

City of Madison

DEPARTMENT OF



TRANSPORTATION

DRAFT BRT Station Siting

August 2, 2019

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1.0 Station Siting Guidelines

BRT stations were initially laid out by Madison Area Transportation Planning Board (MPO) staff as part of the 2013 BRT feasibility study. They have been adjusted and modified since to increase ridership or reduce travel times. A key objective is to space BRT station at about one-half mile apart throughout the system. This standard is consistent with comparable BRT systems and is meant to reduce travel time for BRT passengers and economically target station investments. Siting stations close together results in slow, unreliable service with many lightly used stations and high capital costs; spacing stations too far apart limits the potential for ridership growth.

Several factors were considered when placing stations:

- **Adequate Physical Site**
There needs to be adequate space for the BRT station. Often BRT stations will be located near or at existing bus stops.
- **Existing Metro Ridership**
BRT stations should minimize walk times and be close to ridership generators to the extent possible. Existing bus stops with high boardings suggest potentially high BRT ridership.
- **Density and Destinations**
BRT stations are close to popular destinations like employment areas and hospitals, and high density residential areas.
- **Pedestrian Infrastructure and Crossings**
Since the proposed BRT routing follow arterial streets with higher traffic volumes and speeds, stations should be located where people can cross safely and comfortably. Often intersections with traffic signals provide this crossing opportunity.
- **Modal Integration**
Stations are placed where other bus routes intersect as well as where the street grid provides access to neighborhoods. Stations near the end of the line are in areas that could be served by park-and-ride lots.

The station locations identified resulted in about 50 station pairs for the full east-west, north-south system. In some locations, stations are closer together than on-half mile, but were placed to meet the criteria above. Some comparable peer BRT systems have fewer stations. These systems often have longer routes along freeways or through suburban land uses compared to Madison's proposed BRT routing.

Between 27 and 30 stations are included in the 14-15-mile east-west corridor, depending on the two route options, resulting in an average station spacing of just over one-half mile. The current BRT study will look more closely at the station locations along the east-west corridor and continue to refine them.

2.0 University of Wisconsin Campus

Madison Transportation staff coordinated with UW staff to discuss BRT station locations on the University Avenue and Johnson Street couplet. The discussions recommended stations located at Orchard Street and East Campus Mall, in both directions. Westbound Orchard Street is an existing bus stop, but the other three stops occur where there is no current Metro stop. Existing bus stops at Eastbound Johnson Street and Charter Street, Westbound University Avenue and

Park Street, Westbound University Avenue and Lake Street, Eastbound Johnson Street and Park Street, and Eastbound Johnson Street and Lake Street would be closed. Westbound buses turning left from University Avenue onto Park Street would require a new special phase because of the short distance and multiple lane merge.

The 2013 study presented stations at Bassett Street, Park Street, and either Charter Street or Randall Avenue. The revised station locations will provide faster service while still providing high quality access to the UW campus and will meet the UW's goal of directing pedestrians away from the busy Park Street intersections. In 2017, the city installed bike improvements at University and Bassett, preventing a bus stop there.

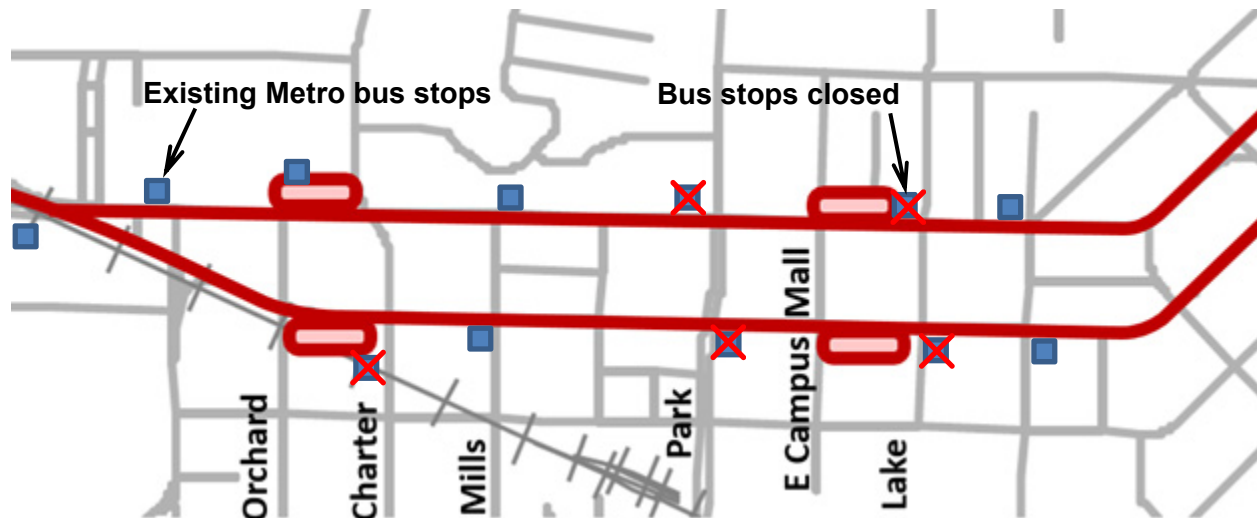


Figure 1: UW campus station locations

3.0 Downtown

Downtown Madison has a complex street network with water barriers and one-way streets, varied destinations, and connections with multiple bus routes. With the high ridership levels, downtown station siting deserves a special focus. Currently, two route alignments are under consideration: via State Street and the Capitol Square, and via Broom and Wilson Streets.

A. State Street and Capitol Square Alternative

Stations in the 200 block of State Street in both directions provide logical locations for riders since eastbound and westbound bus stops are across from each other. Westbound State Street at Gorham Street is not as advantageous because of the westbound left turn left at Gorham Street. Because this is a high congestion intersection, route delay will be minimized if BRT buses do not have to serve a near side stop. Detours that affect State Street will close these stations. Dynamic message boards will be able to provide transit riders more information than Metro is currently able to provide.



Figure 2: Eastbound station location on the 200 block of State Street

The station pair on each side of the Capitol Square (Mifflin and Pinckney Streets and Main and Carroll Streets) are existing time points and logical locations for major bus stops and BRT stations. Relocating these existing stops would have challenges because sidewalk space on the Capitol Square is already used for trees, street furniture, and dining. As designs for stations progress, the project will determine if BRT buses will board in the existing bus stops and layover areas, or in their own dedicated areas. Detours will affect these stops. Detoured buses will use the outer loop with stations near Wisconsin Avenue and Martin Luther King, Jr Boulevard. These temporary station locations will need to be upgraded from their current condition to serve BRT, with dynamic message signing at the closed stations as well as at the temporary stations.

East Washington Avenue at Webster Street is close to the Capitol Square stations. Yet it is well used by government workers originating from the east who would otherwise have to walk across the square. This stop would also serve State workers in the GEF buildings, residents in the First Settlement neighborhood, and other attractions in the area.

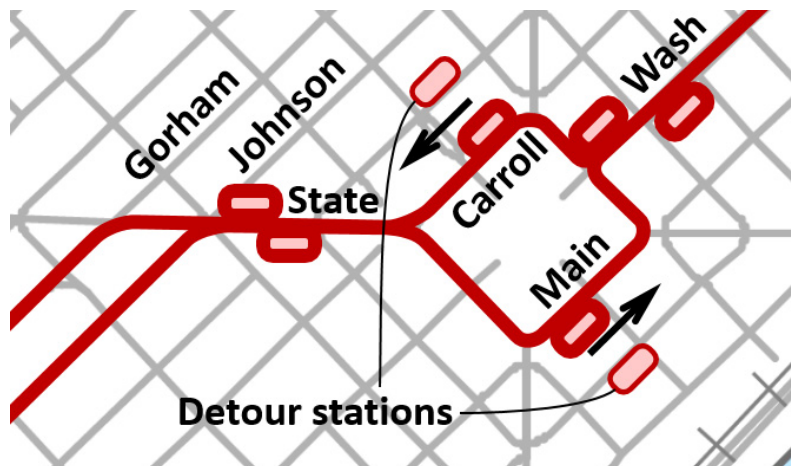


Figure 3: Downtown station locations (State Street alternative)

4.0 East of the Capitol Square

A summary of each BRT station location is below. [##] indicates estimated weekday Metro boardings at all stops serving the intersection, Spring 2019. Station locations that were considered but dismissed are indicated.

- **Livingston** [94] – In the first iteration of locating BRT stations in 2012, staff identified a station at Blair and Paterson. Since that time, a traffic signal, high density residential development, a grocery store, music venue, and other things were constructed at Livingston, making Livingston a focal point of the area, while Blair and Paterson remain less developed. The Blair and Paterson stops were consolidated to Livingston, which also provided better spacing for the stations, reducing running times and operating costs.
- **Ingersoll (not a station - dismissed)** [133] – Ingersoll initially looks like a logical station given its high ridership and that it works well for relief drivers replacing drivers at the end of their shift. However, this location would reduce the station coverage in the isthmus and result in less uniform station spacing compared with the Baldwin Street station.
- **Baldwin** [88] – Baldwin is centered between two other logical BRT stations, Livingston and First Street. It has a traffic signal, has significant ridership levels, and serves residential areas north and south of East Washington.
- **First Street** [68] – First Street has a traffic signal and serves potential redevelopment north of East Washington while avoiding open space near the Yahara River. The Atwood area is served by First Street.
- **Fourth Street** [172 (NOT counting school bus boardings, numbered routes only)] – Fourth Street would likely not be a BRT station but for East High School, generating significant traffic, mostly from students in the morning and afternoon. New queue jumps will be installed in the fall of 2019 at Fourth St.
- **Milwaukee/North** [128] – Milwaukee and North Street provide good pedestrian connections north and east of East Washington. There is a traffic signal and strong existing ridership. The station serves planned new development at Union Corners.
- **Johnson (not a station - dismissed)** [87] – East Washington and Johnson could be a BRT station in lieu of Milwaukee and Marquette, saving costs and reducing running times while serving potential development at the Madison East Shopping Center. However, Marquette and Milwaukee provide better connections to the neighborhoods and provide more consistent stop spacing.
- **Marquette** [62] – Marquette has strong connections to the Darbo/Worthington neighborhood with a pedestrian/bike overpass and the Starkweather Creek shared-use path, as well as a traffic signal. It also serves the Wisconsin Department of Corrections building.
- **Melvin/Rethke** [49] – This is one of few stations that does not have a traffic signal, but provides important service to residential areas north and south of East Washington and potential redevelopment along East Washington, and has significant ridership levels. Alternatively, this station could be at Lexington Avenue, which has lower ridership and inferior connections to dense areas north of East Washington, but has better pedestrian connections south of East Washington and east of the area. This area is also the only area on East Washington that does not have existing local service on it besides Route 6. A BRT

station pair at this location would give Metro the flexibility to not have a local underlay if it is otherwise unnecessary.

- **East Washington and Wright (not a station-dismissed)** [34] – This location would make a logical station halfway between Melvin/Rethke and Anderson, serving a redevelopment area on East Washington between Wright and Stoughton Road. However, this station would be lightly used with little existing ridership. Many of the existing riders using the inbound stop today likely use this stop because it is the first stop where different Route 6 “via”s (local alternates) come together, reducing the chance of misreading the schedule. Because BRT routes will not use “via” routes, misreading the schedule should not be an issue.
- **Straubel (not a station-dismissed)** [28] – This location would serve the low-income residential area on Straubel Street. However, this neighborhood has pedestrian connections north to the Anderson Street station.
- **Anderson** [45] – This station will be the main Madison College station, on Anderson just east of Wright. There is a traffic signal and this point is the closest BRT can get to Madison College’s “front door” on Wright Street.
- **Wright north of Anderson (not a station-dismissed)** [220] – The existing main Madison College bus stops are on Wright Street north of Anderson – these are high quality stops with shelters, real time signs, and direct access to the front door of Madison College. However, serving the existing stops would cause excessive delay for BRT as they travel up to Kinsman Blvd and back and wait for pedestrians at the Madison College crosswalk.
- **Mendota** [68] – This station has a traffic signal and serves a grocery store, low-income areas on McArthur Road, and potential redevelopment areas.
- **Lien (not a station-dismissed)** [18] – Mendota and Thierer could be consolidated to a single station at Lien. However, this change would significantly reduce the number of people and attractions within convenient walking access to BRT.
- **Thierer** [23] – This station location has a traffic signal and serves residential areas north of East Washington as well as commercial, employment, and redevelopment areas south of East Washington.
- **East Towne** [375] – East Towne is a strong logical terminal of the BRT route – it serves many people going to and from the mall, transfers to at least four other routes, and has an existing space for a layover. The existing space may need to be expanded and improved, perhaps reducing the number of parking spaces for the mall. This site is on private property and agreements with the mall would be necessary. Alternative sites include the underutilized parking area directly north of the existing stop and the area around Zeier Road south of East Towne Blvd. This station should be located so that a future BRT extension can expand the service towards Sun Prairie via US-151 or High Crossing Blvd.

5.0 West of the UW campus

A summary of each BRT station location is below. [##] indicates estimated weekday Metro boardings at all stops serving the intersection, Spring 2019. Station locations that were considered but dismissed are indicated.

- **Chamberlain** (Delayed) [N/A] – Originally this freeway station was shown just east of Walnut Street with pedestrian ramps back to Walnut and south to Old University. UW staff recommended moving the stop east to Chamberlain with a new bike and pedestrian crossing of Campus Drive and ramps to the platforms. This location will require an extensive investment in the site with likely property acquisition and cooperation with the railroad. Therefore, this station will be added to the BRT system later to avoid escalating costs and delaying the project.
- **University Bay** [363] – This very high ridership stop serves the UW Hospital and must be served by BRT.
- **Shorewood** [182] – Shorewood provides a traffic signal and connections north to the City of Shorewood as well as access to a grocery store. It fits logically between University Bay and Midvale and eliminating it would produce a one-mile gap.
- **Midvale** [381] – This very high ridership stop with a traffic signal serves Hilldale Mall and high density residential areas south of University as well as a grocery store.
- **Segoe and Sheboygan** [138] – This stop serves very high residential areas as well as pedestrian connections south on Segoe and the redeveloped state office building and Madison Yards development. BRT could be routed on Old Middleton skipping Sheboygan Avenue; however, staff believe this deviation will only cost a minute or two and serve many additional people.
- **Sheboygan at State Office Building (not a station-dismissed)** [364] – Although this stop is a high-profile stop in the neighborhood, having one stop on either end of Sheboygan Avenue will produce more uniform station spacing.
- **Sheboygan and Eau Claire** [435] – This is the highest ridership stop on Sheboygan Avenue, mainly serving people in apartment buildings in the vicinity likely traveling towards the UW campus.
- **Sheboygan at Whitney Way (not a station-dismissed)** [22] – Staff evaluated moving the Eau Claire stop to Whitney Way in order to serve new development on University Row. However, the walk from University Row is indirect, and could suppress ridership that will continue to use local service at Eau Claire.
- **Whitney Way and Regent (not a station-dismissed)** [35] – This location has acceptable spacing between Mineral Point / Whitney Way and Eau Claire, filling a one-mile gap. However, it has relatively low ridership and serves a low-density residential area.
- **Whitney Way and Mineral Point** [32] – This location has a traffic signal and is a major crossroads. It serves the north end of University Research Park and perhaps could attract employment ridership.

- **Mineral Point and Rosa** (Mineral Point Road alternative) [10] – This site serves CUNA and fills an otherwise one-mile gap.
- **Mineral Point and Yellowstone** (Mineral Point Road alternative) [28] – Yellowstone has a traffic signal and sits in a relatively central location in a relatively dense neighborhood. Memorial High School is about one-half mile to the west.
- **Mineral Point and Gammon (not a station-dismissed)** (Mineral Point Road alternative) [97] – Although this stop has the highest ridership in the corridor and provides service to Memorial High School, it is not shown as a station because it is only one-quarter mile away from Westfield Road. However, this area may be looked at more closely if the Mineral Point route is chosen. Moving the Westfield station to Gammon would serve Memorial High School, but would be a worse location for other riders, putting them in a busier intersection with longer walks to their homes and destinations.
- **West Transfer Point** (Odana alternative) [1,713] – Serving the West Transfer Point will add considerable ridership and utility to BRT. Moving the transfer point north to Mineral Point Road is difficult and would impact other Metro operations. The extra run time on southwest-side routes would result in substantial coverage reductions. Staff envision an expanded West Transfer Point on the existing site on the northwest quadrant with an “east lobe” that allows buses to conveniently serve the transfer point without looping around. Alternatively, the transfer point could be moved to the southwest or southeast quadrants, putting riders closer to destinations at the expense of BRT run times. A structured park-and-ride could be considered at this location.
- **Odana and Research Park Blvd** (Odana alternative) [9] – This station serves office and redevelopment areas becoming more dense. Ridership may increase with better service. If Research Park is connected to Forward Drive over the Beltline, it could serve the new Exact Sciences building and destinations south of the Beltline.
- **Odana and Grand Canyon** (Odana alternative) [12] – This station serves some office and redevelopment areas, including Market Square. Ridership may increase with better service.
- **West Towne Mall** (Odana alternative) [80] – A new northbound stop opposite the existing southbound stop would be added for BRT, serving the “front door” of West Towne Mall. In the future, if West Towne is redeveloped, the route would follow a new alignment connecting Odana directly to Westfield with a station central to the area. Alternatively, if BRT followed Gammon to Mineral Point, stops would be northbound far side and eastbound far side, on the wrong side of Gammon Road from the mall, and BRT buses would face congestion on Gammon Road.
- **Mineral Point and Westfield** [40] – This intersection provides a central access point for many multi-family buildings north of Mineral Point Road. It also serves a convenient access point to West Towne Mall to the south, which is a more pleasant walk than if the station were at Gammon Road.
- **Mineral Point and High Point** [25] – This is the last logical stop on the BRT line before it crosses the Beltline in the future. It serves high density neighborhoods north and south of Mineral Point. If buses turn around via Tree Lane and Big Sky Drive, a temporary park-and-ride may be negotiated at the movie theatre with structured parking presumably mostly needed on Friday and Saturday nights.

Table 1: Station matrix

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Location	1. Physical Site	2. Existing Ridership ^a	3. Density and Destinations	4. Pedestrian Infrastructure and Crossings	5. Modal Integration
Mineral Point and High Point	Typical sidewalk/terrace, ex bus stop	25	Multi-family north and south of Mineral Point	Traffic signal	Ped access west and south of Beltline, potential park-and-ride
Mineral Point and Westfield	Typical sidewalk/terrace with ex bus stop, if using mall road, inbound stop would be new stop in wide private terrace	40	Multi-family north of Mineral Point, access to retail and potential redevelopment area south of Mineral Point	Traffic signal	Ped access north, potential park-and-ride
West Towne Mall ¹	If in mall road, southbound existing small pullout stop in private parking area would need to be expanded, northbound new stop in private parking area	80	Retail and potential redevelopment area	Marked crosswalk, closest access to mall front entrance	Ped access to south of Beltline, potential future transfers to local routes
Odana and Grand Canyon ¹	Typical sidewalk/terrace, ex bus stop	12	Market Square and other retail	Traffic signal	
Odana and Research Park ¹	Typical sidewalk/terrace, ex bus stop	9	Few retail destinations, potential redevelopment	Traffic signal	
West Transfer Point ¹	Need to expand existing site or relocate to provide faster BRT circulation and parking	1,713	Retail and redevelopment area, University Research Park	Marked crosswalk, traffic signal	Transfers to many local routes, potential park-and-ride
Mineral Point and Yellowstone ²	Typical sidewalk/terrace, ex bus stop	28	Multi-family north of Mineral Point, retirement community	Traffic signal	
Mineral Point and Rosa ²	Typical sidewalk/terrace, ex bus stop	10	CUNA, University Research Park	Traffic signal	Potential park-and-ride
Whitney Way and Mineral Point	Typical sidewalk/terrace, ex bus stop	32	University Research Park, limited north of Mineral Point	Traffic signal	
Sheboygan and Eau Claire	Typical sidewalk/terrace, ex bus stop	435	High density multi-family, Madison Yards development	Marked crosswalk on low-volume street	Ped access to University Row area,

Location	1. Physical Site	2. Existing Ridership ^a	3. Density and Destinations	4. Pedestrian Infrastructure and Crossings	5. Modal Integration
					potential future transfers to Middleton Routes
Segoe and Sheboygan	Typical sidewalk/terrace, ex bus stop	138	High density multi-family, Madison Yards development	Marked crosswalk on low-volume street, future traffic signal	Ped access south along Segoe
University and Midvale	Typical sidewalk/terrace eastbound, narrow sidewalk/terrace westbound, ex bus stop	381	Hilldale Mall, multi-family to the south, retail to the north	Traffic signal	Transfers to Middleton Routes
University and Shorewood	Typical sidewalk/terrace westbound, narrow sidewalk/terrace eastbound, ex bus stop	182	Retail, urban residential, redevelopment occurring in the corridor	Traffic signal	Broken street grid south of University
University and University Bay	Typical sidewalk/terrace, westbound is adjacent to railroad, ex bus stop	363	UW/VA Hospitals, retail, urban residential	Traffic signal	
Campus Dr and Chamberlain (delayed)	Constrained site, need to provide access to Old University and north of railroad and grade-separated crossing	N/A	High density multi-family on Old University, west UW campus buildings north of Campus Drive	Future grade-separated crossing	Potential new connection to shared-use path, opens access to areas otherwise not served by BRT
University/Johnson and Orchard	Typical sidewalk/terrace	1,934	Central to most UW class buildings, Union South, Camp Randall	Traffic signal	Transfers to many local routes, BCycle station
University/Johnson and E Campus Mall	Typical sidewalk/terrace, more space than typical	2,288 (Park Street)	Southeast dormitories, Memorial Union, Kohl Center, other UW buildings	Traffic signal	Transfers to many local routes, avoids busy Park Street intersections, BCycle station
200 Block State Street ³	Sidewalk/terrace, established high pedestrian environment, ex bus stop	306	Central Library, Overture Center, downtown office buildings, student housing north of State Street	Traffic signals	Transfers to many local routes, BCycle station
Capitol Square ³	Wide sidewalk/terrace, established high pedestrian environment, ex bus stop	1,137	Capitol Square, government buildings, office	Traffic signals	Transfers to many local routes, BCycle station

Location	1. Physical Site	2. Existing Ridership ^a	3. Density and Destinations	4. Pedestrian Infrastructure and Crossings	5. Modal Integration
Broom/Henry and Gorham/Dayton ⁴	Typical sidewalk/terrace, Broom/Gorham is ex bus stop	189 (EB Johnson and Broom, NB Broom and Gorham)	State Street area businesses, dense multi-family	Traffic signals	
Broom/Henry and Doty/Main ⁴	Typical sidewalk/terrace, Broom/Doty is ex bus stop	292 (NB Broom and Doty, SB Bassett and Doty)	Student housing, retirement community	Traffic signal at Broom and Doty, marked crosswalk at low-volume street at Henry and Main	Ped access to Capital City Trail
Wilson/Doty and MLK ⁴	Typical sidewalk/terrace adjacent to Madison Municipal Building, Wilson/MLK is ex bus stop	116 (WB Wilson and MLK, SB MLK and Wilson)	Government buildings, office	Traffic signal at Doty, marked crosswalk at Wilson	BCycle station
East Washington and Webster	Typical sidewalk/terrace, wide westbound with BCycle station, ex bus stop	147 (Including SB Henry and Main)	Government buildings, urban residential	Traffic signal	BCycle station
East Washington and Livingston	Typical sidewalk/terrace, ex bus stop	94	Grocery store, dense multi-family, urban residential, other attractions	Traffic signal	
East Washington and Baldwin	Typical sidewalk/terrace, ex bus stop	88	Urban residential, office	Traffic signal	
East Washington and First	Typical sidewalk/terrace, ex bus stop	68	Urban residential, dense multi-family, redevelopment area	Traffic signal	
East Washington and Fourth	Typical sidewalk/terrace, westbound adjacent to East High School, ex bus stop	172 (Numbered routes only, not including Supplemental Schoolday Service)	High school, urban residential	Traffic signal	
East Washington and Milwaukee	Typical sidewalk/terrace, ex bus stop	128	Urban residential, dense multi-family, redevelopment area	Traffic signal	Transfer to Routes 4, 5, and 10, ped access to neighborhoods along North and Milwaukee
East Washington and Marquette	Existing bus stops under ped/bike overpass provides	62	Urban residential, office	Traffic signal and grade-separated crossing	Shared-use path crossing

Location	1. Physical Site	2. Existing Ridership ^a	3. Density and Destinations	4. Pedestrian Infrastructure and Crossings	DRAFT 5. Modal Integration
	natural weather protection, ex bus stop				
East Washington and Melvin/Rethke	Typical sidewalk/terrace, ex bus stop	49	Multi-family north of East Washington, redevelopment area south	Rapid flashing beacon, improvements may be needed	
Anderson and Wright	Typical sidewalk/terrace, no sidewalk eastbound, ex bus stop	45	Madison College, multi-family residential to the south	Traffic signal	Transfer to Routes 20 and 34, sidewalk may be needed on the south side
East Washington and Mendota	Typical sidewalk/terrace, ex bus stop	68	Grocery store and other retail and redevelopment	Traffic signal	Transfer to Route 23 – Sun Prairie express bus
East Washington and Thierer/Portage	Typical sidewalk/terrace, ex bus stop	23	Retail and redevelopment	Traffic signal	Ped access to neighborhood north of East Washington
East Towne	Existing terminal in private parking area needs to be expanded and/or relocated	375	Retail and redevelopment	Marked crosswalk	Transfers to Routes 20, 26, 30, 36, potential park-and-ride

^a 2019 estimated weekday intersection boardings, Metro Transit fixed route mainline service

¹ Odana Road route alternative

² Mineral Point Road route alternative

³ State Street route alternative

⁴ Wilson / Broom route alternative

East-West Bus Rapid Transit Stations

