



# CLIFTON BOULEVARD / LAKE ROAD ENHANCEMENTS

PRELIMINARY ENGINEERING STUDY  
CUYAHOGA COUNTY, OHIO



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# Introduction

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The 2021 Community Confluence Transportation for Livable Communities Initiative (TLCI) Study provided recommendations to improve multi-modal and active transportation access between the City of Lakewood, the City of Rocky River, and the Cleveland Metroparks' Rocky River Reservation. The TLCI Study provided nine recommended locations for proposed improvements to the active transportation system, which included bicycle and pedestrian enhancements. The two locations from the TLCI that were developed for the Clifton Boulevard/Lake Road Enhancements project are the Clifton Boulevard/Lake Road segment and the West Clifton Boulevard segment. This Preliminary Engineering Study summarizes the activities of the Clifton Boulevard/Lake Road Enhancements between Webb Road in Lakewood and Linda Street in Rocky River. Its scope includes project initiation through the alternatives analysis, and to final recommendations. See Appendix A for the Project Location Map.

Clifton Boulevard serves as an east-west connector between the City of Lakewood, the City of Rocky River, and other communities along Lake Erie. Clifton Boulevard is designated as US Route 6, US Route 20, and State Route 2 within the study area, and is known as Lake Road in the City of Rocky River. The speed limit on Lake Road is 25 mph in Rocky River west of the Marion Ramps, and changes to 35 mph at the ramps as it crosses the bridge and enters the City of Lakewood.

In Rocky River, Lake Road is a three-lane undivided roadway (one lane in each direction with a two-way left-turn lane,) which then becomes a four-lane divided roadway across the bridge (two lanes in each direction). The City of Lakewood restriped Clifton Boulevard between Lake Road (a different road from Lake Road in Rocky River) and Clifton Road from a four-lane divided roadway to a two-lane divided roadway with a separated bike lane in each direction. East of the West Clifton Boulevard intersection, Clifton Boulevard is a seven-lane undivided roadway (three lanes in each direction w/ a two-way left-turn lane). West Clifton Boulevard is a north-south road in the City of Lakewood and is designated as US Route 20 and State Route 237. The speed limit on West Clifton Boulevard is 35 mph. Within the study area at the intersection with Clifton Boulevard, West Clifton Boulevard is a four-lane undivided roadway (two southbound lanes and two northbound lanes). See Appendix B for the Existing Conditions Schematic Plan of the study area.

## Alternative Analysis and Design

The Preliminary Engineering Study began with developing short-term and long-term alternative designs described in the TLCI Study for Clifton Boulevard with intersection and bridge improvements along the study area. Three short-term alternatives and one long-term alternative were developed from the TLCI study and included input from additional discussions with officials from the Cuyahoga County Planning Commission, Cuyahoga County Public Works, City of Rocky River, City of Lakewood, and Cleveland Metroparks. The four alternatives focused on Clifton Boulevard roadway and bridge section layouts. All three short-term alternatives proposed a two-lane divided roadway with separated bike lanes along Clifton Boulevard. The main differences between the three short-term alternatives were the type of buffer proposed between the travel lane and bike lane. One of the three short-term options added a shared-use path on the north side of Clifton Boulevard in lieu of bike lanes. The long-term alternative proposed a two-lane undivided roadway that shifted all traffic onto the south side of Clifton Boulevard and allowed for a shared-use path and greenway on the north side of Clifton Boulevard. See Appendix C for the Short-Term Alternatives Typical Sections and Appendix D for the Long-Term Alternative Typical Sections.

After discussions of the short-term and long-term alternatives with Cuyahoga County and the Cities of Rocky River and Lakewood, the alternatives were revised. The discussion of the intersections focused on the West Clifton Boulevard concept discussed in the TLCI Study. Roundabouts versus signalization of the intersections became a focus of this study, to reduce vehicle delay and improve safety for vehicles, bicyclists, and pedestrians. Through design iterations and meetings, two preliminary concepts, Concept #1 and Concept #2 developed and were presented at a public meeting on October 12, 2021.

Preliminary Concept #1 and Concept #2 both proposed a two-way, two-lane undivided roadway along the existing south curb line of Clifton Boulevard from the east end of the Marion Ramps to the West Clifton Boulevard Intersection. On the bridge, a separated shared-use path runs on the north side of the bridge. East of the bridge, a meandering separated shared-use path runs within a generous green space beyond the proposed north curb line. The shared-use path ties into existing sidewalk at both ends of the project. The final alignment of the shared-use path will be determined following the field survey as part of the final design phase of the project. East of Lakewood's Lake Road intersection, sidewalk was added along the south side of Clifton Boulevard and ties into existing walk at the east end of the project. Concept #1 maintained signalized intersections at Lakewood's Lake Road and West Clifton Boulevard; and at the Clifton Road intersection, proposed that Clifton Road be stop-controlled and Clifton Boulevard to be free flowing. Concept #2 included roundabouts at Lakewood's Lake Road and West Clifton Boulevard intersections, with the same stop-controlled intersection at Clifton Road as Concept #1. See Appendix E for the Preliminary Concept #1 and Concept #2 Schematic Plans.

## Alternative Analysis and Design

A traffic analysis was completed as part of the Alternatives Analysis to determine the future capacity of Clifton Boulevard and the Level of Service (LOS) at the intersections along Clifton Boulevard. The LOS is a letter grade ranging from A (little to no average delay to vehicles) to F (very long average delays and few gaps for maneuverability for vehicles) that describes how well a roadway or intersection operates, based on speed, travel time, maneuverability, delay, and safety. The target LOS is D or better, which is considered by many traffic safety professionals to be the minimum acceptable condition in an urban/suburban setting. The traffic counts for this analysis were performed April 20, 2021; and due to a predominantly negative growth in the area as noted in the Community Confluence TLCI Study, the same traffic counts were used for the 2022 and 2042 capacity models.

The LOS on the bridge for both Concept #1 and Concept #2, as compared to the existing conditions, show a decrease in LOS from A to D for both the AM and PM peak hours due to the reduction from two lanes in each direction to one lane in each direction. Since the current Clifton Boulevard roadway lane configuration east and west of the bridge is one lane in each direction, the conversion of the bridge from four lanes in each direction to two lanes in each direction should not have a significant impact on traffic flows, making it a good candidate for the proposed road diet.

The LOS also analyzed the intersections of Clifton Boulevard/Clifton Road and Clifton Boulevard/West Clifton Boulevard. For Concept #1, the Clifton Road intersection shows a decrease in LOS from B to C; and the West Clifton Boulevard intersection improved in the AM peak hour from LOS D to C -- but maintained a LOS D for the PM peak hour. For Concept #2, the Clifton Road intersection shows a decrease in LOS from B to C; and West Clifton Boulevard intersection improved from a LOS D to A for the AM peak hour and improved from a LOS D to B in the PM peak hour. The overall improved LOS values for the Concept #2 configuration are due to the roundabouts' increased traffic flow through the intersections and less delay as compared to the traditional traffic signalized intersections in Concept #1. See the Appendix F for the Level of Service Criteria and Analysis for both Concepts, which includes intersection LOS figures and detailed LOS grades for each leg of the intersections.

Another consideration during the Alternatives Analysis was the number of vehicle and pedestrian conflict points at traditional intersections and roundabouts. Roundabouts have significantly fewer conflict points, which reduces the likelihood of vehicle and pedestrian crashes. In addition, the remaining conflict points at roundabouts result in sideswipe and rear-end crashes only, not the more severe/deadly side impact (t-bone) crashes common at signalized intersections. Pedestrian safety increases at roundabouts, since the number of pedestrian crossing conflict points are also reduced, and the crosswalk lengths are significantly shorter compared to crossings at signalized intersections. See Appendix G for the Conflict Points Diagrams.

## Public Meeting and Survey Results

The October 12, 2021 public meeting was held at Horace Mann Elementary School, on West Clifton Boulevard just south of the project area in Lakewood, Ohio. This meeting provided the public an opportunity to learn more about the project, review the two Concepts, and comment on them. Representatives from Cuyahoga County Planning Commission, Cuyahoga County Public Works, the City of Lakewood, and OHM Advisors were present to give a formal presentation. Following the formal presentation, the representatives then responded to individual questions on a one-on-one basis at workstations that included displays of the Concept #1 and Concept #2 schematic plans. A recording of the presentation and a weblink to a follow up online survey was provided after the meeting for those who did not join in person. See Appendix H for the Public Meeting Presentation. Comments from the public meeting and online survey were compiled and summarized. See Appendix I for the Public Meeting Comments Summary.

The two major concerns identified from the public meeting were pedestrian safety and vehicle speed. Clifton Boulevard, within the project area, sees frequent speeding of vehicles creating an unsafe environment for vehicles, pedestrians, and bicyclists. To mitigate safety concerns due to vehicle speed, the following traffic calming measures were included in the Final Concept Plans:

- At the two Clifton Boulevard mid-block crossings between the Lakewood Lake Road and Clifton Road intersections, the 13-foot lanes were reduced to 12-foot lanes, and a 6-foot concrete median with vertical reflectors was added. The eastbound lane curb line was held to the existing curb line, and the westbound curb line was shifted to the north to accommodate the median.
- On the Clifton Road bridge at the two larger pedestrian overlook plazas, the 13.5-foot lanes were reduced to 12-foot lanes and a 3-foot concrete median rolled concrete curb and vertical reflectors was added.

Concern for the safety of pedestrians crossing within the Concept #2 roundabout at the West Clifton Road intersection, especially children walking to/from Horace Mann Elementary School, led to two design revisions:

- The separated slip lane for direct right turns from northbound West Clifton Boulevard to eastbound Clifton Boulevard was removed. Due to this removal, the overall LOS for the West Clifton Boulevard intersection remained at LOS A during the AM peak hour but decreased from LOS A to LOS B in the PM peak hour. See Appendix F for the detailed revised LOS for the movement with and without the slip lane.
- Pedestrian-activated Rectangular Rapid-Flashing Beacons (RRFB) were added to the Clifton Boulevard pedestrian crossing, immediately east of the roundabout. RRFB's are motorist-notification signals, including two yellow rectangular-shaped LED indicators below a pedestrian crossing sign. The indicators flash when activated by a pedestrian to warn road users of a pedestrian waiting to cross. This sign treatment with high intensity flashers improves the visibility of the sidewalk crossing locations and are effective at multilane crossings with speed limits less than 40 mph according to the U.S. Federal Highway Administration (FHWA). In the Public Meeting schematics, the RRFBs were already shown at the mid-block crossings.

## Public Meeting and Survey Results

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If the Final Concept #2 roundabout were constructed, one resident recommended education for the students on how to navigate the roundabout for crossing. This comment, along with the other public comments in Appendix I will be discussed further and implemented where feasible, during the final design phase.

Other design revisions include on-street parking on the west side of West Clifton Boulevard to replace the second southbound lane, which abruptly ends south of the Clifton/West Clifton intersection. Also, existing GCRTA bus station locations and bus lanes on Clifton Boulevard were taken into consideration when designing lane transitions and determining the bus station relocations for Concept #2.

See Appendix J for the Final Concept Plans (Concept #1 and #2), which were updated based on comments from the public.

Additional public meeting(s) will be held during the final design phase. The City of Rocky River will be part of this effort.

## Final Concept Plans

Based upon the feedback from the public meeting and online survey, discussions with officials from Cuyahoga County and the Cities of Rocky River and Lakewood, and additional engineering analysis, final concept plans were completed. See Appendix J for the Final Plans (Concept #1 and #2) and Renderings.

Concepts #1 and #2 require both temporary and permanent Right of Way acquisition. Concept #2 requires more takes due to the roundabout footprints. However, it should be noted that the roundabouts were strategically placed to minimize property impacts. See Appendix K for the Right of Way Impacts Summary.

One of the goals of the TLCI study was to shorten the perceived distance across the Rocky River valley and to humanize pedestrians' and cyclists' experiences, while crossing the bridges over the valley. The Clifton Boulevard bridge also presents an opportunity for pedestrians and cyclists to enjoy spectacular views of the Rocky River valley and Lake Erie. The public meeting presentation showed a sampling of potential bridge enhancements designed to achieve this goal. After the meeting, Cuyahoga County requested further development of the proposed improvements, which are shown on the final concept plans and renderings. The enhancements will be refined to fit within the responsible party's maintenance capacity.

Cost estimates for Final Concept #1 and Concept #2 are considered planning-level estimates and include a 25% design contingency for construction costs. Included in the estimates are fees for engineering design, topographic survey, geotechnical engineering, and right of way plan development and acquisition. The planning level project costs are as follows:

Concept #1 - \$9,718,000

Concept #2 - \$11,173,000

See Appendix L for the detailed Cost Estimates for Concept #1 and Concept #2.

Further breakdown of the cost estimates for both Concepts can be found in the tables on the following page. The tables separate the cost of the Clifton Boulevard/Lake Road improvements for both Rocky River and Lakewood. The bridge improvements are also shown as a separate cost.

It should be noted that the project costs are based upon construction occurring in 2023. The Cuyahoga County Department of Public Works and the selected design consultant will determine the timeframe for final design, funding, and construction, which could affect the total project cost. In addition, a Maintenance Agreement for the Clifton Boulevard/Lake Road Bridge will be negotiated by the Cities of Lakewood and Rocky River as part of the next phase of the project.

# Final Concept Plans

## CONCEPT #1 - SIGNALIZED INTERSECTIONS

| CITY OF ROCKY RIVER           |                     | CITY OF LAKEWOOD              |                     | BRIDGE                        |                     |
|-------------------------------|---------------------|-------------------------------|---------------------|-------------------------------|---------------------|
| CONSTRUCTION                  |                     | CONSTRUCTION                  |                     | CONSTRUCTION                  |                     |
| Roadway                       | \$ 197,700          | Roadway                       | \$ 631,800          | Roadway                       | \$ 5,800            |
| Erosion Control               | \$ 89,250           | Erosion Control               | \$ 113,250          | Drainage                      | \$ 46,000           |
| Drainage                      | \$ 116,200          | Drainage                      | \$ 211,900          | Pavement                      | \$ 34,505           |
| Pavement                      | \$ 473,600          | Pavement                      | \$ 829,140          | Traffic Control               | \$ 8,050            |
| Traffic Control               | \$ 32,000           | Traffic Control               | \$ 60,450           | Bridge Enhancements           | \$ 1,461,380        |
| Maintenance Of Traffic        | \$ 27,400           | Traffic Signals               | \$ 300,000          | Maintenance Of Traffic        | \$ 17,250           |
| Lighting                      | \$ 401,100          | Maintenance Of Traffic        | \$ 52,100           | Traffic Calming               | \$ 21,800           |
| Landscape                     | \$ 39,200           | Lighting                      | \$ 408,600          | Incidentals                   | \$ 27,500           |
| Incidentals                   | \$ 112,200          | Landscape                     | \$ 123,700          |                               |                     |
|                               |                     | Traffic Calming               | \$ 32,700           |                               |                     |
|                               |                     | Incidentals                   | \$ 230,300          |                               |                     |
| Subtotal                      | \$ 1,488,650        | Subtotal                      | \$ 2,993,940        | Subtotal                      | \$ 1,622,285        |
| 25% Contingency               | \$ 372,200          | 25% Contingency               | \$ 748,500          | 25% Contingency               | \$ 405,600          |
| 6.9% Inflation to 2023        | \$ 128,400          | 6.9% Inflation to 2023        | \$ 258,300          | 6.9% Inflation to 2023        | \$ 140,000          |
| <b>Subtotal Construction</b>  | <b>\$ 1,989,250</b> | <b>Subtotal Construction</b>  | <b>\$ 4,000,740</b> | <b>Subtotal Construction</b>  | <b>\$ 2,167,885</b> |
| MISCELLANEOUS                 |                     | MISCELLANEOUS                 |                     | MISCELLANEOUS                 |                     |
| Engineering                   | \$ 206,000          | Engineering                   | \$ 413,000          | Engineering                   | \$ 217,000          |
| Topographic Survey            | \$ 18,500           | Topographic Survey            | \$ 37,000           | Topographic Survey            | \$ 6,150            |
| Right of Way                  | \$ 15,000           | Right of Way                  | \$ 75,000           |                               |                     |
| Construction Inspection       | \$ 140,000          | Construction Inspection       | \$ 281,000          | Construction Inspection       | \$ 151,000          |
| <b>Subtotal Miscellaneous</b> | <b>\$ 379,500</b>   | <b>Subtotal Miscellaneous</b> | <b>\$ 806,000</b>   | <b>Subtotal Miscellaneous</b> | <b>\$ 374,150</b>   |
| <b>TOTAL</b>                  | <b>\$ 2,368,750</b> | <b>TOTAL</b>                  | <b>\$ 4,806,740</b> | <b>TOTAL</b>                  | <b>\$ 2,542,035</b> |

**CONCEPT #1 GRAND TOTAL = \$ 9,718,000**

## CONCEPT #2 - ROUNDABOUTS

| CITY OF ROCKY RIVER           |                     | CITY OF LAKEWOOD              |                     | BRIDGE                        |                     |
|-------------------------------|---------------------|-------------------------------|---------------------|-------------------------------|---------------------|
| CONSTRUCTION                  |                     | CONSTRUCTION                  |                     | CONSTRUCTION                  |                     |
| Roadway                       | \$ 197,700          | Roadway                       | \$ 1,147,400        | Roadway                       | \$ 5,750            |
| Erosion Control               | \$ 89,250           | Erosion Control               | \$ 113,250          | Drainage                      | \$ 46,000           |
| Drainage                      | \$ 116,200          | Drainage                      | \$ 211,900          | Pavement                      | \$ 34,500           |
| Pavement                      | \$ 473,570          | Pavement                      | \$ 1,297,700        | Traffic Control               | \$ 8,100            |
| Traffic Control               | \$ 32,000           | Traffic Control               | \$ 144,400          | Bridge Enhancements           | \$ 1,461,380        |
| Maintenance Of Traffic        | \$ 27,400           | Maintenance Of Traffic        | \$ 52,100           | Maintenance Of Traffic        | \$ 17,250           |
| Lighting                      | \$ 401,100          | Lighting                      | \$ 408,600          | Traffic Calming               | \$ 21,800           |
| Landscape                     | \$ 39,200           | Landscape                     | \$ 167,200          | Incidentals                   | \$ 27,500           |
| Incidentals                   | \$ 112,200          | Traffic Calming               | \$ 32,700           |                               |                     |
|                               |                     | Incidentals                   | \$ 308,300          |                               |                     |
| Subtotal                      | \$ 1,488,620        | Subtotal                      | \$ 3,883,550        | Subtotal                      | \$ 1,622,280        |
| 25% Contingency               | \$ 372,200          | 25% Contingency               | \$ 970,900          | 25% Contingency               | \$ 405,600          |
| 6.9% Inflation to 2023        | \$ 128,400          | 6.9% Inflation to 2023        | \$ 335,000          | 6.9% Inflation to 2023        | \$ 140,000          |
| <b>Subtotal Construction</b>  | <b>\$ 1,989,220</b> | <b>Subtotal Construction</b>  | <b>\$ 5,189,450</b> | <b>Subtotal Construction</b>  | <b>\$ 2,167,880</b> |
| MISCELLANEOUS                 |                     | MISCELLANEOUS                 |                     | MISCELLANEOUS                 |                     |
| Engineering                   | \$ 206,000          | Engineering                   | \$ 532,000          | Engineering                   | \$ 217,000          |
| Topographic Survey            | \$ 18,500           | Topographic Survey            | \$ 37,000           | Topographic Survey            | \$ 6,150            |
| Right of Way                  | \$ 15,000           | Right of Way                  | \$ 140,000          |                               |                     |
| Construction Inspection       | \$ 140,000          | Construction Inspection       | \$ 364,000          | Construction Inspection       | \$ 151,000          |
| <b>Subtotal Miscellaneous</b> | <b>\$ 379,500</b>   | <b>Subtotal Miscellaneous</b> | <b>\$ 1,073,000</b> | <b>Subtotal Miscellaneous</b> | <b>\$ 374,150</b>   |
| <b>TOTAL</b>                  | <b>\$ 2,368,720</b> | <b>TOTAL</b>                  | <b>\$ 6,262,450</b> | <b>TOTAL</b>                  | <b>\$ 2,542,030</b> |

**CONCEPT #2 GRAND TOTAL = \$ 11,173,000**

## Recommendations

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Elements of both Concept #1 and Concept #2 are recommended for improved safety of vehicles, pedestrians, and bicyclists. However, both Concept #1 and Concept #2 will remain as design options for further discussion during the final design phase of the project.

At the Clifton Boulevard/Lake Road intersection, a proposed roundabout is recommended as shown in Concept #2. Roundabouts provide improved safety with fewer conflict points for both vehicles and pedestrians, and provide a continuous but slower movement through intersections, reducing vehicle speed and delay as compared to signalized intersections. The roundabout at this location will also serve as a traffic calming measure since all vehicles must reduce their speed to maneuver through, as opposed to accelerating through a green light at a signalized intersection. Roundabout education, especially for young pedestrians and drivers, should be a high priority to address many residents' concerns as this newer intersection type becomes more commonplace in Northeast Ohio communities.

At the Clifton Boulevard/Clifton Road/West Clifton Boulevard intersection, stop controlled and signalized intersections are recommended as shown in Concept #1 due to pedestrian safety (better crosswalk positioning and shorter crosswalk lengths) and reduced right of way conflicts.

Other factors that will determine the final design include the initial cost of roundabout construction, which is greater due to additional Right of Way impacts and the larger pavement footprint. However, the long-term maintenance cost is lower than for signalized intersections. Also, the RTA bus station locations will not require relocation with Concept #1 but will required relocation with Concept #2 due to the roundabout influence area; further coordination with GCRTA will be necessary during final engineering design.

The redesign of Clifton Boulevard into a user-friendly experience for all modes of transportation will foster a stronger sense of connectivity between the two cities and stronger community for its residents.



## Appendices

# Appendix A

## Project Location Map



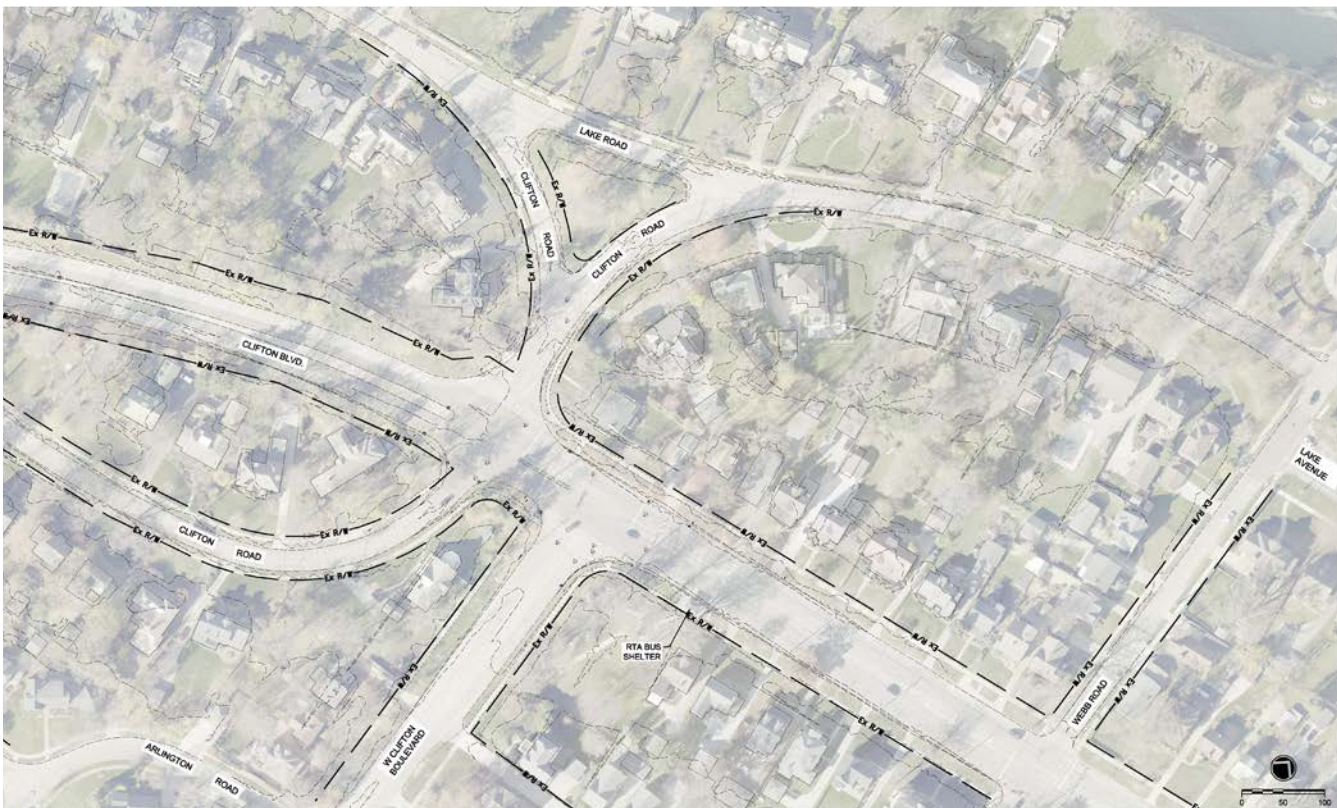
## Appendix B

### Existing Conditions Schematic Plan



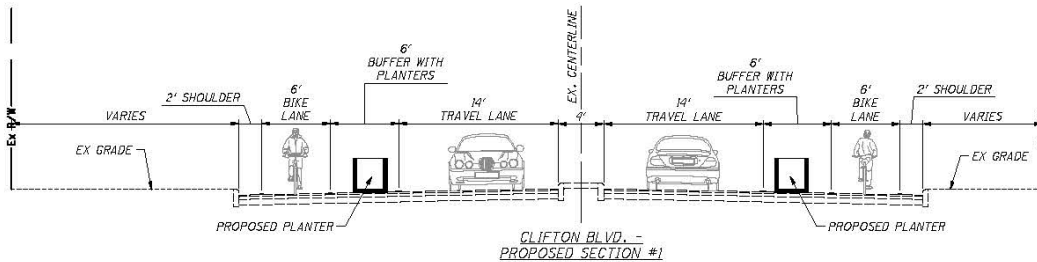
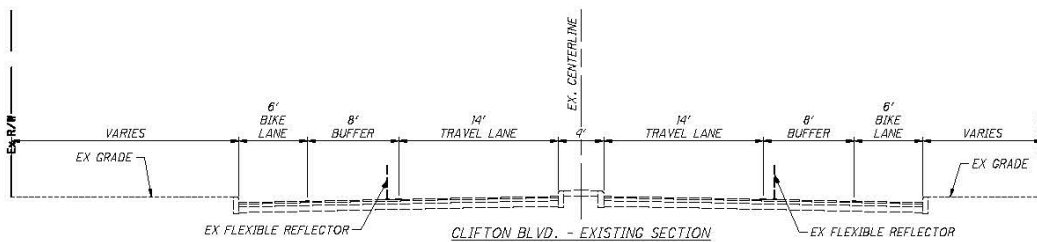
## Appendix B

### Existing Conditions Schematic Plan

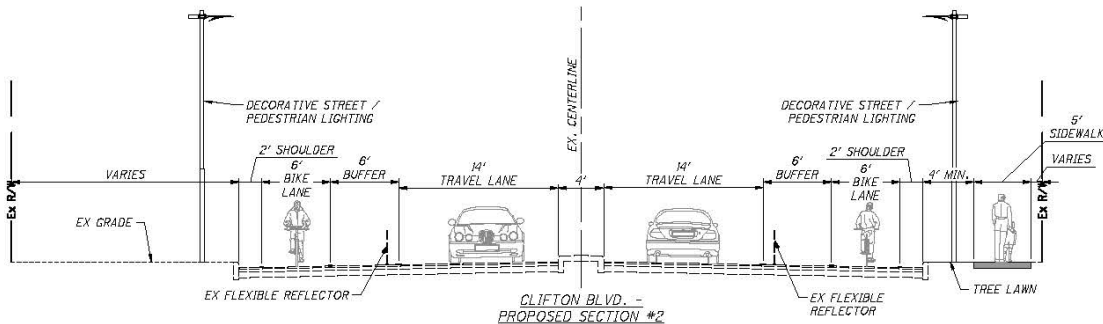


# Appendix C

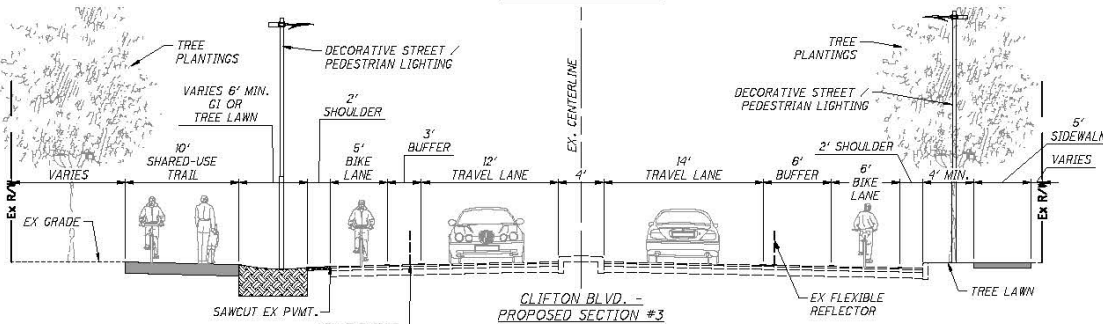
## Short-Term Alternatives Typical Sections



DESCRIPTION: ADD DECORATIVE PLANTERS WITHIN PAINTED BIKE LANE BUFFERS.



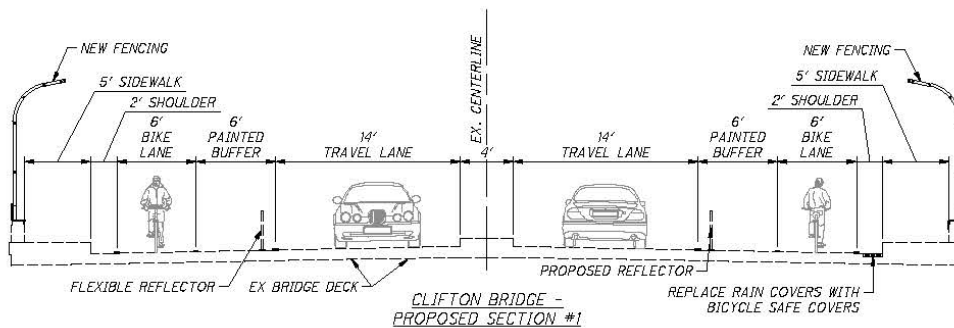
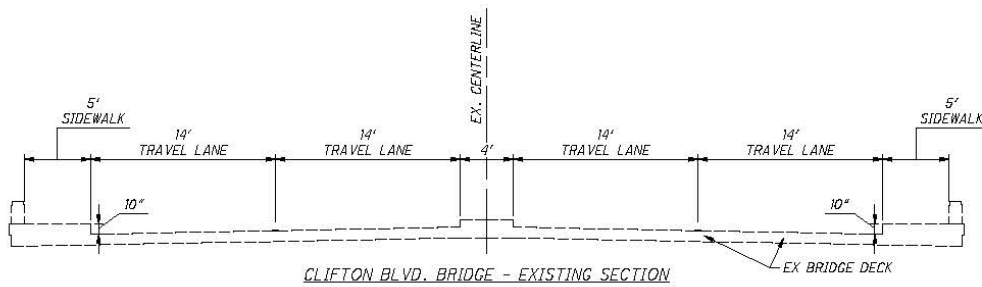
DESCRIPTION: ADD SIDEWALK ALONG SOUTH SIDE OF ROADWAY AND NEW ROADWAY / PEDESTRIAN LIGHTING.



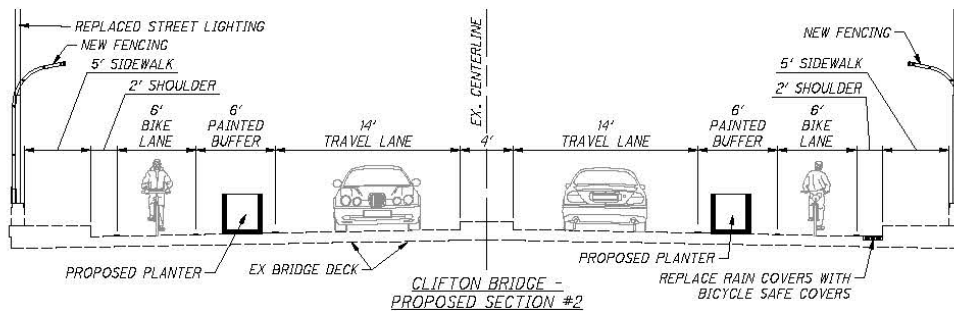
DESCRIPTION: ADD SHARED USE TRAIL ALONG NORTH SIDE OF ROADWAY BY REDUCING TRAVEL LANE AND BIKE LANE BUFFER WIDTHS INCORPORATE GREEN INFRASTRUCTURE BETWEEN ROADWAY AND SHARED USE TRAIL. ADD TREE PLANTINGS IN NEW TREE LAWNS.

# Appendix C

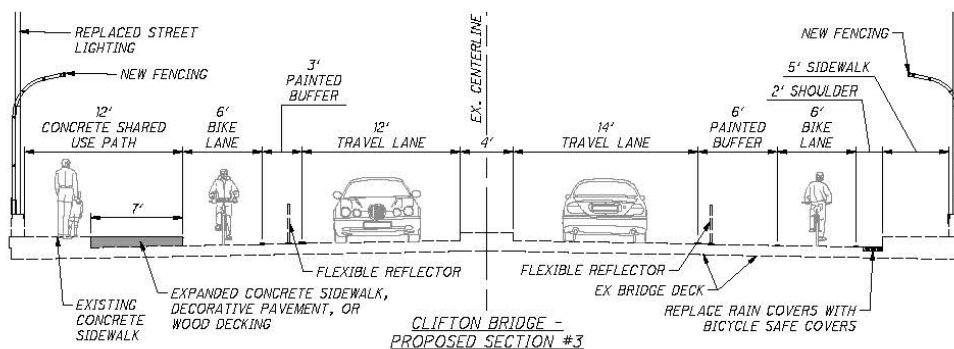
## Short-Term Alternatives Typical Sections



DESCRIPTION: TRANSFORM OUTSIDE TRAVEL LANES TO PROTECTED BIKE LANES, WITH PAINTED BUFFER.



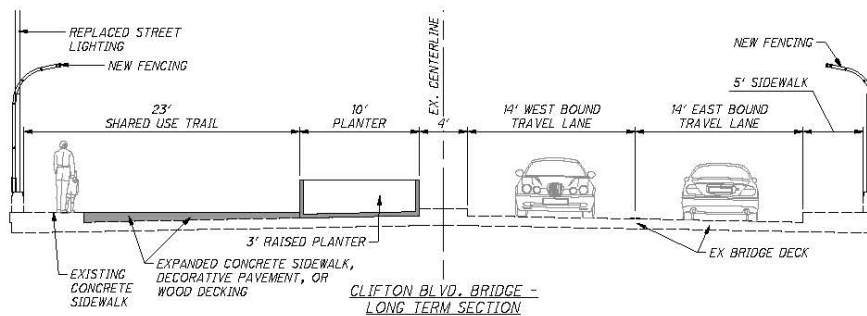
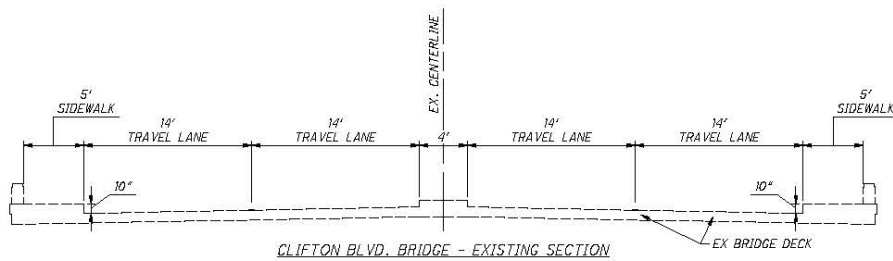
DESCRIPTION: TRANSFORM OUTSIDE TRAVEL LANES TO PROTECTED BIKE LANES, WITH PAINTED BUFFER AND DECORATIVE PLANTER UNITS.



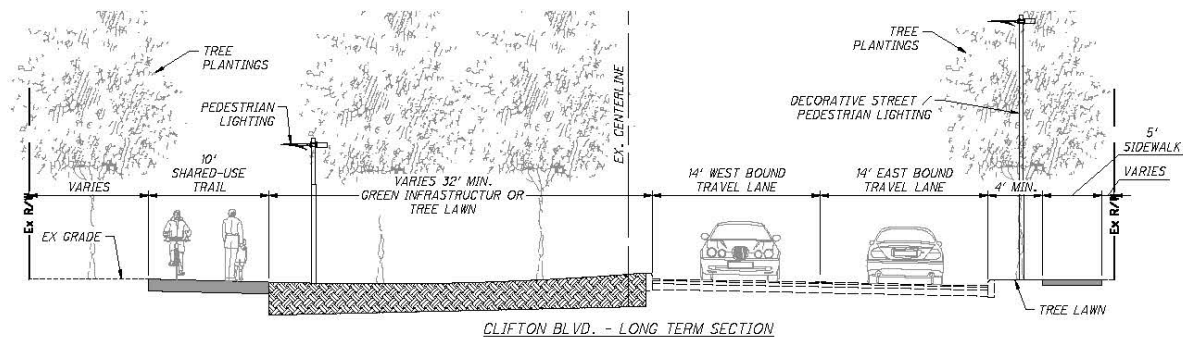
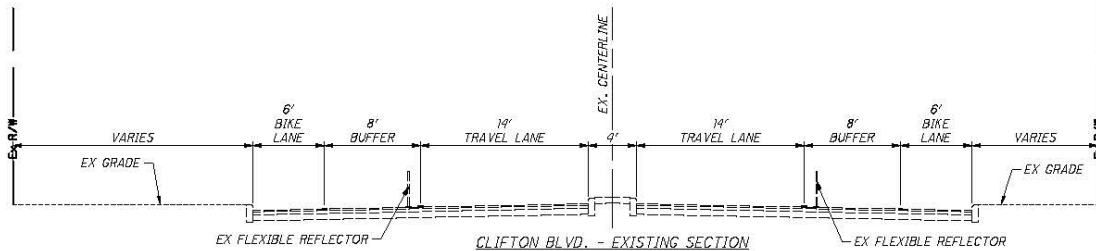
DESCRIPTION: TRANSFORM EASTBOUND TRAVEL LANE TO PROTECTED BIKE LANES, WITH PAINTED BUFFER. TRANSFORM WESTBOUND TRAVEL LANE TO PROTECTED BIKE LANES, WITH PAINTED BUFFER AND EXPAND EXISTING SIDEWALK TO CREATE SHARED USE PATH ALONG NORTH SIDE OF BRIDGE.

# Appendix D

## Long-Term Alternative Typical Sections



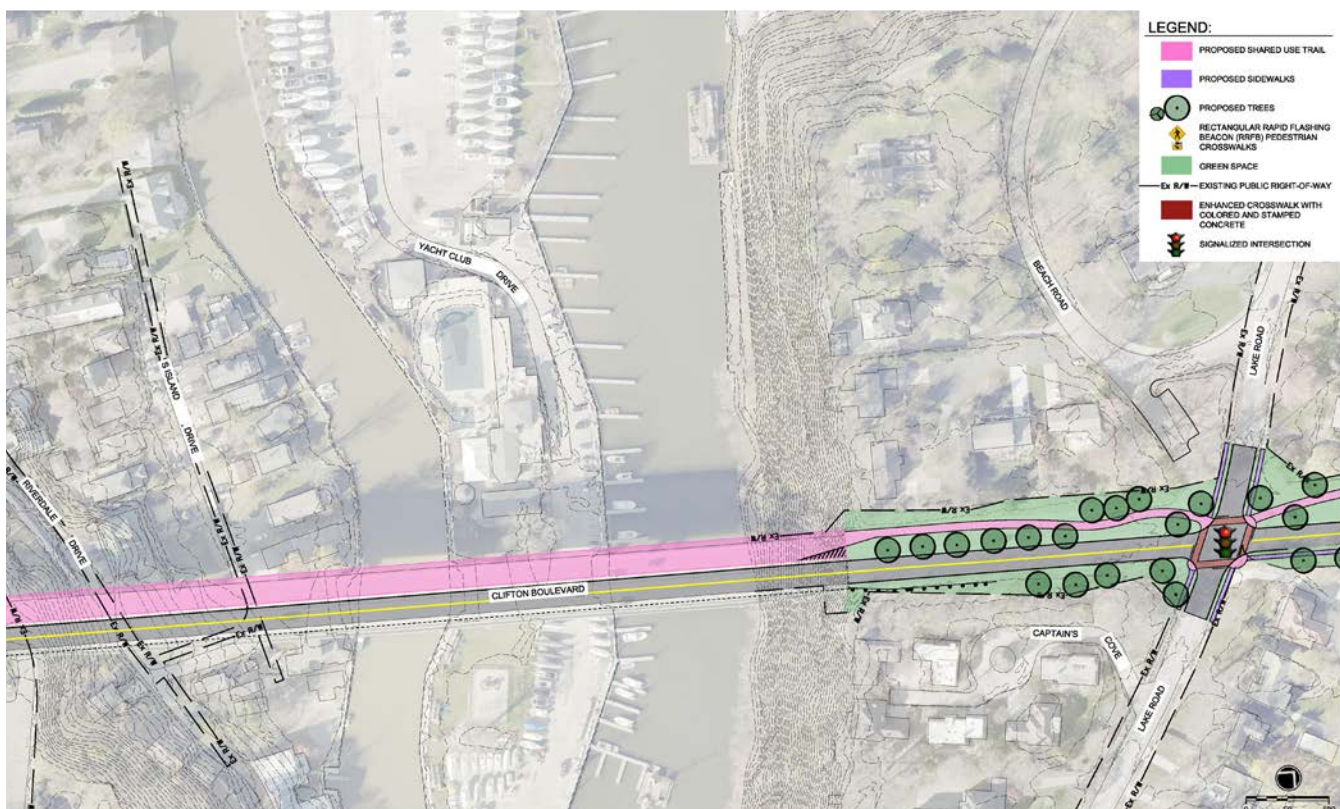
DESCRIPTION: REDUCE 4 TRAVEL LANES TO 2, AND RE-LOCATE TO SOUTH SIDE OF BRIDGE. PROVIDE RAISED PLANTER BETWEEN TRAVEL LANES AND ENLARGED SHARED USE TRAIL



DESCRIPTION: RE-LOCATE TRAVEL LANES TO SOUTH SIDE OF ROADWAY. PROVIDE LANDSCAPE BUFFER BETWEEN TRAVEL LANES AND SHARED USE TRAIL. ADD PEDESTRIAN LIGHTING ALONG SHARED USE TRAIL.

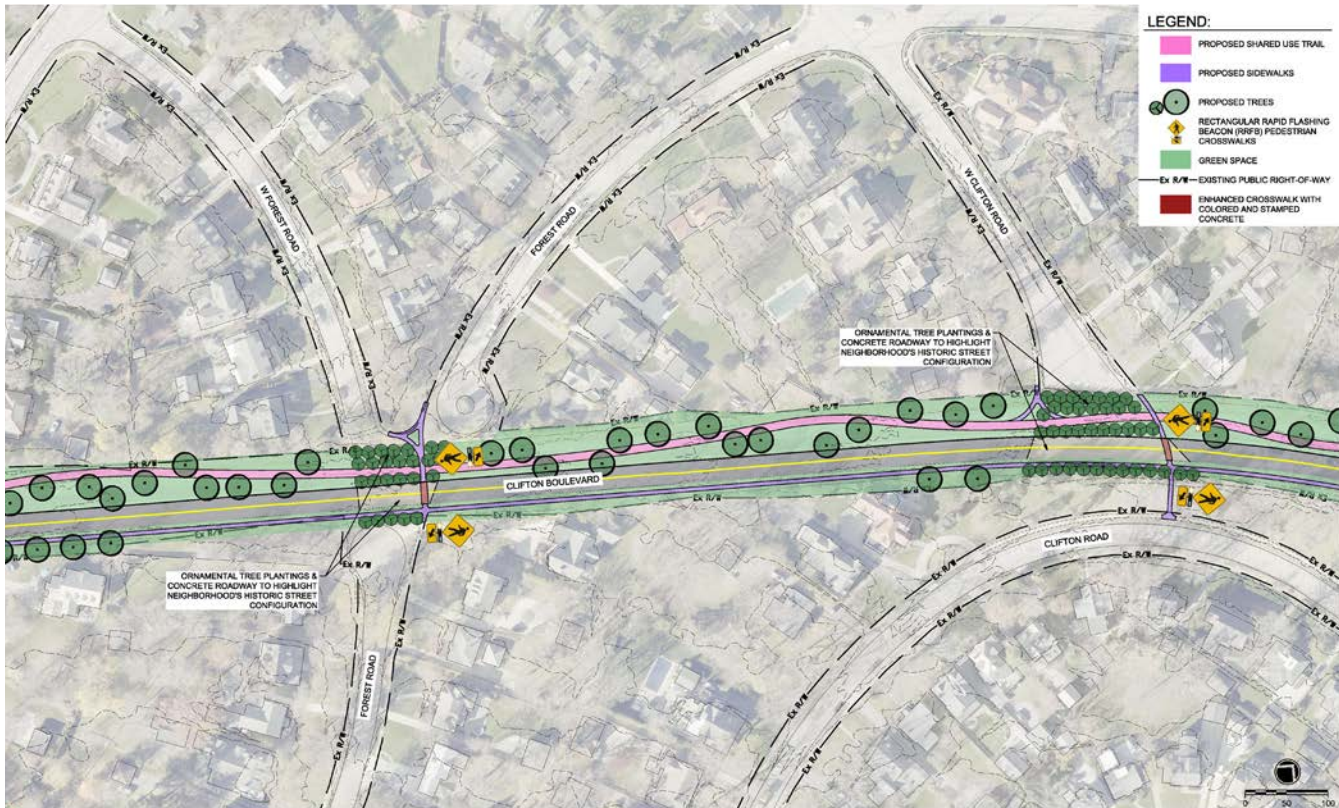
# Appendix E

## Preliminary Concept #1 Schematic Plans



# Appendix E

## Preliminary Concept #1 Schematic Plans



## Appendix E

### Preliminary Concept #2 Schematic Plans



# Appendix E

## Preliminary Concept #2 Schematic Plans



## Appendix F

### Level of Service Criteria and Analysis

**Table 1 – Level of Service Criteria for Signalized Intersections**

| Level of Service | Average Delay/Vehicle (seconds) | Description   |
|------------------|---------------------------------|---|
| A                | Less than or equal to 10        | Most vehicles do not stop at all. Most arrive during the green phase. Little or no delay.                       |
| B                | > 10 to 20                      | More vehicles stop than for LOS A. Still good progression through lights. Short traffic delays.                 |
| C                | > 20 to 35                      | Significant numbers of vehicles stop, although many pass through without stopping.                              |
| D                | > 35 to 55                      | Many vehicles stop. Individual signal cycle failures are noticeable. Progression is intermittent.               |
| E                | > 55 to 80                      | Considered to be the limit of acceptable delay. Individual cycle failures are frequent and progression is poor. |
| F                | >80                             | Extreme and unacceptable traffic delays.  |

Source: Transportation Research Board, Highway Capacity Manual

**Table 2 – Level of Service General Operating Conditions for a Corridor**

| Level of Service | Description   |
|------------------|---|
| A                | Free flow, with low volumes and high speeds.  |
| B                | Reasonably free flow, but speeds beginning to be restricted by traffic conditions.      |
| C                | Stable flow, but most drivers are restricted in the freedom to select their own speeds. |
| D                | Approaching unstable flow; drivers have little freedom to select their own speeds.      |
| E                | Approaching unstable flow; drivers have little freedom to select their own speeds.      |
| F                | Forced or breakdown flow; unacceptable congestion; stop-and-go.                         |

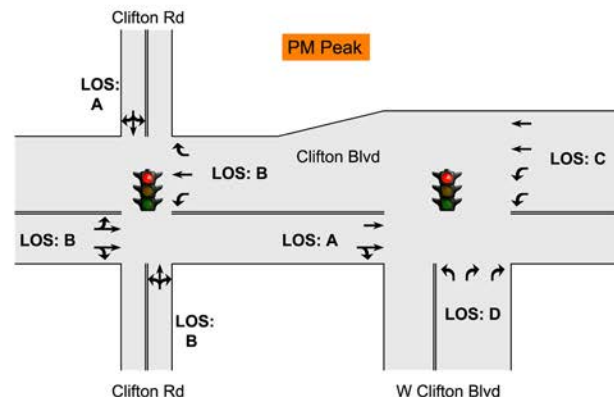
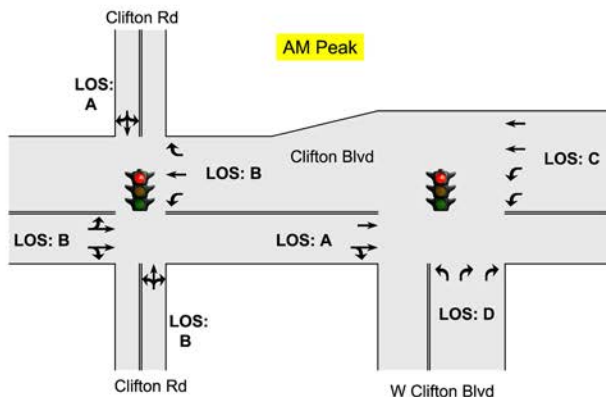
# Appendix F

## Level of Service Criteria and Analysis

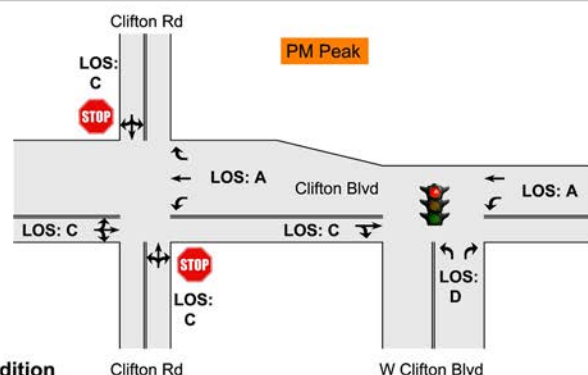
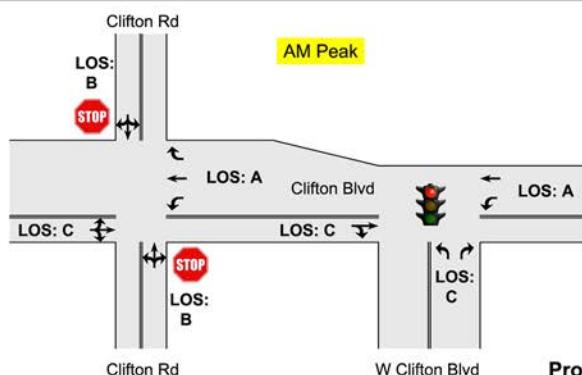
### Preliminary Concept #1

| 2022/2042 No-Build Condition |                   |                  |     |           |     |                |                  |     |           |     |           |
|------------------------------|-------------------|------------------|-----|-----------|-----|----------------|------------------|-----|-----------|-----|-----------|
| Location                     | Approach/Movement | AM Peak Period   |     |           |     | PM Peak Period |                  |     |           |     |           |
|                              |                   | Cycle Length (s) | LOS | Delay (s) | LOS | Delay (s)      | Cycle Length (s) | LOS | Delay (s) | LOS | Delay (s) |
| Clifton Blvd/W Clifton Blvd  | EB                | 80               | A   | 5.9       | B   | 17.4           | 80               | A   | 4.2       | C   | 22.3      |
|                              | WB                |                  | C   | 21.5      |     |                |                  | C   | 26.7      |     |           |
|                              | NB                |                  | D   | 35.5      |     |                |                  | D   | 44.9      |     |           |
| Clifton Blvd/Clifton Rd      | EB                | 80               | B   | 19.9      | B   | 16.0           | 80               | B   | 18.2      | B   | 18.5      |
|                              | WB                |                  | B   | 12.0      |     |                |                  | B   | 19.9      |     |           |
|                              | NB                |                  | B   | 13.2      |     |                |                  | B   | 16.4      |     |           |
|                              | SB                |                  | A   | 5.8       |     |                |                  | A   | 8.1       |     |           |

| 2022/2042 Build Condition                         |                   |                  |     |           |     |                |                  |     |           |     |           |
|---|-------------------|------------------|-----|-----------|-----|----------------|------------------|-----|-----------|-----|-----------|
| Location  | Approach/Movement | AM Peak Period   |     |           |     | PM Peak Period |                  |     |           |     |           |
|   |                   | Cycle Length (s) | LOS | Delay (s) | LOS | Delay (s)      | Cycle Length (s) | LOS | Delay (s) | LOS | Delay (s) |
| Clifton Blvd/W Clifton Blvd (Signalized)          | EB                | 75               | C   | 22.1      | B   | 17.2           | 75               | C   | 25.4      | B   | 17.5      |
|   | WB                |                  | A   | 3.4       |     |                |                  | A   | 6.6       |     |           |
|   | NB                |                  | C   | 34.0      |     |                |                  | D   | 38.4      |     |           |
| Clifton Blvd/Clifton Rd (Two-Way Stop Controlled) | EB                | N/A              | A   | 0.0       | A   | 1.2            | N/A              | A   | 0.0       | A   | 1.5       |
|   | WB                |                  | A   | 0.2       |     |                |                  | A   | 0.1       |     |           |
|   | NB                |                  | B   | 15.8      |     |                |                  | C   | 20.1      |     |           |
|   | SB                |                  | B   | 14.8      |     |                |                  | C   | 20.9      |     |           |



Existing Condition



Proposed Condition  
Concept #1 (Signalized)

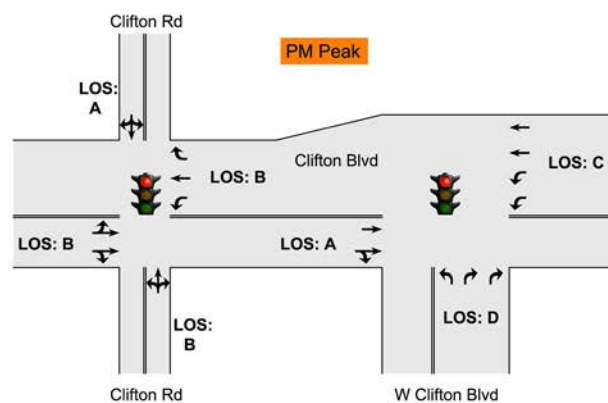
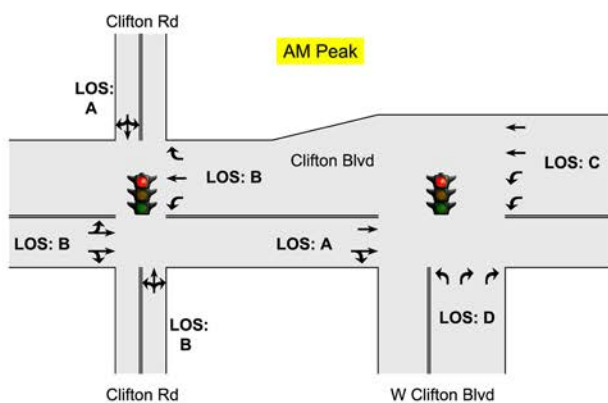
# Appendix F

## Level of Service Criteria and Analysis

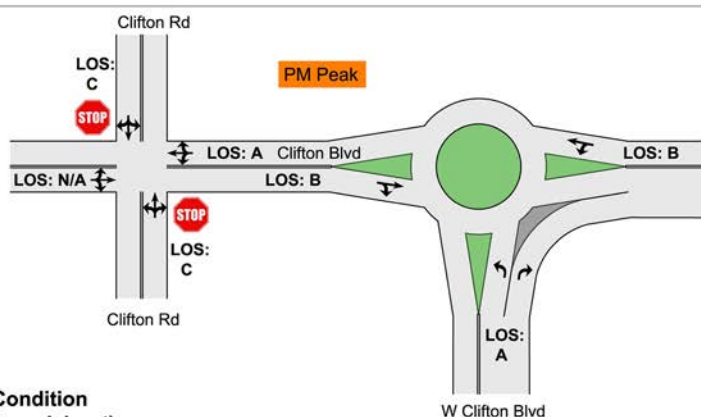
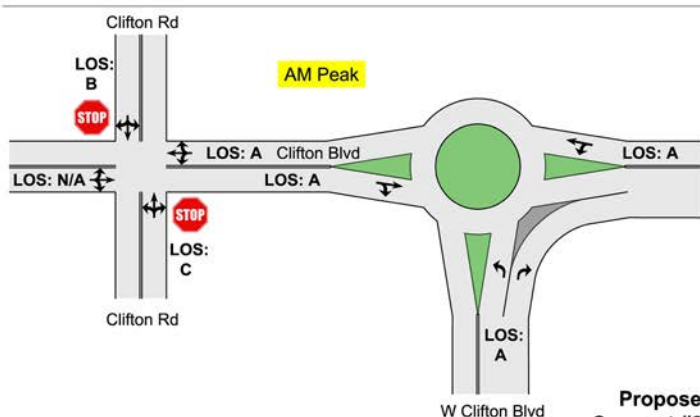
### Preliminary Concept #2

| 2022/2042 No-Build Condition |                   |                  |     |           |     |                |                  |     |           |     |           |
|------------------------------|-------------------|------------------|-----|-----------|-----|----------------|------------------|-----|-----------|-----|-----------|
| Location                     | Approach/Movement | AM Peak Period   |     |           |     | PM Peak Period |                  |     |           | LOS | Delay (s) |
|                              |                   | Cycle Length (s) | LOS | Delay (s) | LOS | Delay (s)      | Cycle Length (s) | LOS | Delay (s) |     |           |
| Clifton Blvd/W Clifton Blvd  | EB                | 80               | A   | 5.9       | B   | 17.4           | 80               | A   | 4.2       | C   | 22.3      |
|                              | WB                |                  | C   | 21.5      |     |                |                  | C   | 26.7      |     |           |
|                              | NB                |                  | D   | 35.5      |     |                |                  | D   | 44.9      |     |           |
| Clifton Blvd/Clifton Rd      | EB                | 80               | B   | 19.9      | B   | 16.0           | 80               | B   | 18.2      | B   | 18.5      |
|                              | WB                |                  | B   | 12.0      |     |                |                  | B   | 19.9      |     |           |
|                              | NB                |                  | B   | 13.2      |     |                |                  | B   | 16.4      |     |           |
|                              | SB                |                  | A   | 5.8       |     |                |                  | A   | 8.1       |     |           |

| 2022/2042 Build Condition                         |                   |                |           |     |           |                |           |     |           |
|---|-------------------|----------------|-----------|-----|-----------|----------------|-----------|-----|-----------|
| Location  | Approach/Movement | AM Peak Period |           |     |           | PM Peak Period |           |     |           |
|   |                   | LOS            | Delay (s) | LOS | Delay (s) | LOS            | Delay (s) | LOS | Delay (s) |
| Clifton Blvd/W Clifton Blvd (Roundabout)          | EB                | A              | 9.0       | A   | 6.5       | B              | 10.4      | A   | 9.6       |
|   | WB                | A              | 6.7       |     |           | B              | 11.8      |     |           |
|   | NB                | A              | 5.4       |     |           | A              | 4.7       |     |           |
| Clifton Blvd/Clifton Rd (Two-Way Stop Controlled) | EBLT              | N/A            | N/A       | A   | 1.2       | N/A            | N/A       | A   | 1.5       |
|   | WBLT              | A              | 8.5       |     |           | A              | 0.0       |     |           |
|   | NB                | C              | 15.7      |     |           | C              | 19.0      |     |           |
|   | SB                | B              | 14.9      |     |           | C              | 20.6      |     |           |

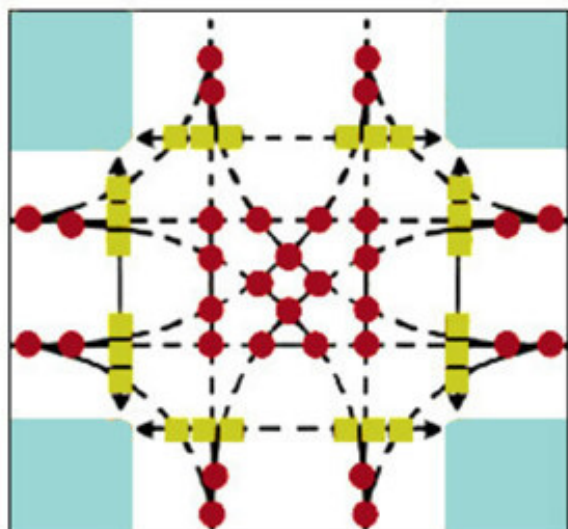


Existing Condition



Proposed Condition  
Concept #2 (Roundabout)

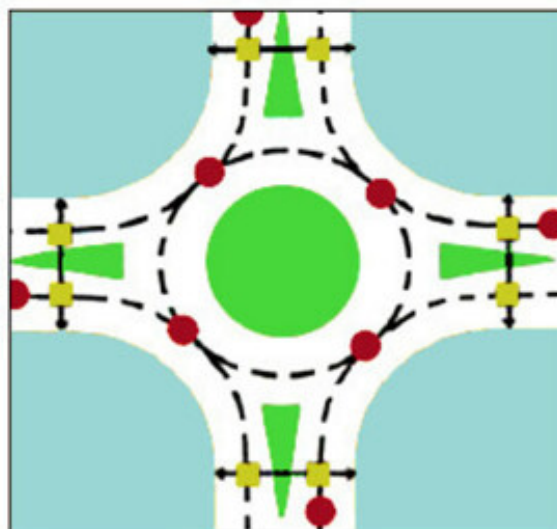
## Intersection



● 32 Vehicle conflicts

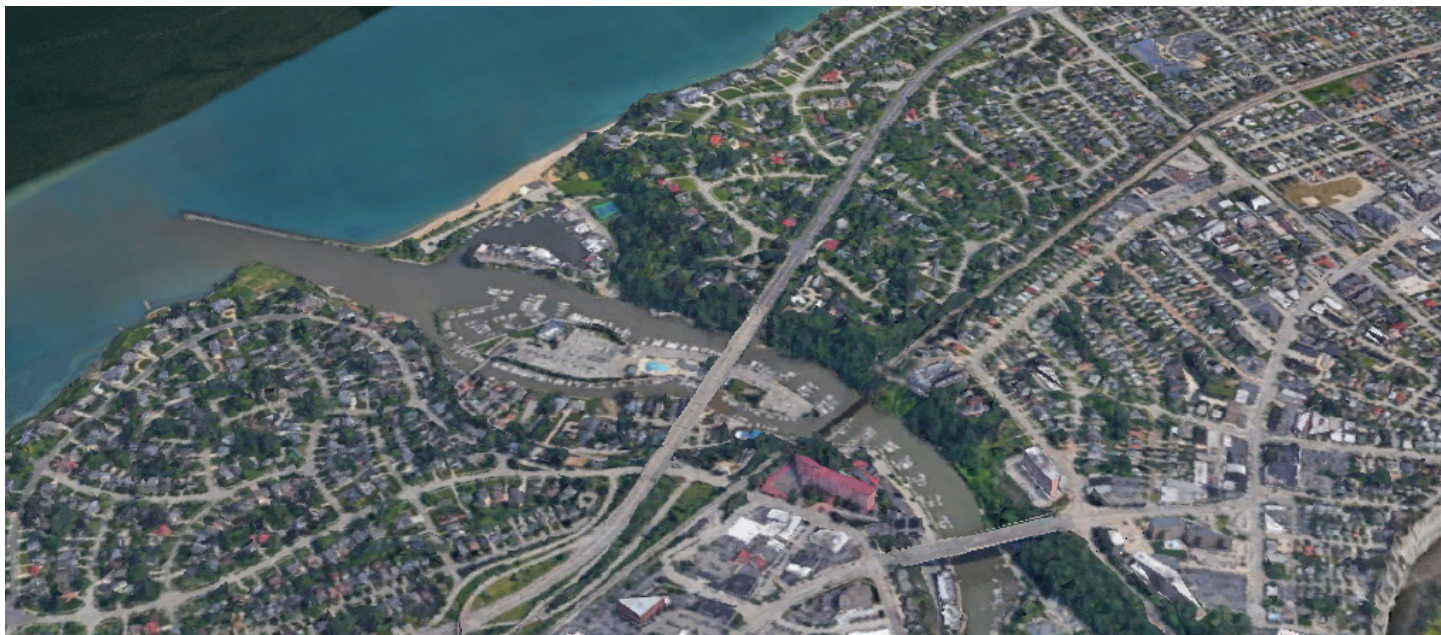
■ 24 Pedestrian conflicts

## Roundabout



● 8 Vehicle conflicts

■ 8 Pedestrian conflicts



## Clifton Boulevard / Lake Road Enhancements

Public Meeting - Presentation

October 12th, 6:30 PM, Horace Mann Elementary



Full presentation can be viewed at:

<https://www.countyplanning.us/projects/community-confluence/>

# Appendix I

## Public Meeting Comments Summary

### Clifton Boulevard Public Meeting 10.12.2021 Public Comments Summary

#### Concept 1

Speed limit? Children crossing?  
Emrae on elementary school does not have a crosswalk north to south inside a school zone. So- who should get one of their super cool crossing things? 2nd graders or rich people walking their dogs  
Lanes that reduce vehicle speeds  
Traffic calming  
Install islands at both ends of the bridge  
Reduce speed  
Happy to learn Marion ramp to Detroit will continue  
Concerned about timing of this project eliminating lanes between cities while Hilliard bridge is going to re-built

#### Concept 2

Slow down traffic

#### Both Concepts

What happens at Linda w/ bikes?  
Support bike infrastructure- Once a biker reaches Rocky River, only a narrow footpath connects to residential streets. I don't dare bike the Marion ramp!

#### Concept 1

Speed  
Concerned about timing of this project which narrows  
Traffic calming  
Am concerned in bridge if EMS can get through. Also, landscaping trucks?  
Reduce speed  
Traffic calming before and after bridge  
Install islands at both ends of the bridge  
Lanes that reduce speed of vehicles  
Sidewalk closer to Lake Road  
Great concepts thank you!  
Like bridge with area to see lake

#### Concept 2

Reduce to 2 lanes of traffic on bridge  
Slow down traffic  
Green space! Yay  
Love circle idea  
Not concerned about a Bay Village person's commute time to downtown  
Police enforcement of existing traffic speeds  
Reduce speed across bridge  
Provide actuated/RRFB pedestrian crossings

#### Both Concepts

Safer ped x-ings  
We were delighted to read that someone is finally thinking about creating a bike friendly way to cross the Rocky River! Bike riding over the Clifton Bridge is unnerving! The sidewalk is narrow, and frequently windy.  
Rocky River's section of Lake Road is very bike unfriendly! My husband and I live in Clifton Park, and we love Lakewood's new Lake Road bike trail and use it regularly. It's so pleasant to bike to Wendy Park, Edgewater, etc. We avoid biking westbound because crossing the Rocky River is so unpleasant.  
Four lanes of traffic travel across the bridge at speeds well in excess of the speed limit  
We would love to see the Clifton Bridge become more bike friendly!  
I agree. When riding East from Rocky River, the "ramp" entrance for bikers is dangerous. It is scary trying to get across that span. It has kept me from riding through that area. It would be awesome if they could put in a bike lane all the way to Huntington Beach!  
Alleluia thank goodness for someone finally looking at the bridge which shouldn't be two lanes. I love the concept of taking one side for pedestrians / bikers and other side for traffic over the bridge. Currently it causes me anxiety knowing my children ride their bikes across the bridge 1 foot high off on sidewalk that is tenuous to cross due to being so narrow- forget about if you have someone traveling in the opposite direction- complete cluster f.

|                                     |
|-------------------------------------|
| Speed                               |
| Pedestrian crossing                 |
| Traffic calming (islands / medians) |
| Green space                         |
| Support concept                     |
| Concerns                            |

# Appendix I

## Public Meeting Comments Summary

### Concept 1

Make crossing safe for pedestrians  
Slow down traffic  
Connections between neighborhoods north-south a major benefit!  
Like the dedicated walk/bike lanes

### Concept 2

Great to connect the neighborhood  
Slow down traffic  
Love this  
25 mph maintain drive on Lake  
Pure fantasy the someone will stop at phony \$30K fake traffic light

### Both Concepts

Consider small median islands at crosswalks  
Safe ped x-ings

### Speed

Pedestrian crossing  
Traffic calming (islands / medians)  
Green space  
Support concept  
Concerns

### Concept 1

W. Clifton must be one lane south between Clifton and Arlington  
Like this better safer for ped crossing  
Walkers are important. They need to cross easy.  
Eliminate a lane on Clifton Blvd all the way to CLE  
I like this one  
2 reasons against roundabout- Clifton Rd changed to stop signs is good but would be irratic to pull out to traffic, lots of kids especially little ones need crossing  
Love this concept

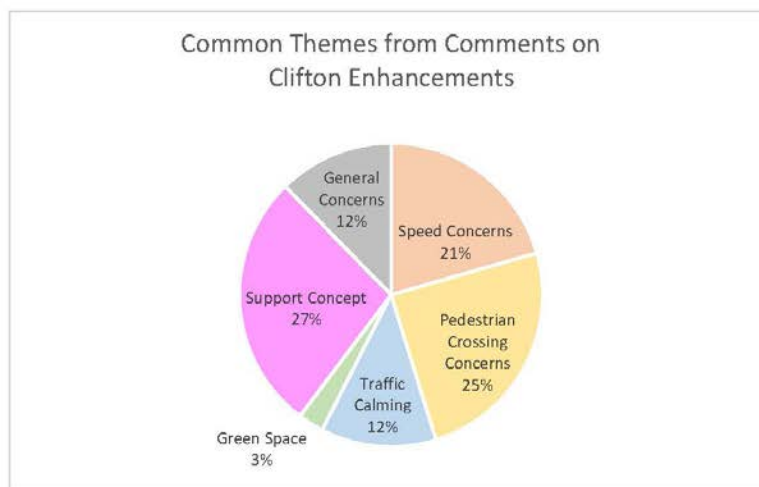
### Concept 2

Slow traffic! Don't worry about commuters  
School zones on Clifton Blvd are not long enough this is priority over reduced commute times  
I am not concerned about how long some guy from Bay Village in his BMW sits at a light at Clifton and Clifton  
Don't like not safe for pedestrian crossing  
Love circle idea  
W. Clifton must be one lane south between Clifton and Arlington  
Geometry of northbound vehicle entrance to roundabout is dangerous  
No slip lane- agree!  
Absolutely no slip lane  
I like this one  
Reduce speed east/west, cars/motorcycles are flying through, noise is awful  
North/south pedestrian traffic must also be safe for the neighborhood  
Doesn't work for cars on Clifton Rd going S or N across Clifton Blvd extension  
Circle concept is great! Efficient, safer, more green space  
Love this concept  
No left turn  
Not concerned about Bay Village person's commute time!  
Concept #2 if ped safety can be assured  
Seems to require 6 or 7 crossing guards  
No breaks in traffic for people crossing b/w W Clifton and Webb  
I have a bit of anxiety and concern around the roundabouts for Clifton in the Clifton Park area. I know a ton of kids ride their bikes to/from school, friends, etc. Americans don't know how to navigate roundabouts so well – in Europe/UK these are common place. Roundabouts are just starting to take off here in US. I do love them as are very efficient to manage traffic. However, my concern with the Clifton roundabouts is ability of pedestrians and bikers to cross. I've been witness to down at Edgewater where they placed roundabouts at entrance/exit and those drivers don't stop to let you cross. It becomes a safety issue – unless you had those pedestrian crossing signs that require drivers to allow pedestrians to cross.

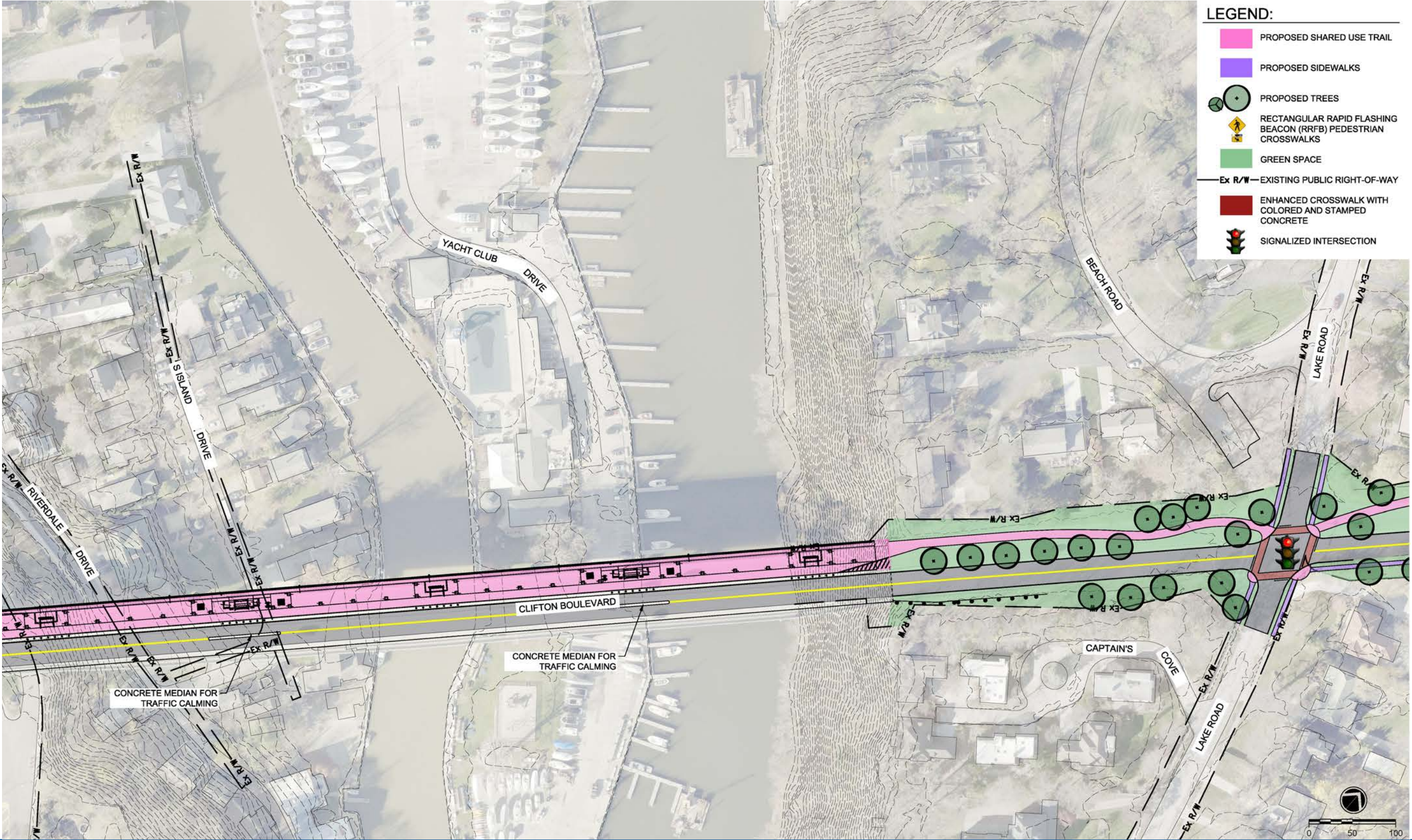
# Appendix I

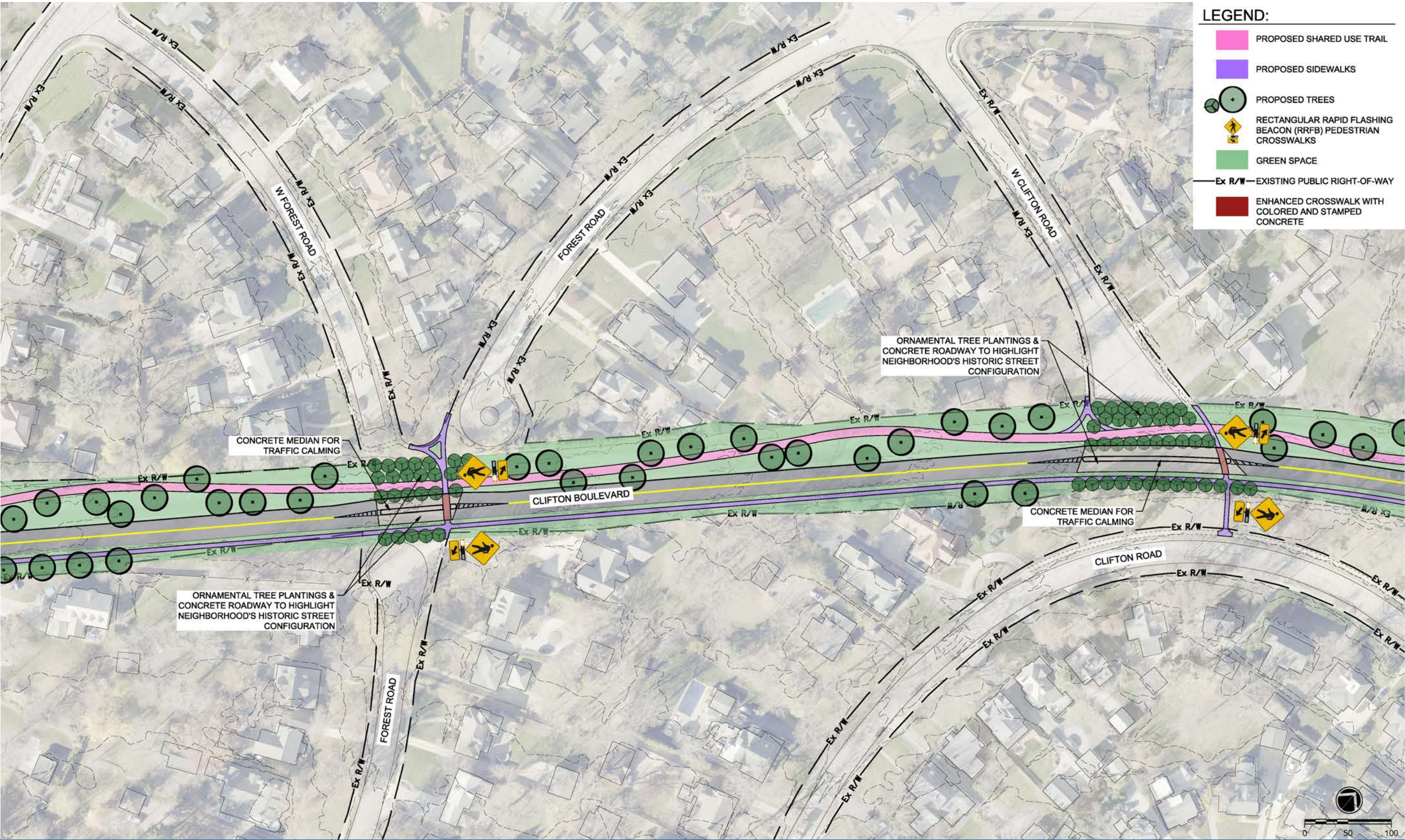
## Public Meeting Comments Summary

|                                       | #  | %   |
|---------------------------------------|----|-----|
| Total Comments                        | 72 |     |
| Support Concept 1                     | 7  | 10% |
| Support Concept 2                     | 9  | 13% |
| Support Both Concepts                 | 12 | 17% |
| Speed Concerns                        | 15 | 21% |
| Pedestrian Crossing Concerns          | 18 | 25% |
| Traffic Calming                       | 9  | 13% |
| Green Space                           | 2  | 3%  |
| Support Concept                       | 20 | 28% |
| General Concerns                      | 9  | 13% |
| -project timing & slip lane in plan 4 |    |     |



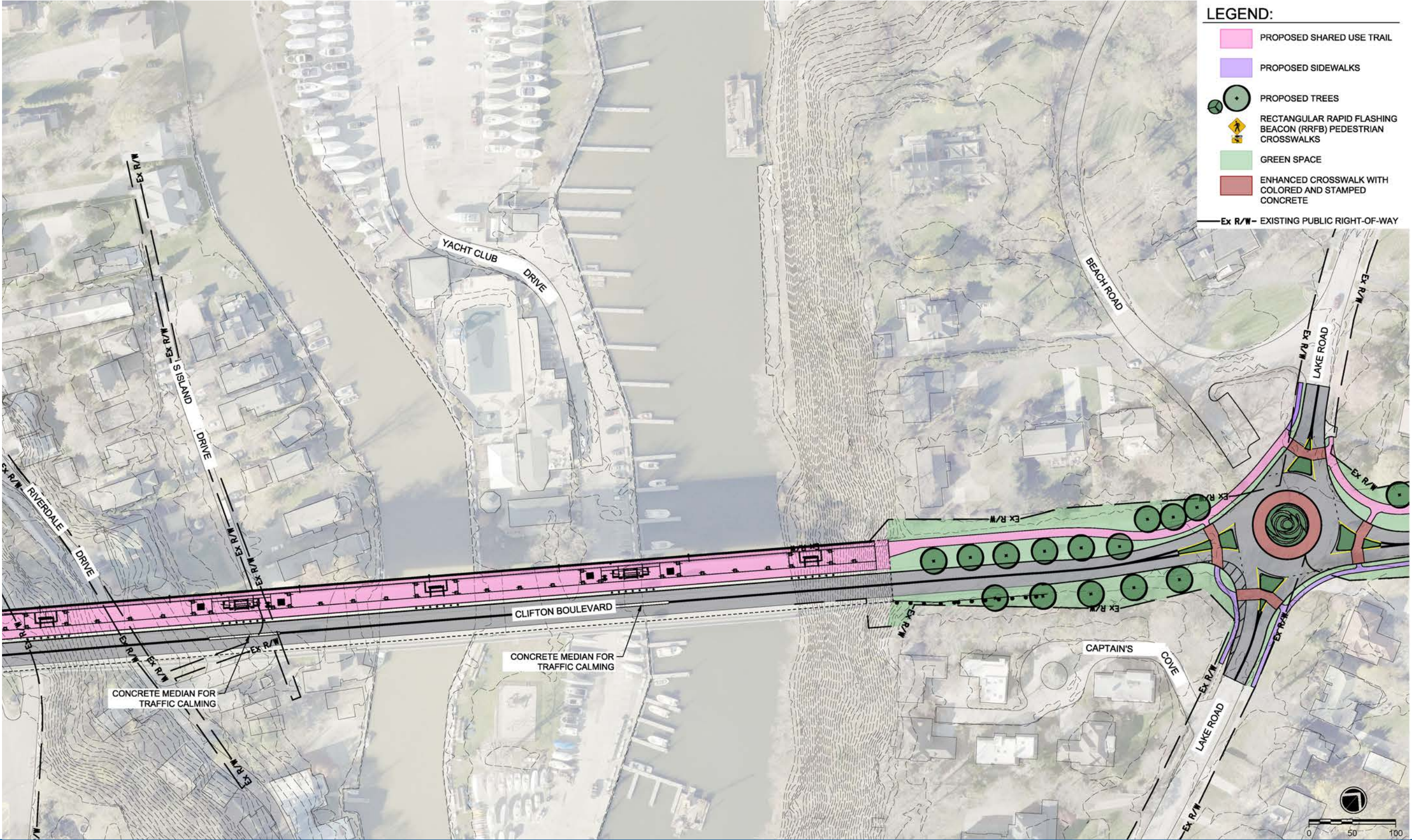




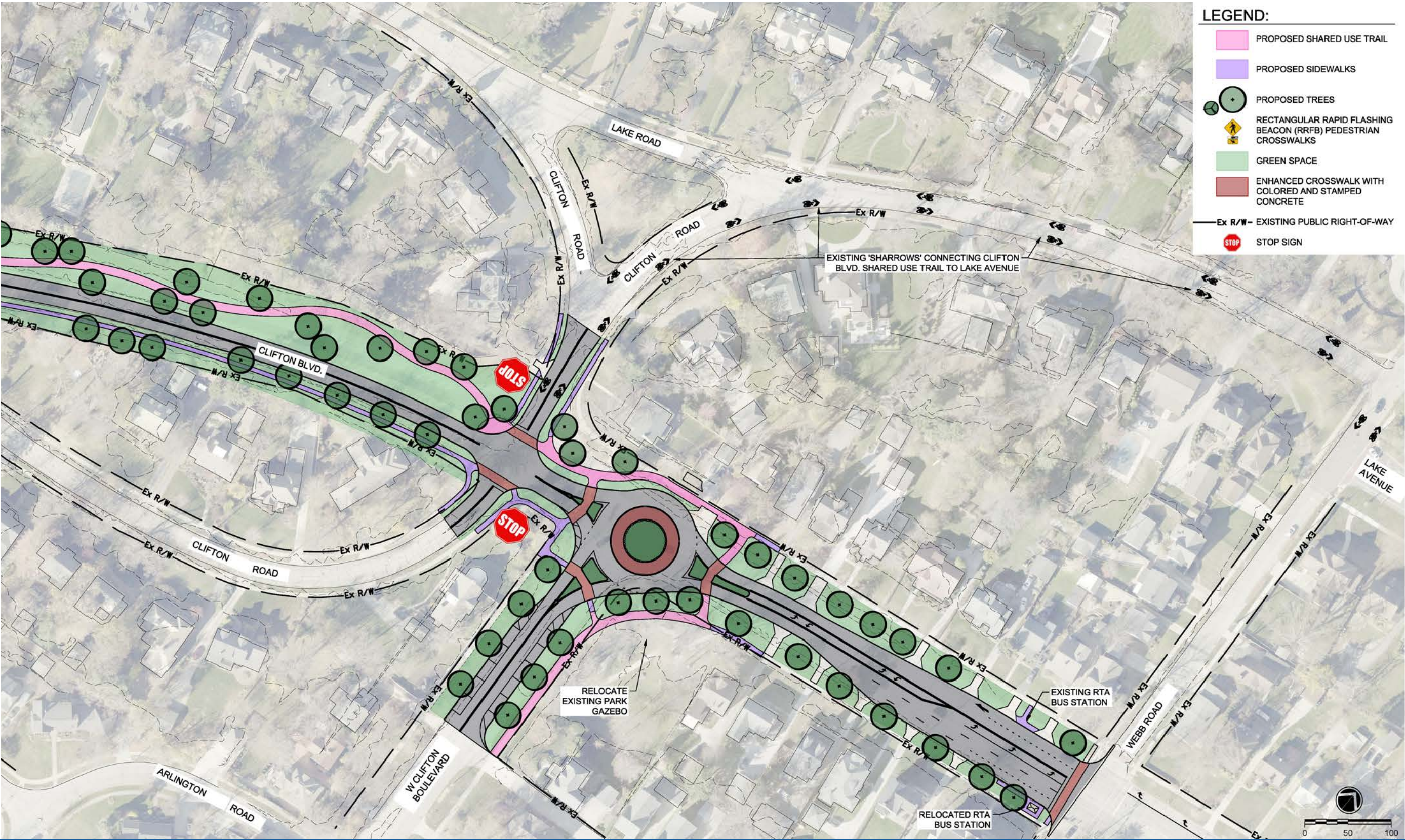












## Appendix J

### Overall Bridge Enhancements

Before



After



## Appendix J

### Bridge Primary Node Enhancements

Before



After



## Appendix J

### Bridge Secondary Node Enhancements

Before



After



## Appendix J

### Gateway Roundabout

Before



After



## Appendix J

### Mid Block Crossing

Before



After



## Appendix J

### Gateway Roundabout

Before



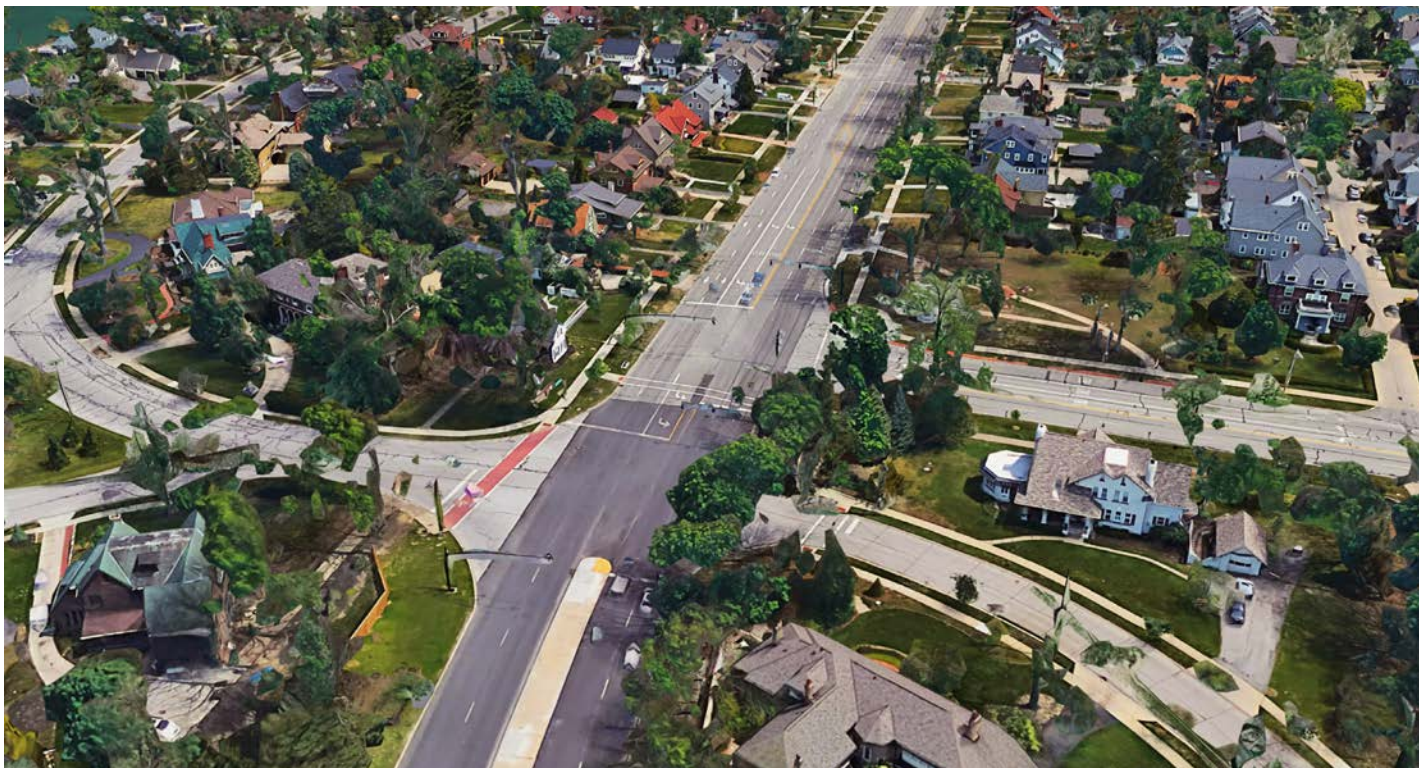
After



## Appendix J

### W. Clifton Boulevard Roundabout

Before



After



## Appendix J

### W. Clifton Boulevard Roundabout

Before



After



# Appendix K

## Right of Way Summary of Impacts

### Right of Way Impacts along Clifton Blvd

| Concept #1 - Right of Way Summary of Impacts |  |                |  |
|--|--|----------------|--|
| Impact #                                     | Location                                   | Condition      | Notes  |
| 1  | Lake Road intersection, SE corner          | Permanent Take | Proposed curb ramp and sidewalk (possible existing R/W encroachment) |
| 2  | Forest Road pedestrian crossing, SW corner | Permanent Take | Proposed sidewalk  |
| 3  | Clifton Road intersection, SW corner       | Permanent Take | Proposed sidewalk (possible existing R/W encroachment)               |
| 4  | Clifton Road intersection, NW corner       | Driveway       | Driveway to be reconstructed   |
| 5  | Clifton Road intersection, NW corner       | Permanent Take | Proposed sidewalk (possible existing R/W encroachment)               |

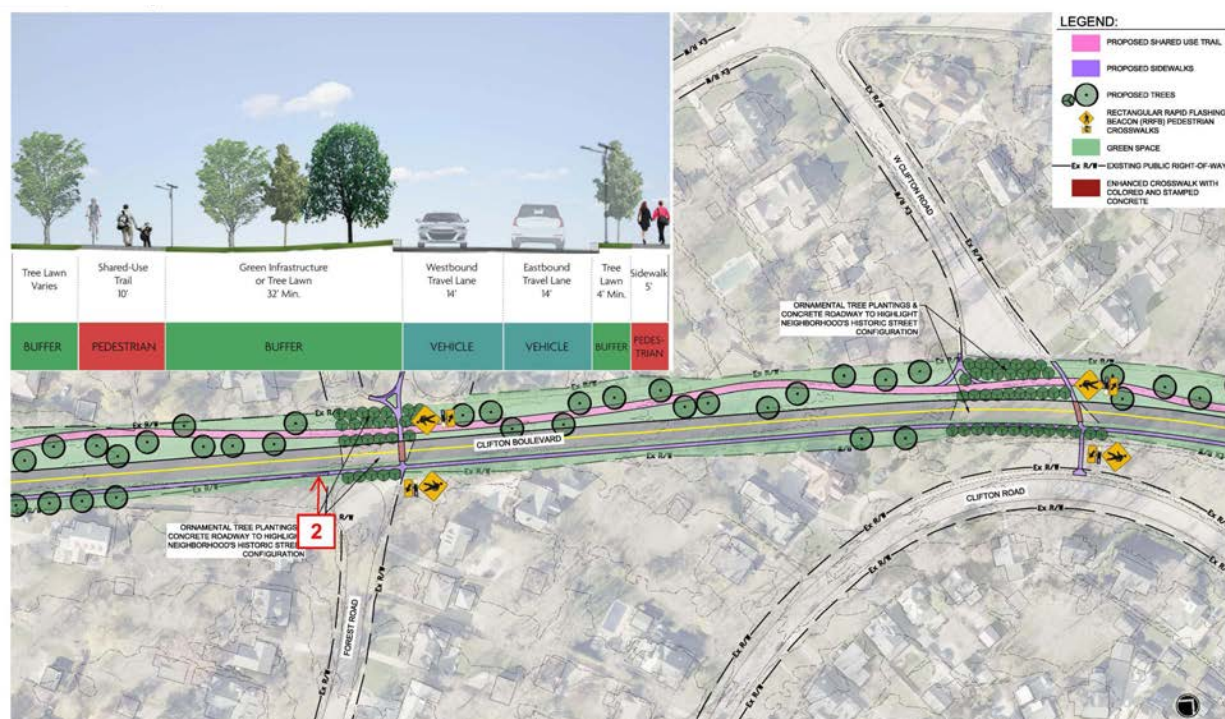
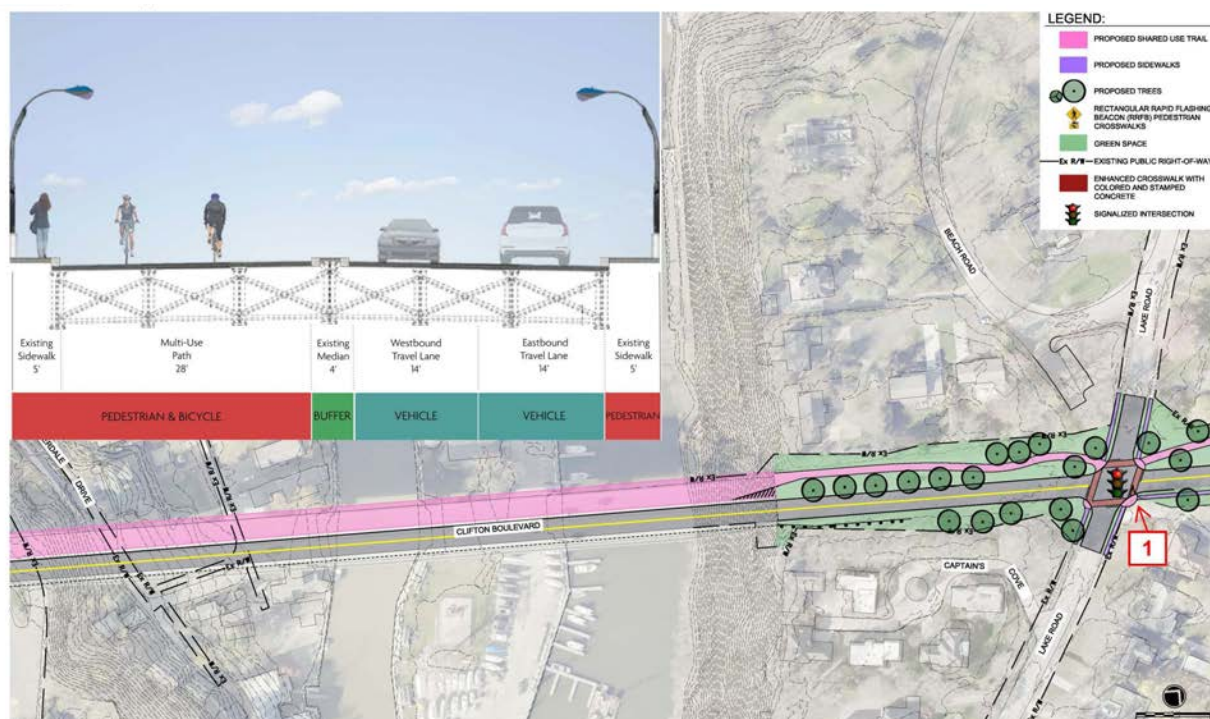
| Concept #2 - Right of Way Summary of Impacts |   |                |  |
|--|---|----------------|--|
| Impact #                                     | Location                                    | Condition      | Notes  |
| 6  | Lake Road, NW corner                        | Permanent Take | Proposed roundabout/shared-use trail                                     |
| 7  | Lake Road, NE corner                        | Driveway       | Driveway to be reconstructed   |
| 8  | Lake Road, NE corner                        | Permanent Take | Proposed shared-use trail  |
| 9  | Lake Road, SE corner                        | Driveway       | Shared driveway to be relocated  |
| 10   | Lake Road, SE corner                        | Permanent Take | Proposed roundabout/sidewalk   |
| 11   | Forest Road pedestrian crossing, SW corner  | Permanent Take | Proposed sidewalk  |
| 12   | Clifton Road intersection, SW corner        | Permanent Take | Proposed sidewalk (possible existing R/W encroachment)                   |
| 13   | Clifton Road intersection, NW corner        | Driveway       | Driveway to be reconstructed   |
| 14   | Clifton Road intersection, NW corner        | Permanent Take | Proposed sidewalk (possible existing R/W encroachment)                   |
| 15   | W Clifton Boulevard intersection, NE corner | Driveway       | Driveway location within roundabout will be difficult for ingress/egress |
| 16   | W Clifton Boulevard intersection, SE corner | Permanent Take | Proposed shared-use trail; gazebo to be relocated                        |

Impact # corresponds with the attached plan sheets labels **#**



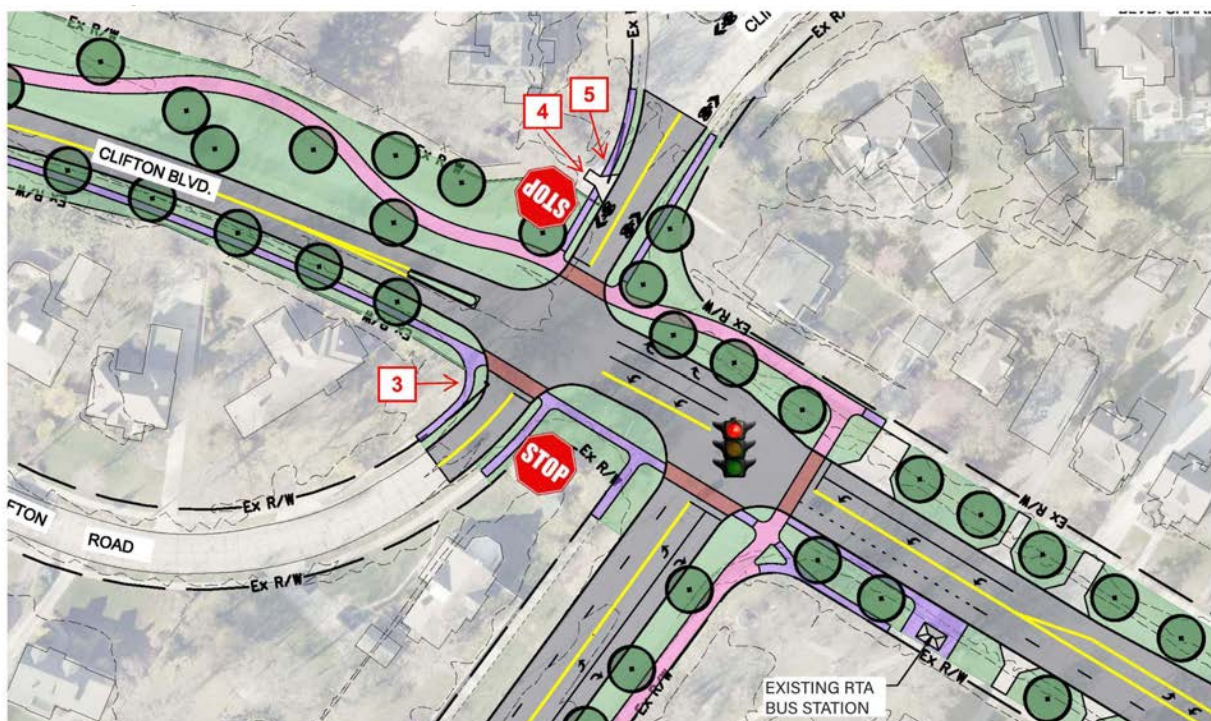
# Appendix K

## Right of Way Summary of Impacts



# Appendix K

## Right of Way Summary of Impacts



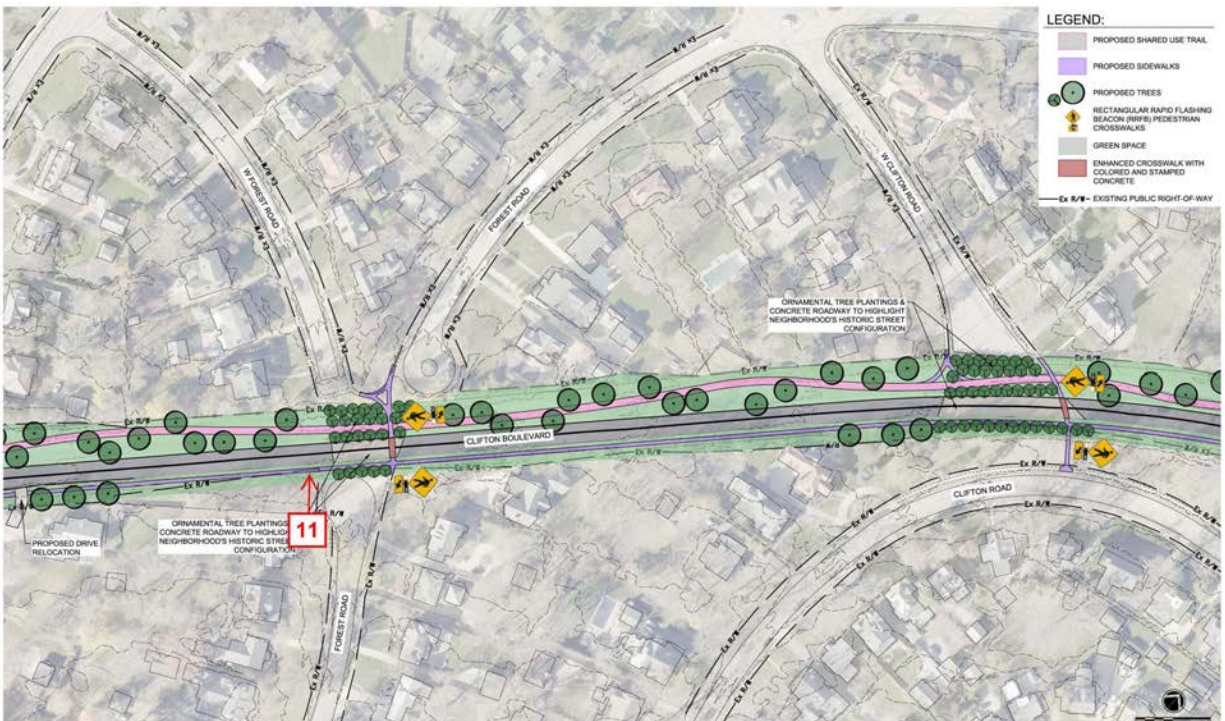
# Appendix K

## Right of Way Summary of Impacts



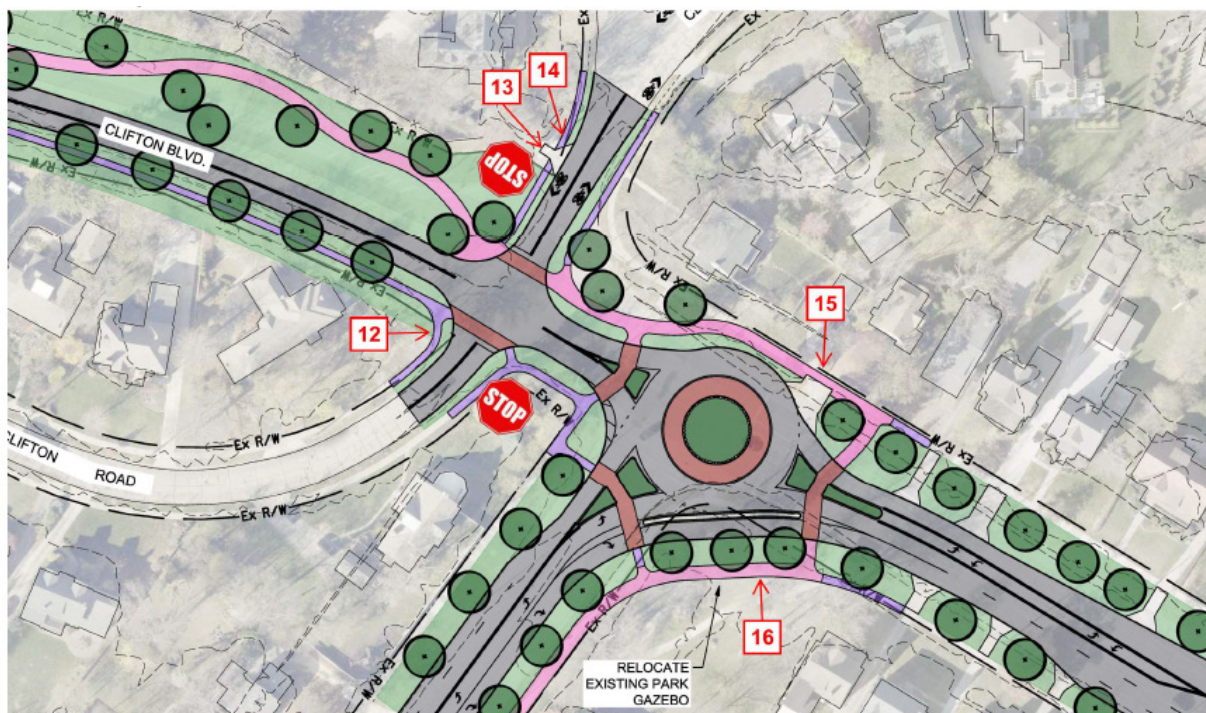
# Appendix K

## Right of Way Summary of Impacts



## Appendix K

### Right of Way Summary of Impacts



# Appendix L

## Concept #1 Cost Estimate

| ITEM           | DESCRIPTION             | QTY    | UNIT | UNIT PRICE | TOTAL COST | NOTES  |
|----------------|-------------------------|--------|------|------------|------------|--|
| <b>ROADWAY</b> |                         |        |      |            |            |  |
| 202            | Pavement Removed        | 18,300 | SY   | \$ 16      | \$ 292,800 | Existing pavement removed.   |
| 202            | Walk Removed            | 16,500 | SF   | \$ 3       | \$ 49,500  | Sidewalk and curb ramp removal.  |
| 202            | Curb Removed            | 12,200 | FT   | \$ 5       | \$ 61,000  | Remove existing 6" curb.   |
| 202            | Guardrail Removed       | 200    | FT   | \$ 15      | \$ 3,000   | Remove existing guardrail at bridge approaches on Clifton Blvd.  |
| 203            | Excavation / Embankment | 1      | LUMP | \$ 50,000  | \$ 50,000  |  |
| 606            | Guardrail, Type MGS     | 200    | FT   | \$ 35      | \$ 7,000   | New guardrail at bridge approaches on Clifton Blvd.  |
| 608            | 4" Concrete Walk        | 24,000 | SF   | \$ 8       | \$ 192,000 | New sidewalk along south side of Clifton Blvd. and tie ins to existing walk.   |
| 608            | Curb Ramps              | 19     | EA   | \$ 1,750   | \$ 33,250  | This includes truncated domes.   |
| Special        | Gateway Features        | 1      | EA   | \$ 50,000  | \$ 50,000  | Signage / sculptural feature.  |
|                | Miscellaneous Items     | 6,450  | FT   | \$ 15      | \$ 96,750  | Includes clearing and grubbing, existing pavement marking removal, subgrade compaction. Cost is calculated per foot of |

|                        |                      |        |    |       |            |   |
|------------------------|----------------------|--------|----|-------|------------|---|
| <b>EROSION CONTROL</b> |                      |        |    |       |            |   |
| 659                    | Seeding And Mulching | 46,000 | SY | \$ 3  | \$ 138,000 | Includes topsoil, soil analysis test(s), repair seeding and mulching, inter-seeding, fertilizer, lime, water. |
|                        | Miscellaneous Items  | 6,450  | FT | \$ 10 | \$ 64,500  | Includes ditch erosion protection, erosion control, SWPPP. Cost is calculated per foot of roadway centerline. |

|                 |                            |       |    |       |            |   |
|-----------------|----------------------------|-------|----|-------|------------|---|
| <b>DRAINAGE</b> |                            |       |    |       |            |   |
|                 | Curbed Drainage            | 6,450 | FT | \$ 40 | \$ 258,000 | Includes storm sewer, manholes, catch basins, underdrain, headwalls. Cost is calculated per foot of roadway centerline. includes bridge drainage adjustments. |
|                 | BMP (Green Infrastructure) | 6,450 | FT | \$ 18 | \$ 116,100 | Cost is calculated per foot of roadway centerline.  |

|                 |   |        |     |        |            |  |
|-----------------|---|--------|-----|--------|------------|--|
| <b>PAVEMENT</b> |   |        |     |        |            |  |
| 251             | Partial Depth Pavement Repair (441)                     | 1,170  | SY  | \$ 75  | \$ 87,750  | Partial depth pavement repair (estimated 5% of existing remaining pavement). |
| 254             | Pavement Planing, Asphalt Concrete                      | 23,400 | SY  | \$ 4   | \$ 93,600  | 1.75" depth  |
| 301             | Asphalt Concrete Base, PG64-22                          | 55     | CY  | \$ 160 | \$ 8,800   | 6" depth   |
| 304             | Aggregate Base  | 55     | CY  | \$ 65  | \$ 3,575   | 6" depth   |
| 407             | Non-Tracking Tack Coat                                  | 2,000  | GAL | \$ 4   | \$ 8,000   | 0.085 gal/sy   |
| 441             | Asphalt Concrete Surface Course, Type 1, (448), PG64-22 | 1,150  | CY  | \$ 190 | \$ 218,500 | 1.75" depth  |
| 452             | 9" Non-Reinforced Concrete Pavement, Class QC MS        | 810    | SY  | \$ 92  | \$ 74,520  | Includes subgrade compaction and 6" aggregate base.                          |
| 609             | Curb, Type 6  | 12,000 | FT  | \$ 30  | \$ 360,000 |  |
| 609             | Concrete Median   | 100    | SY  | \$ 120 | \$ 12,000  |  |
| Special         | Stamped Colored Concrete Crosswalks                     | 4,200  | SF  | \$ 20  | \$ 84,000  | Includes 9" non-reinforced colored concrete pavement and 6" aggregate base.  |

## Appendix L

### Concept #1 Cost Estimate

| ITEM | DESCRIPTION         | QTY   | UNIT | UNIT PRICE | TOTAL COST | NOTES   |
|------|---------------------|-------|------|------------|------------|---|
|      | Driveways           | 950   | SY   | \$ 110     | \$ 104,500 | 6" non-reinforced concrete includes subgrade compaction and aggregate base. |
|      | Shared Use Path     | 5,500 | SY   | \$ 48      | \$ 264,000 | Includes subgrade compaction, aggregate base and asphalt concrete.          |
|      | Decorative Pavement | 600   | SF   | \$ 30      | \$ 18,000  | Pedestrian nodes at intersections within the curb ramp area.                |

#### TRAFFIC CONTROL

|  |  |       |    |           |           |  |
|--|--|-------|----|-----------|-----------|--|
|  | Pavement Markings                        | 6,450 | FT | \$ 7      | \$ 45,150 | Center line, transverse lines, crosswalk lines, edge lines. Cost is calculated per foot of roadway centerline. |
|  | Signing                                  | 6,450 | FT | \$ 3      | \$ 19,350 | Cost is calculated per foot of roadway centerline.   |
|  | Rectangular Rapid-Flashing Beacon (RRFB) | 3     | EA | \$ 12,000 | \$ 36,000 |  |

#### TRAFFIC SIGNALS

|  |                             |   |    |            |            |   |
|--|-----------------------------|---|----|------------|------------|---|
|  | Traffic Intersection Signal | 2 | EA | \$ 150,000 | \$ 300,000 | New traffic signal at Clifton Blvd. / Lake Rd and Clifton Blvd / West Clifton Blvd. |
|--|-----------------------------|---|----|------------|------------|---|

#### STRUCTURES / BRIDGE ENHANCEMENTS

|         |   |       |    |           |            |  |
|---------|---|-------|----|-----------|------------|--|
| 202     | Vandal Protection Fence Removed   | 2,268 | FT | \$ 10     | \$ 22,680  | Removal of existing fencing along both sides of structure                  |
| 517     | Railing (Concrete Parapet With Twin Steel Tube Railing And Vandal Protection Fence) | 2,268 | FT | \$ 50     | \$ 113,400 | Existing parapet replacement/rehab. and steel tubular railing installation |
| 607     | Vandal Protection Fence, 12' Curved, Coated Fabric                                  | 2,268 | FT | \$ 125    | \$ 283,500 | New 12' curved vandal fencing along north and south parapets               |
| Special | Scupper Grate Bicycle Retrofit  | 10    | EA | \$ 500    | \$ 5,000   | Grate modifications for bicycle user safety                                |
| Special | Cycle Track Color Surface Coating   | 1,130 | FT | \$ 60     | \$ 67,800  | Thermoplastic surfacing.   |
| Special | Clear Panel Observation Fence   | 150   | FT | \$ 300    | \$ 45,000  |  |
| Special | Precast Concrete Bollards   | 35    | EA | \$ 2,000  | \$ 70,000  |  |
| Special | Primary Plaza Shade Structure   | 2     | EA | \$ 75,000 | \$ 150,000 | Prefabricated shade structure.   |
| Special | Primary Plaza Observation Platform  | 2     | EA | \$ 60,000 | \$ 120,000 |  |
| Special | Primary Plaza Seating Element   | 2     | EA | \$ 32,000 | \$ 64,000  |  |
| Special | Primary Plaza Decorative Surface Treatment  | 2     | EA | \$ 45,000 | \$ 90,000  |  |
| Special | Secondary Plaza Shade Structure   | 3     | EA | \$ 50,000 | \$ 150,000 |  |
| Special | Secondary Plaza Raised Platform   | 3     | EA | \$ 15,000 | \$ 45,000  |  |
| Special | Secondary Plaza Seating Element   | 3     | EA | \$ 5,000  | \$ 15,000  |  |
| Special | Secondary Plaza Decorative Surface Treatment  | 3     | EA | \$ 20,000 | \$ 60,000  |  |
| Special | Landscape Planter Boxes   | 40    | EA | \$ 4,000  | \$ 160,000 | Including drainage layer, growing medium, and plantings.                   |

# Appendix L

## Concept #1 Cost Estimate

| ITEM                          | DESCRIPTION                         | QTY    | UNIT  | UNIT PRICE | TOTAL COST | NOTES   |
|-------------------------------|-------------------------------------|--------|-------|------------|------------|---|
| <b>MAINTENANCE OF TRAFFIC</b> |                                     |        |       |            |            |   |
|                               | Maintenance Of Traffic Items        | 6,450  | FT    | \$ 15      | \$ 96,750  | Cost is calculated per foot of roadway centerline.  |
| <b>LIGHTING</b>               |                                     |        |       |            |            |   |
| Special                       | Light Pole Assembly                 | 73     | EA    | \$ 7,500   | \$ 547,500 | Includes light fixture, pole and foundation + ground rod.                                 |
| Special                       | 2" Conduit Trenched With(3) #4Awg   | 12,900 | FT    | \$ 18      | \$ 232,200 | Trench, conduit, 2 hot conductors, and grounding electrode conductor.                     |
| Special                       | Power Service                       | 2      | EA    | \$ 15,000  | \$ 30,000  | Installation of new electrical power service. Includes electric meter, power and lighting |
| <b>LANDSCAPE</b>              |                                     |        |       |            |            |   |
| 659                           | Deciduous Tree Plantings            | 136    | EA    | \$ 450     | \$ 61,200  |   |
| 660                           | Deciduous Ornamental Tree Plantings | 63     | EA    | \$ 400     | \$ 25,200  |   |
| 659                           | Mixed Landscape Beds                | 5,000  | SF    | \$ 12      | \$ 60,000  |   |
| 659                           | Planting Soil                       | 75     | CY    | \$ 60      | \$ 4,500   |   |
| 660                           | Green Infrastructure Plantings      | 1,000  | SF    | \$ 12      | \$ 12,000  |   |
| <b>TRAFFIC CALMING</b>        |                                     |        |       |            |            |   |
| 609                           | Curb, Type 6                        | 765    | FT    | \$ 30      | \$ 22,950  |   |
| 609                           | Concrete Median                     | 190    | SY    | \$ 120     | \$ 22,800  |   |
| Special                       | Reflective Delineator Posts         | 50     | EA    | \$ 175     | \$ 8,750   |   |
| <b>INCIDENTALS</b>            |                                     |        |       |            |            |   |
| 614                           | Maintaining Traffic                 | 1      | LUMP  | \$ 75,000  | \$ 75,000  |   |
| 619                           | Field Office, Type B                | 12     | MONTH | \$ 3,000   | \$ 36,000  |   |
| 623                           | Construction Layout Stakes          | 1      | LS    | \$ 59,000  | \$ 59,000  |   |
| 624                           | Mobilization                        | 1      | LS    | \$ 200,000 | \$ 200,000 |   |

**Subtotal Construction** **\$ 6,104,875**  
 25% Design Contingency \$ 1,526,300

**Subtotal Including Design Contingency** **\$ 7,631,175**  
 6.9% Inflation to 2023 \$ 526,600

**Total Construction Costs** **\$ 8,157,775**  
 7% Construction Inspection \$ 572,000

**Grand Total Construction and Inspection** **\$ 8,729,775**

10% Engineering Design \$ 816,000  
 Geotechnical Engineering \$ 20,000  
 Topographic Survey \$ 61,650  
 Right of Way Plan Development \$ 50,000  
 Right of Way Acquisition (Including Acquisition Services) \$ 40,000

**Total Project Cost** **\$ 9,718,000**

# Appendix L

## Concept #2 Cost Estimate

| ITEM                   | DESCRIPTION   | QTY    | UNIT | UNIT PRICE | TOTAL COST | NOTES   |
|------------------------|---|--------|------|------------|------------|---|
| <b>ROADWAY</b>         |   |        |      |            |            |   |
| 202                    | Pavement Removed  | 42,200 | SY   | \$ 16      | \$ 675,200 | Existing pavement removed.  |
| 202                    | Walk Removed  | 18,800 | SF   | \$ 3       | \$ 56,400  | Sidewalk and curb ramp removal.   |
| 202                    | Curb Removed  | 12,400 | FT   | \$ 5       | \$ 62,000  | Remove existing 6" curb.  |
| 202                    | Guardrail Removed                                       | 200    | FT   | \$ 15      | \$ 3,000   | Remove existing guardrail at bridge approaches on Clifton Blvd.   |
| 203                    | Excavation / Embankment                                 | 1      | LUMP | \$ 100,000 | \$ 100,000 |   |
| 606                    | Guardrail, Type MGS                                     | 200    | FT   | \$ 35      | \$ 7,000   | New guardrail at bridge approaches on Clifton Blvd.   |
| 608                    | 4" Concrete Walk  | 22,500 | SF   | \$ 8       | \$ 180,000 | New sidewalk along south side of Clifton Blvd. and tie ins to existing walk.  |
| 608                    | Curb Ramps  | 26     | EA   | \$ 1,750   | \$ 45,500  | This includes truncated domes.  |
| Special                | Gateway Features  | 1      | EA   | \$ 125,000 | \$ 125,000 | Signage / sculptural feature.   |
|                        | Miscellaneous Items                                     | 6,450  | FT   | \$ 15      | \$ 96,750  | Includes clearing and grubbing, existing pavement marking removal, subgrade compaction. Cost is calculated per foot of  |
| <b>EROSION CONTROL</b> |   |        |      |            |            |   |
| 659                    | Seeding And Mulching                                    | 46,000 | SY   | \$ 3       | \$ 138,000 | Includes topsoil, soil analysis test(s), repair seeding and mulching, inter-seeding, fertilizer, lime, water.           |
|                        | Miscellaneous Items                                     | 6,450  | FT   | \$ 10      | \$ 64,500  | Includes ditch erosion protection, erosion control, SWPPP. Cost is calculated per foot of roadway centerline.           |
| <b>DRAINAGE</b>        |   |        |      |            |            |   |
|                        | Curbed Drainage   | 6,450  | FT   | \$ 40      | \$ 258,000 | Includes storm sewer, manholes, catch basins, underdrain, headwalls. Cost is calculated per foot of roadway centerline. |
|                        | BMP (Green Infrastructure)                              | 6,450  | FT   | \$ 18      | \$ 116,100 | Cost is calculated per foot of roadway centerline.  |
| <b>PAVEMENT</b>        |   |        |      |            |            |   |
| 251                    | Partial Depth Pavement Repair (441)                     | 1,060  | SY   | \$ 75      | \$ 79,500  | Partial depth pavement repair (estimated 5% of existing remaining pavement).  |
| 254                    | Pavement Planing, Asphalt Concrete                      | 21,300 | SY   | \$ 4       | \$ 85,200  | 1.75" depth   |
| 301                    | Asphalt Concrete Base, PG64-22                          | 530    | CY   | \$ 160     | \$ 84,800  | 6" depth  |
| 304                    | Aggregate Base  | 530    | CY   | \$ 65      | \$ 34,450  | 6" depth  |
| 407                    | Non-Tracking Tack Coat                                  | 1,800  | GAL  | \$ 4       | \$ 7,200   | 0.085 gal/sy for milled pavement.   |
| 407                    | Non-Tracking Tack Coat                                  | 1,600  | GAL  | \$ 4       | \$ 6,400   | 0.055 gal/sy for new pavement.  |
| 441                    | Asphalt Concrete Surface Course, Type 1, (448), PG64-22 | 1,200  | CY   | \$ 190     | \$ 228,000 | 1.75" depth   |
| 441                    | Asphalt Concrete Intermediate Course, Type 2, (448)     | 155    | CY   | \$ 180     | \$ 27,900  | 1.75" depth. Part of roundabout full depth pavement section.  |
| 452                    | 9" Non-Reinforced Concrete Pavement, Class QC MS        | 810    | SY   | \$ 92      | \$ 74,520  | Includes subgrade compaction and 6" aggregate base.   |
| 609                    | Curb, Type 6  | 16,000 | FT   | \$ 30      | \$ 480,000 |   |
| 609                    | Concrete Median   | 140    | SY   | \$ 120     | \$ 16,800  |   |
| Special                | Stamped Colored Concrete Crosswalks                     | 10,000 | SF   | \$ 20      | \$ 200,000 | Includes 9" non-reinforced colored concrete pavement and 6" aggregate base.   |
|                        | Driveways   | 1,000  | SY   | \$ 110     | \$ 110,000 | 6" non-reinforced concrete includes subgrade compaction and aggregate base.   |
|                        | Shared Use Path   | 5,700  | SY   | \$ 48      | \$ 273,600 | Includes subgrade compaction, aggregate base and asphalt concrete.  |
|                        | Decorative Pavement                                     | 580    | SF   | \$ 30      | \$ 17,400  | Pedestrian nodes at intersections within the curb ramp area.  |

# Appendix L

## Concept #2 Cost Estimate

| ITEM                                    | DESCRIPTION   | QTY   | UNIT | UNIT PRICE | TOTAL COST | NOTES  |
|---|---|-------|------|------------|------------|--|
| Special                                 | Mountable Truck Apron Curb  | 500   | FT   | \$ 35      | \$ 17,500  |  |
| Special                                 | Truck Apron/Central Island Pavement   | 625   | SY   | \$ 100     | \$ 62,500  |  |
| <b>TRAFFIC CONTROL</b>                  |   |       |      |            |            |  |
|   | Pavement Markings   | 6,450 | FT   | \$ 7       | \$ 45,150  | Center line, transverse lines, crosswalk lines, edge lines. Cost is calculated per foot of roadway centerline. |
|   | Signing   | 6,450 | FT   | \$ 3       | \$ 19,350  | Cost is calculated per foot of roadway centerline.   |
|   | Rectangular Rapid-Flashing Beacon (RRFB)  | 10    | EA   | \$ 12,000  | \$ 120,000 |  |
| <b>STRUCTURES / BRIDGE ENHANCEMENTS</b> |   |       |      |            |            |  |
| 202                                     | Vandal Protection Fence Removed   | 2,268 | FT   | \$ 10      | \$ 22,680  | Removal of existing fencing along both sides of structure  |
| 517                                     | Railing (Concrete Parapet With Twin Steel Tube Railing And Vandal Protection Fence) | 2,268 | FT   | \$ 50      | \$ 113,400 | Existing parapet replacement/rehab. and steel tubular railing installation                                     |
| 607                                     | Vandal Protection Fence, 12' Curved, Coated Fabric                                  | 2,268 | FT   | \$ 125     | \$ 283,500 | New 12' curved vandal fencing along north and south parapets   |
| Special                                 | Scupper Grate Bicycle Retrofit  | 10    | EA   | \$ 500     | \$ 5,000   | Grate modifications for bicycle user safety  |
| Special                                 | Cycle Track Color Surface Coating   | 1,130 | FT   | \$ 60      | \$ 67,800  | Thermoplastic surfacing.   |
| Special                                 | Clear Panel Observation Fence   | 150   | FT   | \$ 300     | \$ 45,000  |  |
| Special                                 | Precast Concrete Bollards   | 35    | EA   | \$ 2,000   | \$ 70,000  |  |
| Special                                 | Primary Plaza Shade Structure   | 2     | EA   | \$ 75,000  | \$ 150,000 | Prefabricated shade structure.   |
| Special                                 | Primary Plaza Observation Platform  | 2     | EA   | \$ 60,000  | \$ 120,000 |  |
| Special                                 | Primary Plaza Seating Element   | 2     | EA   | \$ 32,000  | \$ 64,000  |  |
| Special                                 | Primary Plaza Decorative Surface Treatment  | 2     | EA   | \$ 45,000  | \$ 90,000  |  |
| Special                                 | Secondary Plaza Shade Structure   | 3     | EA   | \$ 50,000  | \$ 150,000 |  |
| Special                                 | Secondary Plaza Raised Platform   | 3     | EA   | \$ 15,000  | \$ 45,000  |  |
| Special                                 | Secondary Plaza Seating Element   | 3     | EA   | \$ 5,000   | \$ 15,000  |  |
| Special                                 | Secondary Plaza Decorative Surface Treatment  | 3     | EA   | \$ 20,000  | \$ 60,000  |  |
| Special                                 | Landscape Planter Boxes   | 40    | EA   | \$ 4,000   | \$ 160,000 | Including drainage layer, growing medium, and plantings.   |

# Appendix L

## Concept #2 Cost Estimate

| ITEM                          | DESCRIPTION                         | QTY    | UNIT  | UNIT PRICE | TOTAL COST | NOTES   |
|-------------------------------|-------------------------------------|--------|-------|------------|------------|---|
| <b>MAINTENANCE OF TRAFFIC</b> |                                     |        |       |            |            |   |
|                               | Maintenance Of Traffic Items        | 6,450  | FT    | \$ 15      | \$ 96,750  | Cost is calculated per foot of roadway centerline.  |
| <b>LIGHTING</b>               |                                     |        |       |            |            |   |
| Special                       | Light Pole Assembly                 | 73     | EA    | \$ 7,500   | \$ 547,500 | Includes light fixture, pole and foundation + ground rod                                  |
| Special                       | 2" Conduit Trenched W/ (3)#4Awg     | 12,900 | LF    | \$ 18      | \$ 232,200 | Trench, conduit and 2 hot conductors + grounding electrode conductor                      |
| Special                       | Power Service                       | 2      | EA    | \$ 15,000  | \$ 30,000  | Installation of new electrical power service. Includes electric meter, power and lighting |
| <b>LANDSCAPE</b>              |                                     |        |       |            |            |   |
| 659                           | Deciduous Tree Plantings            | 136    | EA    | \$ 450     | \$ 61,200  |   |
| 660                           | Deciduous Ornamental Tree Plantings | 63     | EA    | \$ 400     | \$ 25,200  |   |
| 659                           | Mixed Landscape Beds                | 7,500  | SF    | \$ 12      | \$ 90,000  |   |
| 659                           | Planting Soil                       | 200    | CY    | \$ 60      | \$ 12,000  |   |
| 659                           | Green Infrastructure                | 1,500  | SF    | \$ 12      | \$ 18,000  |   |
| <b>TRAFFIC CALMING</b>        |                                     |        |       |            |            |   |
| 609                           | Curb, Type 6                        | 765    | FT    | \$ 30      | \$ 22,950  |   |
| 609                           | Concrete Median                     | 190    | SY    | \$ 120     | \$ 22,800  |   |
| Special                       | Reflective Delineator Posts         | 50     | EA    | \$ 175     | \$ 8,750   |   |
| <b>INCIDENTALS</b>            |                                     |        |       |            |            |   |
| 614                           | Maintaining Traffic                 | 1      | LUMP  | \$ 150,000 | \$ 150,000 |   |
| 619                           | Field Office, Type B                | 12     | MONTH | \$ 3,000   | \$ 36,000  |   |
| 623                           | Construction Layout Stakes          | 1      | LS    | \$ 62,000  | \$ 62,000  |   |
| 624                           | Mobilization                        | 1      | LS    | \$ 200,000 | \$ 200,000 |   |

**Subtotal Construction** **\$ 6,994,450**

25% Design Contingency \$ 1,748,700

**Subtotal Including Design Contingency** **\$ 8,743,150**

6.9% Inflation to 2023 \$ 603,300

**Total Construction Costs** **\$ 9,346,450**

7% Construction Inspection \$ 655,000

**Grand Total Construction and Inspection** **\$ 10,001,450**

10% Engineering Design \$ 935,000

Geotechnical Engineering \$ 20,000

Topographic Survey \$ 61,650

Right of Way Plan Development \$ 60,000

Right of Way Acquisition (Including Acquisition Services) \$ 95,000

**Total Project Cost** **\$ 11,173,000**



Clifton Boulevard / Lake Road Enhancements  
Preliminary Engineering Study  
Cuyahoga County, Ohio