



Federal Transit  
Administration

---

Madison Street Corridor Bus Rapid Transit (BRT)

**Public Services and  
Utilities**

**Technical Memorandum**

Prepared for

**Seattle Department of Transportation  
Federal Transit Administration**

Lead Author

**Environmental Science Associates**

October 2016



# 1 Introduction

Transportation projects have the potential to impact public services and utilities either directly, through the disruption of service, or indirectly through changes to land use development patterns. For instance, transportation projects can improve access to areas for emergency services. The National Environmental Policy Act (NEPA) requires that public services and utilities be considered when assessing potential impacts of a transportation project. This technical memorandum evaluates potential impacts on public services and utilities resulting from the Madison BRT Project.

## 2 Project Description

### 2.1 Background

The City of Seattle's Department of Transportation (SDOT) proposes to provide new Bus Rapid Transit (BRT) service on Madison Street between 1st Avenue and Martin Luther King, Jr. Way East (MLK Jr. Way E.), Spring Street between 1st Avenue and 9th Avenue, and 1st Avenue and 9th Avenue between Madison Street and Spring Street as part of the Madison Street Corridor Bus Rapid Transit (Madison BRT) Project.

The Madison BRT Project is located in a dense and rapidly developing area that includes portions of Madison Valley, the Central District, Capitol Hill, First Hill, and Downtown Seattle. These areas are among the densest residential neighborhoods in the City and are sizable employment centers due to the presence of two major medical centers and Seattle University. Providing BRT service along this 2.4-mile corridor is identified in the Seattle Transit Master Plan and listed as a near-term action in the 2016 Move Seattle Strategic Vision. This project would improve transit capacity, travel time, reliability, and connectivity in an area that is highly urbanized and has a lower rate of automobile ownership than other parts of the city.

### 2.2 Project Location

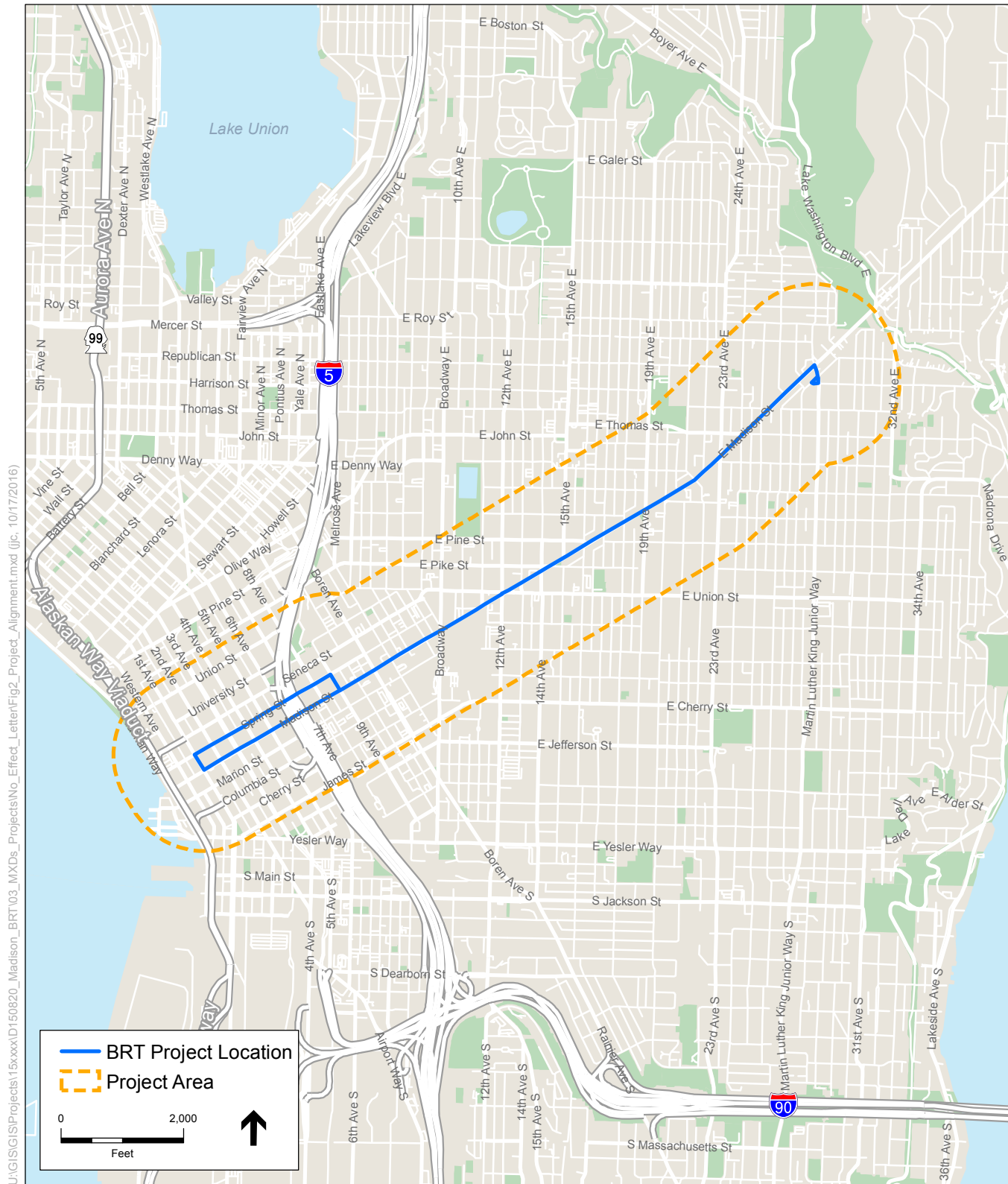
The project site is located in Seattle, Washington (Figure 1). The 4.6-mile roundtrip route would begin and end at MLK Jr. Way E in the east. Figure 2 shows that from MLK Jr. Way E the Madison BRT Project would head west on Madison Street for 2.26 miles to 1st Avenue, head north on 1st Avenue for 290 feet, head east on Spring Street for 0.43 mile, south on 9th Avenue for 290 feet, and head east on Madison Street for 1.78 miles.

The project corridor traverses several Seattle neighborhoods: Downtown, First Hill, Capitol Hill, Central Area, and Madison Valley.



SOURCE:  
 Wa. Dept. of Ecology 2016; ESA 2016; OSM 2015.

SDOT Madison BRT Design . 150820  
**Figure 1**  
 Project Vicinity



U:\GIS\Projects\15xxxx\150820\_Madison\_BRT\03\_MXD\Projects\No\_Effect\_Letter\Fig2\_Project\_Alignment.mxd (jic, 10/17/2016)

SOURCE:  
 Wa. Dept. of Ecology 2016; ESA 2016; OSM 2015.

SDOT Madison BRT Design . 150820  
**Figure 2**  
 Project Alignment

## 2.3 Description of Proposed Work

The Project would create a new BRT line along the Madison Street corridor. It would include approximately 11 BRT station areas with 21 directional platforms along the project corridor, new Transit Only Lanes (TOLs) and Business Access & Transit (BAT) lanes, pedestrian and bicycle improvements, and signal and utility upgrades along the corridor. Each stop would typically have a shelter (except the 1<sup>st</sup> Avenue stop), off-board fare payment machines, and real-time arrival information. The level-boarding platforms would be approximately 13 inches in height (1<sup>st</sup> Avenue stop would have 10-inch platform to accommodate the streetcar) and ADA-accessible to the maximum extent feasible.

The Madison BRT Project would replace portions of the King County Metro Route 12 where they would otherwise overlap. Metro anticipates they will revise Route 12 to compliment the BRT and continue to serve the east Capitol Hill areas as it currently does. The BRT would operate Monday through Saturday from 5 a.m. to 1 a.m. and on Sundays and holidays from 6 a.m. to 11 p.m. They would run every six minutes between 6 a.m. and 7 p.m. on weekdays and every 15 minutes during all other hours of operation.

Construction would start in 2018 and conclude in the fall of 2019.

### Right-of-Way Improvements

#### *Reconfiguration of Lanes*

As part of the project, new TOLs and BAT lanes would be provided. TOLs can be located anywhere within the right-of-way and only allow transit use. They are typically painted red to inform all corridor users that this lane is for transit only. BAT lanes are a type of bus lane located on the curbside and permit general traffic use for accessing driveways or crossing streets (but not for through travel).

#### *Parking*

Bus lanes must be at least 10.5 feet, and preferably 12 feet wide, according to American Public Transportation Association (APTA) standards (APTA, 2010). Many of the existing rights-of-way within the corridor would not allow for the addition of a new 10.5-foot-wide bus lane without the removal of on-street parking. The Madison BRT Project would remove 222 on-street parking spaces within the corridor, 10 of which would be passenger or delivery loading spaces, 113 would be street parking spaces, and 99 would be spaces that are restricted (currently allowing parking during non-peak hours only).

#### *Alterations to Existing Street Corridor*

According to APTA standards, bus lanes must be at least 10.5 feet wide (APTA, 2010). Many of the existing rights-of-way within the corridor would not allow for the addition of a new 10.5-foot-wide

#### **What is a TOL?**

A Transit Only Lane (TOL) is a lane dedicated for buses. General purpose traffic is not allowed to use TOLs.

#### **What is BAT lane?**

Business Access and Transit (BAT) lanes help move bus riders and others more efficiently and improve access to businesses and residences by reserving outside curb lanes for right-turning vehicles and buses.

bus lane without the narrowing of other existing lanes. In certain sections of the roadway, existing general purpose lanes may need to be converted for BRT use. A list of the changes to the existing street corridor is provided below:

- Roadway curb widening on seven blocks of Madison Street;
- Full depth PCCP roadway restoration under proposed BRT travel lanes corridor wide;
- Sidewalk restoration and repairs impacting approximately 75 block faces;
- Storm water detention system construction underneath Madison Street (up to 72" detention pipe diameter);
- Corridor wide roadway restriping;
- Remove north/south crossing of Madison Street via Terry Avenue; and
- Remove left turn lanes on Madison Street to Minor Avenue, Summit Avenue, and Boylston Avenue.

### **Signal and Utility Improvements**

As part of the Madison BRT Project, Transit Signal Priority (TSP) would be provided at most signalized corridor intersections between 7<sup>th</sup> Avenue and MLK Jr Way. Signal priority would be used to hold lights green for approaching BRT vehicles and shorten red times for BRT vehicles at intersections. Separate "queue jump" transit only phases would be employed where BRT vehicles need to go in advance of general purpose traffic. In addition, two new signals would be provided on Spring Street: one at the 8<sup>th</sup> Avenue intersection and one at the 9<sup>th</sup> Avenue intersection.

The vehicles would be electrically powered using either electric trolleybus (ETB) technology requiring overhead contact systems (OCS) or some combination of ETB/OCS and emerging battery-powered technology allowing for substantial "off wire" operation. In order to power the line, new overhead wires would need to be installed in the following areas:

- 1<sup>st</sup> Avenue from Madison Street to Spring Street (approximately 300 feet)
- Spring Street from 1<sup>st</sup> Avenue to 3<sup>rd</sup> Avenue, and from 7<sup>th</sup> Avenue to 9<sup>th</sup> Avenue (approximately 0.5 mile);
- 9<sup>th</sup> Avenue from Spring Street to Madison Street (approximately 300 feet);
- Madison Street from 19<sup>th</sup> Avenue to MLK Jr. Way E (approximately 0.7 miles); and
- MLK Jr. Way E from Madison Street to E Harrison Street (approximately 800 feet).

In addition, a new traction-powered substation (TPSS) would be needed somewhere near the eastern end of the project, where the existing overhead catenary system would need to be extended.

### **Stormwater Improvements**

The project would replace existing stormwater infrastructure impacted by the Madison BRT Project. The majority of storm drainage impacts would be from proposed curbside bus stations.

The Project would address the City's stormwater code, improving stormwater quality and detention where required. The project passes through three basins and each would be addressed appropriately. The project is required to provide flow control for two of the five stormwater basins. The basins that require flow control are the Combined Sewer West basin and the Combined Sewer East basin. Combined Sewer West basin is in the downtown area on Spring Street and Madison Street from 1<sup>st</sup> Avenue to Interstate 5. The Combined Sewer East basin is from 17<sup>th</sup> Avenue to the

end of the project at MLK Jr. Way E. The project would evaluate stormwater BMPs including rain gardens and pervious surfaces to meet requirements of the City of Seattle 2016 Stormwater Manual.

### **Utility Relocations**

Utilities are anticipated to be relocated where the roadway would be widened to accommodate BRT bus lanes and stations. There are approximately eight blocks that are proposed for widening. Utilities that would be relocated include roadway lighting, overhead contact systems, signals, storm drainage, overhead and underground power, and overhead and underground telecommunications. There are conflicts with proposed bus station amenities and existing utility systems that would require utility modifications and relocations.

### **Pedestrian and Bicycle Improvements**

The Project would include a number of improvements for pedestrians and bicyclists. Where the project is impacting the existing sidewalks along the corridor, repairs or replacements would be completed to restore them to ADA standards. Protected Bicycle Lanes (PBLs) would remain on Spring Street between 2<sup>nd</sup> Avenue and 4<sup>th</sup> Avenue and added on Union Street between 12<sup>th</sup> Avenue and 14<sup>th</sup> Avenue. A sharrow situation would be created in the left lane on Spring Street from 1<sup>st</sup> Avenue to 2<sup>nd</sup> Avenue.

### **Other Improvements**

Landscaping Improvements would be made along the corridor where possible. All street trees removed for road and sidewalk work would be replaced in accordance with the City of Seattle's Tree Replacement Standards (SMC 15.43) and in coordination with SDOT Urban Forestry. As part of the project, SDOT would be installing a new 2,600 square-foot Pocket Plaza with sidewalk and landscaping at the intersection of Madison Street, E Pike Street and 14<sup>th</sup> Avenue.

The City has committed to contributing 1% of City funds to add public art (1% for Art Program); federal and state funds do not apply to this program. These funds are combined with other project art contributions to fund larger art installations which may or may not be located on the Madison Street corridor; this decision is made by the City's Art Council.

## **3 Affected Environment**

### **3.1 Emergency Services**

#### **Police**

The West and East Precincts of the Seattle Police Department (SPD) provide emergency response and public safety services within the Madison BRT Project area. The West Precinct is located at 810 Virginia Street, approximately 0.7 mile east of the project alignment. The East Precinct is located at 1519 12th Avenue, approximately 650 feet east of Madison Avenue. Services provided by the precincts include patrol officers and 9-1-1 responders, bicycle patrols, Anti-Crime Teams, a liaison attorney, burglary/theft detectives, Community Police Teams, and Crime Prevention units. SPD headquarters is located at 610 Fifth Avenue. In addition to regular patrols, the SPD periodically



conduct transit lane emphasis patrols. During these times, emphasis is given to enforcing the restrictions on BAT lanes and TOLs.

King County Metro Transit police, a special unit of the Sheriff's office, is the primary law enforcement agency for Metro Transit services. They are responsible for enforcing the Metro Transit Code of Conduct and protecting both operators and riders. They patrol the system by bus, on bicycles, and by car.

### **Fire and Emergency Medical**

Fire and emergency medical services in the project area are primarily provided by the Seattle Fire Department (SFD). The Madison BRT Project area is served by SFD Station #2, located at 2320 4<sup>th</sup> Avenue, approximately 0.9 mile east of the project alignment. SFD Headquarters is located at 301 2<sup>nd</sup> Avenue South. "The mission of the Seattle Fire Department is to save lives and protect property through emergency medical service, fire and rescue response and fire prevention" (City of Seattle, 2016a). Emergency units are generally dispatched from the station closest to the call site, although units can be dispatched from other stations as needed.

In addition to services provided by SFD, ambulance service is also provided by private companies like Tri-Med Ambulance, American Medical Response, and Airlift Northwest. Swedish Medical Center and Virginia Mason Seattle Main Campus are both located on the Madison Street corridor. These hospital facilities provide both emergency and non-emergency medical care to the greater Seattle area. Emergency services are sometimes provided by social services and community groups such as homeless shelters.

## **3.2 Social Community**

There are approximately 100 community facilities in the study area, including social services, cultural institutions (such as libraries, museums, theaters, and landmarks), religious institutions, and government offices. There are also approximately 15 park facilities in the study area which consist of small green spaces, garden, and open plazas. The following is a list of those community facilities that are directly adjacent to the project elements:

### **Social Services**

- Pioneer Human Services
- Planned Parenthood
- Powerful Voices
- Pride Foundation
- Puget Sound Blood Center
- Swedish Medical Center
- Virginia Mason Seattle Main Campus

### **Cultural**

- Bakke Graduate University
- First A.M.E. Child Development Center
- Seattle Academy of Arts and Sciences Arts Center
- Seattle Public Library – Central Library
- Seattle University

### **Religious Institutions**

- First A.M.E. Church
- Madison Temple Church of God
- Sanctuary Church – Capitol Hill
- Seattle First Presbyterian Church

### **Government Offices**

- Federal Trade Commission
- Office of Senator Maria Cantwell
- Seattle Housing and Urban Development Office
- Seattle Inspections Department
- US Appeals Court
- US Coast Guard District 13
- US Immigration Review Court
- US Internal Revenue Services
- US Social Security Administration

## **3.3 Other Public Services**

The Madison BRT Project is within the Seattle Public School District. Schools that have attendance boundaries within or near the project corridor include:

- Garfield High School
- McClure Middle School
- Washington Middle School
- McGilvra Elementary School
- Bailey Gatzert Elementary School
- Stevens Elementary School
- Lowell Elementary School
- Madrona K-8 School

- Nova High School (Option School)
- Seattle World School (Option School)

Postal services are provided in the project vicinity by the US Postal Service and private companies such as the United Parcel Service, Inc. (UPS), FedEx, DHL, and others.

Seattle Public Utilities provides curbside collection of garbage, recycling and yard waste. Collection services are contracted through Waste Management. There is also a transfer station located at 130 South Kenyon Street for garbage, recycling and hazardous waste drop off.

### 3.4 Utilities

For utilities, the project area includes all areas within the public right-of-way where the stations, OCS poles, and other infrastructure are proposed. Electricity, water, sewer/stormwater, gas, steam, and communication lines are all located within the project area. Table 1 describes the utilities, providers, and locations that could potentially be affected by the project.

**Table 1 Existing Utilities in the Study Area**

Utility	Provider	Location/Description
<b>Electric Power</b>	Seattle City Light	Within the project corridor, network and distribution feeder lines are located underground west of I-5 and above ground east of I-5 (SCL, 2016).
<b>Water</b>	Seattle Public Utilities	Water mains are located in Spring from 1 <sup>st</sup> Ave to 6 <sup>th</sup> Ave; in Madison from 1 <sup>st</sup> Ave to 8 <sup>th</sup> Ave and 12 <sup>th</sup> Ave to MLK Jr Way; and cross Madison at almost every cross street east of I-5. There is at least one fire hydrant at every intersection along the corridor (SPU, 2016).
<b>Sewer/Stormwater</b>	Seattle Public Utilities	There are City-owned combined sewer/stormwater lines in Spring and Madison west of I-5; sanitary-only, stormwater-only, combined, and private drainage lines are located throughout most of Madison east of I-5 (SPU, 2016).
<b>Natural Gas</b>	Puget Sound Energy	There are natural gas lines located with and crossing both Madison Street and Spring Street.
<b>Steam</b>	Enwave (formerly Seattle Steam)	Low pressure lines cross Spring in several areas between 1 <sup>st</sup> Ave and 6 <sup>th</sup> Ave, and in Madison from 1 <sup>st</sup> Ave to 6 <sup>th</sup> Ave. High pressure lines cross Spring and Madison at 5 <sup>th</sup> Ave and 9 <sup>th</sup> Ave (Enwave, 2016).
<b>Telecommunications</b>	Multiple providers	Fiber-optic cables and telephone lines in the study area are provided by several private companies and public utilities that own fiber-optic cable and/or provide long-distance and other telecommunication services. Exact locations are unknown at this time.

## **4 Project Effects**

### **4.1 Construction Impacts**

#### **Public Services**

Construction activities within a densely populated corridor such as the Madison BRT Project corridor can affect access to some areas for public service providers. The Madison BRT Project contractors would be required to maintain access to all adjacent properties at all times for emergency service providers. Potential effects during construction of the project would include slightly increased travel time or detours for emergency vehicles due to temporary lane closures and cross-road access restrictions, or closures on evenings and weekends, within the segment under construction. These delays are expected to be minor because the proposed construction would be phased as opposed to disrupting the entire alignment at once, and emergency service providers would have alternative routes available.

Removing on-street parking and delivery zones to accommodate the BAT lanes and TOLs would affect public services, such as postal service and private delivery services. Most waste removal services occur in the alleyways and therefore would not be affected. Close coordination with emergency and other service providers on the project schedule would ensure that impacts to property owners are limited.

#### **Utilities**

Utilities are anticipated to be relocated where the roadway would be widened to accommodate BRT bus lanes and stations. There are approximately eight blocks that are proposed for widening. Utilities that would be relocated include roadway lighting, overhead contact systems, signals, storm drainage, overhead and underground power, and overhead and underground telecommunications. Disruptions in utility service are most likely to occur where the exact location of utility lines is unclear, as is the case with some older systems. All utility relocations would be replaced in kind with the exception of some stormwater facilities.

### **4.2 Operational Impacts**

#### **Public Services**

It is not anticipated that the proposed changes to the channelization of Madison Street and Spring Street would cause delays to police and other emergency services. Although general purpose traffic lanes are being eliminated in some locations, emergency service vehicles would be allowed in BAT lanes and TOLs; therefore, the change in travel times for emergency service providers is expected to be minimal.

Removing on-street parking and delivery zones to accommodate road widening and station construction would affect public services, such as postal service and private delivery services. Most waste removal services occur in the alleyways and therefore would not be affected.

#### **Utilities**

The project would replace existing stormwater infrastructure impacted from proposed BRT, pedestrian, and bicycle improvements. The majority of storm drainage impacts would be from

proposed curbside bus stations. The project would be required to provide flow control for two of the three stormwater basins. The basins that require flow control are the Combined Sewer West basin and the Combined Sewer East basin. All changes to the stormwater system in the project area are expected to be beneficial. For additional information on the drainage basins within the project area, see the Madison Street Corridor BRT No Effect Letter (ESA, 2016a). No long-term effects on other utilities are anticipated.

## 5 Mitigation

Potential operational impacts on public service and emergency service will be mitigated with the following measures:

- SDOT will continue close coordination with emergency service providers (police, fire, hospitals, and other service organizations) during final design and construction.
- SDOT will continue to look for opportunities to create new parking and loading areas as the Madison BRT Project design progresses. SDOT will continue to coordinate with the business and property owners along the corridor that would be directly affected by parking removal. If necessary, SDOT will relocate property access points to side streets in order to maintain loading and unloading areas and access points.
- Solid waste removal will have limited access in construction areas, likely via alleyways and side streets, where curbside service is the only option.

SDOT will work closely with SPU and SCL during final design of the proposed project to take into consideration existing utility lines when determining the final location of new facilities so as to minimize conflicts with future maintenance work on those lines. Prior to the start of any construction, existing utilities and appurtenant facilities (catch basins, fire hydrants, etc.) would be located and field-verified where feasible to avoid conflicts with the proposed facilities.

Coordination with the individual utility providers would be required to determine whether or not existing and future utilities could be affected and how best to avoid or minimize those impacts. SDOT would continue to work with the utility service providers during final design of the project to coordinate the placement of new facilities and ensure protection of other utilities.

Where utility relocations are required, they would be scheduled in advance so as to minimize potential service outages. SDOT would develop a plan for public outreach to inform customers of potential service outages and construction schedules. The public outreach effort would be coordinated with the utility service providers.

The project will meet the requirements of the City of Seattle 2016 Stormwater Manual.

## 6 References

- City of Seattle. 2016a. Seattle Fire Department webpage. Accessed July 2016 at <http://www.seattle.gov/fire/deptInfo/introduction.htm>.
- City of Seattle. 2016b. Seattle Police Department webpage. Accessed July 2016 at <http://www.seattle.gov/police/about/default.htm>.
- Enwave Seattle. 2016. Enwave Seattle website. Service Area Map accessed July 2016 at <http://www.enwavesettl.com/service-area-map.htm>.
- Environmental Science Associates (ESA). 2016a. Draft Madison Street Corridor BRT No Effect Letter. August 2016.
- Environmental Science Associates (ESA). 2016b. Draft Madison Street Corridor BRT Energy Technical Memorandum. August 2016.
- King County. 2016. King County Metro Online, Safety & Security. Accessed July 2016 at <http://metro.kingcounty.gov/safety/transit-police.html>.
- Puget Sound Energy (PSE). 2016. Puget Sound Energy website. Accessed July 2016 at <https://pse.com/aboutpse/Pages/default.aspx>.
- Seattle City Light (SCL). 2016. Seattle City Light website. Accessed July 2016 at <http://www.seattle.gov/light/electricservice/map.asp>.
- Seattle Public Utilities (SPU). 2016. Seattle Public Utilities website. Accessed July 2016 at <http://www.seattle.gov/util/engineering/developmentservicesoffice/watersewermap/>.