommended configuration are:

1. When Clark Elementary School is rebuilt, the building will most likely face and abut Clark, and the Cleveland Metropolitan School District will add a drop off lane on the north side of Clark, between 54th and 56th.
2. Exclude on-street parking from under the railroad bridge, between 61st and 65th.

# concepts & recommendations

## Design for Pedestrians

Safe and accessible sidewalks benefit both pedestrians and merchants. Not only do active sidewalks allow for more “eyes on the street” to monitor safety, but they also improve business -- pedestrians often become patrons in local shops and restaurants.

On-street parking is also an asset to commercial districts, not only does it provide parking for patrons, but it also works congruently with sidewalks to provide protective buffers between pedestrians and on-coming traffic. The Cleveland Complete and Green Streets report identifies seven essential key elements for successful sidewalks, which should be implemented wherever possible along Clark:

### COMPLETE & GREEN STREETS

#### KEY ELEMENTS:

- Accessibility
- Adequate width
- Safety
- Continuity
- Landscaping
- Drainage
- Quality of place and Social space

### Accessibility

All new sidewalks and corner features (such as curb ramps and landings) must adhere to the Americans with Disabilities Act (ADA). Call buttons, signs, symbols, markings, and pavement textures should also be ADA-compliant. Accessible curb ramps designed according to the Americans with

Disabilities Act create accessible routes across streets. Compliant ramps also create high visual contrast that guides pedestrians to crossing locations and raise motorists’ awareness of crossing zones.

### Adequate Width

The minimum width for an unobstructed sidewalk within a City of Cleveland central business district is six feet. A two- to six-foot wide amenity strip should be placed behind the curb. This amenity strip can include street trees, landscaping (in areas that will be maintained) and site furnishings, and serves as a buffer between pedestrians and moving vehicles.

### Safety

Pedestrian safety can be enhanced with the following tools:

#### High-Contrast Crosswalks

Crosswalks with high visual and textural contrast clarify pedestrian crossing zones for motorists, and encourage pedestrians to cross only at specific locations.

#### Curb Radius

Smaller curb radii slow turning vehicles, shortens the crossing distance, and creates more space for pedestrians and/or green infrastructure.

#### Median Pedestrian Refuge

Center islands narrow the cartway and shorten pedestrians’ crossing distance, but also provide a place of pedestrian refuge. On a two-travel lane road (one each direction,) the refuge allows pedestrians to cross one lane of traffic at a time. To improve car visibility and increase pedestrian-motorist eye contact, the pedestrian cut through

the island should be oriented at an angle toward oncoming traffic. The midblock crossing at Clark Elementary School and Clark Recreation Center would benefit from this alignment.

#### In-Street Pedestrian Crossing Signs

Signs which sit in the middle of the street and denote crossing zones raise motorist awareness and pedestrian comfort at non-signalized crossings. These are less durable than median pedestrian refuges, but require less room and are much less expensive than refuges.

#### Countdown Pedestrian Signals

Crossing signals with a countdown number show pedestrians if and how long they have to cross safely.

#### Rectangular Rapid Flashing Beacons (RRFB)

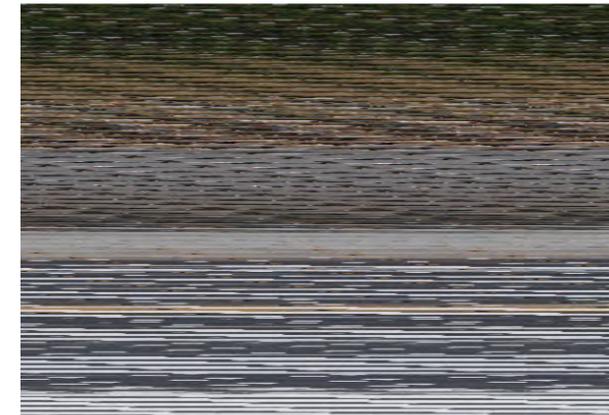
RRFB's are user-actuated amber LEDs that supplement warning signs at unsignalized intersections or mid-block crosswalks. They can be activated by pedestrians manually by a push button or passively by a pedestrian detection system. These signals have been found to be more effective than traditional, flashing yellow pedestrian crossing lights, and are recommended at all proposed midblock crossings, per the Safe Crossings map on pages XX and XX.

### Continuity

Furnishings, specialty paving, public art, and lighting compose a continuous streetscape by delineating pedestrian space and creating character. The planning team recommends using ADA-compliant permeable pavers in the Clark Avenue amenity strip as a unifying element. The proposed furnishings and materials chart on page XX shows design elements selected by the



Bulbouts reduce the crossing distance for pedestrians



Painted ladder crosswalks are more visible to vehicles



Rectangular Rapid Flashing Beacon

# concepts & recommendations

## Landscaping

Street trees enhance the overall visual and spatial character of the pedestrian zone and the corridor as a whole. A continuous canopy defines pedestrian space on both sides of the road, especially where buildings are set back from the sidewalk or are non-existent. Street trees and landscaping also create a more pleasant setting for pedestrians, cyclists, and motorists. An aesthetically-pleasing street increases property value and encourages commercial growth.

The existing trees that occur within the residential area between W. 11th and Scranton Road should be maintained in place. Additional street trees should be urban- and salt-tolerant, mature to a size that does not conflict with overhead power lines, require little maintenance, and given adequate soil volume to grow in, per the chart to the right. For appropriate tree species, refer to the City of Cleveland's Urban Forestry list of approved street trees in the appendix.

Additional salt- and urban-tolerant landscaping can be utilized to define gathering spaces, but should be used only where they will be properly maintained.

## Drainage

Permeable pavement is proposed throughout Clark Avenue's amenity strip.

Bioretention plantings should be incorporated into pedestrian bulbouts, if a merchant, Community Development Corporation or other group commits to regular maintenance. Bioretention plantings are designed to collect, slow, infiltrate, and remove pollutants from rainwater runoff before it enters a drainage system

Bioretention should only be used where pervious solutions are not feasible, or visual impact or public education is desired.

## Quality of Place and Social Space

Not only is a complete street a transportation link, but its sidewalks are a destination in and of themselves. Spaces along the corridor can function as gathering and meeting places (see La Villa Plaza concept on page XX.) Appropriate streetscape materials can compliment local architecture and enhance the neighborhood, well beyond the right-of-way.

## Maintenance

All parts of the roadway and pedestrian areas must be designed with longevity and maintenance as a top priority. Infrastructure is not sustainable if its maintenance requirements are beyond the capacity of the responsible entity. The recommended improvements listed in this report should be prioritized based on cost and maintenance capacity. Some green infrastructure treatments require less maintenance than others, but provide similar rainwater treatment results.

## COST & MAINTENANCE CONSIDERATIONS

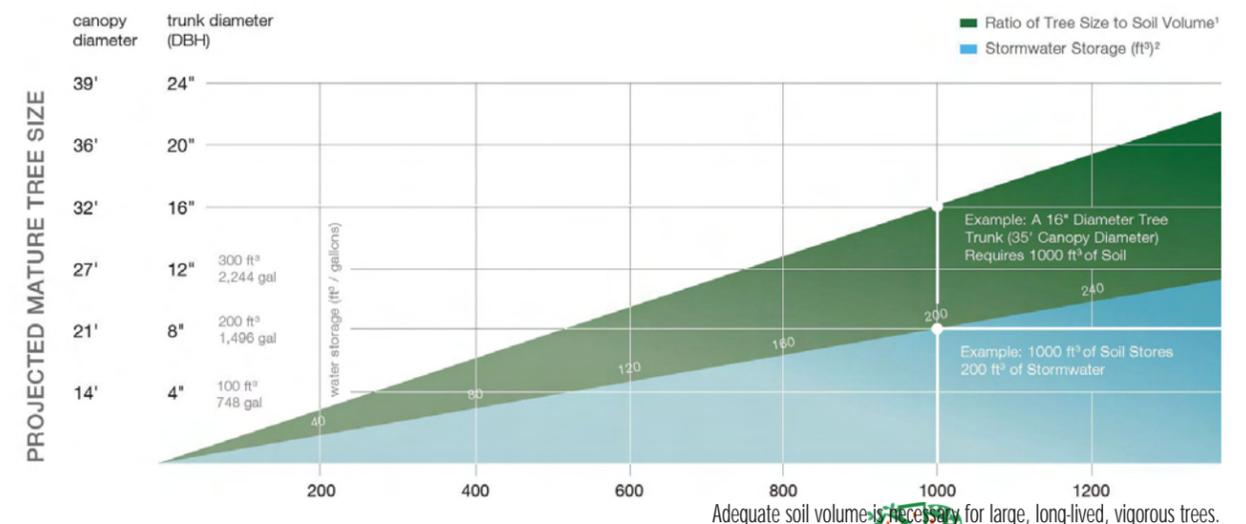
- Tree biofiltration cells under pervious pavement require far less maintenance than bioretention cells.
- the greenest and most aesthetically-pleasing option is to use the bumpouts for bioretention. This also is the highest capital cost, and requires maintenance.
- The next step down is planting beds (no bioretention.) This still is aesthetically-pleasing and still requires maintenance, but has a slightly lower capital cost.
- The most economic option is lawn and trees. This still requires maintenance, but little more than a mower. Lower capital investment.
- The most economic option is paving the bumpouts with pavers or colored, stamped concrete. This has the least visual impact, but also requires little maintenance.
- Consider life cycle costs when choosing materials and designing construction details.
- Quality of construction will affect longevity and maintenance.



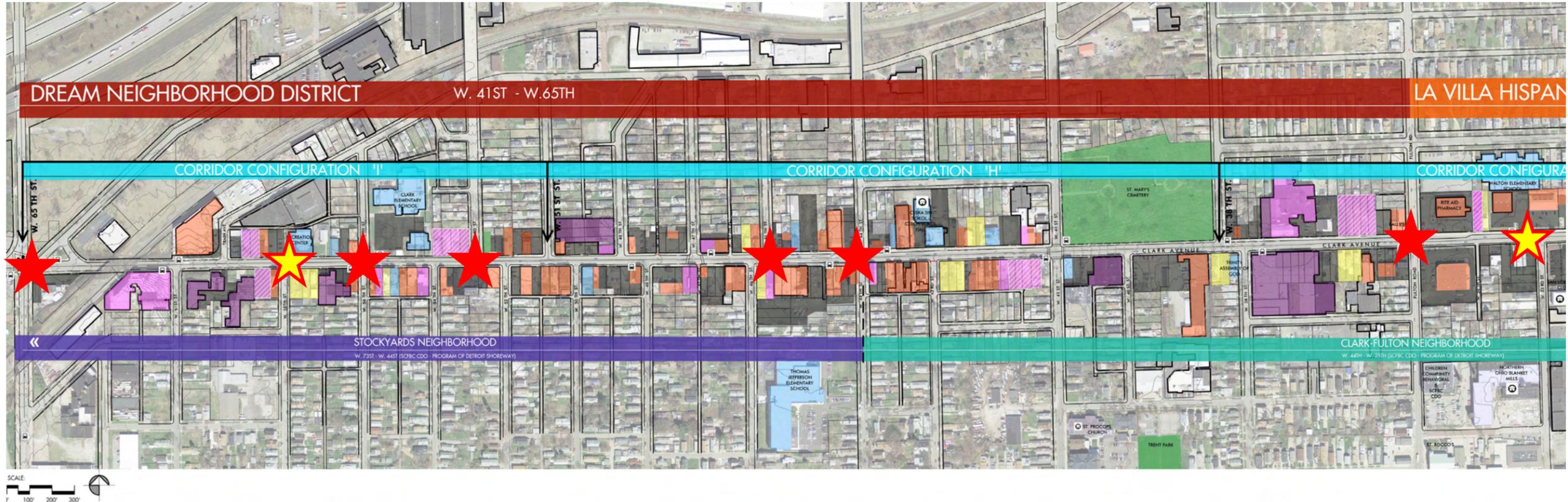
Planted bioswales within bulbouts



Tree biofiltration (Image courtesy of Boonestro)



## SAFE CROSSINGS

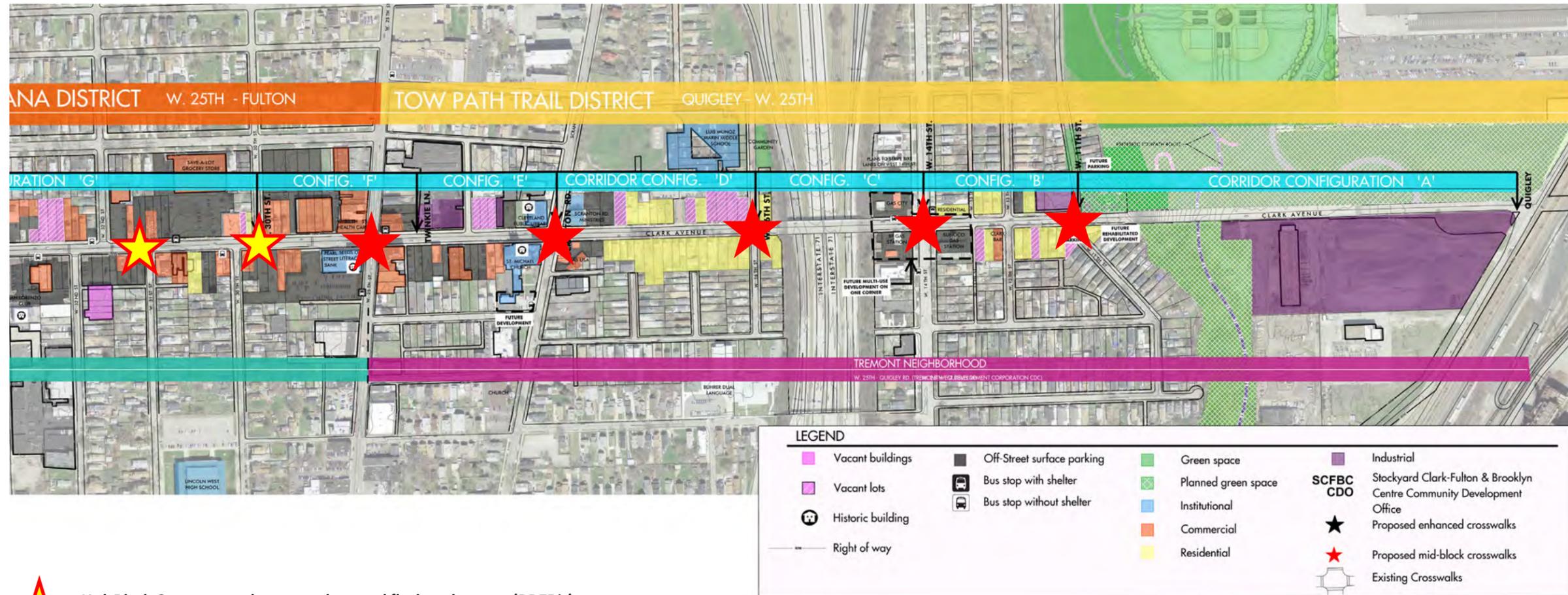


 Mid-Block Crossings, with rectangular rapid flashing beacons (RRFB's)

 Enhanced Crosswalks

# concepts & recommendations

## SAFE CROSSINGS



Mid-Block Crossings, with rectangular rapid flashing beacons (RRFB's)

Enhanced Crosswalks

## Design for Bicyclists

The most successful bicycle facilities accommodate a broad range of bikes and meet the needs of all cyclists, whether experienced or beginner.

### Bicycle Facility Types

A variety of bicycle facilities can serve and provide safety for cyclists within a roadway:

#### Sharrows

Cyclists and motorists share the same space on the road. Pavement markings increase motorists' awareness of cyclists.

#### Bike Lanes

Bike lanes and buffered bike lanes use pavement markings to separate cyclists and motorists on the same pavement. For the Clark Avenue corridor sharrows are recommended for the majority of the study area, with bike lanes recommended from Quigley to W. 16th Street, connecting to the future bike lanes on W. 14th Street. This particular corridor is not listed as a recommended dedicated route on the Cleveland Bikeway Plan. It was also decided during the public outreach phase that on-street parking is more desirable to both residents and merchants. The existing right of way width cannot accommodate both a dedicated parking lane and a separated bike lane.



Sharrow markings are recommended from W. 16th Street to W. 65th Street.



Bike lanes are proposed from W. 11th Street to W. 16th Street.

## Design for Public Transit

Formerly known as bus stops, Transit Waiting Environments (TWE) should be attractive destinations with lit, transparent shelters (where space allows, and if the boardings meet RTA's criteria, as noted to the right,) pedestrian-scale lighting, specialty pavement, seating, trash and recycling receptacles, and low-maintenance landscaping. TWE's that meet these criteria and receive regular maintenance will feel safe for transit riders. The current TWE boardings, along Clark Avenue, however, do not meet RTA's eligibility criteria for new bus shelters. All existing bus shelters should be preserved and protected from damage, during any construction near them.

### CURRENT CLARK TWE BOARDING DATA

#### WESTBOUND

01015, Clark Ave at W 31ST, WB - 24 boardings  
 03021, Clark Ave at W 32ND, WB - 4 boardings,  
 01109, Clark Ave at W 33RD, WB - 0 boardings,  
 03016, Clark Ave at Fulton, WB - 8 boardings  
 03024, Clark Ave at W 36TH, WB - 0 boardings  
 03026, Clark Ave at W 41ST, WB - 1 boardings  
 03028, Clark Ave at W 44TH, WB - 2 boardings

#### EASTBOUND

03025, Clark Ave at W 41TH, EB - 24 boardings  
 03023, Clark Ave at W 38TH, EB - 2 boardings  
 03019, Clark Ave at W 30TH, EB - 7 boardings  
 03020, Clark Ave at W 31ST, EB - 7 boardings,  
 03022, Clark Ave at W 33RD, EB - 5 boardings  
 03015, Clark Ave at Fulton, EB - 15 boardings  
 11154, Clark Ave at W 25TH, EB - 10 boardings

### RTA TWE SHELTER CRITERIA

- 1 50 boardings a day to be eligible for a shelter.
- 2 Standard shelters are 12' long & 6' wide.
- 3 RTA prefers 6' between curb and shelter, and 2' clearance between the shelter and the side walk.



The few existing shelters that are located along Clark Avenue should remain.



Proposed bus bulbs can provide ample space for more heavily-utilized TWE's that do not have a shelter currently.

# concepts & recommendations

## Traffic/Truck Calming

Traffic speeds along the corridor are a major concern that was expressed throughout the public meetings. The intersections most noted include; the W. 25th Street, Fulton and W. 41st and W. 44th intersections. Clark residents are also concerned with increased truck traffic between W. 25th Street and Quigley, as stated in the traffic analysis section, since Steelyard Commons began operation.

The following treatments are feasible recommendations to assist in traffic calming.

### Road Diet

Any reduction in the number of travel lanes is considered a road diet. Studies have determined the reduction from four lanes to three (one travel lane in each direction, with a center turn lane,) increases traffic flow efficiency and turning safety. A center turn lane is proposed between Twinkie Lane and W. 38th Street.

### Bulbouts

Curb extensions toward the center of the road at intersections and mid-block crossings narrow the cartway, thereby slowing motorists, and shorten pedestrians' crossing distance. Bulbouts are proposed at both ends of on-street parking lanes, at midblock crossings, and bus bulbs, where feasible.

### Zero Lot-Line Setback

Buildings located on or close to the Right of Way line create a sense of enclosure, define the corridor edge, and reduce the sense of scale to a pedestrian level. This minimum setback was established from W. 41st to 58th, through City Council's passage of the Pedestrian Retail Overlay District. Parcels redeveloped in the future will be

required to locate their buildings on or very near the Right of Way line.

### Street Trees, Landscaping, Site Furnishings, and Decorative Elements

All of these elements create a sense of enclosure, pedestrian scale, and visual engagement. See sheet XX for proposed materials.

### Vehicular Pavement Treatments

Pavement materials that contrast with the typical street pavement in color, hue, and texture signal pedestrian zones and increase motorists' awareness of their speed. See sheet XX for proposed locations.

### Pedestrian-Scaled Lighting

Low, pedestrian-scale, decorative street lighting helps denote pedestrian zones. Higher light levels create a safer environment. See sheet XX for proposed lighting.

### Traffic signage

The planning team recommends implementing wayfinding signage to direct truck traffic from Steelyard Commons directly to the interstates, and vice versa, as noted on page X. This could help to alleviate residential truck traffic.

## Parking

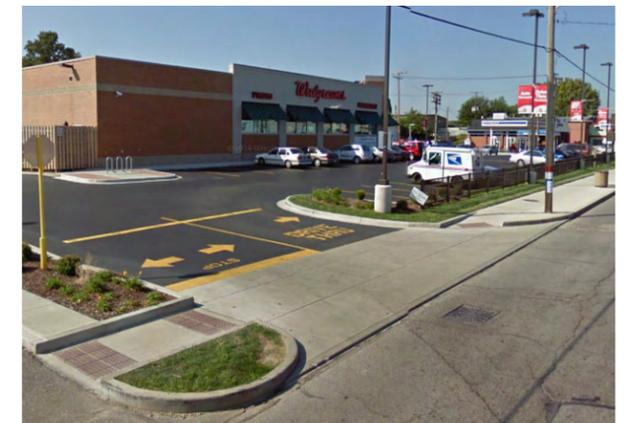
Adequate parking is a must for a viable commercial district. Merchants and residents voted to keep on-street parking throughout most of the corridor. Refer to sheets XX to see configuration sections. Sections A-C illustrate that on-street parking between Quigley and W. 16th is not proposed. Instead, bike lanes are proposed between Quigley and W. 16th. There are a few vacant lots within this area that can serve as future public parking

lots. See Sheet XX for locations. On-street parking is recommended throughout the remainder of the corridor. There are instances where one existing on-street parking lane is proposed to be eliminated due to substandard lane widths. Once the street is improved, the lane widths will need to be brought up to current ODOT standards. An example of this occurs between W. 16th and Scranton, Twinkie Lane and W. 30th, and W. 51st and W. 65th Streets.

The existing conditions map (pages X-X) highlights existing off-street parking lots and vacant lots. These properties could potentially provide additional parking for businesses. Several municipalities within Northeast Ohio provide public parking lots every few blocks, based on commercial density, to effectively accommodate the needs of both merchants and customers. A parking study is recommended for the Clark Avenue corridor and business district, to determine the true need for parking.

## Access Management

Removing or reducing the number of existing access points or curb cuts will improve safety. There are several extraneous access points throughout the corridor that can be eliminated without impacting residents or merchants. Some access points are wider than necessary, and a reduction in width that is to code will also promote safety.



The recent Walgreens redevelopment is a good example of good access management and corridor edge definition.



A combination of street trees, site furnishings, decorative elements, and on street parking



Parking lot opportunities have been identified for the Towpath Trail District at the W. 11th Towpath Trail connection.

# concepts & recommendations

## Streetscape

The consistent use of appropriate streetscape elements can unify and create a sense of place and an identity for a corridor. All of the following elements will be important to incorporate along the full length of Clark Avenue, to work toward making it an ultimate street.

### Pavement

By repeating common materials and colors from buildings and pavement along the corridor within the amenity strips and crosswalks, the corridor becomes unified. This plan recommends brick pavers for specialty pavement treatments, for authenticity, durability, and color longevity.

### Site Furnishings & Public Art

Furnishings should also complement the surrounding architecture, but they also offer an opportunity for visual punctuation with color or unique designs. Metal benches, trash receptacles and bike racks will be most durable. These furnishings should be located regularly at gathering places and eating establishments. Due to the City of Cleveland's lack of resources to maintain public trash receptacles, they should be located only where they are needed most.

Public art should be located in areas with high visibility.

### Lighting and Utilities

Lighting is critical for security, the sense of safety, and to encourage pedestrian traffic and gatherings. A combination of high lights and pedestrian-scale lights will ensure adequate light levels and pedestrian-friendly spaces.

Cleveland Public Power is currently planning for a

wholesale replacement of its cobra-head fixtures with LED lamps, which will reduce the number of its high-level and pedestrian light fixture models, establish consistency throughout the city, and decrease maintenance costs. The pedestrian-scale light and pole should be historic, per the future CPP standard.

All existing utility poles should be examined for consolidation.

### Landscaping

A minimum of five varying tree species should be selected for the standard streetscape. Use the following U.S. National Arboretum Agricultural Research Service guidelines for tree diversity: (1) plant no more than 10% of any species, (2) no more than 20% of any genus, and (3) no more than 30% of any family to ensure biological diversity. Also refer to the City of Cleveland's Urban Forestry list of approved street trees, located in the appendix.

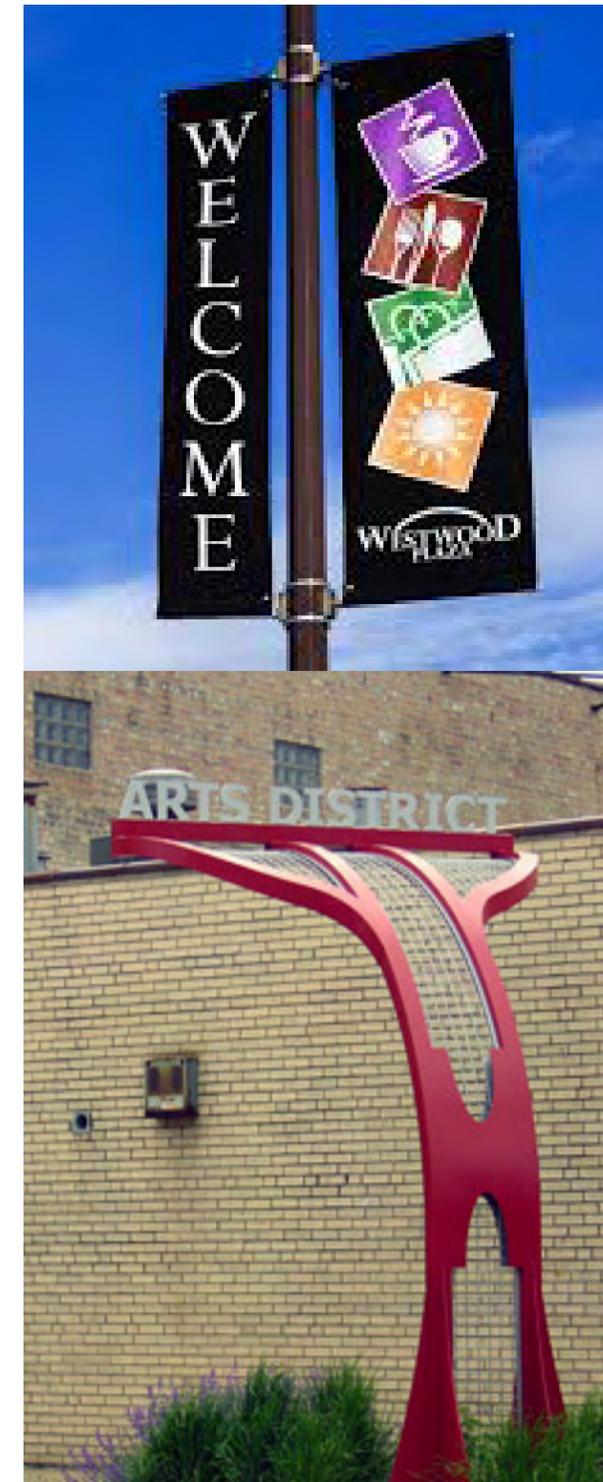
The Standard Clark Avenue Streetscape Palette recommended to be implemented along the entire length of the corridor are shown on the following page.

## Districts

Through the community outreach process, three distinct districts within the corridor emerged, based on characteristics unique to each area. Developing an identity and brand around those qualities should be highlighted and promoted to existing and prospective residents, business owners, and visitors, to foster economic growth. Tremont's brand development and expression of it through the branches and leaves concept has

served Tremont well in creating its identity, and encouraging economic growth.

The following pages discuss each district's existing or proposed identity, and how that identity can be expressed, through distinct variations of or concentrations on elements within the Standard Clark Avenue Streetscape Palette.



# concepts & recommendations

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