IMAGINE MEMORIAL

A planning partnership with Councilwoman Natalyn Archibong,
Atlanta residents, and Georgia Tech's School of City and Regional Planning

DRAFT
2/12/15

Roadway - Intersection Design

Suggested topics for comment:

What are your thoughts on roundabouts in general?

Would you support installing roundabouts at Grant St, Bill Kennedy Way, Maynard Terrace and/or Whitefoord? Please rank in order of priority.

Would you support purchasing land at the Boulevard intersection to expand the right of way and create a left turn lane for eastbound traffic? Do you use this intersection regularly?

Would you support the installation of a traffic signal at Howard St? Do you use Howard St regularly?

Do you have any thoughts about intersection design that were not included in the study?

Roundabouts

For urban arterial streets, roundabouts may be an effective alternative design, because they promote continuous flow as opposed to segmented phases and cycles. According to a National Cooperative Highway Research Program report, there was a 35% overall decrease in crashes and 81% decrease in fatal crashes at 55 intersections nationwide after roundabouts were implemented. To analyze operational efficiency of roundabout implementation at select intersections along the corridor, a Synchro model was built to simulate traffic flow at 12 signalized intersections.

Listed in Figure 18 are all the intersections on Memorial Drive with major road traffic (traffic on Memorial Drive) above 90% of the total activity at the intersection and therefore less effective for roundabouts. This ratio of major road volume to intersecting road volume is derived from studies on effective roundabouts. Typically, the ratio of traffic on the major road to the intersecting road should not be higher than 90% for an effective roundabout, however, in some cases this threshold can be slightly adjusted to a maximum of 85% of the total vehicles utilizing the intersection.

Because roundabouts have been observed to significantly reduce collision rates, consideration was given to accident-prone intersections, resourced through GDOT's accident reporting system. The GDOT database provides crash records from the past three years.

With the combined analyses of volume distribution and crash rates, the primary selection of potential roundabout locations were Capitol Avenue, Hill Street, Grant Street, Bill Kennedy Way, Maynard Terrace, 2nd Avenue, Cottage Grove and Candler Road.

The second level of screening for roundabouts was based on the comparison between roundabout and intersection performance. Reference was given to traffic modeling through Synchro to replace the eight selected intersections with roundabouts and compare measures of operational efficiency with their current signalized level of service.

The results show that some intersections operate less efficiently with roundabout implementation. For example, at Capitol Ave, the utilization of a roundabout is projected at such a congested capacity that the level of service is decreased to a G. At Hill St, the capacity remains the same while the level of service decreases from D to E, which indicates the implementation of a roundabout projects no operational advantage at this intersection. The intersections of Grant St, Bill Kennedy Way and Maynard Terrace however were projected to gain throughput efficiency with roundabout implementation.

FIGURE 18a: Volume on Memorial as Percentage of Total Intersection Volume

Intersection	Percentage
Fraser	97%
Martin	93%
Cherokee	96%
Park	99%
Chester	91%
Stovall	91%
Clifton	92%
Wilkinson	95%
Warren	91%
East Lake Blvd	92%
East Lake Dr	94%
Flat Shoals Ave	95%
Memorial Terrace	94%

FIGURE 18b: Accident Rates at Selected Intersections

Intersection	# Collissions
Capitol	11
Martin	5
Connally	6
Hill	6
Grant	5
Boulevard	6
Cameron	5
Bill Kennedy	4
Moreland	10
Maynard Terrace	10
Howard	6
2nd Ave	5
Cottage Grove	6
Candler	6

FIGURE 18c: Before/After Comparison of Roundabout Implementation

	Before		After	
Intersection	**Intersection Capacity Utilization**	**LOS**	**Intersection Capacity Utilization**	**LOS**
Capitol Ave	79.70%	C	105.5%	G
Hill St	87.70%	D	87.70%	E
Grant St	57.40%	C	60.1%	B
Bill Kennedy Way	68.00%	C	56.8%	B
Maynard Terrace	78.00%	D	83.9%	E
2nd Ave	80.70%	D	74.5%	D
Cottage Grove	70.60%	C	73.9%	D
Candler Rd	95.40%	F	92.1%	F

Maynard Terrace and Clifton

The intersections of Maynard Terrace and Clifton were observed jointly because of their interaction, proximity, and shared concerns. Clifton represents the end of the "speed section," as well as the location of a proposed extension of the reversible-lane configuration. The transition at this location was seen as a strength because these intersections are well-used and a lower speed is desired near the adjacent Alonzo Crim High School. Maynard Terrace would be a good roundabout location both because of its size and that minimal right-of-way would need to be acquired.

Additionally, the lack of a sidewalk on the north side of Memorial Drive in between the two intersections creates a pedestrian hazard. The westbound bus stop is located on that side of the road, forcing teenage students to traverse Memorial Drive with limited or no pedestrian facilities. The access point for the gas station closest to Clifton compounds this pedestrian risk as it accommodates incoming vehicles from almost every angle. An alternative design would close eastern access to the gas station, in order for the reversible lane transition and roundabout to work at the highest efficiency. The resulting design provides space for adequate and safe pedestrian facilities. This alternative design also blends the reversible lane, roundabout and non-reversible segment westward in a fashion where there are no additional vehicle-to-vehicle conflict points.

Figure 19: Illustration of proposed intersection redesign and lane reconfiguration at Clifton Street (looking west)
The combination of an existing "speed section" and unsafe conditions for students at Alonzo Crim High School offer an opportunity for reducing the travel way to three lanes. The additional room could be used for sidewalks, trees, and better crosswalks.

Figure 20: Illustration of proposed intersection redesign and lane reconfiguration at Clifton Street (aerial looking northwest)
At left: Reducing travel lanes to three would gain additional right-of-way for sidewalks on the north side of Memorial Drive. There are currently ***no sidewalks*** *on this block, despite being across the street from the high school.*

Figure 21: Illustration of proposed intersection redesign and lane reconfiguration at Clifton Street and Maynard Terrace (wider aerial looking northwest)
At right: A wider view of the proposed redesign between Clifton Street (lower right) and the Maynard Terrace roundabout (upper left). The changes would improve the safety and appearance of the segment from its current condition. Computer traffic modeling suggests that reducing the overall design speed on Memorial could maintain or improve vehicle throughput, while reducing emissions.

Figure 22: Illustration of proposed roundabout at Maynard Terrace (aerial looking northeast)
Above: Roundabouts improve vehicle progression through a continuous flow, rather than the stop-and-start cycles of conventional intersections. Research indicates that they significantly reduce the number of total crashes and fatal crashes.

Figure 23: Illustration of proposed roundabout at BeltLine/Bill Kennedy Way (aerial looking southwest)
Left: Traffic modeling of potential roundabouts on Memorial Drive showed they were more effective at intersections with streets that carry lower volumes of cars, such as at Bill Kennedy Way and the BeltLine. The design can be easily adapted for future transit.

Bill Kennedy was another intersection that met the criteria for a roundabout and holds particular interest with a connection to the Atlanta Beltline to the north. South of this intersection is a bridge with ramps only on the west side and an existing bike path. These elements, along with a comparatively quiet intersection, make this space available for more effective pedestrian and bicycle facilities to better connect communities on both sides of I-20 with the future Beltline extension.

The right-of-way necessary to implement a roundabout would take place on land owned by the Beltline presently and is roughly calculated to be 744 sq ft. Some right-of-way is gained by merging the lanes with a median of smaller width and using the acquired space for sidewalks, bike paths and landscaping. Illustrations of possible designs are included in Figures 23 and 24.

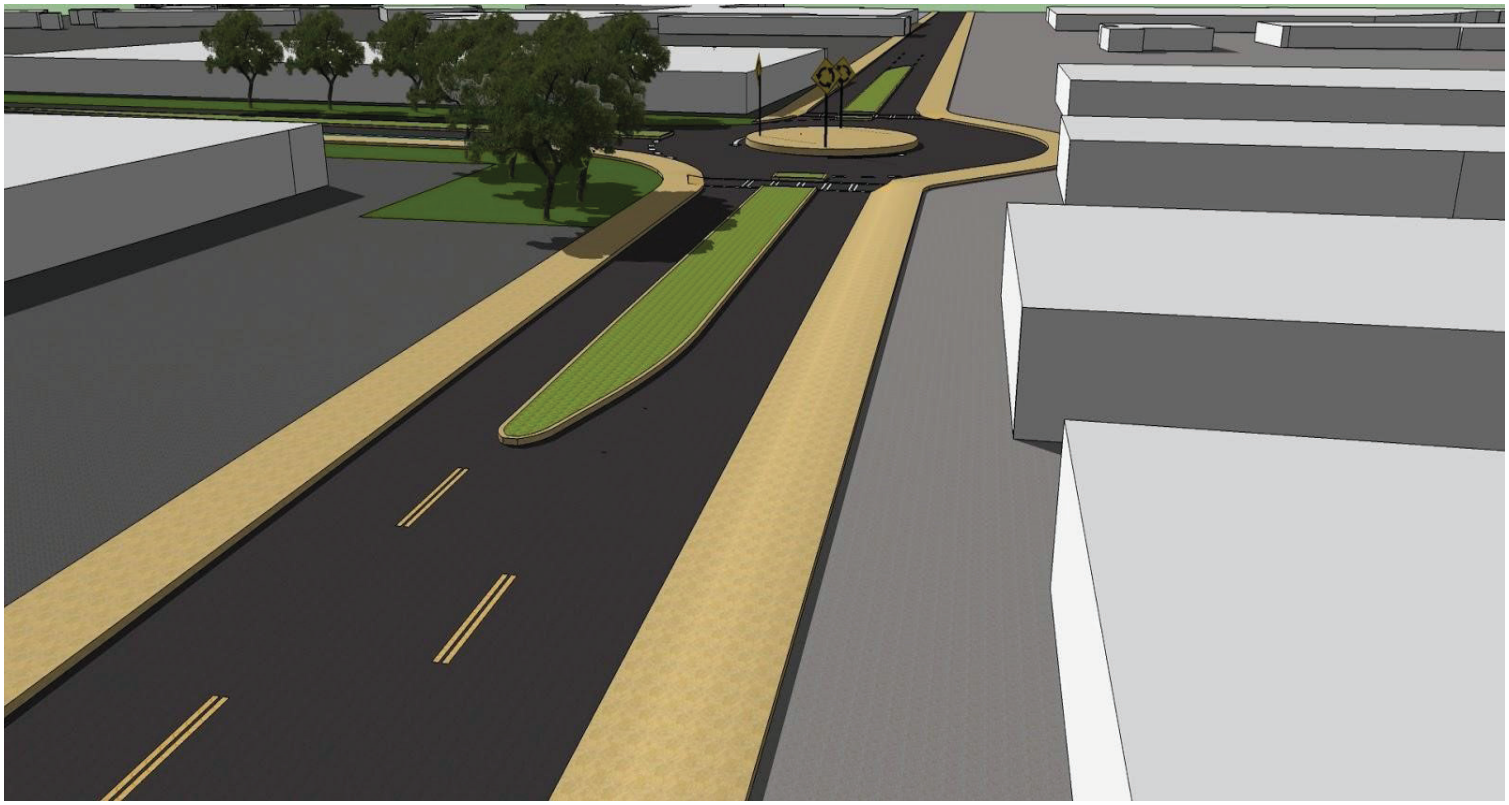


Figure 24: Illustration of proposed lane configuration and roundabout at BeltLine/ Bill Kennedy Way (aerial looking west)
The next extension of the Eastside Trail (est. completion in 2017) will end here, bringing with it high volumes of BeltLine users from all over the city and beyond. More dense development is coming. Enhanced pedestrian and bike improvements, along with reduced driving speeds, will be key for this location.

Signalizing Howard Street

Currently the only signalized intersection in this speed section is at the East Lake YMCA facility and Drew Charter School. A young girl was struck by a turning vehicle at this intersection in recent weeks. No matter the cause of the accident, pedestrian safety concerns at such a location should be a primary focus of this segment. Slightly farther up the road at Howard Street, an additional safety concern arises with the line of sight distance for vehicles turning onto Memorial Drive from Howard. This intersection sees higher traffic because of its proximity and direct connection to Hosea Williams and its use by Kirkwood residents as the main thoroughfare to access the Memorial Drive.

Because the intersection at Howard is located just off of the crest of a hill, eastbound traffic on Memorial has a very short stopping distance. The line of sight in both directions, particularly to the west, is too short for efficient intersection flow and vehicles were observed at taking lengthy amounts of time to turn either direction onto Memorial Drive because of the safety risk. Preliminary traffic counts were observed and plotted against the MUTCD traffic signal warrant graph showed in Figure 25.

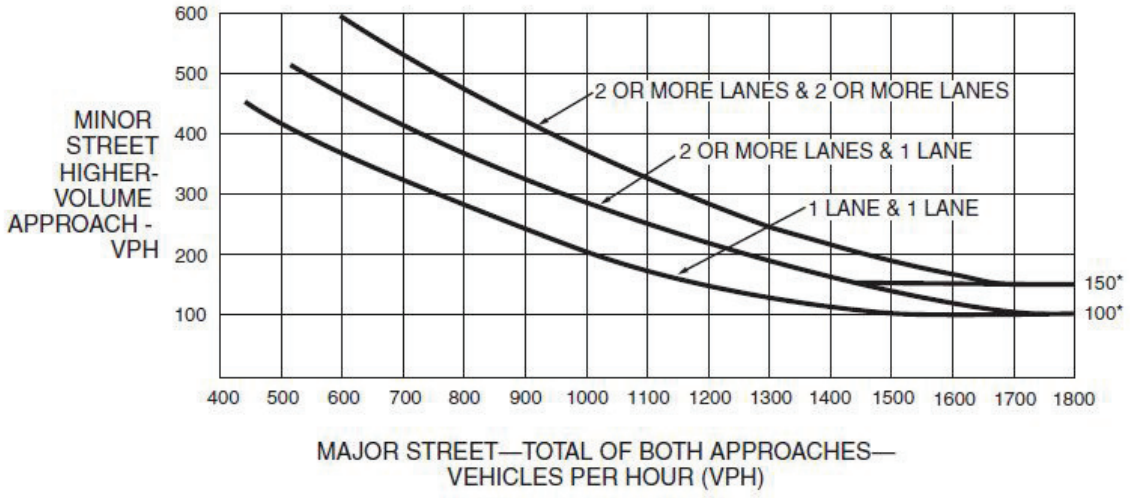


Figure 25: Chart of traffic volumes that justify signals at intersections of major and minor streets
The curves indicate the volume at which a traffic signal is warranted where a minor street intersects with a major street. The three lines show different lane configurations. Volumes above the curved lines require a light; those below don't. A preliminary traffic count conducted by studio members indicates the volume at Howard Street warrants a traffic light because of volume, low visibility, and danger to pedestrians. Source: Manual on Uniform Traffic Control Devices, FHWA.

Figure 26: Driver's perspective from southbound Howard Street looking east on Memorial Drive
Above: A driver attempting to turn right (west) onto Memorial Drive has severely limited visibility because of topography and vegetation on the corner property. This is one of the "speed sections" where the combination of four lanes, hilly terrain, and multiple access points creates dangerous conditions for all modes. Photo by Marcus Ashdown.

Figure 27: Driver's perspective from southbound Howard Street looking west on Memorial Drive
Right: A driver attempting to turn left (east) on Memorial Drive also has limited visibility because of topography and landscaping on the corner property. Photo by Marcus Ashdown.

Whitefoord

Whitefoord is presently a transition point between three lanes with reversible lane and regular four lanes. Furthermore, its north leg does not align with its south leg, making it more confusing to drive through. Drivers coming southbound down Whitefoord Avenue complain that, during PM peak hours, making a left turn to Memorial Drive, merging into main traffic flow is extremely hard due to the large amount of traffic and sight distance problems. To solve this problem, strategies should be taken to coordinate the traffic from different directions and eliminate the confusion of the reversible lane.

The lane configuration of Memorial drive is proposed to change significantly at this intersection. For the west side, the three lanes are converted to two lanes with raised median. For the segment between Whitefoord Avenue and Memorial Terrace, original four lanes are transformed to two lanes. The extra ROW derived from road diet is proposed to construct sidewalks. For the east side, two lanes continue for 100 feet and change to four lanes, with two lanes merging into one for westbound traffic and one lane separates to two lanes for eastbound traffic.

Figure 28: Illustration of current intersection at Whitefoord
The corridor at Whitefoord combines an unaligned intersection, a poorly marked transition between three lanes and four lanes, and a steep grade to boot.

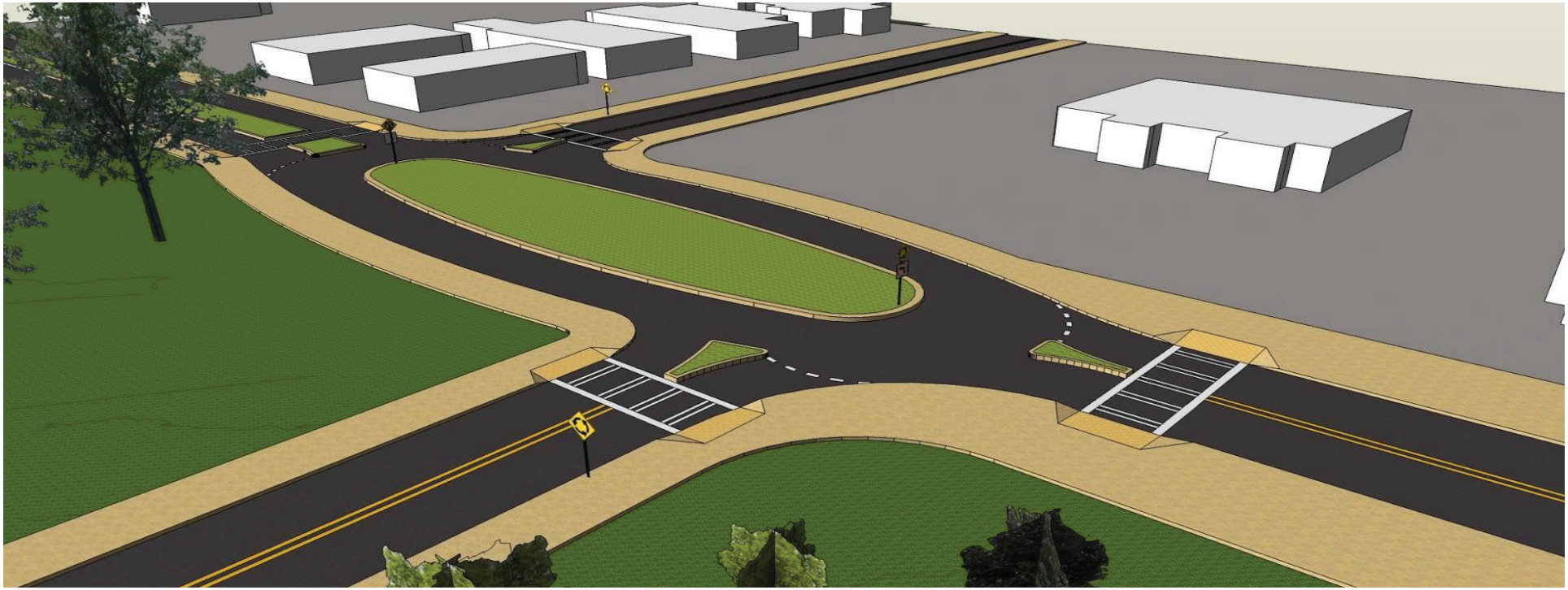


Figure 29: Illustration of the famous "Ovalabout" design for Whitefoord intersection
The "Ovalabout" offers a unique combination of a roundabout's continuous traffic flow, while its shape addresses the offset intersection.

Alternatives for Whitefoord

Alternative 1 - "The Ovalabout" (ROW 4400 sf) - It builds on the continuous efficiency of the roundabout while mitigating an offset intersection. Offset intersections are common along the corridor, including Moore & Kelly streets, Grant Street, Oakland Avenue, East Side Avenue, Howard Street, East Lake Terrace, and Daniel Avenue.

Traffic flows around an ellipse-shaped median, as shown in Figure 29. There is little need for additional right of way beyond that of a standard intersection.

Strengths of the Ovalabout design:

- Continuous flow
- Zero head-to-head collision points
- Enhanced pedestrian safety
- Horizontal curvature in vehicle path calms traffic

Challenges of the Ovalabout design

- Making left turns off Memorial requires longer distance
- Difficult turning radius for large trucks

Alternative 2 - Realignment (ROW: 4400 sf)

- Realign the offset road by directly connecting Whitefoord and Memorial Terrace.
- Remove the two traffic signals and install a new one for the single intersection

Figure 30: Illustration of realignment of Whitefoord and Memorial Terrace

Alternative 3 - Roundabout + Stop Sign (ROW: 500 sf)

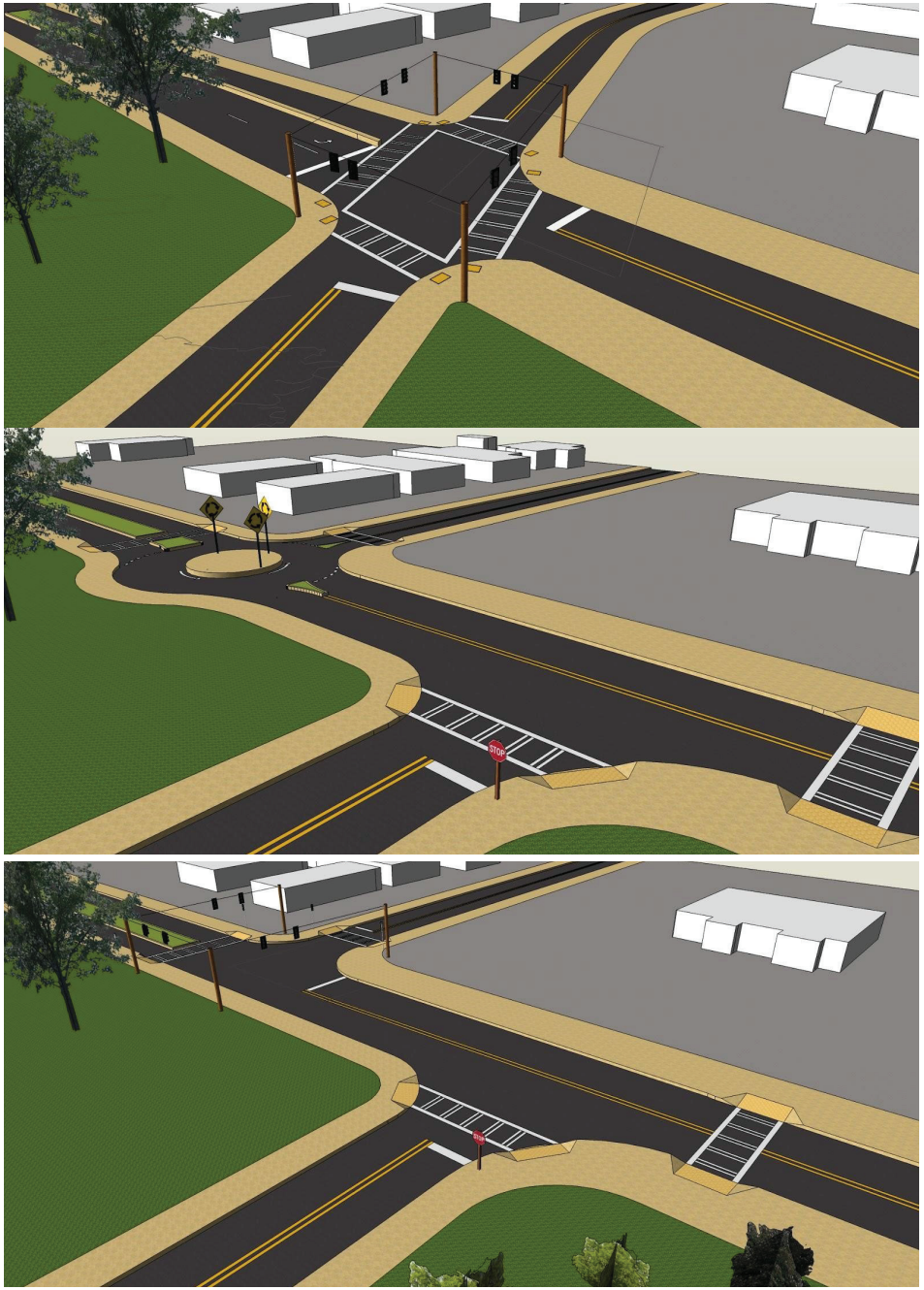
- Remove both traffic signals, install roundabout with indicators at Whitefoord
- Raised medians at each direction to separate traffic flows
- Ramps for crosswalks
- Road diet between Whitefoord and Memorial Terrace. Remove two lanes and use additional ROW to construct sidewalks.
- Add a stop sign at Memorial Terrace

Figure 31: Illustration of roundabout at Whitefoord with elimination of signal at Memorial Terrace

Alternative 4 - Traffic signal + Stop Sign (ROW: 0 sf)

- Keep the traffic signal at Whitefoord
- Add a stop sign at the intersection of Memorial Terrace

Figure 32: Illustration of realignment of Whitefoord and Memorial Terrace



Boulevard

Boulevard is one of the busiest intersections in the corridor. A key issue is truck traffic traveling between the Hulsey multimodal freight yard and Interstate 20. Oakland Cemetery on the northwest corner and other restaurants and businesses in the surrounding community generate pedestrians across the intersection. Also, for the west leg, the left-turn traffic signal has no corresponding left turn lane to separate the left turn vehicles, which are always blocked by through traffic. The conflict points between pedestrians and traffic of different directions have to be controlled and eliminated.

Alternative design considerations for Boulevard intersection, shown in Figure 33:

- For eastbound segment, reduce the lane width from 11' to 10'
- Take 900 sqft more ROW on the south side to add a left turn lane in the middle
- Add fences on street corners to protect pedestrians
- Repair the sidewalks on northeast and southwest corner
- Add ramps on northeast and northwest corner

East Lake

One of the most critical goals is to improve pedestrian safety at this intersection. There is heavy pedestrian demand between the Kirkwood neighborhood to the north and the YMCA and Drew Charter School to the south. Dr. Nisha Botchwey, the co-president of the Drew Charter School PTA, reported that children walk around the back of the corner church because they feel unsafe walking along Memorial Drive. Depicted in Figure 34, nothing but a dirt path exists on the north leg of East Lake Terrace. The sidewalk on Memorial is only a few inches higher than the road and is bound by a stone wall. These concerns could be mitigated with the following proposed intersection enhancements, depicted in Figures 35 and 36:

- Plant trees and set fence along the segment between East Lake Terrace and East Lake Boulevard. According to the tree planting standard, spacing between two trees would be 25 feet.
- Plant trees and set fence along the segment between East Lake Boulevard and Watson Circle, and change the fourth lane on north side to street parking and reserve space for disabled people.
- Set ramps on both ends of the crosswalk to meet with ADA requirement.
- Set new a crosswalk at East Lake Blvd to connect the sidewalks on both sides, and put warning board to remind passing cars to give way to pedestrians.

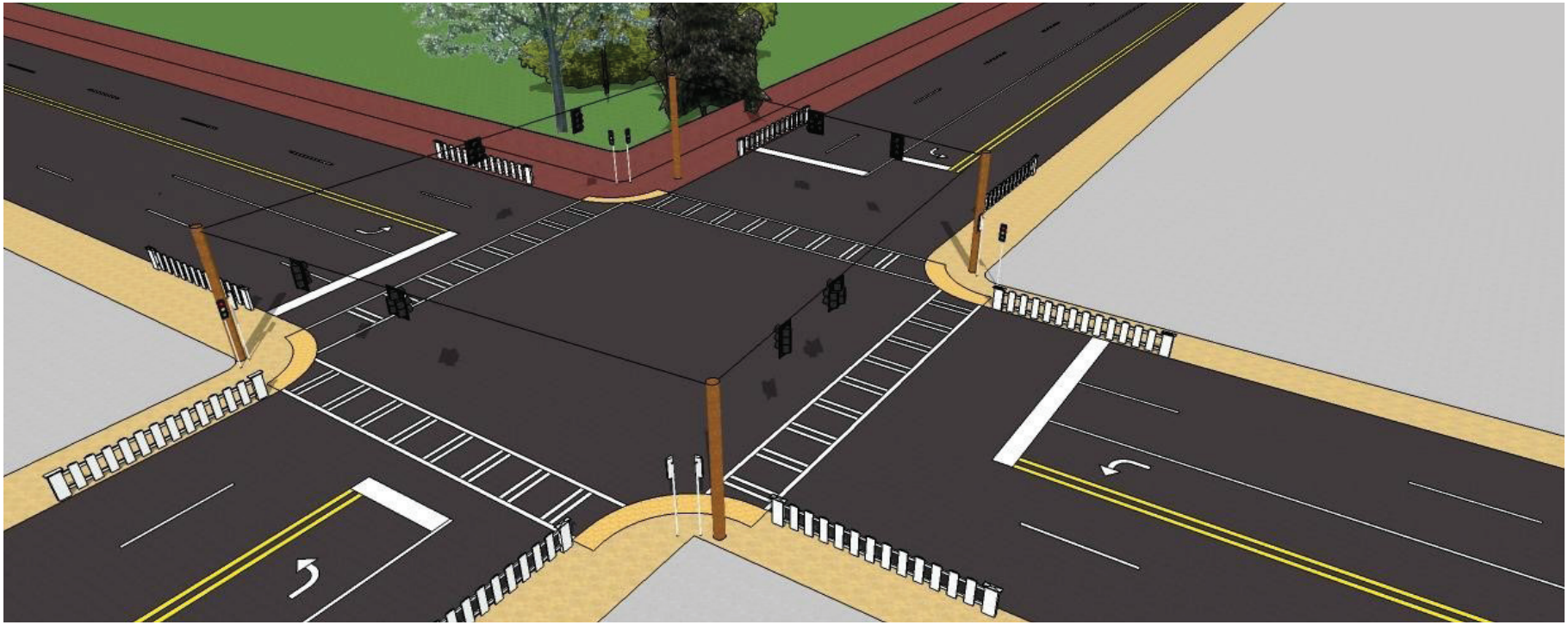


Figure 33: Illustration of Boulevard redesign
Above: A key element at Boulevard will be adding a dedicated turn lane from eastbound Memorial to northbound Boulevard. Fences would help protect pedestrians at the high-volume intersection.

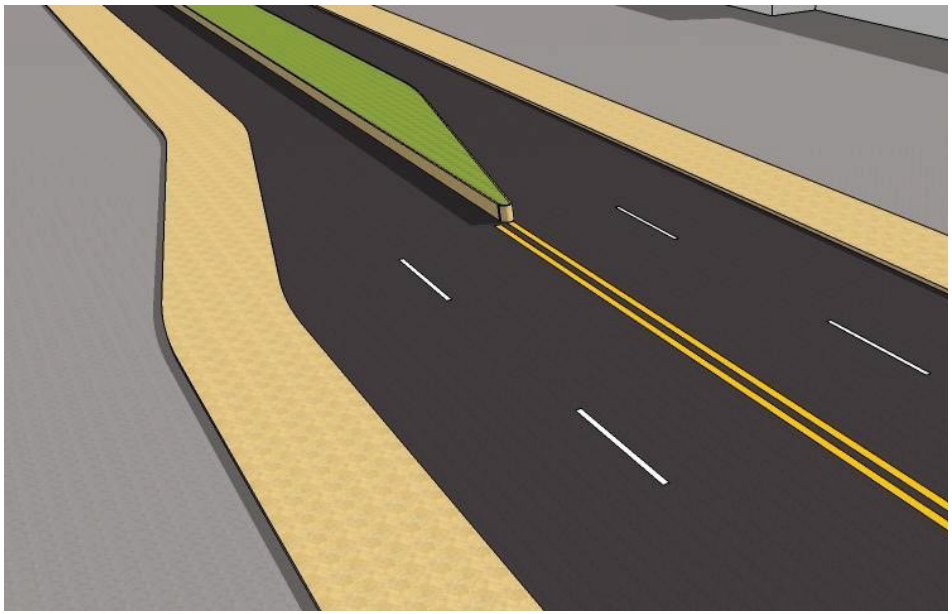
Figure 34: Photo of intersection at East Lake Blvd
Right: Students walking to Drew Charter School south of Memorial have inadequate sidewalks and little protection from high-speed traffic.

Figure 35: Illustration of intersection at East Lake Boulevard (looking northwest)
Above: Reducing this "speed section" to three lanes allows room for new sidewalks and protective barriers to shield children walking to school.

Figure 36: Illustration of intersection at East Lake Boulevard (wider aerial, looking northwest)

Moreland Avenue

Currently there are three segments of reversible-lane configuration along Memorial Drive. The shortest segment, from Moreland to Whitefoord, is barely a quarter-mile long. Besides the short length, the transition just on the east side of Moreland includes both directions in one lane with a dashed diagonal marker as the only indication on how to avoid a head-on collision. This unsafe present condition can be observed in Figure 38 below. The distance between Moreland and the proposed oval-about at Whitefoord is so minimal that it's possible to keep a two-lane configuration or three lanes with two westbound lanes so as to retain queue capacity at Moreland. This proposed change is depicted in Figure 37 from the similar eastbound perspective from the Moreland intersection illustrating the lane alignment and added median.



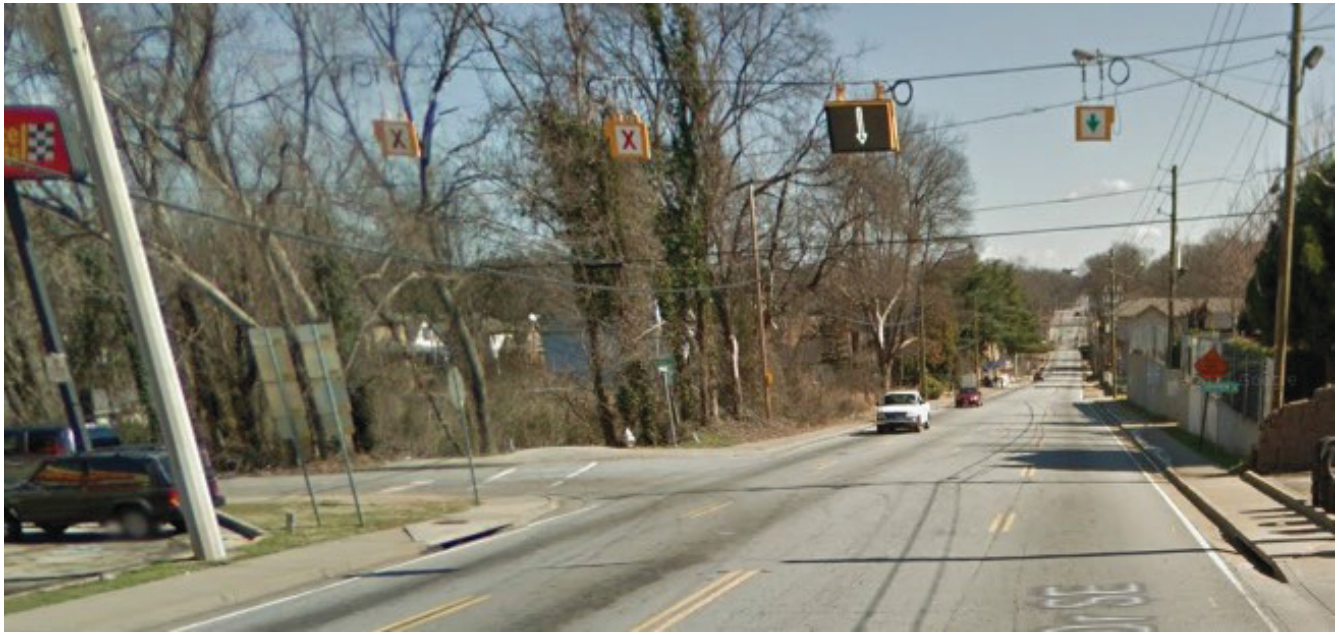


Figure 37: Illustration of proposed lane configuration east of Moreland Avenue
Above: More capacity would be kept near the Moreland intersection, but narrow down as it approaches the proposed Whitefoord "Ovalabout."

Figure 38: Photo of current lane transition east of Moreland
Left: The left eastbound lane from Moreland leads merges into the reversible lane, with only a small overhead sign to mark the direction. Photo from Google Streetview.

Cottage Grove

The fundamental concern with the intersection at Cottage Grove, 4th Street and Memorial is the unsafe geometry depicted in Figure 39. Currently Cottage Grove (the diagonal road) has fewer than 200 vehicles per hour during peak. It has no access points between this intersection and 3rd Street to the west, with the exception of a service driveway for the vacant elementary school on 4th Street. While observing this intersection, the authors witnessed a motorcycle collision at the west side of the intersection on Memorial Drive. Because the westbound stop bar is located so far back from the intersection (due again to the awkward geometry) advancing vehicles could not be seen by the motorcyclist turning onto Memorial Drive. There is also no pedestrian crossing, despite commercial buildings on either side.

To mitigate these geometric flaws, it is proposed that Cottage Grove end at 3rd Street, diverting traffic down either 3rd or 1st to gain access to Memorial Dr., and the service driveway for the school be re-routed to follow the base of the topographic change at the school and connect to 4th Street directly. The resulting effect would be the creation of a standard "T" intersection. Depending on more comprehensive traffic projections, it may or may not warrant a traffic signal.

The acquired space could be used to make the intersection more attractive for pedestrian use. Of several alternative designs, community input favored a plaza in front of existing storefronts on Memorial Drive, enhanced pedestrian facilities, and space for a bus pull-out so that the nearby Route 21 stop would not need to impede traffic. This alternative design proposal for the Cottage Grove intersection (which would not include Cottage Grove anymore) is included in Figures 40-43.

Figure 39: Illustration of current intersection at Cottage Grove
Cottage Grove curves toward Memorial Drive from the top right of the frame. Drivers turning left (east) onto Memorial can't see the indicator for the reversible lane until they are fully facing oncoming traffic.

Figure 40: Aerial photo of Cottage Grove with proposed street closure (highlighted)
The shaded green area shows the portion of Cottage Grove that could be closed to traffic with minimal loss of access for the community. Drivers would access Memorial with a signal at 3rd Avenue. Access to the school site would remain via 4th Avenue. Photo from Google Streetview.

Figure 41: Illustration of proposed redesign of Cottage Grove/4th Avenue intersection
Eliminating the Cottage Grove connection at 4th Avenue would allow a more traditional intersection design, while opening up two large wedges of right-of-way for other uses, such as greenspace, outdoor retail seating, a protected lane for MARTA buses, and shorter crosswalks.

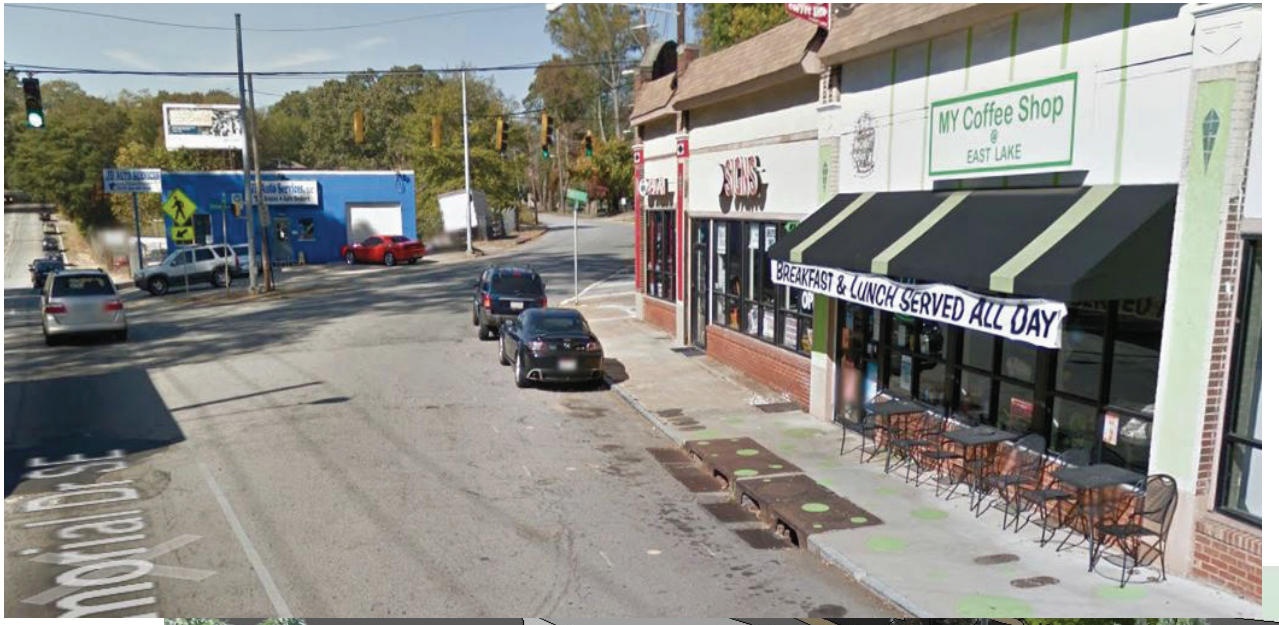


Figure 42: Photo of existing Cottage Grove intersection viewed from westbound Memorial Drive
The current configuration allows for a high-speed merge from Memorial Drive onto Cottage Grove, directly in front of a historic block of street-oriented businesses. Photo from Google Streetview.

Figure 43: Illustration of proposed redesign of intersection at Cottage Grove/4th Avenue (closer view)
The bones of a classic neighborhood retail district are in place at Cottage Grove. Relatively minor changes to surrounding traffic patterns could spark new commercial vitality for the area.s