

Technical Memorandum

Date: July 30, 2007

To: Kristen Overleese, PE, City of Shoreline

From: Kevin Gifford

cc: Jennifer Barnes

Subject: Public Services and Utilities Analysis, Aurora Corridor Improvement Project

Introduction

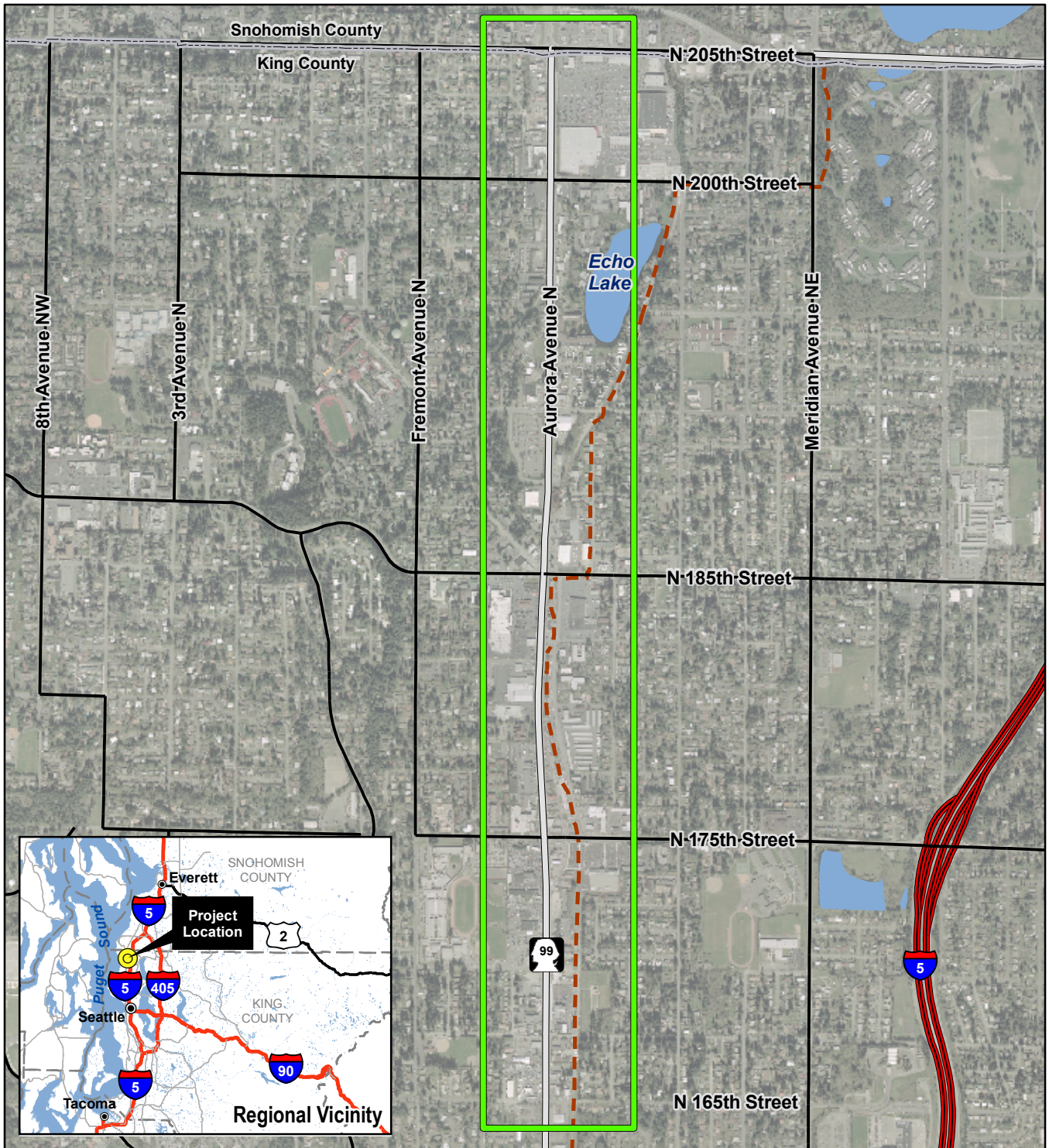
What is the purpose of this memorandum?

The City of Shoreline (City) proposes to construct the Aurora Corridor Improvement Project: N 165th Street to N 205th Street (Project), which will improve a 2-mile-long segment of State Route (SR) 99, named Aurora Avenue North (N) within the City. This Project must be developed in compliance with the National Environmental Policy Act (NEPA) and the Washington State Environmental Policy Act (SEPA).







This technical memorandum was prepared in general accordance with Section 470 of the Washington State Department of Transportation (WSDOT) Environmental Procedures Manual (WSDOT 2006). It describes the public services and utilities available within the study area and the potential effects of the Project on services and utilities.

Where is the Project located?

The Project is located within the city limits of the City on Aurora Avenue N between N 165th Street and N 205th Street (Figure 1, *Project Vicinity*).



Sources: City of Shoreline (2006); Jones & Stokes (2007)

-  City Boundary
-  Project Area
-  Interstate
-  State Route
-  Arterial
-  Interurban Trail

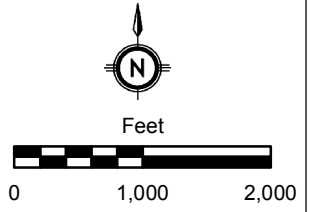


Figure 1. Project Vicinity
 Aurora Corridor Improvement Project
 July 2007

What are the existing characteristics of the Aurora Avenue N corridor?

Aurora Avenue N is a major north/south urban highway that serves both local and regional traffic within the City (Figure 1, *Project Vicinity*). It is a key regional vehicular, transit, and truck corridor within the greater area of Puget Sound and serves as the City's primary arterial roadway, running approximately parallel to Interstate (I)-5 with connections at N 145th Street, N 175th Street, and N 205th Street. Development along the corridor is predominantly commercial, mixed with some multi-family housing. Echo Lake is located approximately 200 feet to the east of the roadway, north of N 192nd Street. The Interurban Trail, currently under construction, runs roughly parallel to Aurora Avenue N, to the east in the Project corridor. Aurora Avenue N has two general-purpose travel lanes in each direction, with a center two-way left-turn lane. Shoulder and sidewalk of varying widths are located sporadically along the corridor, with no curb or gutter, and little landscaping.

Under existing conditions, average daily traffic (ADT) on the roadway is 33,000 to 39,000 vehicles per day. A steady level of pedestrian and bicycle travel occurs along and across the roadway, but the corridor is heavily oriented to vehicle travel and is generally not conducive to non-motorized travel. WSDOT has designated several areas of Aurora Avenue N between N 165th Street and 205th Street with poor safety ratings. The corridor is served heavily by public transit provided by King County Metro, with additional service at the north end of the corridor provided by Community Transit.

Why improve Aurora Avenue N?

The purpose of the Aurora Corridor Improvement Project, N 165th Street to N 205th Street, is to improve safety, circulation, and operations for vehicular and non-motorized users of the roadway corridor, to support multi-modal transportation within the corridor, and to support economic stability along the corridor.

Why consider public services and utilities in planning this Project?

Public services and utilities are evaluated in planning this Project because transportation projects have the potential to impact them either through the creation of demand beyond the capacity of service providers or by disrupting service. Many public services, such as police, fire, emergency services, and schools are dependent on the City's transportation network, and public utilities are often located within street rights-of-way.

What are the key points of this memorandum?

- The Project would include the transfer of existing aboveground utilities to underground locations in the Project area, in compliance with the goals and policies of the City’s Comprehensive Plan.
- TV and fiber-optic cables are currently buried under Aurora Avenue N along its entire length within the Project area. The Project would not result in the removal or relocation of this cable alignment.
- Water mains are currently buried under Aurora Avenue N along its entire length in the Project area and additional water mains cross Aurora Avenue N in several locations.
- Alternatives A and B would result in impacts on Seattle City Light property on the east side of Aurora Avenue N where Seattle City Light’s right-of-way is located adjacent to Aurora Avenue N.
- All three Build Alternatives would impact Seattle City Light property in the vicinity of N 175th Street and N 185th Street.
- All three Build Alternatives would cause relatively equal levels of disruption to existing utilities.
- Construction activities may result in traffic delays that could lengthen the response time for emergency response vehicles and may disrupt other public services.

Table 1 summarizes the potential public service and utilities effects and mitigation measures, as identified in this technical memorandum.

Table 1. Potential Public Services and Utilities Effects and Mitigation

Potential Effects and Mitigation	Alternatives			
	No Build	A	B	C
Potential Operational Effects				
Potential beneficial effects from increased utility reliability due to under grounding of electrical, cable, and phone lines.		X	X	X
Mitigation: Beneficial effect, no mitigation is required.				
Improved traffic circulation and Level of Service leading to improvement in public service response times.		X	X	X
Mitigation: Beneficial effect, no mitigation is required.				
Potential Construction Effects				
Decreased level of service for emergency services and other public service providers due to increased traffic congestion on Aurora Avenue N during construction.		X	X	X

Potential Effects and Mitigation	Alternatives			
	No Build	A	B	C
<p>Mitigation: Coordinate with public service providers to minimize delays, including notifying public service providers of the construction schedule and of any temporary lane or access closures.</p> <p>Coordinate with school officials before and during construction.</p> <p>Schedule lane closures for off-peak hours When feasible (e.g., at night)</p>				
<p>Disruption of utility service during construction of the Project and utility relocation.</p>		X	X	X
<p>Mitigation: Map all utilities prior to starting construction to avoid accidental disruptions.</p> <p>Coordinate with utility providers to minimize disruption of service.</p> <p>Notify and coordinate with fire departments for waterline relocations that may affect water for fire suppression, and establish alternate supply lines prior to any breaks in service.</p> <p>Coordinate with business and property owners to schedule utility connection work to minimize impacts on business operations.</p>				
<p>Potential for increased need for police for crime prevention at construction sites and for traffic and pedestrian control during construction.</p>		X	X	X
<p>Mitigation: Coordinate with law enforcement agencies to implement crime prevention principles and to ensure adequate staffing for traffic and pedestrian control during construction.</p>				

Alternatives

What alternatives are considered?

This technical memorandum evaluates the potential effects of a No Build Alternative and three Build Alternatives, which are described in the following sections.

No Build Alternative

Under the No Build Alternative, Aurora Avenue N would remain exactly as it is today. The roadway has two general-purpose lanes in each direction with a center two-way left-turn lane. Shoulder and sidewalk of varying widths are located sporadically along the corridor with no curb or gutter and little landscaping. The corridor is served heavily by public transit provided by King County Metro, with additional service at the north end of the corridor provided by Community Transit. Buses on Aurora Avenue N would continue to travel and stop in the general-purpose lanes.

Build Alternatives

The City has proposed three Build Alternatives: Alternative A, Alternative B, and Alternative C. Table 2 provides an overview of Project features unique in an individual Build Alternative and features common among them.

Figures 2, 3, and 4 present plan views of the three Build Alternatives, respectively. Figure 5 presents more detailed schematic drawings of the proposed roadway configurations under each of the three alternatives. The drawing shows one direction of travel of the proposed roadway alternatives, which is typical of both directions.

When will the Recommended Alternative be selected?

The Recommended Alternative will be selected after all of the environmental analysis has been completed for the No Build Alternative and three Build Alternatives. The discipline reports and technical memoranda that summarize the environmental analysis will be available for public review after they are finalized.

The boundaries of the three Build Alternatives encompass the maximum possible footprint of the Project. The Recommended Alternative ultimately selected for the Project may combine different elements from the different Build Alternatives. However, no part of the Project will occur outside of the boundaries of the study area analyzed in this report.

Affected Environment

How was information on public services and utilities collected?

The Project lies within a heavily populated area for which the locations of public utilities have been studied and mapped. Information on the locations and types of existing utilities in the Project area were obtained from maps prepared by the various service providers and by field survey. Information on public services available in the vicinity of the study area was obtained from the City's website, from geographic information system (GIS) data provided by the City, and from the Shoreline School District.

What is the study area for public services and utilities?

The study area for utilities is defined by the footprint of the Build Alternatives for the Project. The study area for public services is extended 0.25 mile outside of these limits, a distance selected because it encompasses all public services that may potentially be affected by the Project.

Table 2. Common and Unique Features of the Aurora Corridor Improvement Project Build Alternatives

Features Common among Build Alternatives A, B, and C			
General-purposes lanes	Project design includes two general-purpose lanes in each direction.		
BAT lane	Each Build Alternative would include one Business Access and Transit (BAT) lane in each direction.		
Sidewalk	7-foot sidewalks would be constructed along both sides of the corridor.		
Curb and Gutter	Curb and gutter would be constructed along both sides of the corridor. Curb ramps would be constructed at all intersections in accordance with ADA requirements.		
Underground utilities	Utilities would be placed underground for each of the three Build Alternatives.		
Vegetation	Each of the alternatives includes vegetative plantings. Extent and location vary as described below.		
Center median	A center median would be added, with left-turn and u-turn pockets (width of the center median varies by alternative, as described below).		
Traffic signals	New traffic signals proposed at Aurora Avenue N/N 182nd Street and Aurora Avenue N/Firlands Way N (north of N 195th Street). Signalized intersections will be widened to improve east-west capacity and traffic flow.		
Road improvements	Improvements would be made to: <ul style="list-style-type: none"> Echo Lake Place (north of N 195th Street), including realignment and a connection to Aurora Avenue N at Firlands Way N; and Midvale Ave N (N 175th Street – N 183rd Street), including realignment, addition of a center turn lane, curb and gutter, and sidewalk on the east side of the roadway. The new Interurban Trail will serve as the walking path on the west side of the roadway. 		
Features that vary among Alternatives A, B, and C			
	Alternative A	Alternative B	Alternative C
Cross Section	Typically 98 feet from back-of-sidewalk to back-of-sidewalk. The cross section will be wider where utility vaults, light/signal poles, and bump outs are located, as described below. This dimension is 12 feet narrower than the cross sections proposed under Alternatives B and C, due to a narrower median (12 feet instead of 16 feet) and the absence of the 4-foot amenity zone on each side of the roadway. The City would also acquire a continuous 3-foot-wide easement behind the sidewalk on each side of the roadway for placement of utilities.	110 feet from back-of-sidewalk to back-of-sidewalk.	110 feet from back-of-sidewalk to back-of-sidewalk.
Median Width	Center median would be 12 feet wide.	Center median would be 16 feet wide.	Center median would be 16 feet wide.
Amenity Zone	No amenity zone provided. Utility vaults and light/signal poles would be located behind the sidewalks in the 3-foot easement area.	A 4-foot amenity zone would be located between the curb and sidewalk on each side of the street. Utility vaults, light/signal poles, bus stop signs, hydrants, and other pedestrian amenities would be located in this area.	A 4-foot amenity zone would be located between the curb and sidewalk on each side of the street. Utility vaults, light/signal poles, bus stop signs, hydrants, and other pedestrian amenities would be located in this area.
Bump Outs	Bump outs approximately 4 feet in additional width would be needed at u-turn and left-turn locations to achieve the turning radii needed to accommodate u-turns.	None needed. U-turns would be sufficiently accommodated within the standard roadway width.	None needed. U-turns would be sufficiently accommodated within the standard roadway width.
Placement of Alignment	Required widening would be shifted to the east of the existing right-of-way in the vicinity of N 175th Street, N 185th Street, and N 200th Street.	Required widening would be shifted to the east of the existing right-of-way in the vicinity of N 175th Street, N 185th Street, and N 200th Street.	Required widening would be shifted to the west of the existing right-of-way in the vicinity of N 175th Street, N 185th Street, and N 200th Street.
Vegetation	Limited vegetation would be provided in the median.	More vegetation accommodated by wider median. Vegetation could also be planted in areas within the amenity zone.	More vegetation accommodated by wider median. Vegetation could also be planted in areas within the amenity zone.

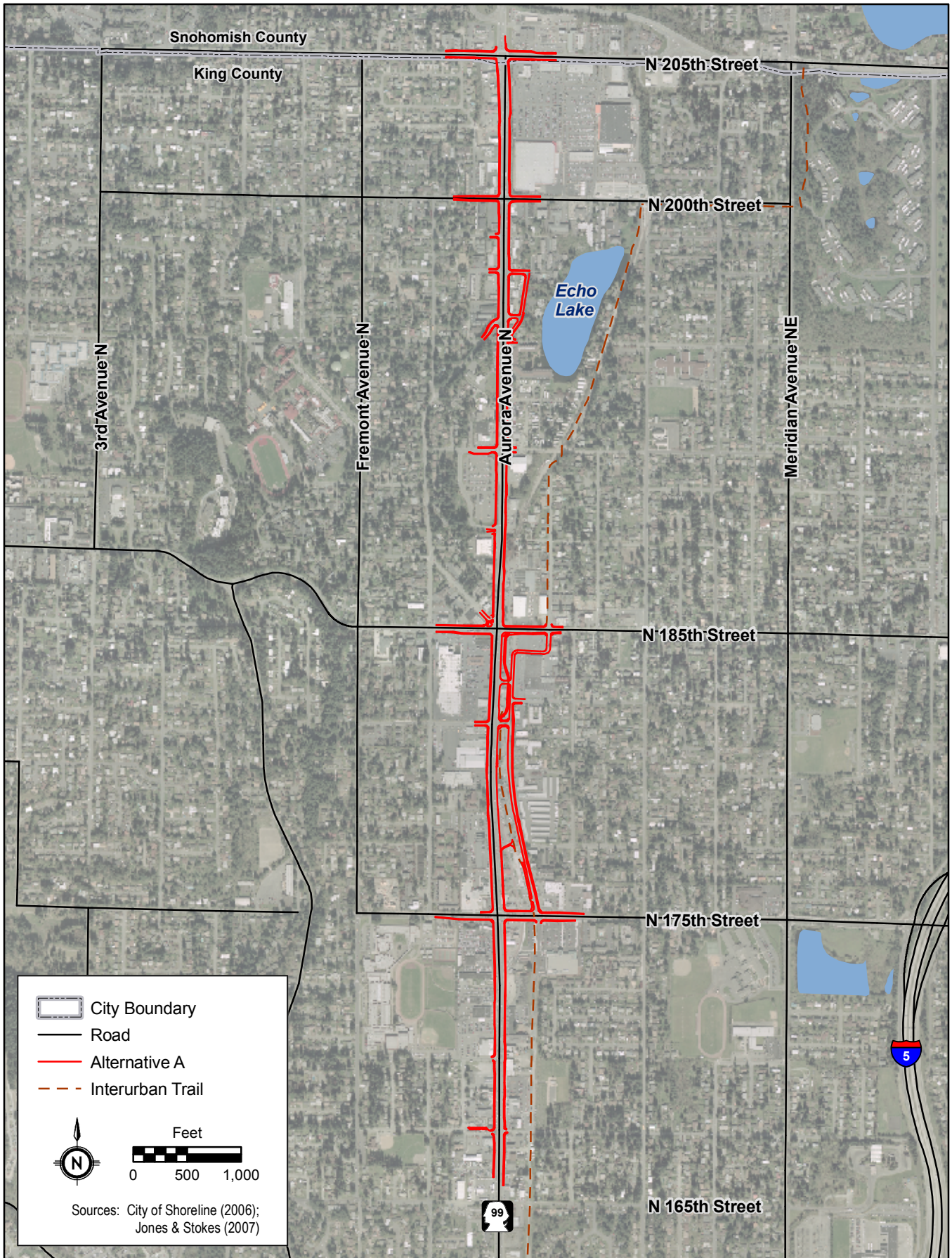
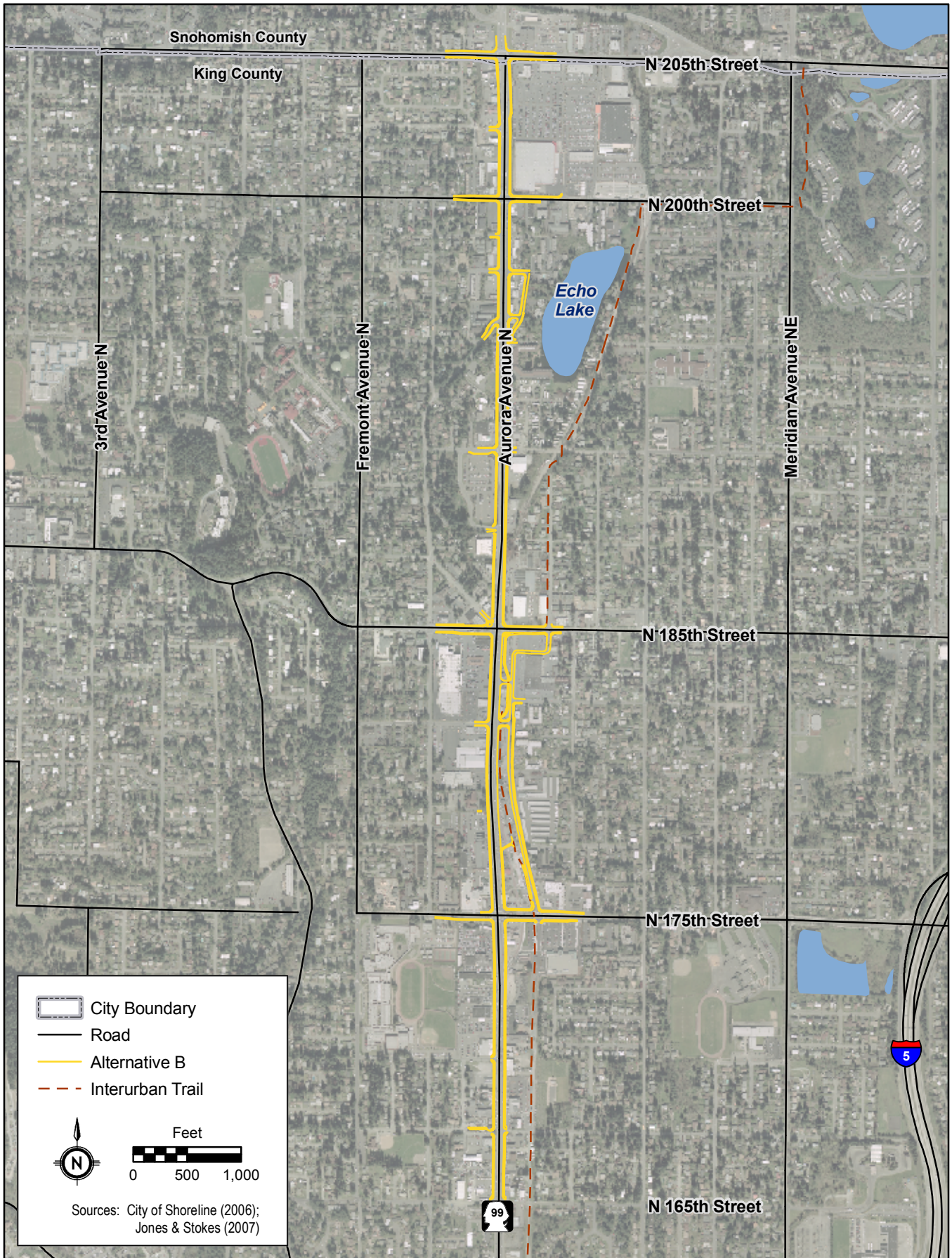








Figure 2. Alternative A
Aurora Corridor Improvement Project
July 2007



 City Boundary
 Road
 Alternative B
 Interurban Trail

Sources: City of Shoreline (2006);
 Jones & Stokes (2007)

Figure 3. Alternative B
 Aurora Corridor Improvement Project
 July 2007

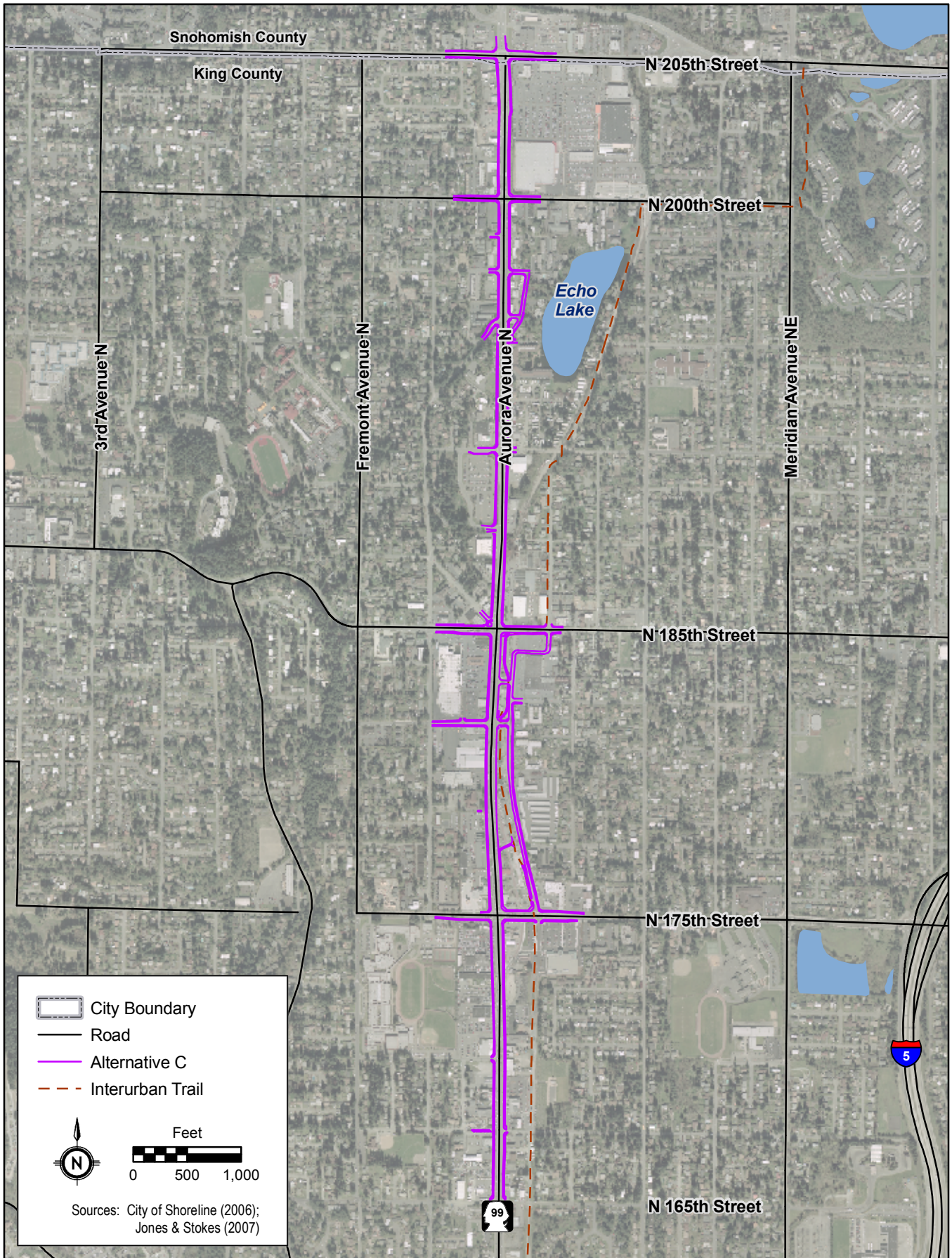
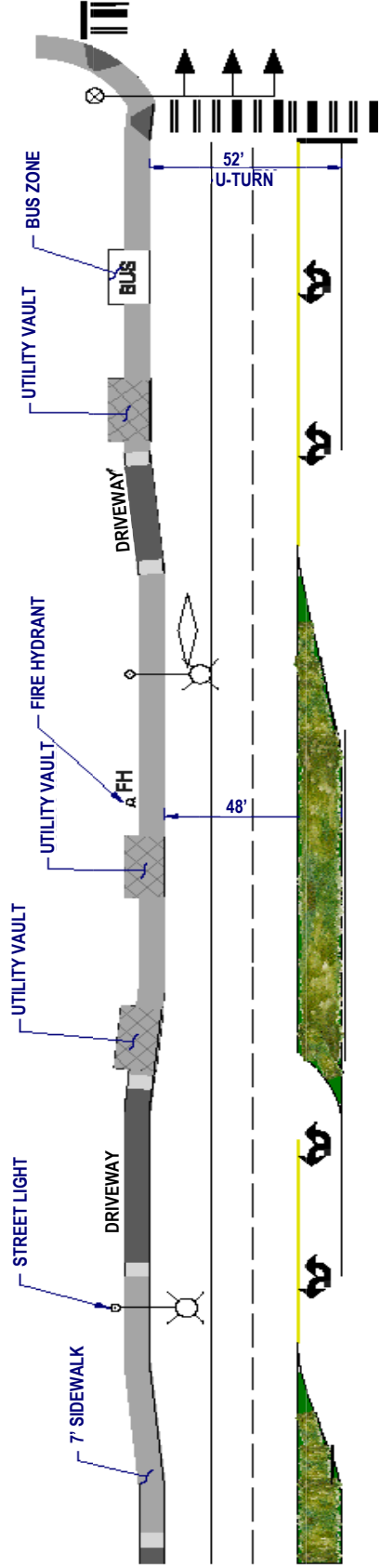
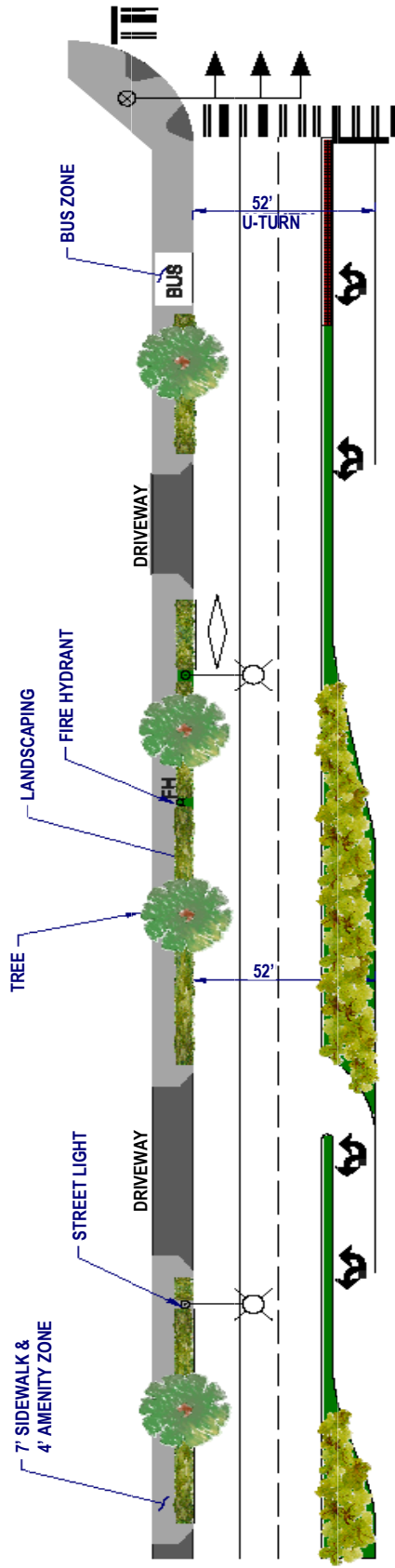


Figure 4. Alternative C
Aurora Corridor Improvement Project
July 2007

Alternative A



Alternatives B and C



Note: Drawing shows one direction of travel of the proposed roadway alternatives, which is typical of both directions

Figure 5. Proposed Plan Detail for Build Alternatives
Aurora Corridor Improvement Project
July 2007

What utilities are located in the study area?

Aurora Avenue N is a major local thoroughfare, and several utilities are located within its right-of-way. Utilities located within the study area include:

- approximately 1,170 feet of underground telephone lines;
- approximately 181 feet of underground electric lines;
- approximately 11,363 feet (2.15 miles) of underground TV/fiber-optic cable, primarily concentrated in a single alignment under the center of Aurora Avenue;
- approximately 8,291 feet (1.57 miles) of overhead telephone lines;
- approximately 2,547 feet of overhead high-voltage electric lines, concentrated in a single alignment in the southeast corner of the study area;
- approximately 6,589 feet (1.25 miles) of overhead electric lines;
- approximately 13,785 feet (2.61 miles) of overhead TV/fiber-optic cable;
- more than 10,560 feet (2 miles) of water mains; and
- approximately 55,900 feet (10.6 miles) of sanitary sewer mains.

Water mains are located under Aurora Avenue N between N 165th Street and N 205th Street. Single mains occur throughout most of the alignment and a double main is located under the section of Aurora Avenue N between N 170th Street and N 182nd Street. Water mains also cross Aurora Avenue north at the following locations: N 165th Street, N 167th Street, N 170th Street, N 182nd Street, N 185th Street, N 192nd Street, N 195th Street, N 200th Street, and N 202nd Street. Water lines branch from these mains to supply individual buildings and fire hydrants in the Project area. Water mains under Aurora Ave N vary in diameter along the road alignment, but a 24-inch line covers most of the length of the Project area. Water mains under the various cross streets generally range in size from 6 to 12 inches, though N 185th Street contains a 20-inch line (Magee pers. comm).

An estimated 83% of the sewer mains are 8-inch concrete pipes, but 6-inch, 10-inch, 12-inch, and 14-inch pipes exist, primarily along Aurora Avenue N. Eight-inch and 10-inch polyvinyl chloride (PVC) pipes are also in limited use, accounting for approximately 4% of the sewer mains in the study area.

In addition to the utilities in place, Seattle City Light owns right-of-way within the study area.

A large amount of stormwater infrastructure is located within the study area, predominately along Aurora Avenue N. This infrastructure includes more than 350 storm drain structures, 45 manholes, and approximately 24,600 feet (4.66 miles) of storm drain lines. Storm drain lines

generally consist of corrugated metal and concrete pipes, ranging in size from 4 to 18 inches in diameter.

What public services are available in the study area?

One school (Shorewood High School at the corner of N 175th Street and Fremont Ave N) is located within 0.25 mile of the Project, and two others are located just outside the study area. Echo Lake Elementary is located at the corner of N 195th Street and Wallingford Ave N, and Meridian Park Elementary is located on Meridian Ave N, between N 170th Street and N 175th Street. Richmond Highlands Park (4.2 acres) and Darnell Park (0.84 acre) lie within the southern end of the study area, but they do not directly front on Aurora Ave N and are not expected to be impacted by the Project. (Shoreline School District 2007).

Government buildings in the study area include Shoreline Fire Station No. 61, which houses the department's headquarters, located at 17525 Aurora Ave N; and Station No. 64, located at 719 N 185th Street. The Shoreline City Hall is located near the intersection of Aurora Avenue N and N 175th Street at 17544 Midvale Avenue N, and the Shoreline Police Station is located at 1206 N 185th Street (City of Shoreline 2007).

Potential Effects

What methods were used to evaluate potential effects on public services and utilities?

The methods used to evaluate the Project's potential effects on public services and utilities include:

- reviewing the proposed project design concept and likely construction methods; and
- evaluating the potential effects of the Project on public services and utilities based on the existing site conditions and standard construction practices, and including the avoidance measures listed below.

How would the Project affect public services and utilities?

Construction

Public Services

Aurora Avenue N would remain open during construction, but construction activities would cause temporary increases in traffic congestion and might temporarily reduce access to public services located in the Project area. Buses, including transit and school buses, and emergency vehicles would continue to use Aurora Avenue N during construction but they would likely be delayed by

expected traffic congestion. Detour routes would be developed for emergency response providers to minimize the effects on response times and access to their respective facilities. Increased police security may be needed at construction sites and staging areas as a result of theft, vandalism, or trespass, and would also be required for additional traffic and pedestrian control during construction. Although a health and safety plan would be in place for the construction activities, there would still be a potential for onsite accidents, resulting in an increased need for emergency medical aid from the fire department.

Utilities

During construction, earth-moving activities may affect utilities located below grade and above grade (overhead wires, fire hydrants, signal cabinets, light poles, etc.). There may be a need to reroute utility lines, water lines, and/or cables, which could cause temporary outages. These outages would be short-term and intermittent. Relocation of some utilities may have a subsequent effect on other utilities near the relocation work. The City would review these effects on a case-by-case basis prior to taking action. Construction methods and best management practices (BMPs) to minimize the disruption of utilities would be developed prior to the start of construction.

Operations

Public Services

The proposed improvements to Aurora Avenue N would improve public services in the Project area. The proposed roadway improvements would reduce traffic congestion and thereby enhance mass transit and access by emergency vehicles.

Utilities

The proposed improvements to Aurora Avenue N would likely provide a net benefit for local utilities. Existing aerial utilities would be relocated to an underground utility corridor, as required by the City's Comprehensive Plan, improving their reliability.

How would potential effects of the Project differ by alternative?

No Build Alternative

Under the No Build Alternative there would be no construction and there would be no direct disruption of public services or utilities. Future traffic congestion anticipated under this alternative, however, would negatively impact emergency service response times in the Project area.

Build Alternatives

Because the Build Alternatives would all occur within and adjacent to the existing Aurora Avenue N alignment, potential effects of the Build Alternatives on public services and utilities would be similar.

Alternative A

Alternative A has the narrowest cross section of the Build Alternatives, therefore it has a slightly reduced potential to affect utilities than Alternatives B or C. Where additional right-of-way would be necessary, Alternative A would shift the road alignment to the east, thereby increasing impacts on Seattle City Light property on the east side of Aurora Ave N where Seattle City Light's right-of-way is adjacent to Aurora Avenue N. All three Build Alternatives would impact Seattle City Light property in the vicinity of N 175th Street and N 185th Street.

Alternative A has the smallest footprint of the Build Alternatives; therefore, the construction of Alternative A may require less time than for Alternatives B or C, and the public services may be affected for a shorter period of time.

Alternative B

Alternative B would shift the alignment to the east in areas where additional right-of-way would be necessary. Similar to Alternative A, this shift to the east would increase impacts on Seattle City Light property where Seattle City Light's right-of-way is adjacent to Aurora Avenue N. Alternative B presents a wider cross section than Alternative A, and therefore has the potential for greater effects on Seattle City Light property than Alternative A. All three Build Alternatives would impact Seattle City Light property in the vicinity of N 175th Street and N 185th Street.

Alternative B may also require a longer construction period than Alternative A due to having a larger project footprint, and so may affect public services for a longer period of time. The duration of construction would be similar for Alternatives B and C.

Alternative C

Alternative C would shift the alignment to the west in areas where additional right-of-way would be necessary. This shift would result in reduced impacts on Seattle City Light property on the east side of Aurora Ave N compared with Alternatives A and B where Seattle City Light's right-of-way is adjacent to Aurora Avenue N. All three Build Alternatives would impact Seattle City Light property in the vicinity of N 175th Street and N 185th Street.

Alternative C may also require a longer construction period than Alternative A due to having a larger project footprint, and so may affect public services for a longer period of time. The duration of construction would be similar for Alternatives B and C.

Measures Taken to Avoid or Minimize Project Effects

The Project will minimize the unavoidable negative effects during construction by working with public service and utility providers during final design and prior to construction. Potential mitigation measures are described below.

What measures will minimize or avoid potential effects to public services?

Potential effects on public services would be minimized or avoided through the following measures:

- coordinate with law enforcement agencies to implement crime prevention principles;
- notify and coordinate with fire departments for waterline relocations that may affect water supply for fire suppression, and establish alternate supply lines prior to any breaks in service;
- notify and coordinate with fire departments during construction to ensure they can respond to all calls during those times in a timely manner;
- notify and coordinate with fire departments before construction to alleviate the potential for increased response times due to roadway closure in accordance with the City’s road closure ordinance;
- notify and coordinate with police departments to ensure they have adequate staffing to provide traffic and pedestrian control during construction;
- notify emergency service providers and police departments in advance of construction schedules and any planned street closures;
- coordinate with school officials before and during construction; and
- schedule construction at night, when feasible, to reduce congestion during peak hours, and thereby minimize effects on school bus routes and service activities such as trash collection.

After construction is complete, the Project will provide only long-term benefits related to public services as a result of improved traffic circulation. Therefore, there is no need to develop mitigation measures for long-term effects on those elements.

What measures will minimize or avoid potential effects to utilities?

Potential effects on utilities would be minimized or avoided through the following measures:

- consider the location of utilities in future detailed designs to avoid or minimize conflicts, disruption of service, and disruption of or restrictions on access and maintenance functions;

- prepare a consolidated utility plan identifying existing locations, potential temporary locations, and potential new locations for utilities; sequencing and coordinating schedules for utility work; and describing any service disruptions, for review with affected utility providers prior to the start of construction;
- field-verify the exact locations and depths of underground utilities prior to construction;
- coordinate with property and business owners to plan service outages to minimize impacts;
- notify neighborhoods of utility interruptions by providing a schedule of construction activities in those areas; and
- coordinate with utility franchise holders and provide them with project schedules to minimize the effects of utility relocations (for example, equipment procurement times, relocation ahead of construction, etc.).

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