

BURKE-GILMAN TRAIL REDEVELOPMENT

SEPA
Draft Environmental Impact Statement

Prepared for:
King County Facilities
Management Division

November 2007



Facilities Management Division
Capital Planning and Development
500 Fourth Avenue, Room 320
Seattle, WA 98104



King County

Capital Planning and Development Section Parks CIP Unit

Facilities Management Division, DES
Kathy Brown, Director
500 Fourth Avenue, Room 320
Seattle, Washington 98104

November 1, 2007

Dear Citizen:

The King County Facilities Management and Parks and Recreation Division propose to redevelop an approximately two-mile stretch of the Burke-Gilman Trail along the northwest shore of Lake Washington. The trail would be redeveloped from NE 145th Street to Log Boom Park within the City of Lake Forest Park. The Lake Forest Park section of the trail is the oldest length of the Burke-Gilman Trail under King County management. This segment of trail is currently faced with a number of issues ranging from impaired sightlines and inadequate signage to cracks in the pavement-all of which are problematic for cyclists, drivers, pedestrians, adjacent homeowners, and other users.

This Draft Environmental Impact Statement (EIS) evaluates alternatives for redeveloping the existing trail segment. Three alternatives are being evaluated in this document, including two action alternatives and the No Action Alternative. Under the Redevelopment Alternative (King County's Preferred Alternative), the trail would be reconstructed and widened, drainage improved, and new trail amenities provided. The Rebuild Alternative includes reconstructing the trail in-kind. Under both the Redevelopment and Rebuild Alternatives, traffic controls and signage would be redesigned and sight distance improved at intersections and driveway crossings, in accordance with current standards and policies.

The project is needed to address safety and ease of use issues along the trail. This need is driven by five factors including: 1) need to address trail surface irregularities; 2) need to meet minimum trail standards; 3) need to create uniformity along the trail; 4) need to accommodate an increasing number of trail users; and 5) need to accommodate the range of users in a safe manner.

Enclosed is the Draft EIS for the Burke-Gilman Trail Redevelopment Project. King County is preparing this EIS for the Burke-Gilman Trail Redevelopment in compliance with the State Environmental Policy Act (SEPA).

We invite your comments on the enclosed Draft EIS. King County Facilities Management Division is the designated SEPA lead agency for the Draft EIS, and will be collecting written comments on the Draft EIS from November 1, 2007, to midnight, December 3, 2007. Comments may be submitted by mail to Maggie Brown, Parks CIP Supervisor, Facilities Management Division, 201 South Jackson, #700, Seattle, WA 98104 or by email to fmd.sepacomments@kingcounty.gov. A public meeting will be held on November 13, 2007 from 6:00 to 9:00 p.m. to hear oral testimony and receive written comments. The meeting will be held in the cafeteria at Shorecrest High School located at 15343 25th Ave NE in Shoreline, Washington.

Thank you for your careful consideration of this important proposal before the citizens of King County.

Sincerely,

A handwritten signature in black ink, appearing to read "Kathy Brown", with a horizontal line extending to the right.

Kathy Brown
Responsible Official

Fact Sheet

Project Title: Burke-Gilman Trail Redevelopment

Location and Description of Proposed Alternatives: The King County Facilities Management Division proposes to redevelop an approximately two-mile stretch of the Burke-Gilman Trail along the northwest shore of Lake Washington. The trail would be redeveloped from NE 145th Street to Log Boom Park within the City of Lake Forest Park. The Lake Forest Park section of the trail is the oldest length of the Burke-Gilman Trail under King County management. The trail is currently in use as a transportation corridor and recreational trail. This Draft Environmental Impact Statement (EIS) evaluates alternatives for redeveloping the existing trail section. Alternatives evaluated in the EIS include:

- **Redevelopment Alternative:** Under the Redevelopment Alternative, the trail would be reconstructed and widened. The paved trail would be widened from 10 feet to 12 feet, with a 3-foot shoulder on the east side of the trail and a 1-foot shoulder on the west side. The shoulder would be soft-surface made of stabilized crushed rock, which would be universally accessible to pedestrians, wheelchair users, and strollers. An additional 1-foot at the outer edges of either side of the trail would be required to stabilize the trail's edges for a total developed trail width of 18 feet. Traffic controls and signage would be redesigned where the trail intersects public and private roadways and driveways. Other improvements would include removing obstacles and identified vegetation and fencing to improve sight distance at crossings; replacing the pedestrian bridge over Lyon Creek; installing new culverts and/or modifying existing culverts to improve drainage; replacing vegetation as appropriate; and replacing and installing new trail amenities. The Redevelopment Alternative is the County's Preferred Alternative.
- **Rebuild Alternative:** Under the Rebuild Alternative, the trail would be reconstructed in-kind to address issues of root heave and pavement irregularities. No widening of the trail would occur. Some sight distance improvements would occur, such as removal or pruning of identified vegetation near crossings. Traffic control signage would be changed as described above for the Redevelopment Alternative.
- **No Action Alternative:** Under the No Action Alternative, no comprehensive project would occur to address safety and ease of use along the trail. The trail would not be redeveloped and traffic control and signage would remain unchanged. Spot maintenance actions would continue to occur on a prioritized basis. Maintenance activities would include spot replacement of asphalt, removal of low hanging branches or vegetation that intrudes on the trail, and other activities as currently conducted by King County.

Proposed Implementation Date: Construction is anticipated to begin in 2008 and occur over 5-6 months.

Proponent: King County Division of Facilities Management

SEPA Lead Agency: King County Division of Facilities Management

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Permits and Approvals

NOAA Fisheries/U.S. Fish and Wildlife Service

Federal Endangered Species Act Section 7 Compliance

U.S. Army Corps of Engineers

Section 404 Permit

Washington State Department of Ecology

Section 401 Water Quality Certification
National Pollutant Discharge Elimination System (NPDES) Permit

Washington State Department of Fish and Wildlife

Hydraulic Project Approval

City of Lake Forest Park

Conditional Use Permit
Shoreline Substantial Development Permit
Level II Tree Removal Permit
Critical Areas Review/Permit
Right of Way Permit
Clearing and Grading Permit

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Issue Date of Draft EIS: November 1, 2007

Due Date for Comments: December 3, 2007

Date of Public Hearing: November 13, 2007

Anticipated Date of Final Lead Agency Action: Spring 2008

To Obtain a Copy of the Draft EIS: Copies of the Draft EIS are available for review at the King County Facilities Management Division, King County Administration Building, Room 320, 500 Fourth Avenue, Seattle, WA 98104. Copies of the Draft EIS are also available for review at the following public libraries: Seattle Public Library, Lake City Branch, Lake Forest Park Public Library, Kenmore Library, Bothell Regional Library, and Shoreline Library.

Printed copies of the Draft EIS can be purchased from Olympic Reprographics for the cost of reproduction. Documents can be obtained by calling (206) 373-7043. Costs of the document are anticipated to be \$15-\$20.

CD-ROMs of the Draft EIS are also available at the reproduction cost of \$1.50 per CD-ROM. Individuals can contact Cat Hicks, King County, Department of Executive Services at (206) 296-1822.

In addition, you may download project documents and get general project information at the project website: <http://www.metrokc.gov/facilities/burkegilmantrail/>

Location of Background Information: Background information is located at King County Facilities Management Division.

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Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
BMPs	Best Management Practices
BNSF	Burlington-Northern Santa Fe
CAG	Citizen Advisory Group
cfs	cubic feet per second
CPSGMHB	Central Puget Sound Growth Management Hearings Board
CWA	Clean Water Act
CTR	Commute Trip Reduction
cy	cubic yard
DAHP	Washington Department of Archaeology and Historic Preservation
dB	decibel
dBA	A-weighted decibel
DNRP	King County Department of Natural Resources and Parks
DPS	Distinct Population Segment
Ecology	Washington State Department of Ecology
EDNA	Environmental Designation for Noise Abatement
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EPF	Essential Public Facilities
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
GMA	Washington State Growth Management Act
HPP	King County Historic Preservation Program
HRI	King County Historic Resources Inventory
LFPMC	Lake Forest Park Municipal Code

KCC	King County Code
KCSWDM	King County Surface Water Design Manual
mph	miles per hour
MUTCD	Manual of Uniform Traffic Control Devices
NCHRP	National Cooperative Highway Research Program
NPDES	National Pollutant Discharge Elimination System
PHS	Priority Habitats and Species
PL	Public Law
PRO	Lake Forest Park Comprehensive Park, Recreation and Open Space Plan
PSRC	Puget Sound Regional Council
RCW	Revised Code of Washington
SCCP	Spill Containment and Countermeasures Plan
SEPA	State Environmental Policy Act
SR	State Route
STA	Station
SWPPP	Stormwater Pollution Prevention Plan
TESC	Temporary Erosion and Sedimentation Control
TMDL	Total Maximum Daily Load
USC	United States Code
USDOT	United States Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMT	Vehicle Miles Traveled
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WNHP	Washington Natural Heritage Program
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation
WQI	Water Quality Index

Fact Sheet	i
Acronyms	v
Contents	vii
List of Tables	x
List of Figures	x
Chapter 1 Introduction	1-1
1.1 Introduction	1-1
1.1.1 Burke-Gilman Trail	1-1
1.1.2 Purpose and Need for the Project	1-5
1.2 Summary of Planning Process	1-5
1.3 Summary of Alternatives.....	1-6
1.3.1 Redevelopment Alternative	1-6
1.3.2 Rebuild Alternative	1-6
1.3.3 No Action Alternative	1-6
1.4 Summary of Major Conclusions.....	1-7
1.5 Areas of Controversy.....	1-7
1.6 Terminology Used throughout the Document.....	1-12
Chapter 2 Alternatives	2-1
2.1 Planning Process.....	2-1
2.1.1 Project Background	2-1
2.1.2 Citizens Advisory Group.....	2-1
2.1.3 Summary of Scoping	2-2
2.2 Overview of Project Area	2-5
2.2.1 Trail Description.....	2-5
2.2.2 Encroachments and Non-Permitted Uses	2-8
2.3 Overview of Project Alternatives	2-8
2.4 Alternatives Considered but Not Carried Forward.....	2-9
2.4.1 On-Road Alternative	2-9
2.5 Alternatives Selected for Further Study	2-9
2.5.1 Redevelopment Alternative	2-10
2.5.2 Rebuild Alternative	2-22
2.5.3 No Action Alternative	2-24
2.5.4 Preferred Alternative	2-24
2.6 Construction Timing and Methods	2-26
2.6.1 Phasing	2-26
2.6.2 Construction Sequence	2-26
2.6.3 Staging.....	2-26
2.6.4 Management of Pedestrians and Vehicles around Work Areas.....	2-27

Chapter 3	Affected Environment, Impacts, and Mitigation	3.1-1
3.1	Earth	3.1-1
	3.1.1 Studies and Coordination	3.1-1
	3.1.2 Affected Environment	3.1-1
	3.1.3 Impacts	3.1-4
	3.1.4 Cumulative Impacts.....	3.1-6
	3.1.5 Mitigation Measures.....	3.1-6
	3.1.6 Significant Unavoidable Adverse Impacts	3.1-8
3.2	Surface Water Resources.....	3.2-1
	3.2.1 Studies and Coordination	3.2-1
	3.2.2 Affected Environment	3.2-1
	3.2.3 Impacts	3.2-7
	3.2.4 Cumulative Impacts.....	3.2-9
	3.2.5 Mitigation Measures.....	3.2-10
	3.2.6 Significant Unavoidable Adverse Impacts	3.2-10
3.3	Wetlands.....	3.3-1
	3.3.1 Studies and Coordination	3.3-1
	3.3.2 Affected Environment	3.3-1
	3.3.3 Impacts	3.3-2
	3.3.4 Cumulative Impacts.....	3.3-5
	3.3.5 Mitigation Measures.....	3.3-6
	3.3.6 Significant Unavoidable Adverse Impacts	3.3-7
3.4	Vegetation, Wildlife, and Fish.....	3.4-1
	3.4.1 Studies and Coordination	3.4-1
	3.4.2 Affected Environment	3.4-1
	3.4.3 Impacts	3.4-7
	3.4.4 Cumulative Impacts.....	3.4-12
	3.4.5 Mitigation Measures.....	3.4-13
	3.4.6 Significant Unavoidable Adverse Impacts	3.4-14
3.5	Land Use and Shorelines	3.5-1
	3.5.1 Studies and Coordination	3.5-1
	3.5.2 Affected Environment	3.5-1
	3.5.3 Impacts	3.5-2
	3.5.4 Cumulative Impacts.....	3.5-4
	3.5.5 Mitigation Measures.....	3.5-4
	3.5.6 Significant Unavoidable Adverse Impacts	3.5-4
3.6	Recreation.....	3.6-1
	3.6.1 Studies and Coordination	3.6-1
	3.6.2 Affected Environment	3.6-1
	3.6.3 Impacts	3.6-5
	3.6.4 Cumulative Impacts.....	3.6-8
	3.6.5 Mitigation Measures.....	3.6-9
	3.6.6 Significant Unavoidable Adverse Impacts	3.6-10
3.7	Aesthetics and Visual Quality	3.7-1
	3.7.1 Affected Environment	3.7-1
	3.7.2 Impacts	3.7-3
	3.7.3 Cumulative Impacts.....	3.7-5
	3.7.4 Mitigation Measures.....	3.7-5
	3.7.5 Significant Unavoidable Adverse Impacts	3.7-5

3.8	Utilities and Public Services.....	3.8-1
3.8.1	Studies and Coordination	3.8-1
3.8.2	Affected Environment	3.8-1
3.8.3	Impacts	3.8-2
3.8.4	Cumulative Impacts.....	3.8-3
3.8.5	Mitigation Measures.....	3.8-3
3.8.6	Significant Unavoidable Adverse Impacts	3.8-3
3.9	Noise.....	3.9-1
3.9.1	Affected Environment	3.9-1
3.9.2	Impacts	3.9-2
3.9.3	Cumulative Impacts.....	3.9-3
3.9.4	Mitigation Measures.....	3.9-3
3.9.5	Significant Unavoidable Adverse Impacts	3.9-4
3.10	Historical, Cultural, and Archaeological Resources.....	3.10-1
3.10.1	Studies and Coordination	3.10-1
3.10.2	Affected Environment	3.10-1
3.10.3	Impacts	3.10-3
3.10.4	Cumulative Impacts.....	3.10-6
3.10.5	Mitigation Measures.....	3.10-6
3.10.6	Significant Unavoidable Adverse Impacts	3.10-7
3.11	Transportation	3.11-1
3.11.1	Studies and Coordination	3.11-1
3.11.2	Affected Environment	3.11-1
3.11.3	Impacts	3.11-5
3.11.4	Mitigation Measures.....	3.11-10
3.11.5	Significant Unavoidable Adverse Impacts	3.11-11
3.12	Socioeconomic Resources	3.12-1
3.12.1	Studies and Coordination	3.12-1
3.12.2	Affected Environment	3.12-1
3.12.3	Impacts	3.12-3
3.12.4	Cumulative Impacts.....	3.12-4
3.12.5	Mitigation Measures.....	3.12-5
3.12.6	Significant Unavoidable Adverse Impacts	3.12-5
	Chapter 4 References.....	4-1
	Chapter 5 Distribution List.....	5-1
	Appendix A – Plan Sheets	

LIST OF TABLES

Table 1-1. Summary of Differences in Impacts among Alternatives, Burke-Gilman Trail Redevelopment 1-8

Table 2-1. Summary of Scoping Comments 2-3

Table 2-2. Summary of Features of Alternatives, Burke-Gilman Redevelopment 2-25

Table 3.2-1. City of Lake Forest Park Stream Types and Associated Buffer Requirements 3.2-2

Table 3.2-2. Summary of Stream Buffer Impacts and Associated Mitigation 3.2-8

Table 3.3-1. Lake Forest Park Wetland Buffer Requirements 3.3-1

Table 3.3-2. Summary of Local and State Wetland Ratings 3.3-2

Table 3.3-3. Summary of Wetland and Buffer Impacts and Proposed Mitigation 3.3-4

Table 3.4-1. Federal, State, and Local Regulations Regarding Vegetation, Wildlife, and Fish 3.4-2

Table 3.4-2. Summary of Potential Fish Occurrence in the Study Area 3.4-4

Table 3.4-3. Summary of Impacts to Vegetation within Study Area Corridor. 3.4-10

Table 3.4-4. Mitigation Measures for Vegetation, Wildlife, and Fish Resources 3.4-15

Table 3.11-1. Trail Use Volumes and Composition 3.11-3

Table 3.11-2. Potential Impacts Associated with Different Trail Crossing Types 3.11-8

Table 3.12-1. Crime Data for Lake Forest Park (2006) 3.12-1

LIST OF FIGURES

Figure 1-1. Project Area Map 1-3

Figure 1-2. Regional Trails Map 1-4

Figure 2-1. Photo Figure – Trail Physical Condition 2-6

Figure 2-2. Photo Figure – Trail Visibility Condition 2-7

Figure 2-3. Typical Trail Section 2-11

Figure 2-4. Trail/Residential Access (NE 147th Street/Edgewater Lane) Signage 2-13

Figure 2-5. Trail/Residential Access (NE 151st Street/Residential Driveway) Signage 2-14

Figure 2-6. Trail/Residential Access (NE 153rd Street/Beach Drive NE) Signage 2-15

Figure 2-7. Trail/Residential Access (Residential Access Drives North of NE 153rd Street) Signage 2-16

Figure 2-8. Trail/Residential Access (NE 157th Street/Residential Access Drive) Signage 2-17

Figure 2-9. Trail/Residential Access (Trail/NE 165th Street) Signage 2-19

Figure 2-10. Trail/Residential Access (NE 170th Street/NE 171st Street) Signage 2-20

Figure 2-11. Trail/Residential Access (Ballinger Way) Signage 2-21

Figure 2-12. Rebuild Alternative – Typical Trail Profile 2-23

Figure 3.1-1. Steep Slopes 3.1-3

Figure 3.2-1. Watershed/Basin Map 3.2-3

Figure 3.2-2. Water Resources 3.2-5

Figure 3.7-1. Typical Trail Section Looking South NE 153rd Street 3.7-2

1.1 *Introduction*

King County proposes to redevelop an approximately two-mile stretch of the Burke-Gilman Trail along the northwest shore of Lake Washington. The Burke-Gilman Trail is a highly popular, non-motorized transportation corridor and multi-use recreational trail that has experienced significantly increased trail use since its construction 30 years ago. The trail is intended to safely accommodate a variety of groups such as bicyclists, pedestrians, runners, wheelchair users (including those with motorized wheelchairs), in-line skaters, and different ages and skill levels within these groups.

The trail would be redeveloped from NE 145th Street to Log Boom Park within the City of Lake Forest Park (Figure 1-1, Project Area Map). The Lake Forest Park section of the trail is the oldest length of the Burke-Gilman Trail under King County management. This segment of trail includes issues ranging from impaired sightlines and inadequate signage to cracks in the pavement—all of which are problematic for cyclists, drivers, pedestrians, adjacent homeowners, and other users. This Draft EIS evaluates alternatives for improving safety and ease of use along the trail.

1.1.1 **Burke-Gilman Trail**

1.1.1.1 **Trail History**

The Burke-Gilman Trail was the second major rail-to-trail conversion in the nation. Prior to its conversion to a trail in 1978, the corridor was part of the Seattle, Lake Shore and Eastern Railroad; a major regional line serving Puget Sound logging areas. The line was acquired by Northern Pacific in 1913 and continued in fairly heavy rail use until 1963. The Great Northern, Northern Pacific, and Burlington lines were merged in 1970 to become Burlington Northern Railroad. In 1971 Burlington Northern abandoned the line.

Citizens recognized the non-motorized transportation and recreational potential in the abandoned railroad line and launched a movement to acquire the right of way for a public biking and walking trail. King County purchased all property rights in the project area formerly belonging to Burlington Northern Railroad via a quitclaim deed in 1974. King County retains outright ownership of the property.

The City of Seattle, the University of Washington and King County cooperated in developing the initial trail. The original 12.1 miles of the trail connecting Seattle's Gas Works Park and King County's Log Boom Park (formerly Tracy Owen Station) in Kenmore were dedicated on August 19, 1978. The trail segment under consideration for the redevelopment project is part of this original section of trail.

During the 1970s, 1980s and 1990s the trail was extended through Seattle as additional sections of trail right of way became available. During this time regional population grew and trail use increased significantly as well. Over time, problems along the trail arose associated with deterioration and irregularities in the pavement, overgrown vegetation, signage changes, intersection crossing safety, and parking on the trail. Due to these conditions the trail has become difficult to maintain under King County's normal maintenance program. In addition, significantly increased use and more up-to-date development guidelines based on current national and King County standards provided direction for the redevelopment of the multi-use trail. It was recognized as both desirable and necessary to redevelop the

trail to safely accommodate more non-motorized traffic of all types, which also included incorporating design and development improvements that have come into being since the trail was first built. As a result, King County began to consider a new design for the trail and started planning for its redevelopment. Preliminary technical studies were undertaken and preliminary designs were explored. These studies and early designs were then used to produce a more thorough and detailed plan for the redevelopment of the trail that would meet current development guidelines. King County deferred any major maintenance of the Burke-Gilman Trail due to the planned redevelopment project, which is the subject of this EIS.

1.1.1.2 Regional Context

Together with the Sammamish River Trail, the Burke-Gilman Trail comprises 27 miles of the King County Regional Trail System (Figure 1-2, Regional Trails Map). The trail is a substantial part of the 90 miles of signed bike routes in Seattle and the 175 miles of trails under the King County Regional Trail System, and is perhaps the most well-known and most highly used paved trail in the region. The trail begins at 11th Avenue NW in Ballard and follows along the Lake Washington Ship Canal and north along Lake Washington. At Blyth Park in Bothell the trail becomes the Sammamish River Trail and continues for 11 miles to King County's Marymoor Park. Access points to the trail are provided at Gasworks Park, Matthews Beach Park, Log Boom Park, Woodinville's Jerry Wilmot Park, Sixty Acres Park, and Marymoor Park. South of NE 145th Street (the southern terminus of the redevelopment project), the trail is managed by the City of Seattle.

The Burke-Gilman Trail is featured prominently in numerous county and city planning documents. Among these are the 1971 *King County Urban Trails Plan*, 1975 *King County General Bicycle Plan*, 1992 *King County Regional Trail Plan*, 1993 *King County Non-motorized Transportation Plan*, 1994 *King County Comprehensive Plan*, and the 1996 *King County Park, Recreation, and Open Space Plan*. The trail is included in the 1994 *City of Lake Forest Park Comprehensive Parks, Recreation and Open Space Plan*, the 2005 *City of Lake Forest Park Comprehensive Plan*, and several other planning documents of other cities traversed by the trail. These documents identify the Burke-Gilman Trail as an important recreational facility and transportation corridor.

The trail serves thousands of commuter and recreational cyclists, pedestrians, and other users. A recent survey (May 2005) conducted on the Burke-Gilman Trail indicated that a minimum of 33 percent of the trail users were commuters (Moritz, 2005). Trail use in general has increased since a survey conducted in 2000. Weekend use increased by more than 850 users per day, and weekday use increased by 1,250 users per day. Weekday users are largely commuters (Moritz, 2005). Trail users are primarily from Bothell, Kenmore, Lake Forest Park, Seattle, and suburban King County. The trail can at times be busy and even crowded with cyclists, walkers, joggers and skaters. Only non-motorized use is allowed on the Burke-Gilman Trail.

Regional population growth has significantly increased trail use since its construction 30 years ago, especially by cyclists for both commuting and recreation. The continuing increase in population has put pressure on the region's existing trails. While cyclists make up approximately 75 percent of trail users in the County, in the Lake Forest Park portion of the trail that number is closer to 80 percent according to a recent survey (The Transpo Group, 2005). The trail is expected to continue to increase in popularity as regional growth continues and as commuters continue to seek non-motorized forms of transportation. Encouraging non-motorized transportation is supported by King County, City of Seattle, and other public, private, and non-profit entity policies and initiatives (e.g., Washington State Commute Trip Reduction [CTR] law and programs, King County Commute Bonus Plus, King County Vehicle Miles Traveled [VMT], Bicycle Alliance and King County Bike Buddy Program, and Commute Challenge programs).

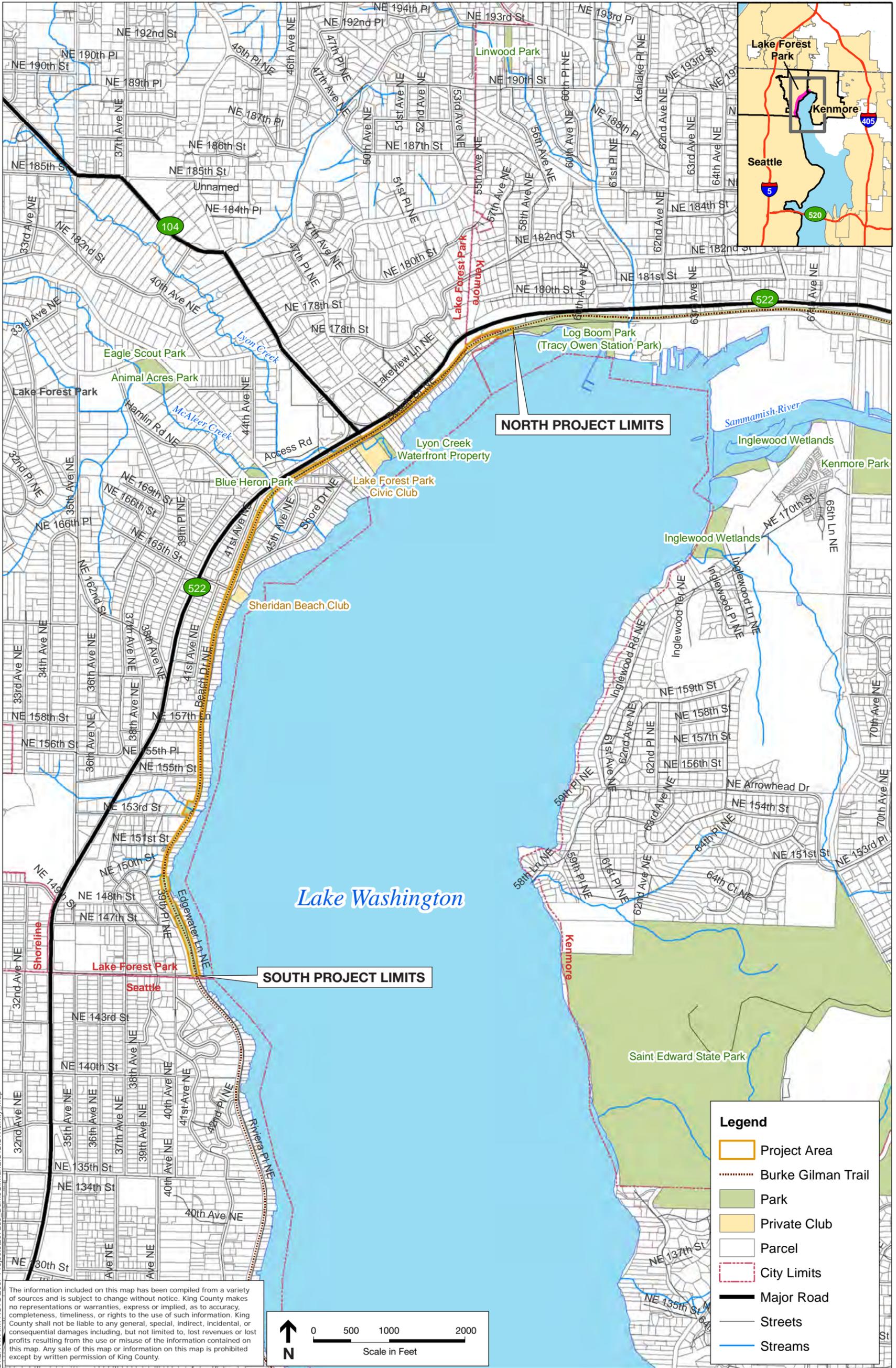
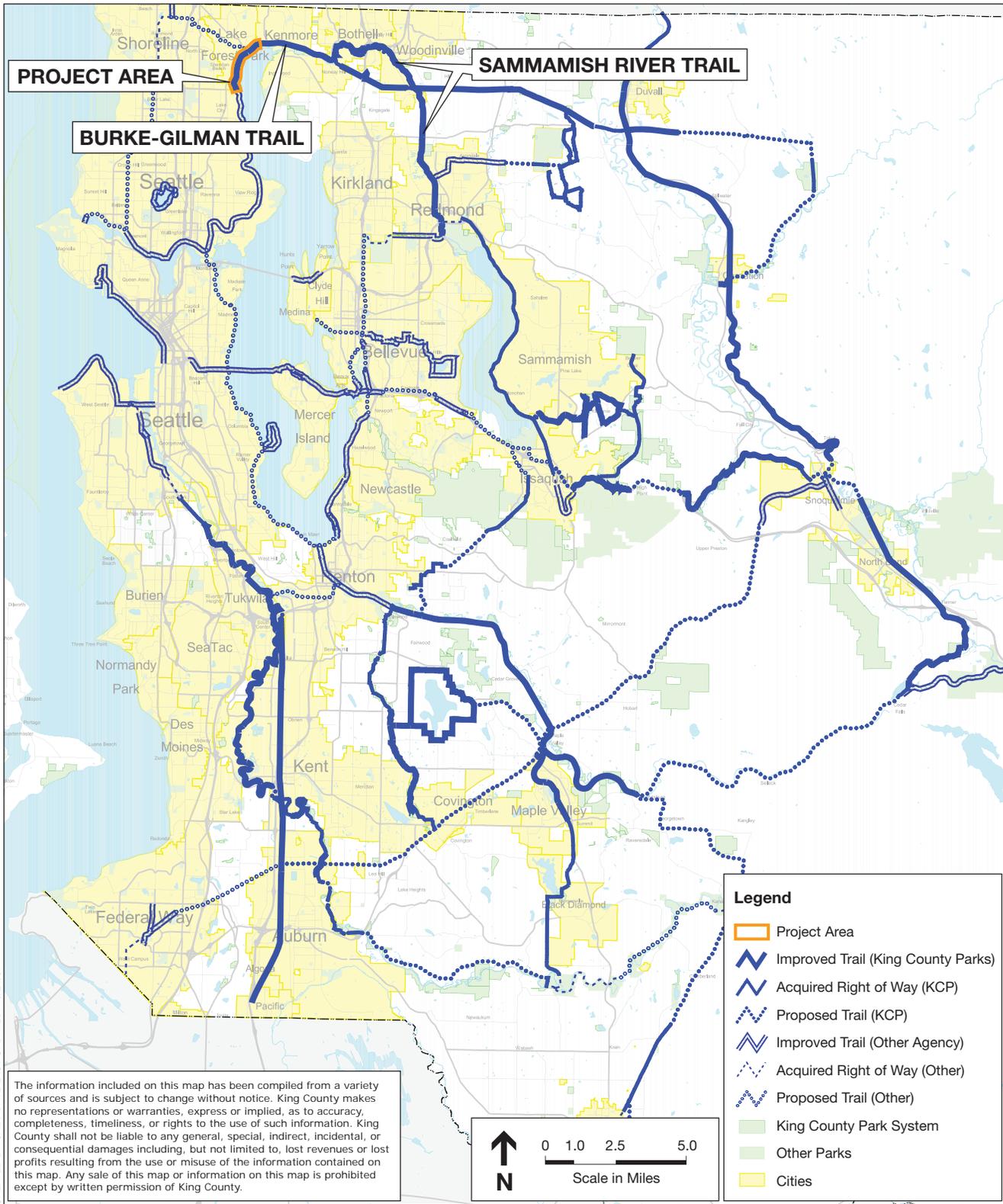


Figure 1-1
 Project Area Map
 King County, Washington

FILE NAME: Fig01-2_regtrails.ai
 CREATED BY: JAB/ DATE LAST UPDATED: 10/24/07



SOURCE: King County, 2004.



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Figure 1-2
 Regional Trails Map
 King County, Washington

In 2004, King County released the new *Regional Trail Inventory and Implementation Guidelines*. This document includes guidelines for providing a connected system of trails serving a wide variety of users. It also addresses shared-use policies, appropriate trail surfaces, access control measures, street and driveway crossings, maintenance, and accessibility compliance. The guidelines recommend a paved surface at least as wide as that recommended in the current American Association of State Highway and Transportation Officials (AASHTO) Guidelines (1999) for shared-use trails as well as recommending a separated soft-surface pedestrian facility to the greatest extent possible along the length of the trail.

1.1.2 Purpose and Need for the Project

The purpose of the proposed project is to redevelop an approximately two-mile stretch of the Burke-Gilman Trail, a highly used multi-use trail along the northwest shore of Lake Washington. A multi-use trail is synonymous with a “shared use path or trail” as defined by the American Association of State Highway and Transportation Officials (AASHTO). It is also defined as a “multiple-purpose trail” in the *King County Regional Trails Plan* and as a “Class 1 bikeway” in the Washington State Department of Transportation (WSDOT) *Facilities for Non-Motorized Transportation*.

The primary need for the project is to improve safety and ease of use along the trail. This need is driven by several factors, including: 1) need to address trail surface irregularities; 2) need to meet minimum trail standards; 3) need to create uniformity along the trail; 4) need to accommodate an increasing number of trail users; and 5) need to accommodate the range of users in a safe manner.

Physical conditions along the Burke-Gilman Trail have deteriorated and do not meet best engineering practices. Root intrusions from trees along the side of the trail result in uneven surfaces. Sight distances are inadequate and the existing signing and striping is not uniformly applied or warranted. Current trail width does not meet minimum trail standards adopted by King County and cannot safely accommodate the number and range of current and projected users on the trail. Nearby residents and trail users have noted bicycle/vehicle conflicts and bicycle/pedestrian conflicts.

National, state, and local design guidelines are important considerations in the design of the redeveloped trail (AASHTO, 1999; FHWA, 2003; King County, 2004; WSDOT, 2006). Trails need to provide adequate operating space for bicycle riders and other users; adequate width to avoid conflicts with other users of a two-way trail; appropriate surfaces in good condition; controlled crossings; safe alignment; and adequate stopping distances. In order to accommodate the increasing levels of recreational and commuter use of the trail in a manner consistent with King County policies, improvement of the trail in accordance with adopted safety and design guidelines is necessary.

1.2 Summary of Planning Process

Discussions between King County and community leaders and stakeholder groups have been occurring since 2000 to address rehabilitation and redevelopment of the trail. Throughout the planning process, King County has sought input from trail users and trailside homeowners, as well as the broader community.

In late 2004 King County, working jointly with the City of Lake Forest Park, appointed a Citizens’ Advisory Group (CAG) to ensure the trail design reflects the input and values of the community. Made up of a broad subset of the stakeholder groups, the CAG has provided input on several issues: design, safety, liability, maintenance, enforcement, and environmental concerns. At key points in the planning

process, the CAG submitted reports to King County summarizing the committee's thinking on key issues. The group's comments and viewpoints have been valuable in the development of alternatives.

1.3 Summary of Alternatives

1.3.1 Redevelopment Alternative

Under the Redevelopment Alternative, the paved trail would be widened from 10 feet to 12 feet, with a 3-foot shoulder on the east side of the trail and a 1-foot shoulder on the west side. The shoulder would be soft-surface made of stabilized crushed rock, which would be universally accessible to pedestrians, wheelchair users, and strollers. The purpose of the shoulder is to provide a walking surface and refuge area for pedestrians and other users that is separate from bicycle traffic. An additional 1-foot at the outer edges of either side of the trail would be required to stabilize the trail's edges for a total developed trail width of 18 feet.

Traffic controls and signage would be redesigned where the trail intersects public and private roadways and driveways. Trail stop and yield signs that are currently posted at a number of public and private roadways and driveways along the trail would be removed. Cars would be required to stop, or in some cases yield, at all trail crossings, except the signalized intersections of NE 170th and Ballinger Way, consistent with national, state, and local guidelines. Signage, pavement markings, distinctive surfacing through the crossing, and tactile warning strips across the trail would be provided to alert cyclists and motorists as they approach a trail crossing.

Other improvements would include removing obstacles and identified vegetation and fencing to improve sight distance at crossings; replacing the pedestrian bridge over Lyon Creek; installing new culverts and/or modifying existing culverts to improve drainage; replacing vegetation as appropriate; installing lighting at crossings, and replacing and installing new trail amenities.

The Redevelopment Alternative is the County's Preferred Alternative.

1.3.2 Rebuild Alternative

Under the Rebuild Alternative, the trail would be reconstructed in-kind to address issues of root heave and pavement irregularities. No widening of the trail would occur, and there would be no drainage upgrades and no upgrade to Lyon Creek Bridge. Some sight distance improvements would occur, such as removal or pruning of identified vegetation near crossings.

Traffic control signage would be changed as described above for the Redevelopment Alternative. This alternative addresses some of the needed safety improvements at a lower cost than the Redevelopment Alternative (e.g., trail resurfacing, traffic control signage changes, sight distance improvements), but it does not meet all of the safety objectives, namely it does not provide adequate trail width to accommodate the range of users in a safe manner and it does not provide adequate separation of users. Only the most severe sight distance constraints would be addressed, and drainage issues would continue in some areas.

1.3.3 No Action Alternative

Under the No Action Alternative, no comprehensive project would be implemented to address safety and ease of use issues along the trail. The trail would not be redeveloped and traffic control and signage would remain unchanged. Spot maintenance actions would continue to occur on a prioritized basis.

Maintenance activities would include spot replacement of asphalt, removal of low hanging branches or vegetation that intrudes on the trail, and other activities as currently conducted by King County. This alternative does not meet King County's objectives for the regional trail system as it is not consistent with the County's safety policies, and does not comply with AASHTO design guidelines or King County's Regional Trail Plan, and would become increasingly unsafe as trail user volume increases.

1.4 Summary of Major Conclusions

Table 1-1 provides a summary of the impacts associated with the alternatives considered for the Burke-Gilman Trail Redevelopment.

1.5 Areas of Controversy

There are several areas of controversy associated with the proposed Burke-Gilman Trail Redevelopment Project.

Among trail users and local residents, the most common concern has been bicyclists who travel too fast or who travel in "packs" with what has been described as little regard for others. Conversely, many cyclists have complained about uncontrolled pets on the trail; children unable to control their bikes; and trailside homeowners using the trail right of way for parking vehicles, installing fences and plantings. Cyclists also complain that inconsistent trail signage presents a safety problem. Other complaints from trail users include the condition of the trail's surface, lack of enforcement relating to speeding cyclists, lack of lighting, and a perception of inadequate maintenance on the part of King County.

Among trailside homeowners, a major concern has been related to the proposed removal of stop and yield signs that are currently posted on the trail at a number of private driveways. A number of trailside homeowners have expressed concerns about the fate of vegetation and fencing in the right of way that currently provides screening and privacy. A number of trailside homeowners also expressed concerns about drainage and lack of maintenance of the trail on the part of King County. As described below, one of the biggest areas of controversy has been related to signage along the trail.

1.5.1.1 Traffic Operation and Signage

One of the most contentious issues of the trail redevelopment project has been the existence of trail stop signs at private driveways and minor crossings on the trail, directing trail users to stop and/or yield to vehicle traffic crossing the trail. Removal of these signs for trail users is included in the Redevelopment and Rebuild Alternatives. Because trail traffic volume is significantly higher than the motorized vehicle traffic volume at these intersections, cars would be required to stop or yield at all trail crossings, except the signalized intersections of NE 170th and Ballinger Way. This is consistent with recommendations included in *Burke-Gilman Trail Crossing Plan* (The Transpo Group, 2005). This is also consistent with the *Manual of Uniform Traffic Control Devices* (FHWA, 2003) and Washington State law regarding crossings and crosswalks, which note that in most cases the highest volume of traffic warrants the right of way, and that motorists must yield to crossing non-motorized traffic. The design includes a number of "alerts" for both cyclists and motorists that they are approaching a trail crossing, including signage, pavement markings, distinctive surfacing through the crossing, and tactile warning strips across the trail.

Some trailside homeowners have stated that the current stop/yield signs on the trail are important deterrents to cyclist speeding. Another major concern expressed by trailside homeowners is the issue of liability in the event an accident with a trail user were to occur with the new signage in place.

Table 1-1. Summary of Impacts for Alternatives, Burke-Gilman Trail Redevelopment

Alternative	Redevelopment Alternative	Rebuild Alternative	No Action
Construction Impacts	<ul style="list-style-type: none"> • Construction length for approx. 5-6 months. • Approx. 10 round-trip truck trips would occur on avg. for each day of construction. • Trucks would access trail from public streets and potentially from driveways through negotiation with homeowners. • Equipment noise, fugitive dust, or odors from paving could disrupt activities at nearby homes or at nearby recreation areas on weekdays during daylight hours. • Temporary trail closures or detours possible during anticipated 5-6 month construction period. 	<ul style="list-style-type: none"> • Construction duration for approx. 2-3 months would be shorter than the Redevelopment Alternative due to less earthwork and construction components. • Approx. 9-round-trip truck trips would occur on avg. for each day of construction. • Trucks would access trail from public streets and potentially from driveways through negotiation with homeowners. • Potential for noise, dust, and odor impacts, similar to Redevelopment Alternative but over a shorter construction period. • Temporary trail closures or detours possible during anticipated 2-3 month construction period, though less than Redevelopment Alternative. 	<ul style="list-style-type: none"> • No construction required.
Wetland Impacts	<ul style="list-style-type: none"> • 0.05 acre of wetland fill. • 0.48 acre of wetland buffer impact. 	<ul style="list-style-type: none"> • No wetland fill. • No wetland buffer impact. 	<ul style="list-style-type: none"> • No wetland fill or buffer impacts required.
Drainage, Fish, and Stream Impacts	<ul style="list-style-type: none"> • Increase of 1 acre total impervious surface; however, minimal increase in stormwater runoff expected because area is small relative to basin. • New drainage structures, culvert extensions, and culvert replacement to improve drainage collection and conveyance next to the trail. • 0.28 acre stream buffer impact due to construction of widened trail. • Work on culverts required (all drainage ditches or steep hillside drainages – not fish-bearing). • Potential for turbidity during bridge demolition/construction, trail, and drainage system improvements. 	<ul style="list-style-type: none"> • No increase in total impervious surface. • No new drainage structures or conveyance improvements. • Potential for turbidity during trail reconstruction is similar, but less than for the Redevelopment Alternative. 	<ul style="list-style-type: none"> • Minor potential for turbidity during trail and drainage system maintenance.
Vegetation Impacts	<ul style="list-style-type: none"> • Permanent removal of vegetation to accommodate widened trail and to improve sight distances. • Approximately 60 trees (native and non-native) would be removed. • Temporary disturbance of vegetation near retaining wall locations and drainage ditch. 	<ul style="list-style-type: none"> • Permanent removal of vegetation less than Redevelopment Alternative (only for sight distance improvements). • No tree removal. • Temporary disturbance of vegetation less than Redevelopment Alternative. 	<ul style="list-style-type: none"> • Only periodic vegetation trimming and hazard tree removal.

Alternative	Redevelopment Alternative	Rebuild Alternative	No Action
Impacts to Private Properties	<ul style="list-style-type: none"> No property acquisitions or relocations required. Potential for parking impacts near residences and businesses as trail use increases. Trail use increases over time would increase potential for long term disruption to adjacent residents. No substantial increase in crime expected along trail. Some residents may experience reduced privacy due to vegetation and fence removal necessary for sight distance improvements, especially where residences are close to trail crossings. 	<ul style="list-style-type: none"> No property acquisitions or relocations required. Parking impacts similar to Redevelopment Alternative. No substantial increase in crime expected along trail. Privacy impacts would be similar, but less for residents than Redevelopment Alternative because existing vegetation and fencing outside of sight distance areas would not be removed. 	<ul style="list-style-type: none"> No impacts to private properties.
Impacts on Views	<ul style="list-style-type: none"> Removal of vegetation and fences in County-owned corridor for sight distance improvements and for widened trail could increase visibility from or toward homes. Removal of vegetation as part of trail widening would likely result in removal of some tall vegetation that obstructs views of the Lake from above the trail. This may open up views for some residences. Visual impacts due to retaining walls and fencing would be moderate to high where a wall is visible from a sensitive view or is close to a house. 	<ul style="list-style-type: none"> Visual impacts would be similar, but less than Redevelopment Alternative. 	<ul style="list-style-type: none"> Views would remain the same as they are currently.
Recreation Impacts, Trail Safety and User Conflicts	<ul style="list-style-type: none"> Proposed trail widths would reduce potential for conflicts among trail users. Safety would be improved on the trail due to increased width and user separation, sight distance improvements, and traffic control signage changes, but could encourage bicyclists to travel at higher speeds. Meets current King County, MUTCD, and AASHTO guidelines. 	<ul style="list-style-type: none"> Potential for conflicts among trail users would be more than with Redevelopment Alternative because trail would not be widened and trail user separation would not be provided. Safety would be improved on the trail due to sight distance improvements, and traffic control signage changes, but could encourage bicyclists to travel at higher speeds. Not fully consistent with adopted King County plans and does not meet King County and AASHTO guidelines for trail width. Continued narrow width, lack of user separation, and trail use increase over time could result in more trail user conflicts. 	<ul style="list-style-type: none"> No changes to current trail condition. Safety concerns would persist and would likely worsen as trail use increases with population growth and trail conditions continue to deteriorate.

Alternative	Redevelopment Alternative	Rebuild Alternative	No Action
Transportation Impacts	<ul style="list-style-type: none"> • Sight distance improvements would decrease potential for motor vehicle/bicycle conflicts at intersections. • Traffic control signage changes consistent with current standards for safe trail use. • Traffic control signage changes would have minimal potential impacts if clearly signed, including advance warnings, and if vehicles obey signs. • Motor vehicles may experience longer crossing delays at the trail under the new traffic control signage. As trail use increases, delays for motorists could increase. • Motor vehicles may experience a period of adjustment once traffic control signage changes are implemented. 	<ul style="list-style-type: none"> • Same as described for Redevelopment Alternative. 	<ul style="list-style-type: none"> • Existing safety issues related to inadequate sight distances and non-standard traffic control signage will persist. Potential for bicyclist/vehicle conflicts could increase at intersections as trail use increases with population growth.

Signage History

The 1975 *Burke-Gilman Trail Supplement to Final Environmental Impact Statement* stated that motorized vehicles would be granted the right of way at all street intersections and that stop signs could be posted. Private crossings of the trail were not considered street intersections and were not signed or controlled, as the trail was granted right of way. At the time the trail was constructed, user volumes were much lower than they are today and regulations and design standards for trails were different.

Placement of current stop controls on the trail at several private driveways along the trail is contrary to standard engineering practice, and is not consistent with current King County policy for trails as described below. No record of engineering studies related to placement of these signs has been found. Discussions with County staff indicate that the placement of stop controls on the trail at certain locations was based on directions of a former King County Councilmember in response to requests from local residents.

Standards and Guidelines

The best practice traffic engineering standards as applied by King County, Washington State Department of Transportation, and the U.S. Department of Transportation, state that the right of way is assigned to the direction of travel or leg of the intersection with the most traffic volume. These best practices are derived from the U.S. Department of Transportation's *Manual of Uniform Traffic Control Devices* (MUTCD) (FHWA, 2003) and Washington State regulations (Washington State Driver's Manual [WSDOT, 2007] and Washington State Department of Transportation Design Manual [WSDOT, 2006]). Sight distance standards, which are a consideration in the application of traffic control standards, are derived from the *Geometric Design for Highways and Streets, 4th ed (Green Book)* (AASHTO, 2001) and *Guide for the Development of Bicycle Facilities* (AASHTO, 1999). It is King County policy to be consistent with MUTCD and AASHTO standards (King County, 2004).

A traffic study prepared for the project included a traffic survey of the trail segment, which found that at every driveway and road crossing along this segment of trail, trail user volume significantly exceeds motor vehicle volume (The Transpo Group, 2005). As such, the traffic study recommended that trail stop signs at driveways be removed if adequate sight distance for vehicles and bicycles can be achieved, which is consistent with the best practice traffic engineering standards derived from MUTCD and AASHTO standards. This is also consistent with other segments of the Burke-Gilman Trail and other King County regional trails.

A contrasting opinion was presented in the *Burke-Gilman Trail Standards Review Summary and Suggested Conditions for a Conditional Use Permit* (2005), prepared by Huitt-Zollars, an architect/engineering firm hired by the City of Lake Forest Park. In this report, Huitt-Zollars stated that, in their professional opinion, trail yield signs are the best solution for controlling the interaction between trail users and motor vehicles. The report concluded that such yield signs are consistent with other areas of the Burke-Gilman Trail and that, in fact, cyclists and pedestrians should be required to yield to motorists in the area. King County and its traffic consultant have said that such yield signs would be contrary to the AASHTO guidelines, MUTCD recommendations and standard best engineering practices. In other places along the trail where such signing exists (i.e. the City of Seattle segment immediately to the south) this signage convention is currently under review and consideration by the City for changes similar to what is proposed in the Redevelopment Alternative. The Huitt-Zollars report was in part based on an anticipated update to AASHTO standards. Revised AASHTO standards are not expected until 2011 at the earliest, and any future changes to current recommendations/standards are unknown. It is King County's position that implementation of/and compliance with such potential future guidelines or

standards is speculative until the standards are finalized, and in the meantime, King County is committed to meeting current AASHTO standards.

1.6 *Terminology Used throughout the Document*

The terms “trail” and “trail segment” are used synonymously throughout this document to describe the section of trail under consideration for this proposal. The trail generally follows a north/south direction with a portion of the trail following a more east/west direction. For simplicity, and to avoid confusion, the sides of the trail are referred to in terms of the east side and west side. The terms “right of way” or “trail corridor” are used to describe the area of King County ownership in which the trail is located.

2.1 *Planning Process*

2.1.1 **Project Background**

The segment of the Burke-Gilman Trail that is the subject of this EIS has been in use for nearly 30 years and in that time the community it serves has grown from primarily local residents to a wide range of recreational users as well as bicycle commuters. In the same time frame, the surface of the trail has deteriorated; encroaching vegetation has reduced the width in places; drainage ditches have become potential hazards; trees, shrubs, and fences block the view of crossing vehicular traffic; and trail etiquette is inconsistent. Trailside homeowners have expressed concern about the dangers of crossing the trail with its high volume of traffic. Cyclists have voiced concern about the inconsistency in trail signage, the number of stop signs at private driveways, inadequate sight distances, poor condition of the trail; and pedestrians have complained about the continuing conflicts with inconsiderate cyclists, pet waste, and lack of maintenance.

Given the atmosphere of community dissatisfaction and general degradation of trail conditions, community leaders came together to initiate rehabilitation and redevelopment of this heavily used segment in early 2000. Staff from several departments of the City of Lake Forest Park met with King County staff to discuss elements of a program for redesigning and upgrading the trail. In May of that year, City officials held a public meeting to identify stakeholders, solicit community input on trail issues, and establish a process for redesign implementation. Stakeholders included the City of Lake Forest Park, King County, local residents, business owners, trail neighbors, and trail users.

Following the completion of several technical studies and substantial stakeholder input, the Burke-Gilman Trail Redevelopment Study was completed in late 2005. The Trail Redevelopment Study evaluated the approximately two-mile section of the Burke-Gilman Trail through Lake Forest Park from NE 145th Street to Log Boom Park, and included recommendations for how the trail can be redesigned and rebuilt to provide for the safety of all users, as well as adjoining homeowners and motorists.

2.1.2 **Citizens Advisory Group**

In late 2004, King County working jointly with the City of Lake Forest Park appointed a Citizens Advisory Group (CAG) to ensure the trail design reflected the input and values of the community. The CAG is part of a collaborative effort between King County and Lake Forest Park to ensure representative community input would be considered in the redevelopment of the trail. The mission of the CAG has been to provide King County with thoughtful and informed recommendations on issues related to the proposed redevelopment of the Burke-Gilman Trail. The CAG has provided input on several issues: design, safety, liability, maintenance, enforcement, and environmental concerns. The CAG is composed of 13 members. Four of these are trailside homeowners, two represent trail cyclists, two represent other trail users, one is a business representative, one represents parks and recreation interests, and three are community members at large from Lake Forest Park. One member, an elected official on the Lake Forest Park City Council, serves in an ex-officio, non-voting capacity.

The first meeting of the group was convened in November 2004, and the group met an additional five times in 2005, under the direction of King County Parks staff. The group's first effort was to comment and make recommendations on a Trail Redevelopment Study led by the landscape architect firm of Atelier.

At key points in the review process, the CAG submitted reports to King County summarizing the committee's thinking on key issues. The Phase One Report was issued in February 2006 and included the group's comments and recommendations on the Trail Redevelopment Study. The Phase Two Report was issued in October 2006 and summarized the group's recommendations on trail design schematics. From the onset, it was understood the CAG might not achieve consensus on all items. In those instances, the CAG provided a description of the reasons for differing viewpoints, so that King County would be informed in making their decisions.

2.1.3 Summary of Scoping

In accordance with SEPA, a scoping period for the Draft EIS was conducted from February 22, 2007, to March 15, 2007. Thirty comment letters, e-mails, and telephone comments were received during the scoping period. Comments received are summarized in Table 2-1. These comments were used to shape the evaluations included in the Draft EIS. In some cases, comments received were not directly relevant to the proposed redevelopment project, but were applicable to other projects or issues. These issues, as identified in the table, are not discussed in this document.

Prior to the formal scoping period, public input was collected throughout the redevelopment planning process and included comments made at public meetings as well as written responses to questionnaires created by King County staff. Members of the public have also made their views known to King County via email and letters. The intent of collecting input has been to ensure that major concerns are addressed in the planning and decision making process. Public meetings held for the Burke-Gilman Trail Redevelopment Project are described below.

- On May 24, 2006, King County held a general public meeting for the Burke-Gilman Trail Redevelopment Project. The purpose of the public meeting was to inform residents about the project and gather feedback on the design schematics.
- On March 14, and May 23, 2006 King County held two property owner meetings for homeowners whose properties lie adjacent to the trail. The purpose of these meetings was to provide an opportunity for property owners to talk directly with the design team, to share information about their properties, and to ask questions.

During this time, the CAG also met periodically to provide input to the planning process (<http://www.metrokc.gov/facilities/burkegilmantrail/>). Comments received as a result of scoping and other public and agency outreach helped the County identify alternatives to be considered for the project, as well as areas of potential concern.

Table 2-1. Summary of Scoping Comments

Issue	Comments
Alternatives	Discuss alternative trail designs to address issues noted below.
	Consider alternatives to asphalt for construction of the trail surface.
Earth	Discuss measures that will be taken to maintain the stability of slopes above the trail and prevent erosion and sliding (in particular, below 12734 42 nd Ave NE), both during and after construction.
Air	No comments on air quality.
Water	Discuss the impacts of stormwater runoff to wetlands and streams from impervious trail surfaces and loss of vegetation. Include impacts to McAleer Creek.
	Describe the McAleer Creek stream bypass project that was designed to reduce flooding of properties between the trail and Lake Washington; discuss the effectiveness of the bypass. (This issue is not directly relevant to the propose Burke Gilman Trail Redevelopment and is not discussed in the Draft EIS).
	Discuss measures that could be taken to reduce the impacts to stream and wetlands.
	Discuss maintenance of the stormwater management system after construction.
	Discuss how existing drainage problems in the area between NE 145 th and 147 th Streets will be corrected.
Plants and Animals	Discuss the value of trees that would be removed – how they contribute to the urban forest canopy, a reduction in air and water pollution, and a reduction in noise and visual pollution.
	Discuss the impact to wildlife and wildlife habitat that will result from loss of vegetation.
	Discuss the impact of invasive plant species on native plant species along the trail.
	Discuss the impacts to endangered species, including eagles in Log Boom Park and Chinook salmon in Lake Washington.
	Discuss a vegetation management plan to be implemented both during and after construction, including possible removal of the cottonwood trees between the two parts of the trail and Log Boom Park.
Energy and Natural Resources	Discuss the use of environmentally friendly demolition and construction, including reusing materials to pave new sections of the trail and using recycled materials for park benches.
Scenic Resources	Discuss replacing tall trees, especially cedars, with vegetation that will not block views for property owners.
	Discuss providing periodic maintenance of existing vegetation so it does not block views for property owners.
	Include a discussion of documents (memo August 6, 1975, re Burke-Gilman Trail Development Final Design Plans; letter September 21, 1993, from Linda Dougherty to Mr. & Mrs. Victor M. Jones et al.; letter September 25, 1995, from Randy Schroers to Norman & Gayle Breslow
	Discuss how fencing and hedging between the trail and the adjacent roadway, both of which are public rights-of-way, obstructs views of Lake Washington.
	Discuss ways to open up views of Lake Washington for the enjoyment of trail users.
Environmental Health/Noise	Discuss noise impacts to adjacent landowners.
Environmental Health/Toxic & Hazardous Materials	Discuss the flow of toxic materials from parking lots and trail surfaces to Lake Washington.

Table 2-1. Summary of Scoping Comments (continued)

Issue	Comments
Land & Shoreline Use/Plans	Discuss previous plans for the trail, such as EISs and vegetation management plans, and consistency of the current plan with the previous plans (EIS, December 1973; Supplemental EIS, July 1975).
	Discuss how this section of the Burke-Gilman Trail relates to the regional trail system.
	Design this section of the trail to be consistent with other sections of the regional trail system.
	Discuss whether the trail is primarily a bicycle commuter corridor or a multi-use recreational trail, or both.
	Discuss how the trail design accommodates the intended use of the trail.
	Discuss measures that will be taken to maintain, enhance, and promote a safe, courteous, and welcoming atmosphere for all users, including but not limited to walkers, walkers with dogs, walkers with children, families riding bikes together, in-line skaters, wheelchair users, and adjacent land owners.
Land & Shoreline Use/Light & Glare	Discuss the potential to provide lighting or reflectors along the trail to increase visibility after dark for bicycle commuters.
Land & Shoreline Use/Aesthetics	<i>See comments provided under Scenic Resources.</i>
Land & Shoreline Use/Historic & Cultural Preservation	Conduct studies of historic and archaeological resources in the vicinity of the Burke Gilman Trail.
	Discuss impacts to cultural resources that would result from trail widening.
Transportation / Transportation Systems	Discuss how the trail design encourages bicycle riding as an alternative to driving a car.
	Discuss options for keeping the trail open or providing a reasonable detour (not SR 522) during construction.
Transportation / Parking	Discuss the impact of trail users parking in front of homes along the trail.
	Discuss measures to provide parking for trail users.
Transportation / Traffic Hazards	Discuss the appropriate placement of stop signs. When is it appropriate for bicyclists to stop/yield; when is it appropriate for automobiles to stop/yield?
	Discuss how speeding bicyclists endanger pedestrians and other trail users.
	Discuss steps that could be taken to control bicycle speeds – trail design, separation of bicyclists from pedestrians and other trail users, speed limit signs, enforcement, licensing of bicycles, or other measures to promote safe behavior by bicycle riders.
	Discuss how fencing and hedging at intersections and between the trail and the adjacent roadway, both of which are public rights-of-way, reduces safety on the trail.
Public Services & Utilities	Discuss the potential to place electrical wires and utility lines underground during construction of trail improvements, in particular, between NE 145 ^h and NE 155 th Streets.
Other	Discuss how the project will be funded. Will it increase taxes for waterfront property owners?
	Discuss whether/how trail design may increase use of the trail by transients and homeless people.
	Consider providing bathroom facilities for trail users to discourage inappropriate use of resident's yards.
	Describe the encroachment of private property owners onto public rights-of-way.
	Discuss steps that can be taken to protect the privacy and security of homeowners adjacent to the trail.

2.2 Overview of Project Area

2.2.1 Trail Description

The trail right of way runs north/south along an east-facing slope above the western shore of Lake Washington in a primarily residential setting (refer to Figure 1-1). The right of way extends 25 feet on either side of the original rail right of way centerline. In the southern segment of the study area is a 100-foot-wide segment of trail right of way. The trail lies within 200 feet of the edge of Lake Washington from NE 145th to NE 168th Street for about one mile, and veers away to about 800 feet from the lake edge for about 0.5 mile then back to within 200 feet of the water's edge for the last 0.75 mile. This section of the trail was designed by the King County Department of Community and Environmental Development in 1975 and built in 1977.

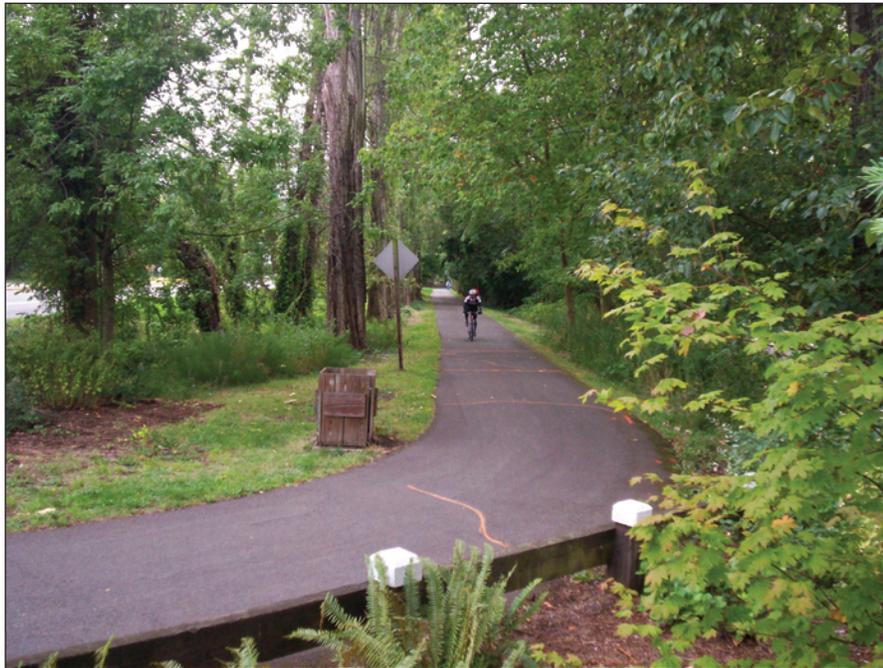
The trail right of way is characterized by a 15- to 20-foot-wide graded "bench" (former rail bed) with cut and embankment slopes between 2h:1v (horizontal: vertical) and 3h:1v for most of its length. Side slopes vary in location and extent, generally rising to the west and dropping toward the lake to the east. The slope along the paved trail is less than two percent.

The trail pavement currently consists of a 10-foot-wide asphalt surface, typically with two feet of dirt and discontinuous grass and gravel shoulder on one or both sides. Turf encroachment at trail edges has reduced asphalt width in some places to between 9 and 9.5 feet. The trail was initially designed with a one-foot margin on both sides as well as a shoulder, the width of which varies from less than a foot to more than eight feet. In general, the shoulder slopes away from the pavement. The pavement surface is irregular, with signs of settlement, cracking, and root heave. Invasive weeds as well as overgrown trees and shrubs predominate along much of the upland side of the trail (Figure 2-1, Photo Figure).

In many places the ground on the upland (west side) slopes steeply into a drainage ditch, sometimes less than a foot from the edge of pavement. Some sections of the drainage ditch are as deep as two to four feet below the surface of the trail. At the trail's initial creation in the mid 1970s, King County erected chain link fences along the eastern edge of the right of way at varying distances from the 12-inch margin as a means of providing security and privacy for trailside property owners. In many places these fences were built up to private driveway edges and a number of homeowners have since added gates to these fences at their crossings.

Trail users encounter two signalized intersections in the northern part of the study area, at NE 170th and at Ballinger Way NE. In the same area two bridges are crossed: the McAleer Creek Bridge (replaced in 1996/1997 with a 12-foot-wide steel span) and the original 8-foot-wide wooden railroad bridge over Lyon Creek.

In general, the west side of the trail has a fairly steep slope gradient and residential development is not highly visible as houses are at a higher elevation than the trail bench. To the east, single-family residences lower than the trail's elevation line most of its length. A local access road, Edgewater Lane, forms the eastern edge in the southern end of the study area and another, Beach Drive NE, forms an edge along much of the middle and northern sections. Where roads do not serve residences, private driveways cross the trail. Trail crossings at these points are generally of differing widths with differing gradients. Few have markings to warn drivers and/or trail users of cross traffic. For both homeowners and trail users, visibility is often limited by impeding vegetation and fences (Figure 2-2, Photo Figure).



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FILE NAME: Fig02-1_condition.ai
 CREATED BY: JAB / DATE LAST UPDATED: 10/24/07

SOURCE: ESA Adolfsen, 2007.



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FILE NAME: Fig02-2_visibility.ai
 CREATED BY: JAB / DATE LAST UPDATED: 10/24/07

SOURCE: ESA Adolfson, 2007.

Above ground utility structures are physical obstacles to pedestrian/bicycle movement at the two signalized intersections (NE 170th Street and Ballinger Way NE). These include traffic light poles, light poles, and electrical boxes. At these intersections, insufficient queuing space for trail users creates crowded conditions during times of heavy use and crowds trail users with bus commuters. Along the trail, fire hydrants, electrical boxes, sewer manholes, water valves, and other utility structures are present in the trail right of way.

Site amenities along the two-mile study area consist of: 1) one bench, a drinking fountain, and two picnic tables in the vicinity near Ballinger Way NE, and 2) two benches in an open clearing (within a zone of 100 foot right of way) on the lake side of the trail between NE 147th and NE 151st Streets. Slats in the chain-link fence along the top of the slope block views of the lake from this clearing. The nearest public restroom is located just north of the northern study area terminus at Log Boom Park.

2.2.2 Encroachments and Non-Permitted Uses

Over a period of years the railroad issued indefinite term leases to private property owners along the railroad right of way for various undertakings, such as building driveways, creating parking spaces, and planting gardens within the right of way. When the right of way changed hands from the railroad to King County, those leases became obsolete and had to be negotiated with the County. Pursuant to King County Code 14.30 and consistent with its management of the regional trails system, King County maintains a Special Use Permit system to authorize private use of County-owned property. These permits are issued on a renewable basis for a 5-year duration, but can be issued for a 10-year duration under limited circumstances. Although several homeowners obtained these permits in the past, most have expired. It is the intent of King County to work with current property owners to secure permits for these non-permitted uses. However, the County reserves the right to require removal of any structures should they adversely impact trail redevelopment.

2.3 Overview of Project Alternatives

Background resources for the selection of project alternatives included King County's *Regional Trail Inventory and Implementation Guidelines* (2004), the American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities* (1999), the *Manual of Uniform Traffic Control Devices* (2003), the Washington State Department of Transportation's *Bicycle Facilities Design Guidance* (2006), and the Rails-to-Trails Conservancy's *Trails for the Twenty-First Century* (2001). These resources, combined with technical information and input from CAG members, were used in the selection and evaluation of alternatives.

The following four preliminary alternatives, including a No Action Alternative, were identified during scoping. Of these, the *On-Road Alternative* was rejected from further consideration for reasons explained in Section 2.4. The remaining three alternatives, described in Section 2.5, have been carried forward for evaluation in this EIS.

- Redevelopment Alternative
- Rebuild Alternative
- On-Road Alternative (not carried forward)
- No Action Alternative

2.4 Alternatives Considered but Not Carried Forward

Under the State Environmental Policy Act, a “reasonable alternative” is a feasible alternative that meets the project’s purpose and need at a lower environmental cost (WAC 197-11-786). Described below are the alternatives that were identified during the scoping process but have been rejected from further consideration because they do not meet the purpose and need, and are therefore not “reasonable.”

2.4.1 On-Road Alternative

The City of Lake Forest Park, in their EIS scoping comment letter, requested consideration of an alternative to trail widening that would create parallel on-road bike lanes to separate bike traffic from other users of the trail. While details of an on-road alternative were not provided in the scoping comment letter, parallel roads to the trail include Bothell Way/State Route (SR) 522, a busy state highway, and Beach Drive NE and Edgewater Lane, narrow local access roads. Under such an alternative, it is presumed that bicyclists, or a subset of bicyclists, would transition to bike lanes on a roadway and would not utilize the section of the Burke-Gilman Trail that traverses Lake Forest Park.

Creation of bike lanes on parallel roads (by the County or by others), if technically feasible, would be a far greater undertaking that warranted for a project to address safety and use issues along an existing trail and would create new safety concerns. King County would need to coordinate and enter into an agreement with the City of Lake Forest Park regarding the use of local road rights of way for a non-motorized facility. Local parallel roads are narrow, discontinuous along the entire trail length, and cross numerous driveways. If the on-road bike lanes were to be located on Bothell Way/SR-522, King County would need to coordinate with WSDOT. The location of the on-road bike lanes would have to accommodate existing uses in the right of way and the City’s future plans for the roadways, and in the case of Bothell Way/SR-522, WSDOT’s future plans and policies regarding bike use on state highways. Further, combining bike traffic with the substantial vehicular traffic volumes and high speeds on Bothell Way/SR-522 would likely be a significant safety concern for both King County and for WSDOT.

The Burke-Gilman Trail is part of a 27-mile regional trail system. Connectivity between multiple jurisdictions and with other trails makes it an ideal bicycle route for commuting and recreational purposes. Rerouting the cyclists onto local roadways through this segment is not consistent with the County’s objectives to improve safety and ease of use for all trail users, and was not evaluated further.

2.5 Alternatives Selected for Further Study

Three alternatives are considered in this EIS:

- Redevelopment Alternative
- Rebuild Alternative
- No Action Alternative

These alternatives are described below. Table 2-2 at the end of this section provides a summary of the features associated with each alternative.

2.5.1 Redevelopment Alternative

2.5.1.1 Trail Widening

Under the Redevelopment Alternative, the asphalt portion of the trail would be widened to a width of 12 feet and two shoulders would be provided, for a total developed trail width of 18 feet (refer to Figure 2-3, Typical Trail Profile). The 18-foot width is based on King County Regional Trail Guidelines and AASHTO guidelines for shared-use trails. The width was determined to be the best width for a shared-use trail of this volume because it allows people to walk in pairs or ride two abreast. A 3-foot shoulder would be provided on the east side of the trail and a 1-foot-wide shoulder on the west side. An additional 1-foot at the outer edges of either shoulder is required to stabilize the trail's edges. The shoulders would be soft-surface, made of stabilized crushed rock, which would be universally accessible to pedestrians, wheelchair users, and strollers. The purpose of the shoulder is to provide a walking surface and refuge area for pedestrians and other users to be separate from cyclists.

Based on the preliminary design, the trail would narrow to 12 feet at the existing McAleer Creek Bridge. If determined feasible during detailed design, a separated soft-surface path would be provided between NE 165th Street and McAleer Bridge, which would increase the total trail width through this section. The widening in this segment would occur to the east to the extent feasible. The additional trail width would be achieved in some locations by removing some fences and vegetation and adding retaining walls where necessary.

2.5.1.2 Sight Distance Improvements

Obstacles, such as chicanes (short, sharp curves in the trail) and identified vegetation and fences, would be removed at intersections to improve visibility/sight distance at crossings. Further, the trail widening described above would serve to improve sight distance. Safe sight distances enable cyclists to see where they are going and to respond earlier if there are potential conflicts or obstacles ahead on the trail.

2.5.1.3 Bridge Replacement

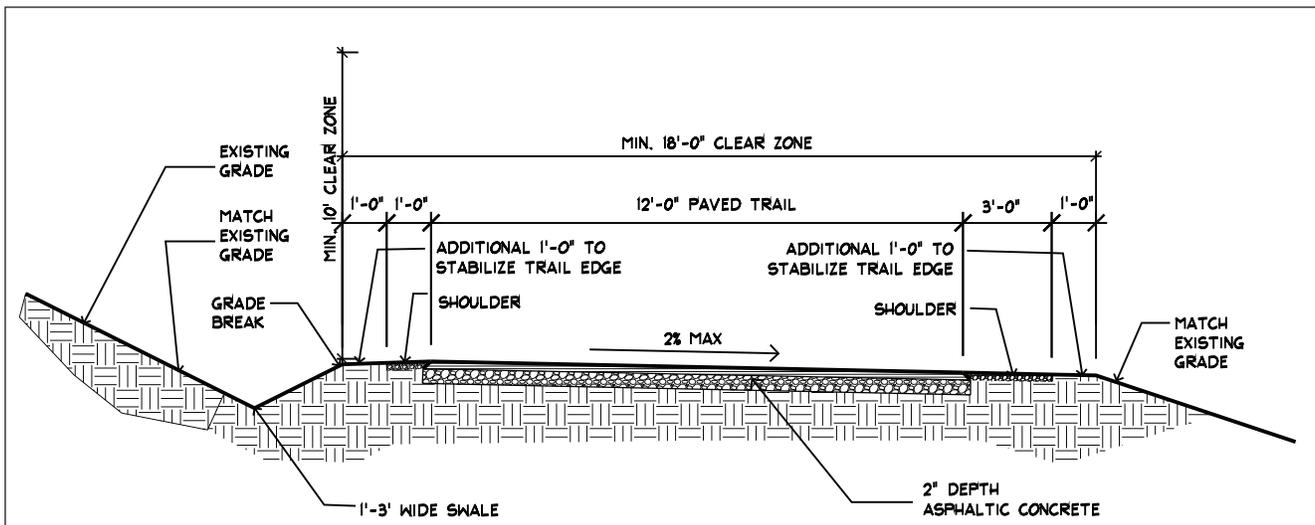
The Lyon Creek Bridge would be replaced with a 60-foot-long and 12-foot-wide pre-manufactured steel bridge with a concrete deck.

2.5.1.4 Retaining Walls

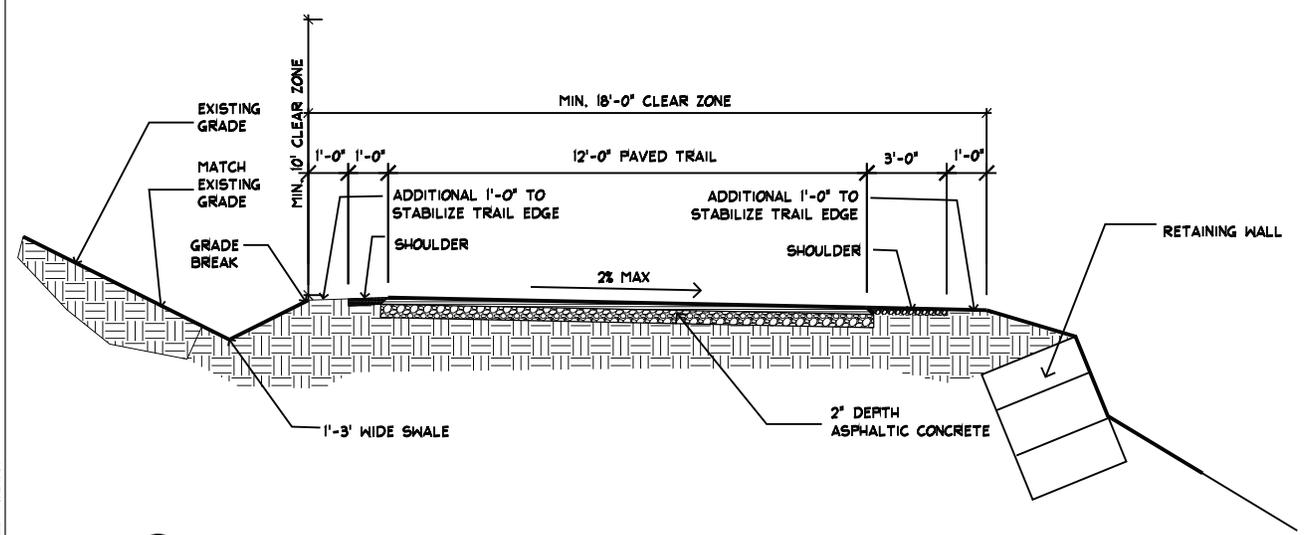
Because of the topography along portions of the trail right of way, retaining walls would be required in many places along the widened trail to support cuts and fills associated with new trail configurations. These wall locations are depicted in the plan sheets (Appendix A). Existing retaining walls would be replaced as necessary. The total length of the widened trail that would be bounded by retaining walls on one or both sides is approximately 2,245 linear feet. The application of various types of walls in specific situations is further discussed in Section 3.1, Earth Resources.

2.5.1.5 Fencing

King County does not routinely fence the perimeter of all parkland, whether or not it is improved. Fencing is only provided if conditions dictate. If fences are too close to the trail, trail users (especially bicyclists) either risk running into the fence or must move toward the center of the trail to reduce conflicts.



A TYPICAL REDEVELOPMENT SECTION



B TYPICAL REDEVELOPMENT SECTION WITH WALL

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Figure 2-3
 Redevelopment Alternative — Typical Trail Profile
 King County, Washington

Where there is existing fencing that must be removed to accommodate the widened trail, fencing would be replaced where it does not conflict with the trail alignment or sight distance triangles. Areas where fencing would be removed/replaced are depicted in the plan sheets (Appendix A).

- Four- or six-foot, black-coated chain-link fencing or approved equivalent would be used in areas where there is existing chain-link fencing that must be removed to accommodate the widened trail.
- Four-foot, six-inch wood fence or approved equivalent would be used in areas where there is existing wood fence that must be removed to accommodate the widened trail.
- Three-foot split-rail fence would be located adjacent to environmentally sensitive areas such as wetlands and steep slopes. This fencing is intended to reduce the risk of intrusion from humans and pets.

All fencing would be located no closer than 1 foot from the outside edge of the widened trail shoulder, maintaining a 1-foot “clear zone.”

2.5.1.6 Drainage Improvements

Existing culverts would be cleaned, extended, replaced, or resized where necessary to improve drainage. Existing drainage swales would be cleaned and improved, and slope stabilization and/or catchment walls would be provided where necessary to minimize the potential for erosion and sloughing on the trail. The new trail surface would generally be sloped slightly to the east, to sheet flow storm drainage towards the Lake.

2.5.1.7 Traffic Control and Signage

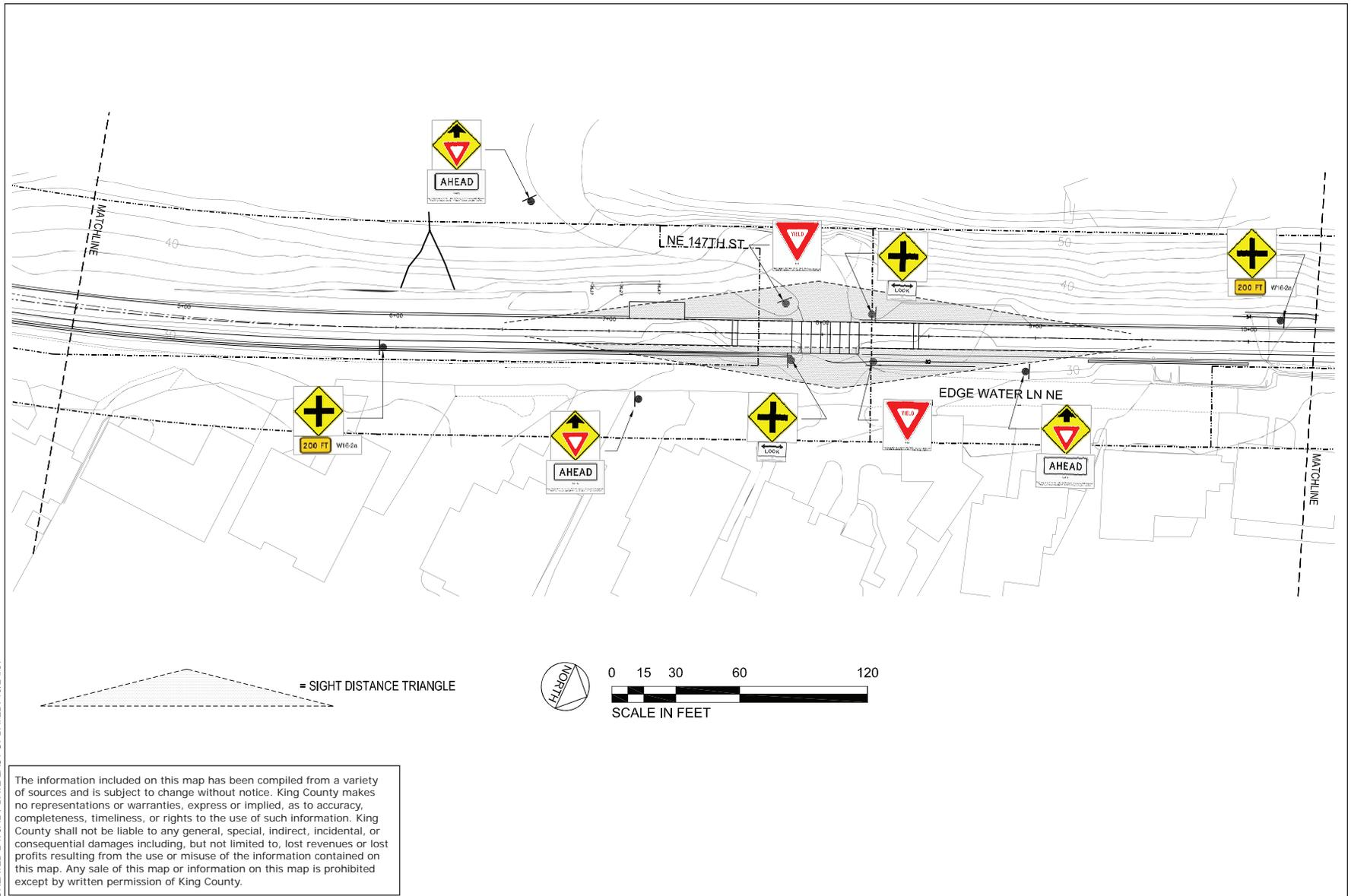
Traffic engineers developed preliminary traffic control measures for roadway and driveway crossings. Further detail regarding the potential impacts of each type of crossing can be found in Section 3.11, Transportation, and in Appendix A, Plans.

Local Residential Access Crossing

At existing residential access crossings, obstacles to vision within the needed sight distance would be removed. The recommended traffic control would be to remove stop signs on the trail and provide stop or yield signs at roadways. This situation occurs at NE 147th Street/Edgewater Lane, NE 151st Street/Residential Driveways, Residential Access Drives North of NE 153rd Street, and NE 157th Street/Residential Access Drive (Figures 2-4, 2-5, 2-6, 2-7, 2-8, Trail/Residential Access – Signage).

Neighborhood Access Crossing

At NE 165th Street, a pedestrian crossing of the Burke-Gilman Trail on each side of 165th is proposed. Research was conducted for traffic engineering guidance and “right of way” for this crossing. Sources reviewed included the *Burke-Gilman Trail Crossing Plan* (The Transpo Group, 2005), the *Manual of Traffic Control Devices* (FHWA, 2003), the *Pedestrian Facilities Guidebook* (WSDOT, 1997), the Washington Administrative Code (WAC) 132N-156-430, *Pedestrian Right of Way*, and other national reference documents on planning and guidance of pedestrian/bicycle facility design.

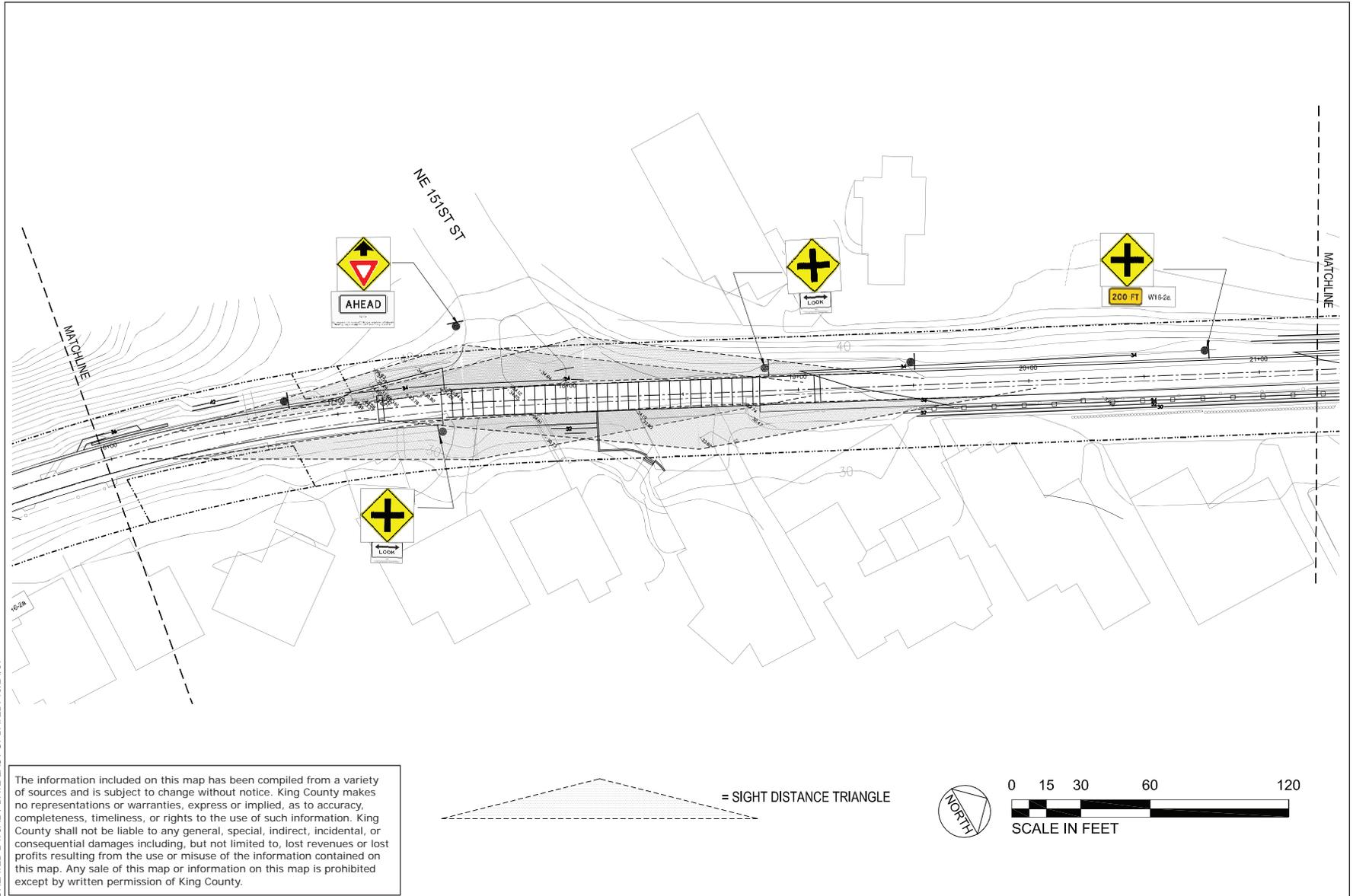


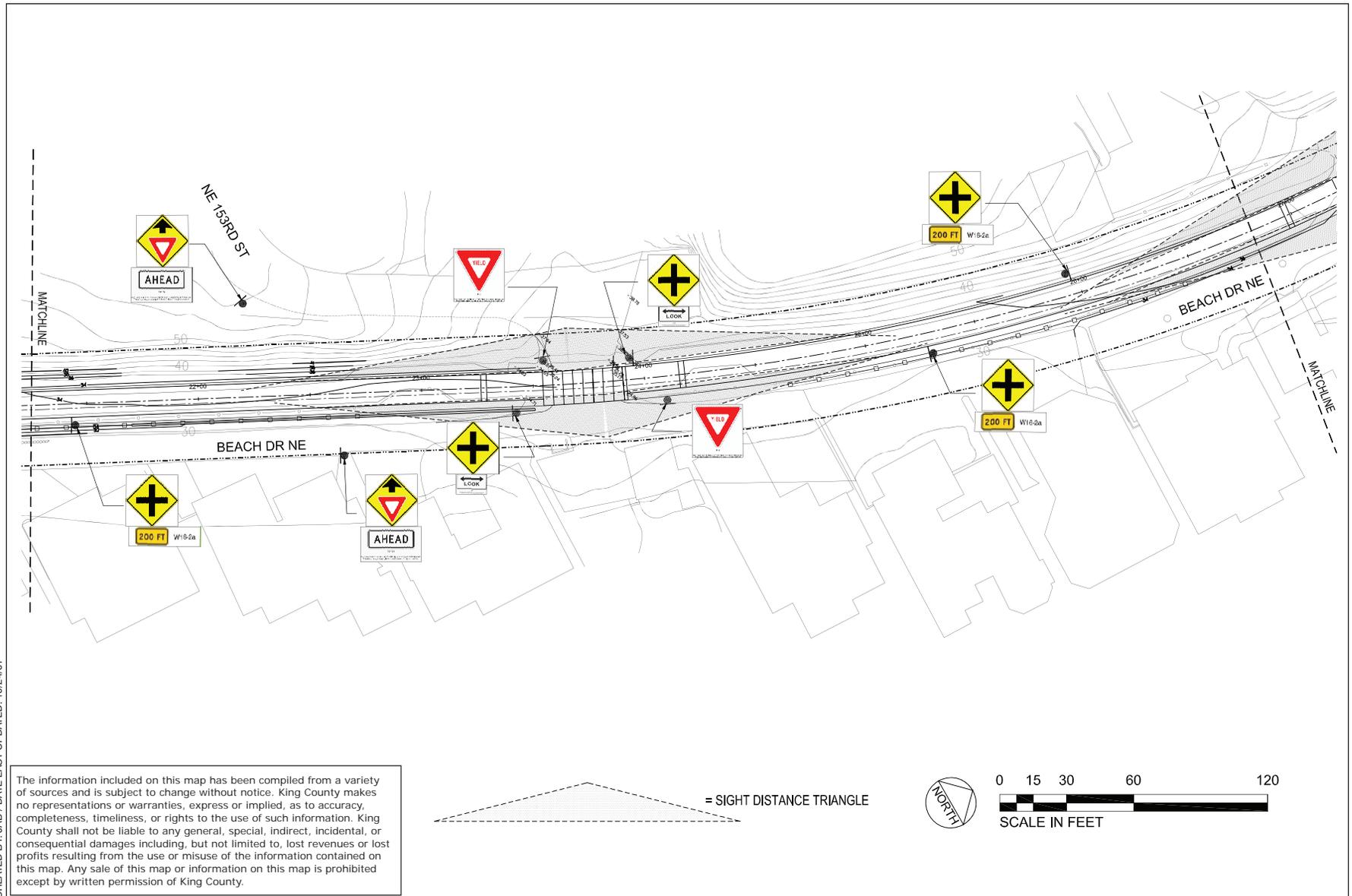
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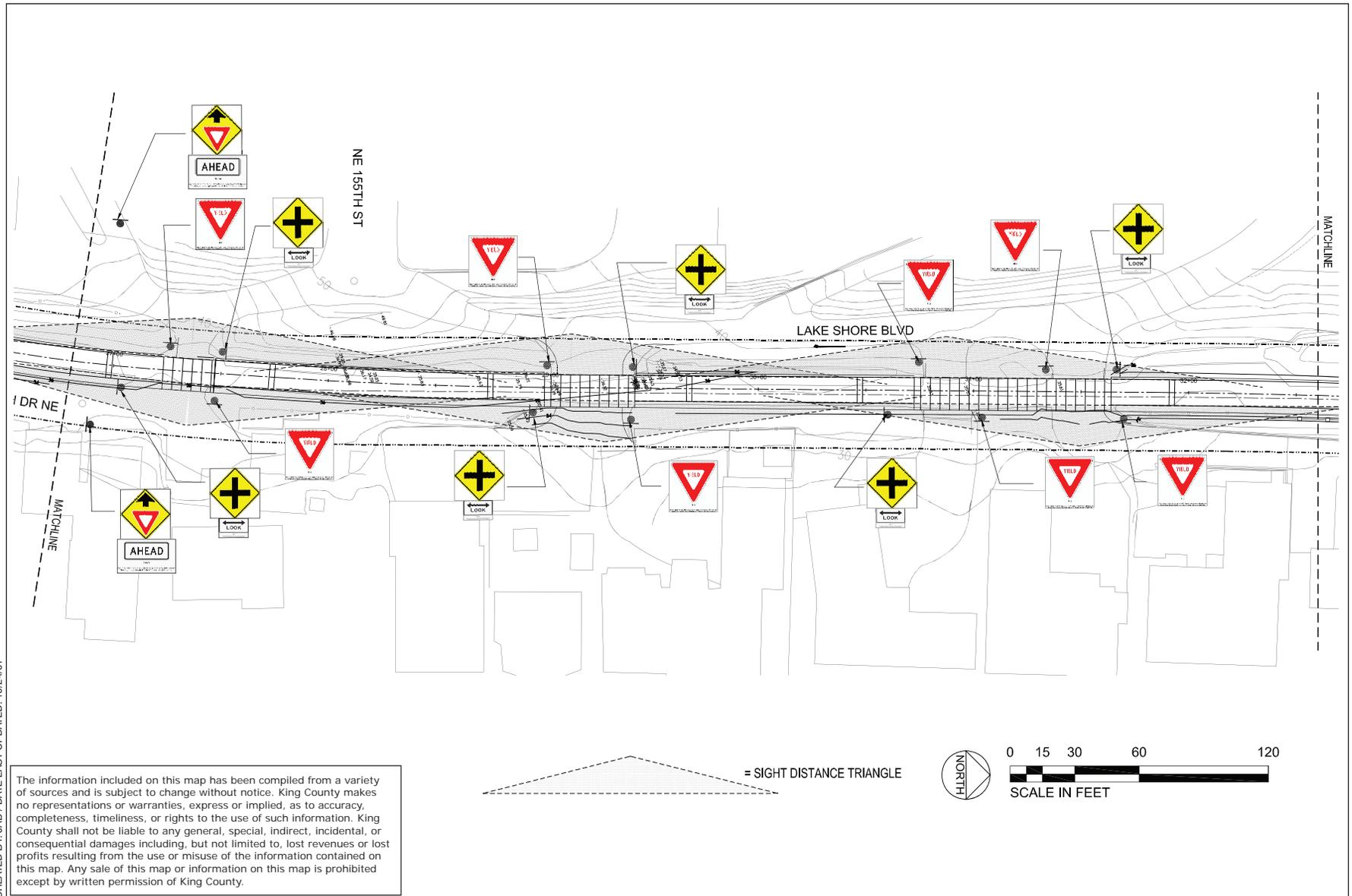
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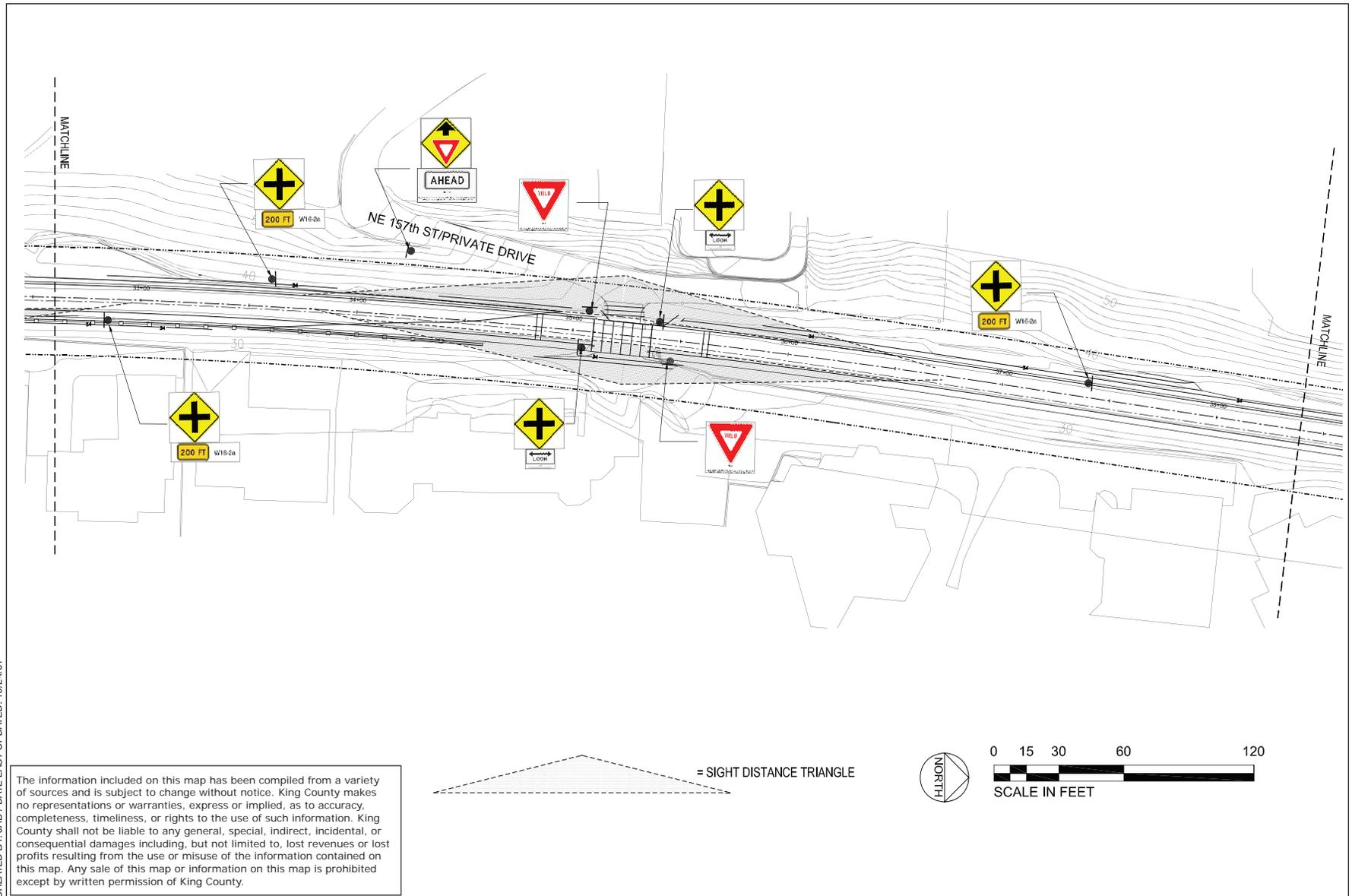
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Figure 2-6
 Trail/Residential Access (NE 153rd Street/Beach Drive NE) — Signage
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Figure 2-7
 Trail/Residential Access (NE 155th Street/Residential Access Drive) — Signage
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It was determined that the operator of a vehicle (in this case a non-motorized vehicle or bicycle) should yield the right of way, slowing down or stopping if need be, to any pedestrian crossing any street, roadway, fire lane, or pathway with or without a marked crosswalk. At this location, standard pedestrian crossing signs would be installed across the trail and other signage would be provided at the trail approaches. Trail pedestrian yield signs would be placed at the approaches to NE 165th Street. Motor vehicles on NE 165th Street would stop for trail traffic (Figure 2-9, Trail/NE 165th - Signage) as at other crossings.

Signalized Intersection Crossing

Only minimal changes to traffic controls at signalized intersections would occur, mainly to address uniformity. This situation exists at NE 170th Street and at Bothell Way NE (Figure 2-10, 2-11, Trail/Signalized Intersection – Signage).

2.5.1.8 Traffic Operation

On-trail travel at speeds in excess of 15 miles per hour (mph) is not reasonable or prudent, and is a violation of King County Code, Section 7.12.295. The posted speed limit for trail users would be 15 mph consistent with King County code, and is consistent with other King County regional trails. After applying a factor of safety, the design speed for the Redevelopment Alternative was established at 20 mph, which is also the minimum design speed recommended by AASHTO for a shared use path. The design speed helps determine the horizontal geometry (minimum turn radius) of the trail, the distance needed for a trail user (bicyclist) to come to a complete stop, and thus the sight distances necessary when approaching an intersection.

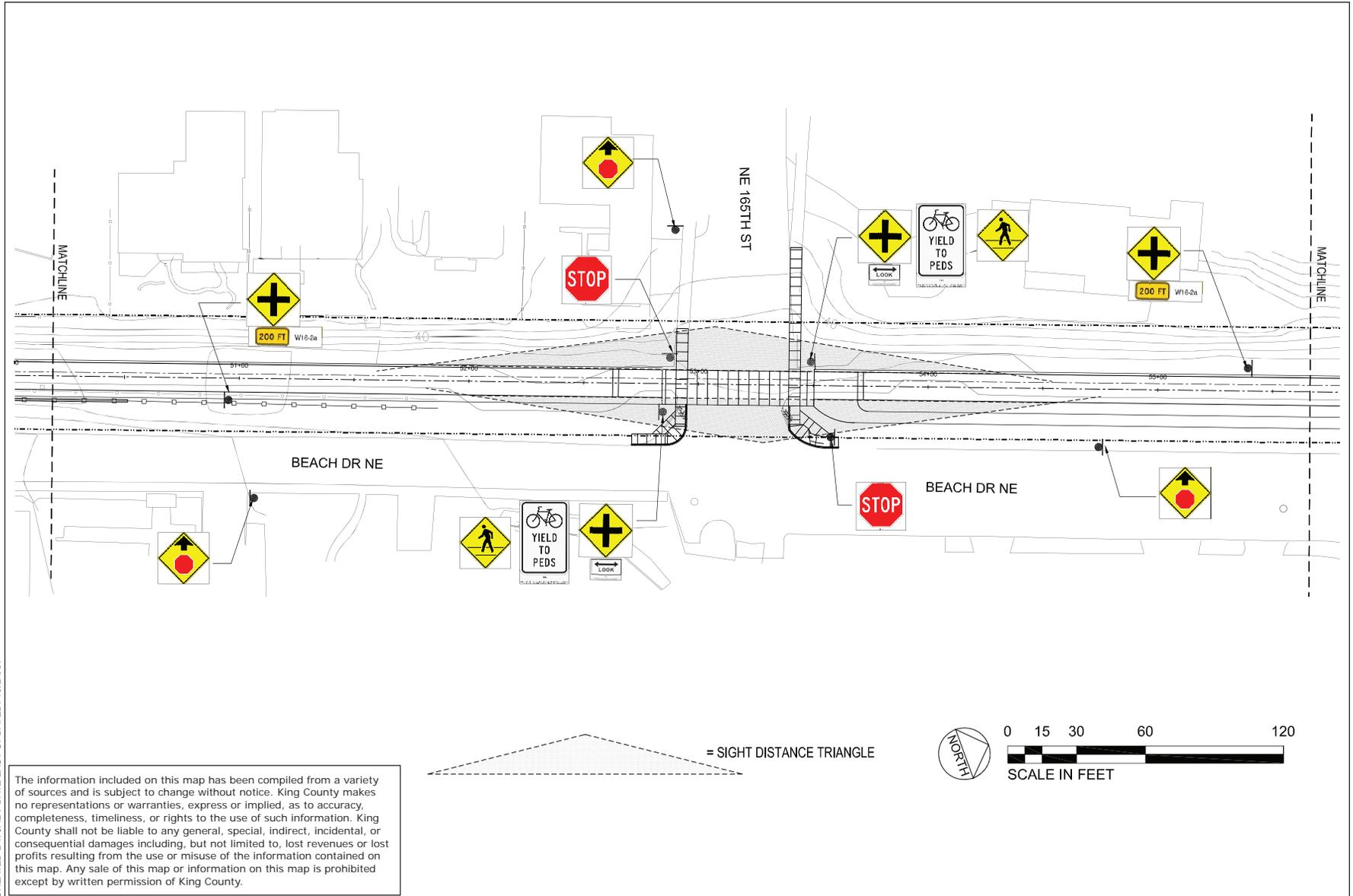
2.5.1.9 Bollards

New trail bollards (posts) would be installed, spaced 6 feet on-center to meet AASHTO Guidelines and to improve safe passage between them. They would be located at trail and roadway crossings to prevent vehicular traffic from intentionally or inadvertently driving onto the trail. Bollards and their associated spacing would be based on King County standard details and layout, which are consistent with the recommendations for “barrier posts” in the AASHTO Guide for the Development of Bicycle Facilities. The central bollard(s) would be removable to accommodate access by emergency and maintenance vehicles. The outer bollards would be fixed and located off the edge of the paved surface.

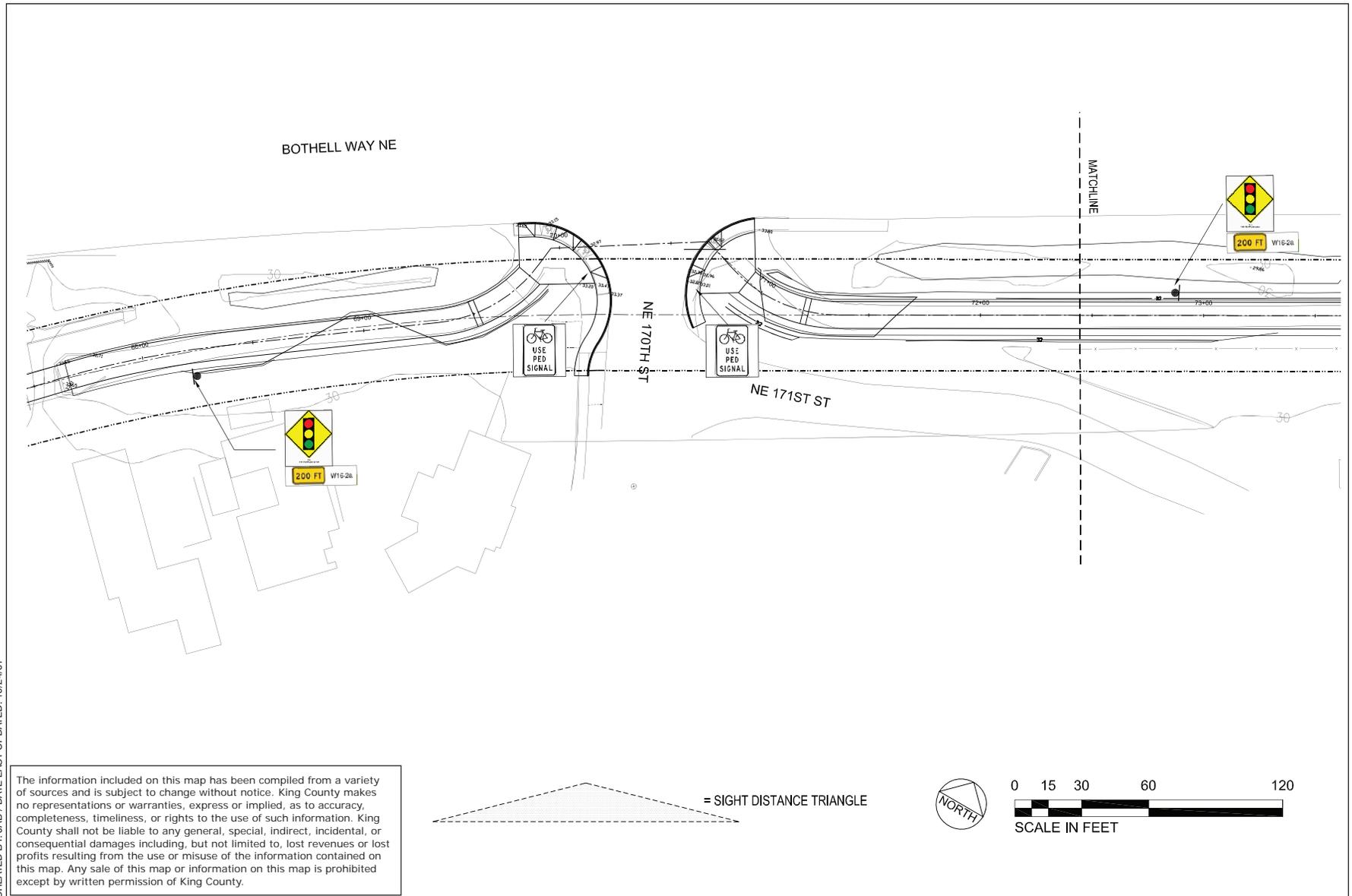
2.5.1.10 Vegetation Management

Circumstances under which vegetation within the trail right of way would be trimmed or removed include the following:

- To widen the trail.
- To maintain sight distances on the approaches to an intersection, where vegetation would potentially prevent a vehicle or trail user from identifying an obstruction and stopping in time to prevent an accident.
- To remove trees or limbs located next to the trail that represent a hazard to trail users.
- To remove noxious weeds within the limits of the construction zone and replace them with appropriate native, or near-native plantings (species similar to natives, but originating in a different region).
- To maintain ditch systems and repairing or replacing culverts.



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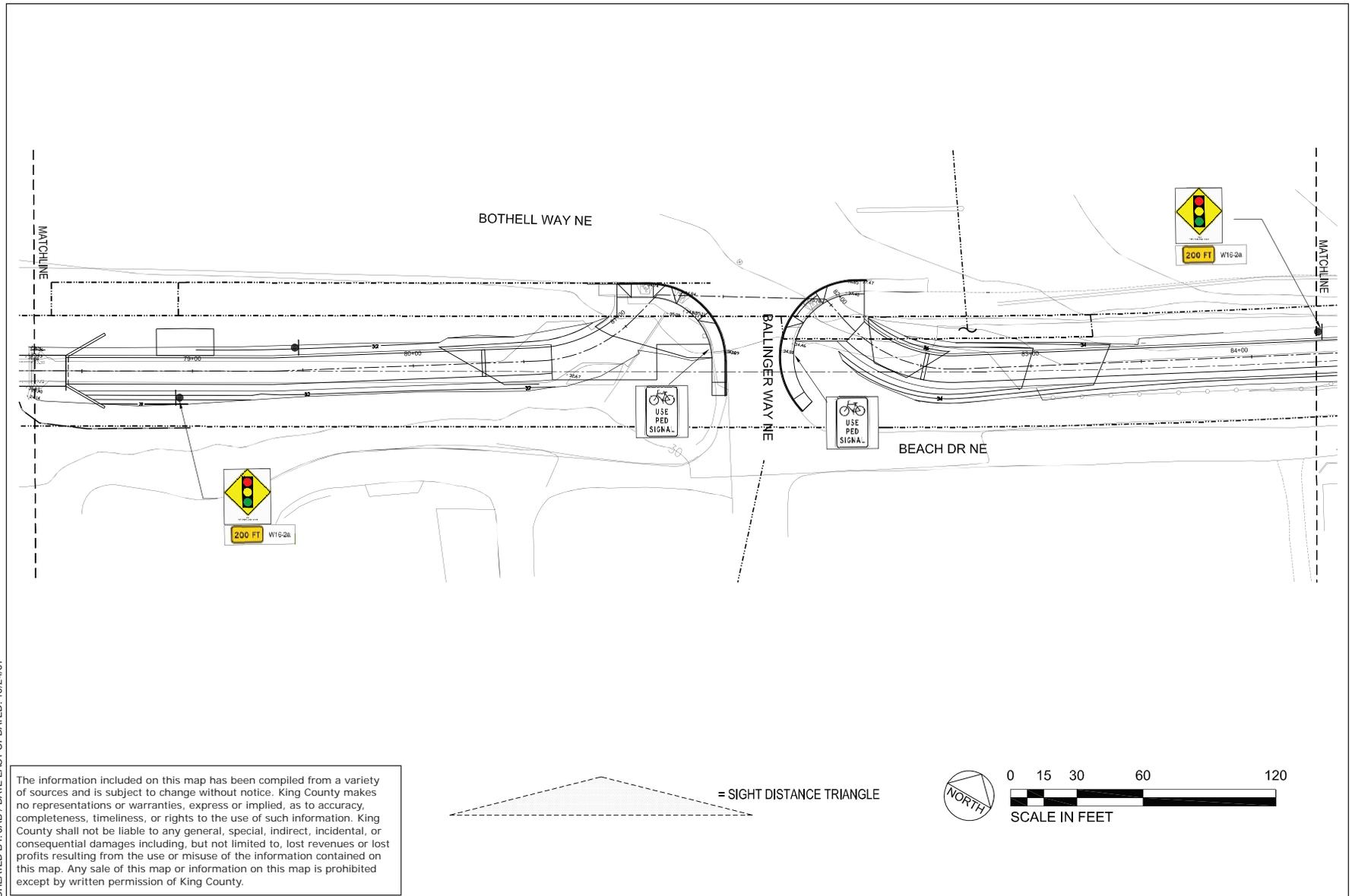


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Figure 2-10
 Trail/Bothell Way NE/NE 170th Street — Signage
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Figure 2-11
 Trail/Ballinger Way NE/Beech Drive NE — Signage
 King County, Washington

Where consistent with design and where it does not impact safety, existing vegetative screening that would be displaced by the work would be replaced. Vegetation that is replaced would be similar in nature to what is removed, but not necessarily identical. Vegetation would be replaced in-kind where it is possible and appropriate to do so.

A planting plan was developed to address the need to maintain sight distances at driveways and intersections and to guide the replacement of vegetation where in-kind replacement, as described above, is not possible or appropriate. The plan takes into consideration the views of hillside property owners by selecting plants by ultimate growth height. Low screening plant species (under 3-foot growth height) would be planted where vegetation is removed adjacent to the trail at driveways and intersections (in sightline distances). These plantings may include barberry, rhododendron or similar species. Medium screening species (up to 6-foot growth height) would be planted where vegetation, such as hedges, must be removed to accommodate the widened trail if not located within sightline distances. These plantings may include compact strawberry tree, Nootka rose, snowberry, western hazel, bayberry, evergreen huckleberry, or similar species. Restoration/enhancement planting would be provided in disturbed sensitive areas and buffers.

2.5.1.11 Additional Improvements

Additional improvements are proposed at many places along the trail. Existing deteriorated benches and trail furniture would be replaced with new benches, trash receptacles, signing, racks and other elements. New benches and drinking fountains would be placed in broad areas of the right of way located at NE 147th Street and NE 170th Street to create resting areas along the trail. The locations of these areas are provided on the plan sheets included in Appendix A.

New light fixtures would be installed along the trail at crossings. These fixtures would be mounted on low 12-to 14-foot (pedestrian-scale) poles selected specifically for trails. The luminaires would include cut-offs to focus the light downward to reduce light pollution and glare into the neighborhoods and would be placed in a staggered position at intersections.

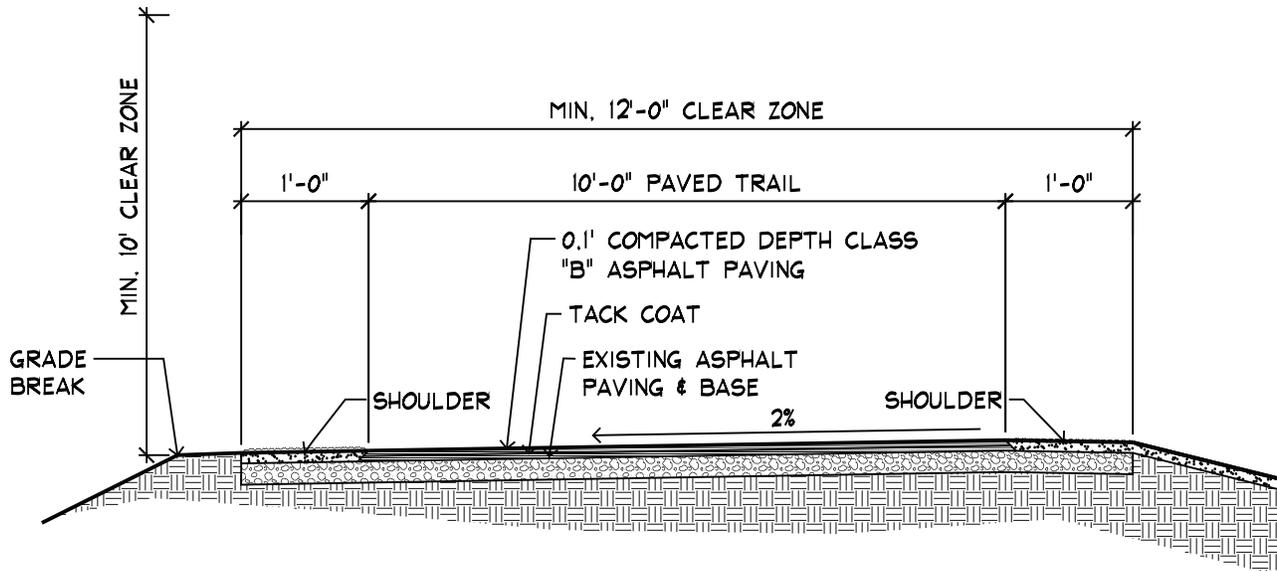
These improvements are depicted in preliminary form in Appendix A and are evaluated as needed in the various sections of this EIS. The improvements would be further developed during the detailed design and permitting process.

2.5.2 Rebuild Alternative

Under the Rebuild Alternative, improvements would be limited to reconstructing the trail, sight distance improvements, and traffic control and signage improvements. All other aspects of the trail and its operation would remain as-is.

2.5.2.1 Trail Reconstruction

The existing trail has an asphalt surface approximately 10-feet wide with approximately 2 feet of dirt shoulders and discontinuous grass and gravel shoulders on both sides of the trail (refer to Figure 2-12). The Rebuild Alternative would reconstruct the trail in-kind to address issues of root heave and irregular pavement.



(A) TYPICAL REBUILD SECTION

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Burke-Gilman Trail Redevelopment Project EIS . 207286
Figure 2-12
 Rebuild Alternative — Typical Trail Profile
 Lake Forest Park, Washington

2.5.2.2 Sight Distance Improvements

Sight distance improvements would be limited to removing or trimming vegetation at intersections where it impairs visibility/sight distance at crossings.

2.5.2.3 Traffic Control and Signage

Traffic control and signage would be provided as described above for the Redevelopment Alternative.

2.5.3 No Action Alternative

Under the No Action Alternative, the trail would not be redeveloped. There would be no comprehensive construction project to address issues of safety and ease of use; current conditions and features would be managed as-is. King County would perform spot maintenance as necessary on this section of the Burke-Gilman Trail. Maintenance activities would be performed in accordance with maintenance prioritization and would include spot root removal and patching of pavement in areas.

The No Action Alternative provides a baseline for evaluating the changes and impacts of the Action Alternatives.

2.5.4 Preferred Alternative

The preferred alternative is the Redevelopment Alternative because it best meets King County's purpose and need of redeveloping the trail to improve safety, maintenance, drainage, and ease of use along the trail. The Redevelopment Alternative best addresses: 1) trail surface irregularities; 2) need to meet minimum trail standards; 3) need to create uniformity along the trail; 4) need to accommodate an increasing number of trail users; and 5) need to accommodate the range of users in a safe manner (see Table 2-2). The Rebuild Alternative would address some, but not all of the safety issues associated with the trail at a lower construction cost; it would improve the trail surface in some areas but would not increase the separation between cyclists and pedestrians. This alternative would not address issues associated with increased trail usage and user conflicts, and would not address drainage issues and sight distance conflicts. This alternative would not safely accommodate the full range of users as trail volumes increase in the future. The No Action Alternative would not address the County's safety objectives and would not be consistent with adopted County policies and standards for trails, and would also not be consistent with federal and state guidelines and standards.

Although a preferred alternative has been identified for this Draft EIS, final selection and refinement of the preferred alternative will be based on the environmental review, including cost considerations, and comments received on this Draft EIS.

Table 2-2. Summary of Features of Alternatives, Burke-Gilman Redevelopment

Feature	Redevelopment	Rebuild	No Action
Trail width	18 feet total (in most places). Includes: paved surface (12 feet); gravel shoulders (3 feet on east and south and 1 foot on west) turf shoulder (1 foot each side).	10 feet without gravel shoulders.	10 feet without gravel shoulders.
Sight Distance Improvements	Remove chicanes and identified vegetation and fences at intersections to improve visibility/sight distance at crossings.	Remove identified vegetation at intersections to improve visibility/sight distance at crossings.	No change.
Fencing	Replace, where necessary, existing fencing, generally in kind and in a way that protects privacy and preserves trail views/visibility.	No change from existing.	No change from existing.
Bridges	Replace pedestrian bridge over Lyon Creek.	No change from existing.	No change from existing.
Retaining walls	Replace, where necessary, existing retaining walls, generally in kind. Construct new retaining walls and cut and fill slopes of widened trail where necessary.	No change from existing.	No change from existing.
Drainage Improvements	Drainage ditch improvements; install new culverts or modify existing culverts	No change from existing.	No change from existing.
Traffic Control Signage	Stop signs for trail users would be removed at all crossings. At NE 165 th Street, Yield to Pedestrian signs would be installed on the trail.	Stop signs for trail users would be removed at all crossings. At NE 165 th Street, Yield to Pedestrian signs would be installed on the trail.	No change from existing.
Traffic Operation	15 MPH speed limit signs	No change from existing.	No change from existing.
Bollards	New bollards would be provided at crossings.	No change from existing.	No change from existing.
Lighted Crossings	Pedestrian-scale luminaires with cut-offs designed specifically for trails. Placed in a staggered position.	Existing lights would remain.	None
Trail amenities	Replace existing deteriorated benches and other trail amenities. Establish resting areas along the trail at NE 147 th and NE 170 th Streets with benches and trail furniture, drinking fountains, and landscaping.	No change from existing.	No change from existing.
Vegetation	Where consistent with design and where it does not impact safety, existing vegetative screening that would be displaced by the work would be replaced. Vegetation would be replaced in-kind where it is possible and appropriate to do so. Vegetation that is replaced would be similar in nature to what is removed, but not necessarily identical.	No change from existing.	No change from existing.

2.6 Construction Timing and Methods

A detailed construction plan would not be developed until the final alternative has been selected. However, the following information is provided to guide the reader in considering the evaluation of potential impacts that could occur during construction.

2.6.1 Phasing

The approximate phasing and relative duration of construction is described for each alternative below from longest to shortest:

- The Redevelopment Alternative would require pavement removal, grading and retaining wall construction, drainage improvements, bridge demolition and construction, surfacing and other improvements. Depending on permitting and funding availability, the work could be completed in one or two construction seasons and within 5 to 6 months.
- The Rebuild Alternative would require pavement removal and surfacing and other minor improvements. Assuming seasonal constraints and funding availability, construction would likely occur over one construction season and within 2 to 3 months.
- The No Action Alternative would not require construction.

2.6.2 Construction Sequence

The following is a general description of the types of construction methods and their sequence that likely would be employed to construct any segment of the project. The general steps in the construction sequence would occur as follows:

1. Preparation and demolition
2. Erosion and traffic control
3. Grading and retaining wall construction (Redevelopment Alternative only)
4. Drainage (Redevelopment Alternative only)
5. Bridge Construction (Redevelopment Alternative only)
6. Surfacing (the placement of asphalt, top course, base course, and top soil)
7. Fencing (Redevelopment Alternative only)
8. Signage
9. Planting

Construction activities expected to generate the most noise would be asphalt cutting in conjunction with the regrading of driveway crossings and audio warnings on vehicles backing up.

2.6.3 Staging

Staging area locations would be determined during final design/permitting for the selected alternative. Possible staging areas for construction material and equipment include areas of unimproved right of way near major intersections (e.g., NE 165th Street, NE 170th Street, of Ballinger Way NE). These staging areas would not be located in areas proximate to residences in order to minimize impacts.

2.6.4 Management of Pedestrians and Vehicles around Work Areas

Several measures would be used during construction to provide for pedestrian safety, driveway access, and traffic control along roadways. These measures include:

1. **Temporary Detours and Trail Closures.** It is the County's goal to provide safe alternative detour routes around construction areas where possible. At locations where there are no safe alternatives, it is the County's goal to avoid shutting the trail down by providing safe passage through the construction corridor. Advanced notice and signage would be provided.
2. **Driveway Crossings.** Access through driveways and roads would be maintained during construction. Vehicle and pedestrian access to homes along the trail would be maintained through use of traffic control devices and traffic control personnel. Construction activities would be temporary and would be minimized through proper traffic control signage, and homeowner notification. Construction at driveway and road crossings would typically last from one to two weeks per crossing.
3. **Construction along Roadways.** This type of traffic control would occur where the trail approaches and is adjacent to the roadway. The road shoulder would be closed, construction fencing and traffic control devices would be placed, and in some situations the adjacent roadway might be temporarily restriped. Along with the traffic control devices, flaggers would guide oncoming traffic through and around the work zone.

Chapter 3 Affected Environment, Impacts, and Mitigation

3.1 *Earth*

3.1.1 Studies and Coordination

This section is based upon geotechnical studies conducted by Zipper Zeman Associates, Inc. (2006; 2007), geology maps, and other literature. In addition, field reconnaissance was completed along the approximately two-mile section of the trail, which included walking the trail section to evaluate slopes, evidence of mass wasting (land slides, soil creep, and debris flows) as well as significant areas of erosion.

3.1.2 Affected Environment

3.1.2.1 Regulatory Environment

Washington State's Growth Management Act (Chapter 36.70A RCW) requires all cities and counties to identify critical areas within their jurisdictions and to formulate development regulations for their protection. Among the critical areas designated by the Growth Management Act are geologically hazardous areas. The City of Lake Forest Park has defined four specific types of geologically hazardous areas and has promulgated restrictions and development standards for these areas.

3.1.2.2 Topography and Geology

The trail corridor is located within the Puget Lowland, which is a north-south trending depression bounded on the east by the Cascade Mountains and on the west by the Olympic Mountains. The existing topography and geology in the project area are heavily influenced by past glacial activity. The existing trail is built on top of an old railroad track alignment, which was constructed on fill material over a mixture of glacially-deposited sediments.

The trail can be generally divided into four geologic areas, each of which is discussed below.

Southern end of trail alignment to NE 161st Street

This initial segment of the trail alignment is located near the toe of a moderately steep to steep east-facing slope. To the east of the trail, the ground slopes gently towards Lake Washington, and this area has been mapped as lake deposits, composed of silt and clay with other layers. To the west of the trail, the area has been mapped as sediment deposits composed of a mixture of sand, gravel, silt and till. These deposits have been compacted by glaciers, and are thus dense and hard. There are many indications of past slope instability on the west side of the trail within this section, as well as areas of more recent slope movement.

NE 161st Street to approximately NE 165th Street

This portion of the trail is located near the toe of a moderately steep east-facing slope. The ground to the east of the trail in this section can be characterized as gently sloping toward Lake Washington and has been mapped as lake deposits composed of silt and clay. To the west of the trail, there is a moderately steep slope that has been mapped as recessional outwash, composed of a mix of sand and gravel. The

outwash, the lack of glacial compaction, and the lack of areas of recent slope movement are the primary differences from the previous segment.

NE 165th Street to approximately Ballinger Way NE

This portion of the trail alignment is located within an area that slopes gently towards Lake Washington. There are some moderately steep slopes present on the west side of the trail within this segment, closest to NE 165th Street. This area is mapped as being composed of lake deposits, consisting of silt and clay, as well as areas of older alluvium, consisting of a sand and gravel mixture.

Ballinger Way NE to the end of the trail alignment

This portion of the trail alignment is located near the toe of a moderately steep slope. In general, the area to the east of the trail is gently sloping towards Lake Washington and has been mapped as lake deposits, and the moderately steep slope to the west of the trail has been mapped as older alluvium. The location of this segment at the toe of a steep slope coupled with the mix of lake deposits and alluvium set this segment apart from the previous three.

3.1.2.3 Geologically Hazardous Areas

Geologically hazardous areas are divided into four distinct types: Seismic Hazard Areas, Steep Slope Hazard Areas, Landslide Hazard Areas, and Erosion Hazard Areas. In general, before development is allowed in these areas, detailed geotechnical studies must be prepared to discuss specific standards related to site geology, soils, seismic hazards and facility design.

Seismic Hazards

Seismic Hazard Areas are defined by Chapter 16.16.040 of the City Municipal Code as those areas underlain by low-strength fill and floodplain deposits with soil and groundwater conditions that are more susceptible to seismic hazard than other areas. The area of the trail between approximately NE 165th Street and the northern end of the trail alignment may be susceptible to seismically induced lateral spread of fill soils.

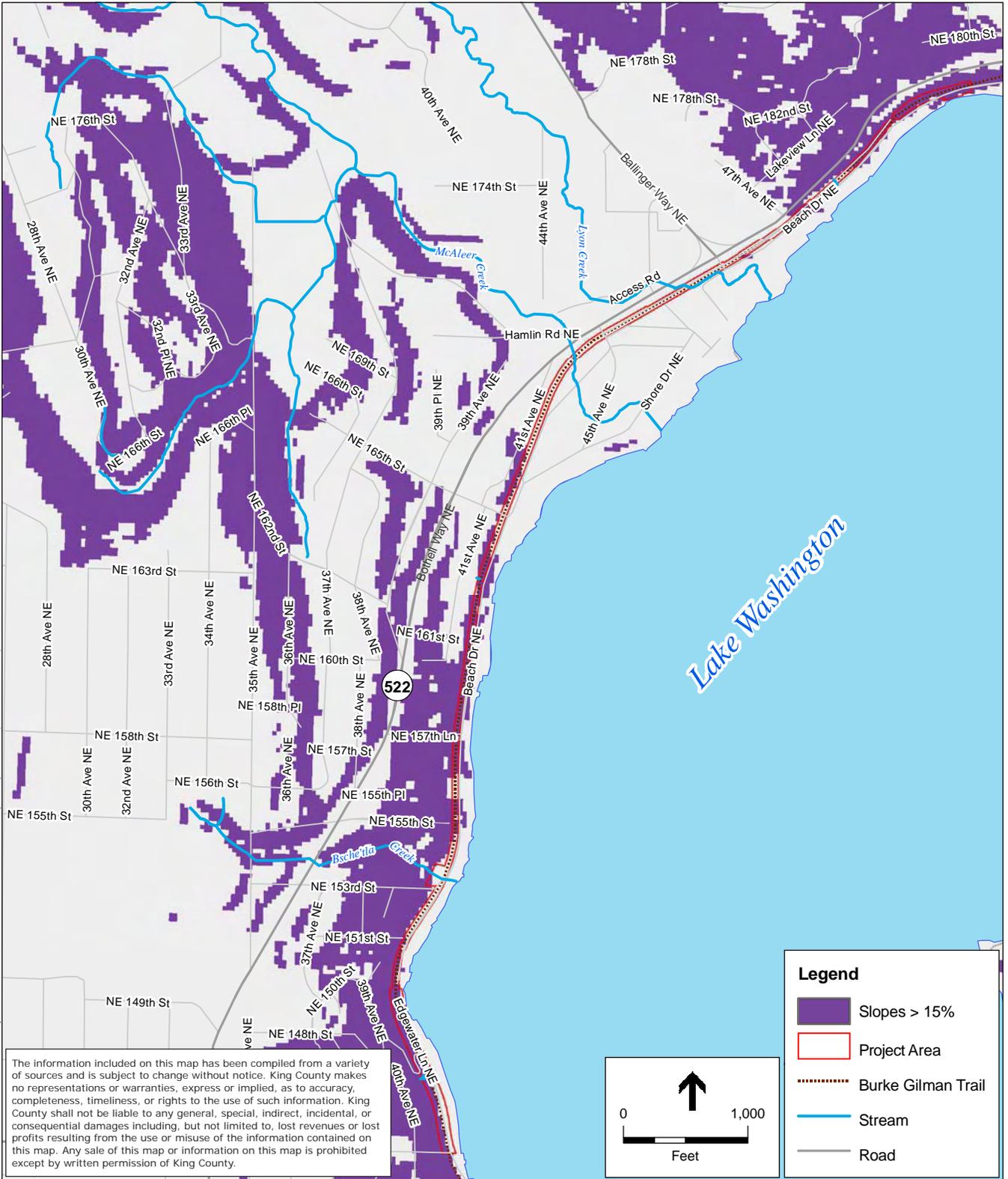
Steep Slopes and Landslide Hazard Areas

Steep Slope Hazard Areas are generally defined by Chapter 16.16.040 of the City Municipal Code as those areas with slope gradients of 40 percent or greater and with a vertical elevation change of at least 10 feet. Landslide Hazard Areas are generally defined by Chapter 16.16.040 of the City Municipal Code as having a slope that is potentially subject to landslides.

A portion of the trail corridor, from the southern limits to just north of NE 157th Street, falls within a mapped steep slope and landslide area (City of Lake Forest Park, 2005). While not mapped by the City, other areas north of NE 157th Street and south of 165th Street and an approximately 100-foot section north of 47th Avenue NE contain steep slopes and potential landslide areas (Zipper Zeman, 2006).

A minimum 50-foot buffer must be established from all sides of Steep Slope and Landslide Hazard Areas for certain types of developments as regulated by the City, and vegetation cannot be removed from these areas unless permitted by a sensitive areas permit.

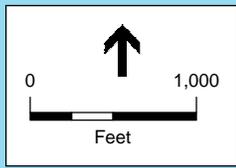
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The information included on this map has been compiled from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. King County shall not be liable to any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

Legend

- Slopes > 15%
- Project Area
- Burke Gilman Trail
- Stream
- Road



SOURCE: King County, 2006; PACE, 2007

Erosion Hazards

Erosion Hazard Areas are defined by Chapter 16.16.040 of the City Municipal Code as those areas containing soils, which according to USDA Soil Conservation Service, may experience severe to very severe erosion hazard, including slopes greater than 15 percent with exposed erodible soils. The City considers the following soils to be particularly susceptible to erosion: infill soils of almost all soil types, loose sandy soils such as Vashon recessional outwash, Esperance sand, weathered Vashon till, and dense fine-grained clay.

The majority of the trail alignment and soils on the adjacent slopes are composed of soils that are susceptible to erosion (i.e., fill, recessional outwash). Areas where the slopes exceed 15 percent likely meet the definition of Erosion Hazard Areas (Figure 3.1-1).

3.1.3 Impacts

3.1.3.1 Redevelopment Alternative

Construction Impacts

Grading and filling would be required to prepare the trail alignment for widening under the Redevelopment Alternative. It is anticipated that cuts would be made into the west side of the trail (uphill side) and fill would be placed on the east side in order to widen the roadbed. Excavated soils would be used for fill, if appropriate; otherwise fill would be exported from the site or used for landscaping purposes. Estimates indicate that export/haul quantities (inclusive of unsuitable material, not asphalt) would be approximately 1,350 cubic yards, with an additional 980 cubic yards of old asphalt removal/haul. Approximately 4,700 cubic yards of import material would be needed for construction activities along the trail corridor, including 2,400 cubic yards of structural fill, 2,050 cubic yards of gravel base course, and approximately 250 cubic yards of new finished shoulder gravel. Approximately 1,400 tons of paving would be needed.

Soil Disturbance. Construction of the expanded trail could result in erosion associated with the excavation, fill placement, and potential spoils removal and/or stockpiling. Temporary soil disturbance would result during demolition of the existing trail and construction of the redeveloped trail. In addition, erosion could result from vegetation removal and drainage improvements along the trail. Erosion could result in water quality degradation of local surface waters due to the transport of sediment and silt particles off-site through stormwater runoff. This is of greatest concern where construction activities take place near ditches along the trail. These ditches can serve as conveyance features to other local waterbodies.

The severity of the potential erosion would be dependent upon the quantity of vegetation removed, weather conditions during construction, and the volume of soils stockpiled.

Disposal of Spoils. Construction activities would generate relatively large volumes of spoils that would require disposal. Spoils disposal could result in the transportation of soil, dust, and mud off-site through erosion or by being tracked off-site on truck and equipment tires.

Excavation and Filling. Excavation and filling would be needed to grade and widen areas to accommodate the widened trail. Excavation and filling activities may require the creation of soil stockpiles, transportation of excavated material to a stockpile or an off-site location, and filling of a disposal site if there is a need for the excavated materials to be disposed. Erosion could result from any of these activities, due to the exposure of soil.

Construction of Retaining Walls. Retaining walls would be constructed along approximately 2,245 linear feet of the trail where cuts or fills would be made along existing slopes to serve as a support feature. A brief summary of the locations of the retaining walls is provided here, and more detailed information can be found in the plan sets included in Appendix A. The longest continuous wall would be approximately 790 feet in length and would start at the southern end of the trail and extend northward. This segment of the trail has been identified as containing areas of more recent slope movement; therefore, additional precautions would be taken when constructing the walls within this initial segment of the trail. Retaining walls would also be constructed from NE 151st Street to approximately NE 165th Street and between Ballinger Way NE to the end of the trail alignment.

Construction of these walls would expose surfaces and potentially result in erosion, slope instability, and alterations in drainage courses. The potential for these impacts would depend upon wall type; wall location, including construction access and surrounding conditions; wall height; and wall length.

There are numerous types of walls, each with its own advantages and disadvantages, depending on engineering considerations such as retained earth properties, foundation conditions, height, and construction access. Wall types may include rockery, reinforced concrete, or block depending on the site conditions and other considerations. Final selection of wall type would be made during detailed design and permitting.

Geologically Hazardous Area Impacts

Seismic Hazard Areas. Construction of the widened trail would not affect existing seismic hazard areas, which are mapped from approximately NE 165th Street to the northern end of the trail. However, during a seismic event, lateral spreading of fill soils could occur and could thus affect the stability of the soils in this segment of the trail during its future operation. There could be a potential for loss of strength, settlement and lateral displacement of soils supporting the trail. The magnitude of settlement, soil movement, and loss of strength would be a function of the soil thickness, soil quality, groundwater level, and the location and magnitude of the seismic event.

Steep Slopes and Landslide Hazard Areas. Under the Redevelopment Alternative, the trail and the adjacent drainage ditch would be shifted in a few locations towards the uphill side of the trail where steep slope areas are located. In these areas, short retaining walls (1 to 3 feet high) would be constructed at the toe of the slope to support the slope soils. With these activities comes the potential for sliding of existing steep slopes. Sliding can be triggered by a seismic event, by the natural process of stabilization of a steep slope to a flatter profile, by an increase in the amount of water in the soil (caused by excessive rainfall), or by construction that adds fill to, traverses, or cuts into a steep slope.

There are three areas along the trail that exhibit obvious surficial indications of past and/or recent landslide activity (Zipper Zeman, 2006). In the first area, from the southern tip of the trail to approximately NE 147th Street, recent earth movements have been detected. Because of the groundwater seepage in the area and the nature of the soil deposits, it is unclear when the next slope movement could occur. Therefore, this area is deemed to have a high potential for landslide hazards.

In the second area from approximately NE 147th to approximately NE 150th Street, indications of earth movement were detected. There is no indication of groundwater seepage in this segment, therefore, the potential for landslide hazards is deemed to be low.

In the third section of the trail, a short segment just north of 147th Avenue NE, severely leaning and overturned trees were detected along the trail, and groundwater seepage was observed as well (Zipper Zeman, 2006). This area would be deemed to have a high potential for landslide hazards.

Based on geotechnical evaluations, the trail redevelopment is not expected to destabilize uphill steep slope hazard areas (Zipper Zeman, 2007). At most locations, the limits of construction would not extend onto these existing slopes. In addition, site grades along the trail at the toe of the slope would not be substantially modified. Retaining walls would be designed by a licensed engineer and constructed in short segments to limit the length of the toe of the slope that is unsupported at any one time.

Erosion Hazards. The majority of the trail alignment and adjacent slopes are composed of soils that are susceptible to erosion (i.e., fills, recessional outwash), and areas with slopes that exceed 15 percent. Therefore, precautions must be taken, in the form of best management practices (BMPs), to ensure that the potential for erosion is minimized. These BMPs are discussed further under Section 3.1.5 Mitigation Measures.

3.1.3.2 Rebuild Alternative

Construction Impacts

The Rebuild Alternative would include soil disturbance, disposal of spoils, and excavation and filling to rebuild the trail, though to a lesser extent than under the Redevelopment Alternative. Under the Rebuild Alternative, there would also be no excavation, filling, or construction associated with new retaining walls. As such, there would be no associated soil disturbance or need for disposal of spoil material in those areas.

Geologically Hazardous Area Impacts

No construction activities would occur outside the immediate trail limits, therefore there would be no impacts to geologically hazardous areas.

3.1.3.3 No Action Alternative

There would be no construction impacts under the No Action Alternative, as no construction activities would take place. However, under the No Action Alternative, maintenance activities for culverts and debris clearing would continue to occur. Maintenance activities include the potential for erosion due to removal of sloughed material from ditches. Eroded soils could result in increased siltation and sedimentation of surface waters.

3.1.4 Cumulative Impacts

Construction of the Redevelopment Alternative would require a net import of approximately 4,700 cubic yards of material, including structural fill and gravel base. This would contribute to the depletion of existing borrow sources over time. No other cumulative earth-related impacts are anticipated.

3.1.5 Mitigation Measures

3.1.5.1 Erosion

The following best management practices (BMPs) could be used to control erosion during construction along the trail corridor, as well as during maintenance activities such as ditch cleaning.

- Prepare and implement a Temporary Erosion and Sediment Control Plan.
- Mulch the slopes of ditches with straw or matting to reduce erosion in areas where accumulated sediment is removed.

- Minimize areas of soil exposure.
- Retain vegetation where possible, especially in areas with steeper slopes. Seed or plant appropriate vegetation on exposed areas as soon as work is completed.
- Route surface water through temporary drainage channels around and away from disturbed soils or exposed slopes.
- Use clean soils containing little or no silt and clay as fill to reduce the potential for erosion.
- Use silt fences or other suitable sedimentation control devices. Due to the linear nature of the project area, a sediment trap or pond would not be feasible as a sedimentation control device. Silt fencing and catch basin inserts would be the primary sedimentation control measure.
- Cover exposed soil stockpiles and exposed slopes with plastic sheeting, as appropriate.
- Use straw mulch and erosion control matting to stabilize graded areas and reduce erosion and runoff impacts to slopes where appropriate.
- Intercept and drain water from any surface seeps if they are encountered.
- Use a truck tire wash to reduce the potential for turbid runoff from roads.
- Incorporate contract provisions allowing temporary cessation of work under certain, limited circumstances, if weather conditions warrant. Some construction activities that are difficult to mitigate through BMPs should be limited to the drier summer months.
- Consider the use of recycled paving materials for the trail surface.

Mitigation for additional impervious surfaces can include properly designing surface water catchment features to control runoff. See Section 3.2 for further discussion of surface water impacts and mitigation.

3.1.5.2 Seismic Hazards

Seismically induced slope failure can be mitigated through the design and construction of retaining walls on slopes where walls would be built for the trail. Final design of the retaining walls would incorporate all appropriate measures to mitigate seismic impacts. For seismically induced liquefaction, the appropriate level of mitigation would likely be to re-level and repair the trail as needed following a seismic event.

3.1.5.3 Steep Slopes and Landslide Hazards

For existing steep slopes that would not be impacted by construction, little mitigation would be required outside of continued maintenance (e.g., removal of leaning trees, removal of slide debris as slides may occur, and continued clearing of drainage ditches). In some areas, steepening of the slopes can be accomplished without reducing the stability below normally accepted standards. In other areas requiring cutting or filling, retaining structures would be added to eliminate the possibility of sliding. The potential for slope instability would be mitigated by site-specific geotechnical investigation, engineering design, and construction techniques that would be detailed as part of the permitting process.

3.1.5.4 Disposal of Spoils

The method used for disposal of the spoils would depend upon on a number of factors: whether the spoils are clean or contaminated, the type of soil (coarse-grained or fine-grained), the moisture content of the soil, regional demand for fill soils at the time the project is undertaken, the availability of disposal sites, and other factors. Site-specific analysis, construction planning and sequencing, and an economic evaluation would be undertaken to determine the appropriate disposal method prior to construction.

3.1.5.5 Excavation and Filling

Mitigation would include implementation of BMPs, specifically installing erosion protection and following the Temporary Erosion and Sedimentation Control Plan for the project. Other mitigation would include limiting times of hauling and reusing excavated soil elsewhere along the corridor as appropriate.

3.1.5.6 Retaining Wall Construction

In general, choosing the most appropriate type of retaining wall, designing the wall for the site-specific conditions (soil, access, and space), taking care during construction, and using BMPs would mitigate most impacts associated with retaining wall construction.

Appendix A includes plans showing the locations of new and replaced retaining walls to be included as part of the Redevelopment Alternative.

Generally all of the erosion impacts that could result from constructing retaining walls would be mitigated by proper use of BMPs. Proper wall design that evaluates both the internal stability of the wall and the overall stability of the slope would mitigate existing slope instability issues at proposed wall locations. Vibration and noise impacts resulting from use of construction equipment could be minimized by restricting the hours of construction work. Wall types could be chosen that require the use of less noisy equipment in locations adjacent to acoustically sensitive areas (homes, wildlife habitat, etc.).

3.1.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to earth resources associated with either of the action alternatives have been identified.

3.2 Surface Water Resources

3.2.1 Studies and Coordination

Pertinent existing and historical water quality information used to characterize the affected environment, potential impacts, and mitigation measures was obtained by reviewing the following resources and documents:

- *Sensitive Areas Study: Burke-Gilman Trail Redevelopment, Lake Forest Park, Washington* (The Watershed Company, 2007);
- *Preliminary TIR Burke-Gilman Trail Redevelopment in Lake Forest Park* (PACE Engineers, 2006); and
- Washington Department of Ecology 2004 State Water Quality Assessment.

Review of these documents was supplemented with field reconnaissance.

3.2.2 Affected Environment

3.2.2.1 Regulatory Environment

The project must comply with a number of federal, state, and local regulations, permits, and approvals. It is assumed that the point of compliance is the point at which runoff from the project leaves the site. Runoff would be treated and detained as required prior to discharging to the receiving water.

Federal Regulations

The U.S. Army Corps of Engineers (Corps) regulates the placement of fill in waters of the U.S., including streams, under Section 404 of the Clean Water Act (CWA). Stormwater discharges must also comply with the applicable provisions of the CWA. Under CWA Section 402: National Pollutant Discharge Elimination System (NPDES), a permit is required for discharge of pollutants into waters of the U.S. In addition, Federal Emergency Management Agency (FEMA) has mapped 100-year floodplains within the basins along the trail corridor. Development within floodplains is regulated by local jurisdictions through the permitting process.

State Regulations

The Washington State Department of Ecology (Ecology) regulates discharge to surface waters through the Individual 401 Water Quality Certification process, and through the State's antidegradation policy for water quality. The project would comply with the antidegradation policy because the trail is not considered a pollutant-generating impervious surface.

The Environmental Protection Agency (EPA) requires Ecology to periodically assess the quality of water in the state by collecting data. Based on the data, Ecology prepares the 303(d) list of all waters in which beneficial uses, such as salmon habitat and recreational uses, have been impaired due to poor water quality. Ecology then uses this list to develop plans to improve water quality. The 303(d) list is a requirement of the federal CWA (33 U.S.C §1313(d)). The discussion below includes identifies which waterbodies are impaired and listed on the 303(d) list.

Local Regulations

The City of Lake Forest Park has adopted the 2005 King County Surface Water Design Manual (KCSWDM), which establishes standard procedures for implementing the City’s surface water policies. The Lake Forest Park Municipal Code, Title 16 Environmental Protection also contains additional requirements for the protection of surface water quality.

In Lake Forest Park, streams are also regulated under the City Municipal Code, Chapter 16.16 Environmentally Sensitive Areas. Streams are classified as either Type 1, Type 2, or Type 3, based on fish use and flow. These stream types are defined in Table 3.2-1 with their associated buffer widths.

Table 3.2-1. City of Lake Forest Park Stream Types and Associated Buffer Requirements

Stream Type	Definition of Stream Type	Standard Buffer Width (feet)	Minimum Buffer Width with Enhancement (feet)
Type 1	Streams that are used at least seasonally by fish for spawning, rearing or migration. Type I streams include those that are fish passable from Lake Washington. Type I streams also include streams or parts thereof that are waters of the state.	115	70
Type 2	Streams that are not fish bearing and streams that are considered to be perennial streams. Type 2 streams include the intermittent dry portions of the perennial channel below the uppermost point of perennial flow.	50	35
Type 3	Streams that are not Type 1 or Type 2 streams. Type 3 streams are seasonal, non-fish-bearing streams in which surface flow is not present for a significant portion of a year of normal rainfall and that are not located downstream from any Type 2 or higher stream.	35	25

Source: Lake Forest Park Municipal Code 16.16

3.2.2.2 Existing Watersheds and Waterbodies

The trail corridor is located adjacent to the western shoreline of Lake Washington within Water Resource Inventory Area (WRIA) 8, the Cedar-Sammamish Basin. The southern and northern portions of the trail corridor are located in the East Lake Washington Watershed, and the middle portion of the trail corridor is located in both the McAleer Creek and Lyon Creek Watersheds (see Figure 3.2-1).

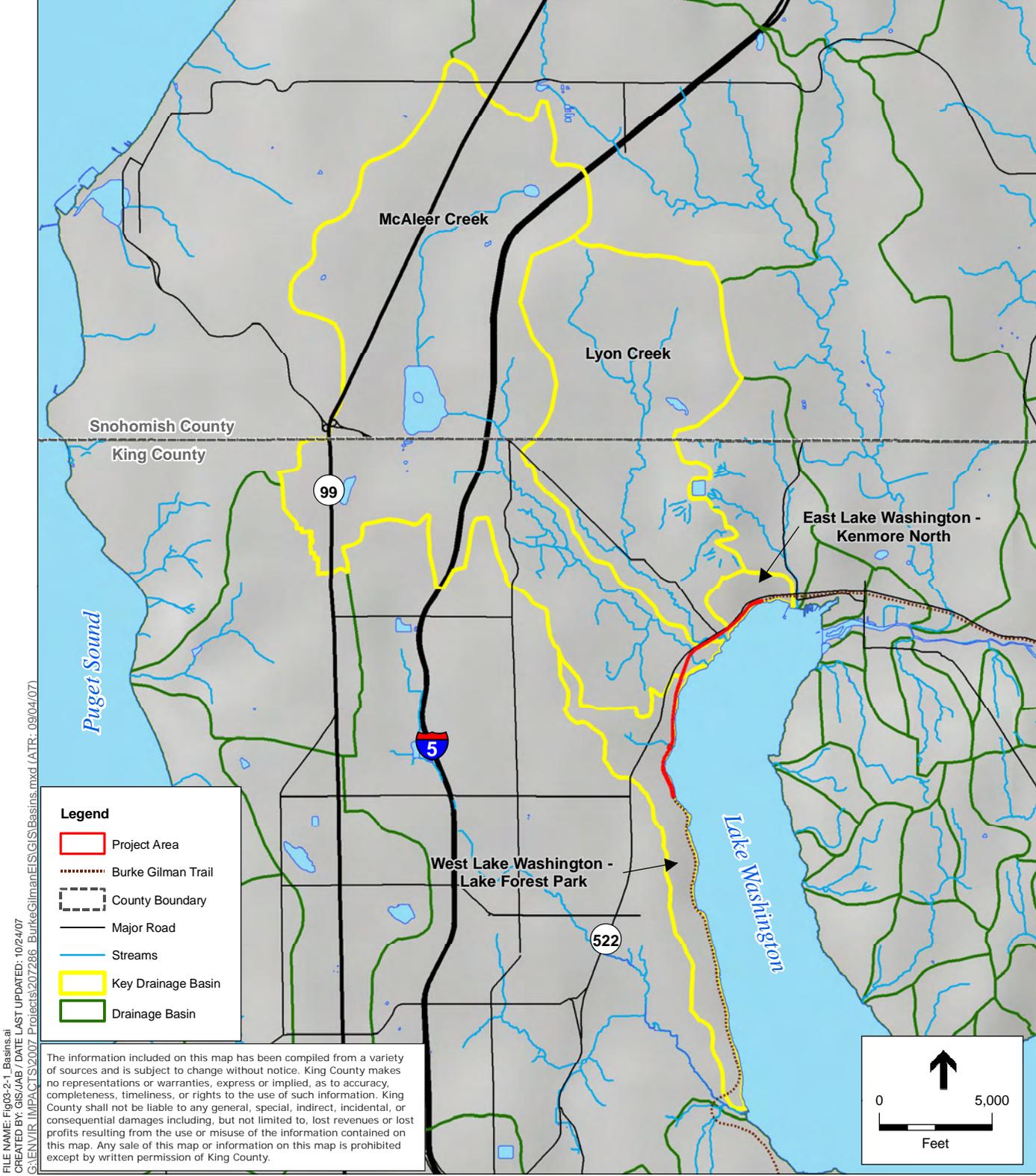


Figure 3.2-1

Watershed/Basin Map
 King County, Washington

The majority of WRIA 8 lies within the Urban Growth Area boundaries of cities (Kerwin, 2001). The majority of the immediate Lake Washington watershed is highly developed, with approximately 63 percent of the watershed being fully developed (King County, 2003).

Portions of six streams were identified within the study area for the trail expansion: Lyon Creek, McAleer Creek, Bsche'tla Creek, and three small unnamed streams (3-5), all of which are hillside drainages (see Figure 3.2-2). Each of these streams is discussed in more detail below.

Lyon Creek

The headwaters of Lyon Creek originate in wetlands located in south Snohomish County. The stream flows 3.8 miles through Lake Forest Park, before draining into the northwest corner of Lake Washington (King County, 2007a). The Lyon Creek drainage basin is approximately 2,600 acres in size, and is one of the smallest tributary systems of Lake Washington.

The Department of Ecology has listed Lyon Creek in its Category 5 Polluted Waters/303(d) List of Threatened and Impaired Waterbodies for fecal coliform (Ecology, 2004). Waters with Category 5 listings are considered to be polluted waters and require the development of a Total Maximum Daily Load (TMDL). In addition, Lyon Creek has three Category 2 listings for dissolved oxygen, mercury, and temperature. Category 2 waters are considered "waters of concern," where pollution is present, but may not violate state water quality standards.

Ecology has developed a Water Quality Index (WQI) rating system that evaluates several overall water quality parameters and provides an overall rating of "high," "moderate," or "low" concern. During the 2001-2002 and 2002-2003 water years, Lyon Creek was rated as "high" concern due to the presence of high levels of bacteria and nutrients (King County, 2007a). During the 2003-2004 and 2004-2005 water years, the stream was rated as "moderate" concern. A 25-year (1979-2004) trend analysis of Lyon Creek indicated that the water in the stream is becoming more acidic over time; however, the pH levels of the stream are still within an acceptable range when compared to the State standards (King County, 2007a).

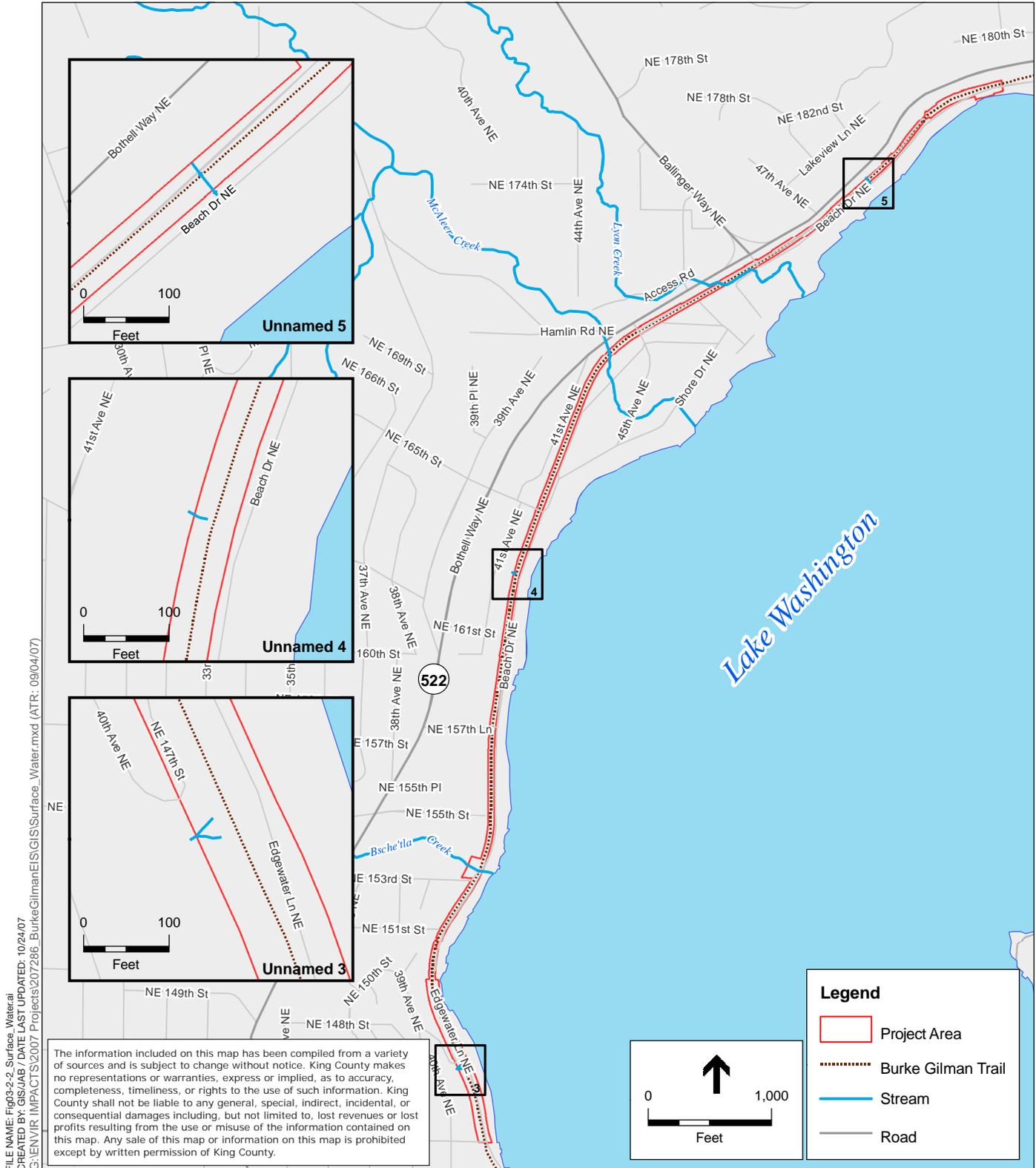
Stream sediment data from Lyon Creek were analyzed for the period between 1987 through 2002. The data indicate that sediments in Lyon Creek exceeded sediment quality guidelines for both nickel and zinc (King County, 2007a).

Lyon Creek is a Type 1 Stream, based on the Lake Forest Park classification system (Table 3.2.1).

McAleer Creek

McAleer Creek originates at Lake Ballinger and flows approximately 6 miles before draining into the northeast corner of Lake Washington, just south of Lyon Creek (see Figure 3.2-2). The McAleer Creek drainage basin is approximately 5,700 acres in size (3.6 square miles) and includes portions of Mountlake Terrace, Shoreline, Lake Forest Park, and unincorporated King County (King County, 2007b)

The Department of Ecology has listed McAleer Creek in its Category 5 Polluted Waters/303(d) List of Threatened and Impaired Waterbodies for dissolved oxygen and fecal coliform (Ecology, 2004).



SOURCE: King County, 2006; PACE, 2007

Burke-Gilman Trail Redevelopment Project EIS . 207286



Capital Planning and Development Section
Parks CIP Unit
 Facilities Management Division, DES
 201 South Jackson Street, Room 700
 Seattle, WA 98104

Figure 3.2-2
 Water Resources
 King County, Washington

According to the Water Quality Index rating system, during the 2001-2002, 2002-2003, 2003-2004, and 2004-2005 water years, McAleer Creek was rated as “moderate” to “high” concern. The ratings of high concern were due primarily to high fecal coliform levels within the stream (King County, 2007b). The results of a 25-year trend analysis, stemming from 1979-2004, indicate that there has been no significant change in temperature, dissolved oxygen, bacteria, nitrogen, or total phosphorus over this period (King County, 2007b). The results do indicate that the creek is becoming more acidic, as shown by a decrease in pH. As with Lyon Creek, the pH levels remain within the acceptable range when compared with the State standards.

Stream sediment data from McAleer Creek were analyzed for the period between 1987 through 2002. The data indicate that sediments in McAleer Creek exceeded sediment quality guidelines for arsenic, nickel and zinc (King County, 2007b).

McAleer Creek is a Type 1 Stream under the City of Lake Forest Park’s classification system (Table 3.2.1).

Bsche’tla Creek

This stream flows through an underground culvert in the vicinity of the Burke-Gilman Trail near NE 153rd Street.

Unnamed Stream 3

Stream 3 is a small drainage from the hillside north of NE 145th Street (see Figure 3.2-2). This stream branches into three small channels, and the flow is collected in a ditch at the base of the hill where the stream flows into a culvert under the trail toward Lake Washington (The Watershed Company, 2007). Stream 3 is unlikely to flow year-round during years with normal rainfall and is therefore considered to be a seasonal stream (The Watershed Company, 2007).

Unnamed Stream 4

Stream 4 is located northeast of NE 161st Street, in an artificial channel which flows through rock and concrete substrates before flowing into a culvert under the trail (see Figure 3.2-2). Based on the existing characteristics of this stream and its surroundings, Stream 4 would be considered to be perennial (The Watershed Company, 2007).

Unnamed Stream 5

Stream 5 is located west of Log Boom Park at the eastern end of the trail corridor, and is completely contained within a corrugated steel half-pipe on the hillside and culverted under the trail (see Figure 3.2-2). Based on the existing characteristics of this stream and its surroundings, Stream 5 is also considered perennial (The Watershed Company, 2007).

Lake Washington

Lake Washington is the second-largest natural lake in Washington State, covering a surface area of 22,138 acres (WRIA 8 Steering Committee, 2002). The lake receives flow primarily from the Cedar River.

The Department of Ecology has listed Lake Washington in the Category 5 Polluted Waters/303(d) List of Threatened and Impaired Waterbodies for ammonia and fecal coliform. In addition, Lake Washington has a Category 5 listing for total PCBs for tissue. The lake also has a Category 4C listing for habitat for invasive exotic species, and multiple Category 2 listings, including ammonia, fecal coliform, lead, mercury, and total PCBs.

Water pollution within urbanized areas, such as the Lake Washington watershed, can have a variety of point and non-point sources. Impervious surfaces associated with developed areas, such as roads and parking lots, can serve as conduits for pollutants such as metals and oil which come from cars and other vehicles. Gardening and fertilizing of residential areas can result in nutrients (nitrogen and phosphorus) entering surface water through stormwater runoff, ultimately promoting algal growth and elevated levels of organic waste. Pet wastes and sewer overflows can contribute to fecal coliform entering area surface waters.

3.2.2.3 Existing Drainage System

The existing conveyance system along the Burke-Gilman Trail is composed of a network of drainage ditches that run parallel to the trail on the upstream side of the trail. These drainage ditches are connected to culverts which convey the runoff and seepage across the trail to Lake Washington (PACE Engineers, 2006).

A study undertaken by PACE Engineers uncovered several existing drainage problems along the trail. Near the south end of the trail, flooding has been recorded. This section of the trail sits at the toe of a steep slope, contributing to ponding on the upstream side of the trail, due to both seeps and surface water sources (PACE Engineers, 2006). Minor flooding has resulted from this ponding. Adjacent property owners have also identified several additional drainage problem areas, listed below (PACE Engineers, 2006):

- Inadequate drainage between 15550 and 15524 Beach Drive NE;
- Concerns about drainage at 16835 Beach Drive NE;
- Drainage problems at 17729 Beach Drive NE; and
- Drainage from the trail causing damage to the road, even during the summer, and groundwater drains under the trail resulting in property damage at 17753 Beach Drive NE.

3.2.3 Impacts

3.2.3.1 Redevelopment Alternative

Construction Impacts

Construction impacts could result from (1) a temporary increase in erosion and sedimentation and potential for spills of fuel or oil at staging areas; (2) in-stream or in-ditch work associated with drainage improvements and culvert extensions or replacements; (3) dewatering, cast-in-place concrete work, and stream diversions associated with retaining wall construction and the construction of the Lyon Creek bridge replacement; and (4) work in and adjacent to streams. Construction impacts would be temporary and could be minimized or prevented through the proper implementation of BMPs as discussed in the mitigation section.

Temporary construction impacts to water quality could result from the erosion of disturbed soil areas or soil stockpiles, resulting in stormwater runoff transporting silt and sediment to receiving waters. The highest probability of impacts associated with sediment is when construction occurs in or adjacent to wetlands or streams. Runoff may also carry other contaminants, such as fuel or oil from construction operations. Both sediment and contaminants can increase turbidity and affect other water quality parameters such as the amounts of available oxygen in the water. Spills are most likely to occur at staging areas.

The Redevelopment Alternative would require new drainage structures and pipe laterals (culvert extensions) to convey water to the culvert crossings in a more efficient manner, as well as the replacement of a culvert under the expanded trail. The culverts would be replaced at an unnamed stream (Stream #5 as shown in Appendix A, Plans). These activities would likely require diverting the stream around the work area during construction, which could have temporary impacts to water quality, such as increased turbidity. The construction of retaining walls is likely to require temporary dewatering or cast-in-place concrete, which could impact water quality by reducing base flows, increasing pH, or increasing turbidity. The demolition of the existing bridge and the construction of the pre-manufactured steel bridge with a concrete deck would likely result in temporary water quality impacts, such as sedimentation and increased turbidity.

All in-stream work would comply with the requirements of the Hydraulic Project Approval (HPA) permit issued by Washington Department of Fish and Wildlife (WDFW), including measures to avoid turbidity impacts.

Widening the trail would require work within the buffers of the following streams: Lyon Creek, McAleer Creek, and unnamed streams 3-5. The impacts to each of these stream buffers and the associated potential stream buffer mitigation areas are included in Table 3.2-2.

Table 3.2-2. Summary of Stream Buffer Impacts and Associated Mitigation

Stream	Stream Buffer Impact (square feet)	On-site Buffer Mitigation Area (square feet)
Lyon Creek	6,553	9,266
McAleer Creek	2,692	3,361
Stream 3	584	181
Stream 4	1,216	278
Stream 5	1,274	
Total	12,319	13,086

Source: Watershed Company, 2007

Operation Impacts

Operation of the trail would have impacts associated with (1) new impervious surface area, (2) changes in scour resulting from drainage improvements, and (3) maintenance.

New Impervious Surface Area. New impervious surface area has been linked to increases in the frequency of peak flow rates and the volume of stormwater runoff. These in turn can result in bed incision in steep reaches of streams and can alter the hydroperiod in wetlands. Eroded sediment is deposited as the stream slope decreases, which can lead to drainage problems and local flooding.

Approximately 11,600 square feet or 1.07 acres of total new impervious surface would be created along the corridor as a result of trail widening. New conveyance elements are planned along the trail to improve the collection of both trail and hillside runoff. An existing culvert that has been identified as being under capacity would be upgraded as necessary to convey runoff.

No water quality impacts would be created by the widened trail as the trail is not considered a pollutant-generating impervious surface (PGIS) (Ecology, 2005; King County, 2005). Therefore, water quality treatment measures would not be necessary as part of the ongoing use of the trail. New parking areas, or

modifications to existing parking areas, are not being considered as part of the Redevelopment Alternative. As a result, pollutants entering stormwater from parking areas are not anticipated to change as a result of this alternative.

Drainage Improvements. Constructing drainage structures and pipe laterals to convey water to existing culvert crossings under the trail and replacing an existing culvert would increase the efficiency of the drainage system and could result in an increase in flow velocities at the outlet of the culverts. This could result in an increase in local scour and erosion along the receiving streams within the trail corridor.

Trail Maintenance. The redeveloped trail would be constructed with adequate drainage and maintained to prevent wash-outs, flooding, and siltation from intruding on path. Trail maintenance would include removing sediment and vegetation from ditches and streams, repairing and replacing culverts as needed, repairing gravel or pavement, and mowing. Emergency maintenance may be necessary if ditches or culverts are blocked with debris. Periodic and temporary increases in turbidity in local waterbodies during these maintenance activities are likely.

3.2.3.2 Rebuild Alternative

Construction Impacts

The construction impacts of the Rebuild Alternative would be similar to though less than those discussed above for the Redevelopment Alternative. Under the Rebuild Alternative, only ground disturbance necessary to rebuild the trail would be necessary. Temporary construction impacts would therefore be less than described for the Redevelopment Alternative. No other construction activities would be undertaken.

Operation Impacts

No additional impervious surfaces would be generated under the Rebuild Alternative.

Major drainage improvements would not be performed under the Rebuild Alternative. As a result drainage problems associated with ponding next to the trail would continue. The drainage system would continue to be maintained.

3.2.3.3 No Action Alternative

Construction Impacts

There would be no construction impacts under the No Action Alternative, as no construction activities would take place.

Operation Impacts

The drainage system would continue to be maintained as the trail remains in operation. Existing drainage system capacity and conveyance problems would not be addressed as part of the No Action Alternative and would therefore continue or worsen with increased future development. Potential impacts due to drainage system maintenance could include temporary, short-term increases in turbidity and sedimentation during maintenance activities.

3.2.4 Cumulative Impacts

Suburban and urban development will continue to occur in the surrounding area. This development will result in an increase in impervious surfaces that will impact streams and wetlands in the basins in which

the development occurs. The new impervious surfaces created under the Redevelopment Alternative would add incrementally to this impervious surface area. However, current and future development in the general area of the trail corridor would comply with stormwater regulations that will help to minimize the impacts on local waterbodies.

3.2.5 Mitigation Measures

The following measures could be used to minimize the amount of runoff and sediment entering local waterbodies:

- King County will consider the use of pervious pavement to reduce the amount of runoff from the trail.
- Treat stormwater runoff from active construction sites prior to discharge as necessary to comply with the requirements of the Washington Administrative Code and/or the construction NPDES permit.
- Treat turbid or contaminated dewatering water prior to discharge as necessary to comply with the requirements of the Washington Administrative Code, the construction NPDES permit, and/or the local grading permit.
- During the permitting and design processes, develop a temporary sediment and erosion control (TESC) plan, a spill containment and countermeasures plan (SCCP), and a stormwater pollution prevention plan (SWPPP) for the project. These plans would outline the BMPs that would be used during construction activities.
- Perform construction monitoring in accordance with Ecology's standards.

In addition to the mitigation measures listed above, all project components must comply with the King County Stormwater Design Manual, as adopted by the City of Lake Forest Park. These requirements would be included in the construction NPDES permit for both the Redevelopment and Rebuild Alternatives.

Habitat Enhancement

The Redevelopment Alternative may require mitigation, such as local stream habitat enhancement, at Lyon Creek bridge. These determinations would be made during the design and permitting phase of the project and in collaboration with permitting agencies. All impacts to locally regulated sensitive areas would be mitigated onsite within the County-owned trail corridor.

3.2.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to surface water resources have been identified for any of the proposed alternatives. The types of impacts on surface waters typically considered to be significant unavoidable adverse impacts include activities such as: extensive floodplain fill, levees, dredging, stream relocation, or activities resulting in high pollutant loads. None of these activities would occur with the proposed project under any alternative.

3.3 Wetlands

3.3.1 Studies and Coordination

Information in this section is summarized from the *Sensitive Areas Study for the Burke-Gilman Trail Redevelopment* (The Watershed Company, 2007), which contains additional detailed information on wetlands in the project area. Wetlands boundaries were identified using the Washington State Wetlands Identification and Delineation Manual (Ecology, 1997).

3.3.2 Affected Environment

3.3.2.1 Regulatory Environment

Wetlands are formally defined by the Federal Register, Washington State Shoreline Management Act, and Washington State Growth Management Act as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. *Wetland buffers* are upland areas surrounding wetlands that provide protection to the biological, chemical, and hydrologic functions of the wetlands.

Wetlands are regulated at the federal, state, and local levels. The U.S. Army Corps of Engineers (Corps), Washington State Department of Ecology (Ecology), Washington State Department of Fish and Wildlife (WDFW), and the City of Lake Forest Park are the primary regulatory agencies with jurisdiction over wetlands and wetland buffers in the trail corridor.

Federal laws regulating wetlands include Sections 401 and 404 of the Clean Water Act, which are implemented by Ecology and the Corps, respectively. WDFW regulates certain wetlands under the Washington State Hydraulic Code, which is intended to protect fish. The Washington State Shoreline Management Act, along with local shoreline master programs in each jurisdiction, regulates the shoreline of Lake Washington and several streams in the vicinity that have a mean annual flow of over 20 cubic feet per second (cfs).

In Lake Forest Park, wetlands are regulated as sensitive areas under Title 16 of the City Municipal Code, Environmental Protection. In order to differentiate between levels of wetland protection and the application of development standards, the City classifies wetlands into three categories: from Category 1 (highest quality) to Category 3 (lowest quality). These categories are based on size, vegetation classes present, the presence of threatened and endangered species, and other elements. Wetland buffers have been established for each category of wetland (Table 3.3-1) and these buffer widths must be adhered to during development.

Table 3.3-1. Lake Forest Park Wetland Buffer Requirements.

Wetland Type	Standard Buffer Width (feet)	Minimum Buffer Width with Enhancement (feet)
Category 1	150	105
Category 2	100	70
Category 3	50	35

Source: Lake Forest Park Municipal Code 16.16.320

3.3.2.2 Existing Wetlands within the Study Area

Portions of eight wetlands were identified within the study area. These wetlands are mapped on the plan sheets in Appendix A of this EIS. Only two of these wetlands, Wetlands 2 and 4, are relatively broad and distinct depressions and are located between the trail and the road. The remaining six wetlands are trailside ditches which meet the criteria for a jurisdictional wetland.

Wetland 2 is shrubby area located on the west side of the trail, south of Lyon Creek. The wetland vegetation consists of red-osier dogwood, Himalayan blackberry, Watson's willow-herb, and horsetail. In addition, a large weeping willow and several cottonwoods are present in and adjacent to the wetland. The buffer area surrounding the wetland is dominated by Lombardy poplar, blackberry, Robert's geranium, reed canarygrass, and other grasses.

Wetland 4 is a forested depression located on the west side of the trail, south of McAleer Creek. This wetland is dominated by large black cottonwoods, blackberry, reed canarygrass, English ivy, creeping buttercup, and Cooley's hedge nettle. The wetland buffer is dominated by blackberry, grasses, dandelions, and young osoberry sprouts.

Wetlands 1, 3, 5, 6, 7, and 8 are trailside ditches associated with hillside seeps or stream flow. The vegetation of these trailside ditch wetlands includes species associated with highly disturbed areas, such as Himalayan blackberry. Wetland vegetation includes balsam poplar, reed canarygrass, creeping buttercup and red osier dogwood.

Each wetland was rated based on the three wetland categories designated in the Lake Forest Park Municipal Code as well as the Department of Ecology rating system. Table 3.3-2 provides a summary of these ratings for each wetland.

Table 3.3-2. Summary of Local and State Wetland Ratings

Wetland	Local Wetland Rating	Dept. of Ecology Wetland Rating
Wetland 1	Category 3	Category IV
Wetland 2	Category 3	Category III
Wetland 3	Category 3	Category IV
Wetland 4	Category 2	Category IV
Wetland 5	Category 3	Category IV
Wetland 6	Category 3	Category IV
Wetland 7	Category 3	Category IV
Wetland 8	Category 3	Category IV

Source: Watershed Company, 2007

3.3.3 Impacts

3.3.3.1 Redevelopment Alternative

Construction Impacts

Under the Redevelopment Alternative, construction may result in temporary impacts such as the clearing of wetland vegetation, changes in wetland hydrology due to dewatering, and an increase in sediment-

laden runoff due to earthwork. All potential impacts to wetlands would be subject to mitigation requirements imposed by federal, state, and local agencies. Permits that are potentially required depending on final design and extent of wetland impact include a Section 404 permit from the U.S. Army Corps of Engineers, a 401 Water Quality Certification from Ecology, and a local critical areas permit from the City of Lake Forest Park. These construction impacts are discussed in more detail below.

Removal and Disturbance of Vegetation. Wetland vegetation and habitat functions would be temporarily disturbed during construction where clearing is required to provide access, maneuver equipment, or install fences.

Changes in Wetland Hydrology. Retaining walls would be required along some segments of the Redevelopment Alternative. In wetland areas, the depth of soil of sufficient bearing strength may be below the water table. In these areas, construction of wall footings could potentially require dewatering of the footing area, or it may require construction during the dry season. Temporary effects to wetlands located downslope from fill areas could result if dewatering for wall footings is required. Construction dewatering temporarily lowers the water table, removes moisture from the soil, and reduces the water available for plant uptake. Dewatering would occur for short periods during a single season. Given the broad tolerance of the wetland plant species found in wetlands near the trail, it is unlikely that short-term changes in soil moisture would eliminate or change wetland vegetation.

Increased Sedimentation. During construction, exposed soil during earthwork operations could erode and potentially result in a localized increase in sediment-laden runoff to ditches and adjacent wetlands. The installation of split-rail fences in areas adjacent to wetlands could also cause localized sedimentation. Because of the temporary and localized nature of this activity, the potential change in sedimentation would not be expected to alter the vegetation structure or physical conditions in wetlands or result in changes in wetland functions.

Table 3.3-3. Summary of Wetland and Buffer Impacts and Proposed Mitigation.

Wetland	Wetland Buffer Impact Area (square feet)	Wetland Buffer Mitigation Area (square feet)	Wetland Fill Area (square feet)	Wetland Enhancement Area (square feet)	On-site Wetland Mitigation Area (square feet)
Wetland 1	4,553	4,553	598	3,588	
Wetland 2	3,383	3,383	N/A	N/A	2,974
Wetland 3	189	189	N/A	N/A	735
Wetland 4	3,437	3,437	N/A	N/A	1,300
Wetland 5	4,623	4,623	985	5,910	
Wetland 6	1,941	1,941	26	156	
Wetland 7	949	949	N/A	N/A	
Wetland 8	1,821	1,821	560	3,360	1,087
TOTAL	20,896	20,896	2,169	13,014	6,096

Source: Watershed Company, 2007

Operation Impacts

Potential impacts include the long-term loss of wetland area and associated functions due to wetland fill, changes in wetland water quantity or quality, vegetation management in wetlands, loss of wetland and wetland buffers, and habitat fragmentation.

Water Quantity and Hydrologic Conditions. New impervious surfaces generated by the trail widening could potentially result in minor changes to the quantity and flow of water through wetlands adjacent to or downslope of the trail.

Analysis of the effects of new impervious trail surface added under the Redevelopment Alternative determined that the potential increase in water quantity would be minimal, and that very small and widely dispersed changes to the runoff characteristics of the project area would occur as a result of the project. Drainage improvements planned along the trail would improve the collection of trail and hillside runoff. Existing culverts that have been identified as being under capacity would be upgraded as necessary to convey runoff (PACE Engineers, 2006).

The existing drainage facilities along the trail corridor are maintained as part of the operation of the existing trail. This maintenance, including replacement or repair of culverts, would continue under the Redevelopment Alternative. These actions could result in limited temporary maintenance impacts to some riparian wetland vegetation. Measures discussed in the mitigation section would reduce the risk of sediments entering streams or wetlands during maintenance.

Vegetation Management. The Burke-Gilman Trail within Lake Forest Park was built on an existing railroad embankment where adjacent vegetation has historically been managed to maintain a clear corridor. The wider footprint of the Redevelopment Alternative would result in vegetation management activities in areas where such practices were not previously required. The impacts of vegetation management in wetlands would depend on the type of existing vegetation. The removal or periodic mowing/trimming of this vegetation would not be expected to substantially alter wetland habitat characteristics nor wildlife use of the wetland or adjacent areas.

Vegetation management within the existing wetlands would typically include periodic mowing to prevent tree establishment as necessary to maintain visibility. These wetlands are generally vegetated with reed canarygrass and Himalayan blackberry, and impacts would be minor. The removal and management of forested wetland vegetation would not be expected to substantially alter wetland habitat characteristics nor wildlife use of the wetland or adjacent areas.

Wetland and Wetland Buffer Impacts. Under the Redevelopment Alternative, approximately 2,169 square feet (0.05 acre) of wetland would be impacted by the placement of fill. Approximately 20,869 square feet (0.5 acre) of wetland buffer would be impacted, resulting in the removal of primarily grassy and weedy vegetation along the existing trail. In many locations, buffer impacts are likely to occur along the slopes of the railbed embankment, specifically between the edge of the existing trail and the wetland edge. In most of these areas, the vegetation consists of species that are associated with disturbed areas, such as Himalayan blackberry; therefore, no substantial areas of native trees, shrubs, or wildlife habitat would be impacted. Modification of these buffers would not substantially alter wetlands and wetland functions. Impacted wetland buffers would be mitigated and replanted with the following species:

- Shrubs – vine maple, red osier dogwood, black twinberry, osoberry, salmonberry, Scouler's willow, and snowberry.
- Emergents/ferns – lady fern, sword fern, and Cooley's hedge nettle.

Habitat Fragmentation. Wildlife use of wetlands and wetland buffers in the study area is limited because the existing available wildlife habitat is highly altered and fragmented by urban development. The former railbed, numerous city streets, and numerous residential driveways contribute to this fragmentation, as do the residentially developed parcels along the trail. As stated previously, the widened trail would bisect wetlands 1, 5, 6, and 8. However, due to the location of these wetlands adjacent to the trail in previously disturbed areas, the habitat within these wetlands is not of high quality. Impacted wetlands would be mitigated according to Table 3.3-3.

As indicated above, the wetland and wetland buffer areas impacted would be mitigated and replanted with native shrub and emergent/fern species.

3.3.3.2 Rebuild Alternative

Construction Impacts

There would be no wetland impacts anticipated under the Rebuild Alternative. All construction would occur within the existing trail footprint.

Operation Impacts

Impacts to wetlands under the Rebuild Alternative from the operation of the trail would be limited to trail maintenance activities, as discussed above for the Redevelopment Alternative, with respect to vegetation management and drainage facility maintenance.

3.3.3.3 No Action Alternative

There would be no construction impacts under the No Action Alternative, as no construction activities would take place. Operational impacts would be limited to human and pet intrusion and the potential for maintenance activities to result in temporary impacts to wetlands in the form of water quality degradation or buffer intrusion.

3.3.4 Cumulative Impacts

Changes in land use in the project area as well as the general vicinity have impacted wetlands and their buffers. The majority of those impacts at the project site were sustained when the railbed was originally constructed.

The historical impacts to wetlands and wetland buffers are typical for urban areas in King County. Land development has included filling wetlands, modifying stream channels, changing watershed hydrology, and loss of habitat. Shorelines have been developed for both residential and recreational use. Loss of wetland buffers has resulted in an overall decline in the functions of the wetlands and a reduction of habitat.

Current and future development and redevelopment in the general area of the Burke-Gilman Trail would be required to comply with increasingly protective regulations addressing wetlands and wetland buffers. These regulations and substantial mitigation requirements would reduce the potential for further cumulative impacts in the form of wetland losses. All substantial impacts to wetlands potentially resulting from the Redevelopment Alternative would be mitigated, and the project would not contribute to cumulative wetland impacts.

3.3.5 Mitigation Measures

The Burke-Gilman Trail project has been planned to follow the mitigation sequencing requirements of federal, state, and local regulations. The planning for the project, specifically for the Redevelopment Alternative, has included steps to avoid, minimize, and compensate for impacts to wetlands as discussed further below.

3.3.5.1 Strategies to Avoid and Minimize Wetland Impacts

Avoidance and minimization of wetland and buffer impacts was a guiding principle in the preliminary design stage of this project. All construction activities would be undertaken in a manner consistent with regulatory requirements.

Under the Rebuild Alternative, all wetland impacts would be avoided as there would be no expansion of the trail associated with this alternative. King County would continue to apply the following strategies to minimize wetland and buffer impacts during the design, permitting and construction phases for the Redevelopment Alternative:

- Using retaining walls to narrow the trail section where wetlands are crossed;
- Shifting alignments away from wetland areas;
- Reducing the potential for human and pet intrusion;
- Limiting earthwork to the dry season; and
- Utilizing BMPs to reduce all impacts.

Some of the strategies that could be employed to avoid or reduce impacts, particularly under the Redevelopment Alternative, are discussed in more detail below. The feasibility of these strategies would be evaluated further, in light of the project's purpose and need, their overall practicability, and other design constraints during the final design and permitting phase of the project.

Retaining Walls

In some locations along the trail corridor, it may be possible to completely avoid or minimize wetland and buffer impacts through the incorporation of retaining walls into the design. Standard fill slopes for the sides of the trail are designed with a ratio of two horizontal to one vertical, and achieving this slope can result in wide areas of fill. By constructing retaining walls, the area of fill would be smaller.

Reducing the Potential for Human and Pet Intrusion

Fencing and signage can discourage intrusion by humans and pets into wetlands and their buffers. Regulations for trail use would continue to require that pets be leashed while on the trail. Fencing could be used to keep trail users away from wetland areas. Final design would indicate whether fencing is needed to ensure the protection of wetland areas.

Utilizing Construction Best Management Practices

BMPs would be employed during trail construction, maintenance, and operation to minimize temporary impacts to wetlands and buffers. The following BMPs are recommended during construction:

- Use highly visible temporary construction fencing to delineate sensitive areas and vegetation and avoid accidental intrusion.

- Design, implement, and maintain temporary erosion and sediment controls to eliminate or minimize potential effects from sedimentation.
- Preserve and protect native plant species when installing fencing, signage, and other features.
- Revegetate temporarily disturbed areas with appropriate species.

3.3.5.2 Wetland Mitigation

The project has been designed to avoid and minimize wetland impacts. However, approximately 2,169 square feet (0.05 acre) of wetland fill would be necessary to accommodate the widened trail under the Redevelopment Alternative. The agencies that regulate wetlands would require compensation for these fill impacts. These agencies have established ratios for the acreage of mitigation required to compensate for each acre of fill within the different classes and categories of wetlands. The requirements for both the City of Lake Forest Park as well as the Department of Ecology are discussed below.

Lake Forest Park. Chapter 16.16.340 of the Lake Forest Park Municipal Code contains wetland mitigation requirements. This section states that restoration is required when a wetland or its buffer is altered, and that this restoration must conform to the following minimum requirements:

1. The original wetland shape and form must be replicated, including its depth, width, length and gradients at the original location;
2. The original soil types and configuration must be restored;
3. The wetland edge and buffer configuration must be restored to original condition;
4. The wetland edge and buffer must be replanted with native vegetation which recreates the original in terms of species, sizes, and densities; and
5. The original wetland functions must be restored, including but not limited to hydrologic and biologic functions.

In addition, this chapter sets forth the required mitigation ratios for wetland replacement or enhancement. Category 1 wetlands must be mitigated on a 6:1 ratio basis; Category 2 wetlands must be mitigated on a 3:1 ratio; and Category 3 wetlands on a 2:1 ratio.

Department of Ecology. Ecology requires the following mitigation ratios for re-establishment or creation based on the category of wetland impacted (Ecology, 2006).

- Category 1 Wetlands – 6:1 for forested; and 4:1 based on score of functions
- Category 2 Wetlands – 3:1
- Category 3 Wetlands – 2:1

3.3.6 Significant Unavoidable Adverse Impacts

Due to the small area of wetland impacts, the generally limited functions provided by the affected wetlands, and the regulatory requirements that provide for wetland mitigation, no significant unavoidable adverse impacts to wetland resources in the project area would result from the Redevelopment or Rebuild Alternatives

3.4 Vegetation, Wildlife, and Fish

3.4.1 Studies and Coordination

Information on vegetation, fish and wildlife resources within the trail corridor was obtained from site visits and from a review of existing information, including the following:

- Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species database;
- King County Department of Natural Resources and Parks, Water and Land Resources Division;
- *Salmon and Steelhead Habitat Limiting Factors Report for the Cedar-Sammamish Basin (WRIA 8)* (Kerwin, 2001);
- *Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Near-Term Action Agenda for Salmon Habitat Conservation* (WRIA 8 Technical Committee, 2002); and
- *Burke Gilman Trail Expansion Arborist Report* (Northwest Arborvitae, 2005).

3.4.2 Affected Environment

3.4.2.1 Regulatory Environment

Various federal, state, and city regulations address the protection of vegetation, wildlife, and fish in the overall project vicinity (see Table 3.4-1).

Additional information on the lakes, streams, and drainage patterns in the study area can be found in Section 3.2, Surface Water Resources.

Table 3.4-1. Federal, State, and Local Regulations Regarding Vegetation, Wildlife, and Fish

Regulation	Overseeing Agency	Vegetation or Wildlife or Habitats
Federal		
Federal Endangered Species Act (ESA)	NOAA Fisheries; U.S. Fish and Wildlife Service (USFWS)	All federally listed threatened and endangered species and critical habitats.
National Environmental Policy Act (NEPA)	Federal Highway Administration (FHWA)	All wildlife and fish.
Federal Migratory Bird Treaty Act	USFWS	Most birds.
Fish and Wildlife Coordination Act	USFWS; WDFW	All wildlife and fish.
State		
Washington State Environmental Policy Act (SEPA)	King County	All wildlife and fish.
Washington State Endangered Species Act	WDFW	All state-listed threatened and endangered species.
Washington State Fish and Game Code	WDFW	All state-listed Priority Habitats and Species.
Shoreline Management Act	Washington Department of Ecology	All wildlife and fish.
County and City		
King County Comprehensive Plan	King County	Designated fish habitat conservation areas; habitats for state- or federally-listed endangered, threatened, or sensitive species; habitat for species of local importance.
City of Lake Forest Park Comprehensive Plan	City of Lake Forest Park	Sensitive areas (including streams, wetlands, and critical areas), and other environmental resources including forest canopy and fish and wildlife.
City of Lake Forest Park Urban Wildlife Habitat Plan	City of Lake Forest Park	Urban wildlife habitat.
City of Lake Forest Park Sensitive Areas Ordinance, Code Chapter 16.16 Environmental Protection	City of Lake Forest Park	Sensitive areas (including streams, wetlands, and critical areas) and development standards and mitigation requirements for each.
City of Lake Forest Park , Code Chapter 16.14 Tree Protection and Replacement	City of Lake Forest Park	Trees - tree removal permit required; minimum protection standards for retaining trees; tree replacement standards.
City of Lake Forest Park, Code Chapter 16.16.160 Vegetation Management Plan	City of Lake Forest Park	Vegetation - clearing limits specified.
City of Lake Forest Park, Code Chapter 16.16.380 Wildlife Habitat Conservation Areas	City of Lake Forest Park	Wildlife and associated habitats - identification of species of local importance, priority species, or endangered, threatened, sensitive, or candidate species; management recommendations; and establishment of buffers.
City of Lake Forest Park, Code Chapter 16.24 Drainage Plans – 16.24.300 Fish Passage	City of Lake Forest Park	Fish – All projects involving perennial streams must have adequate fish passage.
City of Lake Forest Park, Code Chapter 16.24 Drainage Plans – Article IV Stream Corridors and Sensitive Area Designations	City of Lake Forest Park	Wetlands, streams, wildlife habitat – Protection of these resources, including minimizing turbidity and pollution of wetlands and fish-bearing waters, and maintaining wildlife habitat.

3.4.2.2 Vegetation and Associated Wildlife

The vegetation communities along the trail corridor vary from narrow strips of native forest and shrub habitats to slopes dominated by Himalayan blackberry, Japanese knotweed, and morning glory. Native tree species include large black cottonwoods, alders, bigleaf maple, sycamore, black locust, and cedars. In many areas, the non-native species are out-competing the native species and dominate large areas along the trail.

The understory vegetation along the western side of much of the trail is dominated by non-native species such as Himalayan blackberry, English ivy, and Japanese knotweed. Horsetail, reed canarygrass, and ferns are found in wetter areas, along the drainage ditches running parallel to the trail.

Segments of the trail, for example north of NE 165th Street and north of NE 170th Street on the east side, have a maintained grass right of way on the west side of the trail, approximately three feet in width.

The trail crosses Lyon Creek south of State Route 104 (see Figure 3.2-2). The creek at this bridge crossing has a riparian zone composed of species such as sycamore and blackberry. The stream banks on the west side of the bridge are up to four feet in height and areas of the banks have been previously stabilized with concrete. The stream banks on the east side of the bridge are approximately two feet in height.

The trail crosses McAleer Creek adjacent to Blue Heron Park (see Figure 3.2-2). The creek has a riparian zone composed of species such as willow, Douglas fir, and English ivy.

Wildlife associated with the study area includes such species as American crow, European starling, house finch, house sparrow, American robin, black-capped chickadee, Bewick's wren, song sparrow, bushit, and spotted towhee. Waterfowl species identified in Lake Washington near the trail include mallard, bufflehead, greater scaup, common merganser, American coot, and western grebe.

Mammals expected to utilize the habitats within the study area include such generalist species as moles, mice, opossums, and squirrels.

3.4.2.3 Water Bodies and Fish Use

This section includes information and an analysis of fish resources in the study area, which includes Lake Washington, Lyon Creek, McAleer Creek, and three unnamed streams, which drain into Lake Washington.

Table 3.4-2 contains an overall summary of salmonid occurrence in the study area and their federal and state status. Individual waterbodies are discussed below with respect to the salmonids present.

Table 3.4-2. Summary of Potential Fish Occurrence in the Study Area

Species	Anadromous	Resident	Federal Status	State Status	Waterbodies with Potential Occurrence
Chinook salmon	X		Threatened	Candidate	McAleer Creek, Lake Washington
Coho salmon	X		Candidate	N/A	Lyon Creek, McAleer Creek, Lake Washington
Sockeye salmon	X		N/A	Candidate	Lyon Creek, McAleer Creek, Lake Washington
Coastal cutthroat trout	X	X	N/A	Priority	Lyon Creek, McAleer Creek, Lake Washington
Rainbow/steelhead trout		X	N/A	Candidate	Lyon Creek, McAleer Creek, Lake Washington
Bull trout	X		Threatened	Candidate	Lake Washington
Kokanee salmon		X	N/A	Priority	Lake Washington

Source: Kerwin, 2001

Lyon Creek

According to WDFW Priority Habitats and Species data, Lyon Creek supports sockeye, coho, and coastal cutthroat trout. Sockeye have known spawning areas designated throughout the stream, and sockeye also occur and migrate within Lake Washington. However, salmonid habitat has been impacted by high storm flows that have resulted in degraded substrate and lack of spawning habitat (King County, 2007). Coastal cutthroat trout occur throughout the stream and in Lake Washington. In addition, rainbow trout have been observed in the stream (Kerwin, 2001). Fish passage barriers are numerous through Lyon Creek. In addition, the lack of large woody debris, which can provide channel complexity and can serve as habitat, coupled with the developed nature of the watershed, serve as limiting factors to the use of the stream by salmonids (Kerwin, 2001).

McAleer Creek

According to WDFW Priority Habitats and Species data, McAleer Creek supports fall Chinook, coho, sockeye, and coastal cutthroat trout. The Volunteer Salmon Watcher program documented the presence of Chinook and coho in McAleer Creek at river mile (RM) 0.79 in 2006 (King County, 2007). Sockeye also migrate from Lake Washington to spawn within the stream. Coastal cutthroat trout are found throughout the stream and into Lake Washington. In addition to these species, rainbow trout have been observed in the stream. Significant transport of suspended sediments, clearing and land use changes within the riparian areas of the stream, including high impervious area, and limited large woody debris recruitment, all serve as limiting factors to the utilization of the stream by salmonids (Kerwin, 2001).

At the trail crossing of McAleer Creek, there is a concrete spillway associated with the stream on the west side of the bridge.

Unnamed Streams and Bsche'tla Creek

Streams 3, 4, and 5 and Bsche'tla Creek do not support any salmonid species.

Lake Washington

All species of salmon in the larger Lake Washington/Cedar/Sammamish Watershed migrate through, and rear in, Lake Washington (WRIA 8 Steering Committee, 2002).

Nine salmonid species utilize Lake Washington habitats. The five salmonid species that are regularly documented in the lake are sockeye, coho, Chinook, coastal cutthroat, and rainbow/steelhead trout (Kerwin, 2001). Pink salmon and chum salmon were historically abundant in the Lake Washington system but are now considered to be extinct in the watershed (Kerwin, 2001). Atlantic salmon and bull trout are rare and were likely to have been strays from other watersheds.

There are several general habitat factors that have been identified as potential contributors to the decline in the abundance of salmonids and their habitats within Lake Washington. These factors include (Kerwin, 2001):

- Sediment quality;
- Degradation of shoreline conditions;
- Altered hydrology;
- Invasive plants;
- Poor water quality; and
- Water quantity.

3.4.2.4 Threatened, Endangered, or Sensitive Species

Plant Species with Federal Status

The U.S. Fish and Wildlife Service (2005) has indicated that two federally designated sensitive plant species may occur in King County: marsh sandwort (*Arenaria paludicola*) and golden paintbrush (*Castilleja levisecta*). Given the developed nature of the project study area, these species are not anticipated to be present.

Plant Species with State Status

The Washington Natural Heritage Program (WNHP) of the Washington State Department of Natural Resources maintains a list of plant species considered to be threatened, endangered, or sensitive within Washington State. According to the WNHP dataset from 2006, there are no rare plant species populations or endangered ecosystems within the trail corridor.

Wildlife Species with Federal Status

The U.S. Fish and Wildlife Service (USFWS) identified five threatened or endangered wildlife species as potentially occurring in King County: Canada lynx, gray wolf, grizzly bear, marbled murrelet, and northern spotted owl (USFWS, 2005). The USFWS also identified two candidate species, the yellow-billed cuckoo and the fisher, as potentially occurring in King County (USFWS, 2005). However, these species have habitat requirements that are not met in this generally urban environment.

The bald eagle is no longer listed as a federally threatened species (officially delisted August 8, 2007), but still receives protection under the Migratory Bird Treaty Act and the Washington Bald and Golden Eagle Protection Act. Bald eagles generally perch, roost, and build nests in mature trees near water bodies and available prey, usually away from intense human activity. The closest bald eagle nest to the trail corridor is located on the eastern side of Lake Washington in the Inglewood Wetlands, approximately 1 mile from the trail corridor. Bald eagles have been noted perching in trees near the lake at Log Boom Park and at the Sheridan Beach Club.

Wildlife Species with State or Local Status

According to the Washington Department of Fish and Wildlife Priority Habitats and Species data, there are no state special status species within the trail corridor.

Fish Species with Federal Status

Fish with federal status under the Endangered Species Act (ESA) that are known to occur in the study area include the Puget Sound Evolutionarily Significant Unit (ESU) Chinook salmon, the Puget Sound/Strait of Georgia ESU coho salmon, and the Puget Sound Distinct Population Segments (DPS) Steelhead. The Puget Sound ESU Chinook salmon are considered threatened under the ESA in the State of Washington. The Puget Sound/Strait of Georgia ESU coho salmon is a species of concern under the ESA. The Puget Sound DPS steelhead is a threatened species under the ESA in Washington. The Coastal/Puget Sound DPS bull trout is a threatened species under the ESA for Washington and is considered to have a rare occurrence in Lake Washington, and are assumed to be strays from other watersheds.

Fish Species with State Status

State Priority Species include all state-listed endangered, threatened, sensitive, and candidate species and species of recreational, commercial or tribal importance that are considered vulnerable. No state-listed sensitive, threatened, or endangered fish species occur within the study area; however, other fish species that are designated as State Priority Species may occur within the study area. These species include coastal cutthroat trout and kokanee salmon.

3.4.3 Impacts

3.4.3.1 Redevelopment Alternative

Construction Impacts

Vegetation. Both temporary and permanent vegetation impacts would result from the clearing required for the construction of the widened trail. The plans included in Appendix A illustrate this clearing area. Clearing limits would vary and would generally occur within 11 feet of the trail centerline or to the limits of work as shown on the plans. To the maximum extent practicable, the size of this construction impact area would be minimized and the area replanted after construction. Temporary construction impacts to vegetation would also occur in some locations where retaining walls would be installed. The exact width of these areas would depend on the construction method, local topography, and other potential site restrictions determined during final design.

Low screening plant species (under 3-foot growth height) would be planted where vegetation is removed adjacent to the trail at driveways and intersections (in sightline distances). These plantings may include barberry, rhododendron or similar species. Medium screening species (up to 6-foot growth height) would be planted where vegetation, such as hedges, must be removed to accommodate the widened trail if not located within sightline distances. These plantings may include compact strawberry tree, Nootka rose, snowberry, western hazel, bayberry, evergreen huckleberry, or similar species. Where appropriate, vegetation that is removed to accommodate the widened trail would be replanted in-kind with non-invasive species. In all other areas, vegetation would be planted with the same or similar species as described above for low screening and medium screening plantings.

Approximately 60 trees (a mix of native and non-native deciduous and evergreen trees) would be removed to accommodate the widened trail. Trees would be removed throughout the length of the corridor; however, numerous trees would be removed from NE 170th Street and the Lyon Creek bridge, near Ballinger Way, and near the McAleer Creek bridge. King County will attempt to retain as many trees as possible during the widening efforts, where the trees will not impact the trail stability. Tree removal and replacement will be conducted in accordance with Chapter 16.14 of the City Municipal Code. City code requires that a forested look, value, and function must be maintained after development or modification.

Wildlife Resources. Widening the trail, paving, and retaining wall construction would involve noise and visual disturbance that could cause temporary displacement of sensitive wildlife to surrounding areas. However, the period of construction in any given trail segment would be short, and most wildlife would be expected to return to their original areas of use following completion of construction. It is not anticipated that any of the trees proposed for removal are those used for bald eagle perching; the majority of these trees are deciduous.

Due to the urbanized nature of the trail and its associated habitats, coupled with the fact that the wildlife species that are present are adapted to urban areas, the effects of construction on wildlife in the area are expected to be negligible.

Fish Resources. The Redevelopment Alternative could result in temporary impacts on streams, particularly during bridge demolition and construction. These potential impacts include instream sedimentation resulting from erosion and runoff; disturbance of fish due to instream work, stream diversions, and dewatering activities; changes in stream hydrology; spills of hazardous materials (e.g., oil and gasoline); displacement of fish due to construction noise; and disturbance or removal of riparian vegetation. These impacts are discussed in more detail in the sections below.

Instream Sedimentation. The implementation of best management practices (BMPs) during construction activities can assist in reducing the risk of erosion, and in minimizing the potential for sediments, chemical contaminants, and other materials to enter local waterbodies during construction. Construction activities, in particular excavation, filling, and the construction of new retaining walls, could result in temporary habitat alteration or disruption due to erosion and sedimentation. Sedimentation can result in the degradation of spawning habitat through a reduction in the suitability of spawning gravels. These effects are usually greatest in stream reaches inhabited by salmonids during critical spawning and rearing periods, when fine sediment blanketing the substrate and stream bottom can hide invertebrates that provide a food source for the fish. Lyon Creek supports sockeye, coho, and coastal cutthroat trout; however only sockeye have designated spawning areas throughout the stream. McAleer Creek supports fall Chinook, coho, sockeye, and coastal cutthroat trout; all have designated spawning areas within the stream. Spawning habitat occurs upstream and downstream of the trail, as well as within the segment of the stream that passes directly beneath the trail. Thus, the construction activities that would occur closest to these streams (i.e., bridge demolition and construction at Lyon Creek, clearing, grading, new paving) have the greatest potential to affect salmonid populations due to instream sedimentation.

Over the short-term, localized increases in turbidity and sedimentation are likely. Over the long-term, if disturbed areas are not properly revegetated, they may become a source of chronic erosion and sedimentation.

Drainage Improvements. The Redevelopment Alternative would include the construction of drainage structures, culvert extensions, and the replacement of an existing culvert. Potential construction impacts from these activities would include increased short-term sedimentation with the potential to impact fish habitat at downstream areas. Adherence to project BMPs described in Section 3.1, Earth, would reduce this potential impact.

The culvert conveying Stream 5 (unnamed stream) would be replaced under this alternative. This is a steep hillside drainage and is unlikely to contain fish. All instream work would be conducted in compliance with the conditions specified in the Hydraulic Project Approval (HPA) permit.

Hazardous Material Spills and Construction Noise. With any construction project, there is a potential for accidental spills of hazardous materials, such as gasoline and oil. Control of hazardous materials is a standard provision in construction contracts and permits. In the event fish are present in the stream at the time of construction, construction noise could result in short-term displacement of fish. Construction noise should not occur for more than a few days in the vicinity of the streams within the trail corridor. For all instream work, the timing of the work would be specified in permits, which would typically eliminate the potential impact of noise because spawning fish would not be present during those work windows.

Disturbance of Riparian Vegetation. Some riparian areas may be temporarily disturbed, resulting in a corresponding interruption of the riparian functions. Riparian areas provide functions such as shading and inputs of large woody debris. Shading helps to regulate the stream temperature and large woody debris provides complex habitat features for fish to utilize. Trail construction activities would take place immediately adjacent to McAleer Creek; Lyon Creek; and unnamed streams 4 and 5. In addition, the bridge replacement at Lyon Creek would disturb the riparian area. Where there are temporary disturbances or where riparian vegetation is removed, the disturbed area would be replanted with native vegetation.

Lyon Creek Bridge Replacement. In addition to the impacts above, the Redevelopment Alternative would include replacement of the Lyon Creek bridge. The demolition of the existing bridge and the construction of the 60-foot by 12-foot pre-manufactured steel bridge with a concrete deck and associated retaining walls, would likely result in temporary water quality impacts, such as sedimentation and increased turbidity. Instream work would abide by the same project BMPs discussed in Section 3.1, Earth, and would be fully compliant with the HPA permit.

Operation Impacts

Vegetation. Permanent impacts to vegetation would result from trail widening. Impacts would occur mainly to non-native ornamental shrubs.

Because the study area is located in a largely urban environment, long-term trail use would not result in loss of plant species diversity or reduced plant structural diversity in the study area. Trail maintenance would include removing hazard trees when necessary and trimming vegetation to maintain sight lines at intersections and crossings. Vegetation may also be disturbed temporarily in maintaining the trail drainage system. These impacts would occur under both the Redevelopment and the Rebuild Alternatives.

Table 3.4-3 provides a summary of the impacts to vegetation under the three alternatives.

Table 3.4-3. Summary of Impacts to Vegetation within Trail Corridor.

Action	Impacts			Mitigation
	Redevelopment Alternative	Rebuild Alternative	No Action Alternative	
Trail widening	Permanent removal of vegetation from trail alignment to accommodate the widened trail. Vegetation would be mostly non-native and composed of grasses or shrubs. Approximately 60 trees would be removed (mix of native and non-native deciduous and evergreen trees).	N/A	N/A	Avoid removal of mature native trees where possible. Replant appropriate native vegetation.
Retaining wall construction	Temporary reduction of vegetation near walls for construction access.	N/A	N/A	Minimize disturbance area to greatest extent possible. Replant according to planting plan described in Chapter 2, Alternatives, or work with adjacent landowners to reestablish vegetation.
Drainage Improvements	Temporary disturbance to vegetation adjacent to drainage ditches and culverts.	N/A	N/A	Use BMPs to reduce disturbance and revegetate disturbed areas with native species.
Culvert maintenance	Temporary disturbance to vegetation adjacent to culverts.	Same as Redevelopment Alternative	Similar to but less than Redevelopment Alternative	Use BMPs to reduce disturbance and revegetate disturbed areas with native species.
Sight Distance Improvements	Removal and trimming of vegetation in sight line distances.	Similar to Redevelopment Alternative.	Periodic maintenance trimming.	Replant according to planting plan described in Chapter 2, Alternatives, or work with adjacent landowners to reestablish vegetation.

As shown in Table 3.4-3, the permanent impacts to vegetation would be greater under the Redevelopment Alternative than for the Rebuild Alternative due to the expansion in trail width. These impacts, however, are not expected to be significant.

Wildlife Resources. Long-term operation of the trail would result in two general types of potential impacts to wildlife: 1) habitat loss from permanent vegetation removal; and 2) disturbance.

The Redevelopment Alternative would result in permanent removal of primarily non-native shrubs and trees which currently provide habitat for wildlife species that are adapted to the urban habitat types found along the trail. Loss of this cover type would not result in substantial changes to the type or numbers of species currently occupying the trail corridor. As trail use continues to increase, disturbance effects on

wildlife would also increase. However, when considering the surrounding noise-generating activities, such as traffic, recreational uses on Lake Washington, lawnmowers, and the presence of residents and pets within the immediate project vicinity, increases in disturbance associated with the Redevelopment Alternative are expected to have only a minor effect on wildlife.

Fish Resources. The continued operation of the redeveloped trail would involve the following activities:

- Creation of new impervious surfaces;
- Permanent removal of riparian vegetation to allow for the widened trail; and
- Ongoing trail use and maintenance.

These activities could potentially result in impacts on fish-bearing streams in the form of loss of instream fish habitat, potential changes in hydrologic regimes, and the loss of riparian vegetation. However, careful project design and the implementation of avoidance and mitigation strategies would minimize or eliminate negative effects on fish or aquatic habitat within the study area.

New Impervious Surface. The Redevelopment Alternative would result in the generation of approximately 46,460 (1.07 acres) of new non-pollution-generating impervious surface as a result of trail widening. Runoff from these areas would not contain the types of pollutants that are typically associated with the use of motorized vehicles, namely oil, metals, and other similar contaminants. Although this new additional impervious surface has the potential to slightly increase peak flows and reduce base flows in ditches and streams within the trail corridor, the effects from these new surfaces on stream hydrology would be minimal.

Removal of Riparian Vegetation. Riparian buffer impacts are defined as the portion of the riparian buffer that would be permanently cleared of vegetation in order to accommodate the widened trail. For the Redevelopment Alternative, the total area of buffer impacts along the entire trail alignment would be approximately 12,300 square feet (see also Table 3.2-2 in the Section 3.2 Surface Water).

Although clearing vegetation near streams could result in the loss of some instream cover, riparian functions such as providing large woody debris to the stream, contributing other organic matter to the stream, and regulating stream temperatures through shading would not be substantially affected. In cases where impacts to riparian vegetation in the stream buffers are unavoidable, mitigation, such as enhancement of other riparian areas, would occur in accordance with the local Sensitive Areas Permit (see the mitigation section for further details).

Trail Use. In the absence of mitigation measures, increased human use of the trail and access to fish-bearing streams such as Lyon Creek and McAleer Creek could result in the erosion of trail shoulders; disturbance of spawning fish at stream crossings; trash and debris in the streams; and untreated pet waste entering the stream. Design elements such as trail edge stabilization, signage, retaining walls, and fencing, coupled with general trail use regulations, would minimize these impacts.

Trail Maintenance. Maintaining the trail would require removing sediment and vegetation to prevent blockage at ditches, culverts, and underneath bridges. While culvert and bridge maintenance typically improves streamflows and fish passage, it can also potentially disturb sediments and debris and release them downstream, which can result in fish impacts.

3.4.3.2 Rebuild Alternative

Construction Impacts

Vegetation. Impacts to vegetation associated with this alternative are expected to be minimal. Sight distance improvements would be limited to removing or trimming vegetation at intersections where it impairs visibility.

Wildlife Resources. Impacts to wildlife would be similar or reduced under this alternative due to shorter construction timeframe and fewer construction elements.

Fish Resources. Impacts to fish would be reduced under this alternative due to fewer construction elements. The Rebuild Alternative only includes earth disturbance to rebuild the trail. No drainage improvements or bridge replacement would occur that might increase potential for sedimentation in fish-bearing streams.

Operation Impacts

In general, operational impacts to vegetation, fish and wildlife resources are similar to those described for the Redevelopment Alternative, although to a lesser degree because of the reduced amount of construction and vegetation removal.

Vegetation. The operational impacts to vegetation under the Rebuild Alternative would be limited to those sustained during culvert maintenance activities; and vegetation removal for ongoing trail use, such as for safety, and maintenance of the open trail corridor.

Wildlife Resources. The operational impacts to wildlife under the Rebuild Alternative would be limited to those sustained during the long-term maintenance of vegetation along the trail and general use of the trail in the form of noise and human activity.

Fish Resources. The operational impacts to fish resources under the Rebuild Alternative would be limited to those resulting from general trail maintenance activities, including removal of sediment and vegetation to prevent blockage of ditches and culverts, and general trail use and access to fish-bearing streams. However, it is anticipated that the use of proper BMPs during drainage maintenance, and the use of signage and fencing would minimize and mitigate the general trail use impacts.

3.4.3.3 No Action Alternative

There would be no construction impacts under the No Action Alternative to vegetation, wildlife resources, or fish resources, as no construction activities would take place. Operational impacts would be the same as those that currently occur on the trail.

3.4.4 Cumulative Impacts

Vegetation. Cumulative effects to native vegetation have resulted from urbanization in the general project vicinity. These effects are expected to continue with further development or redevelopment within the larger geographical area. In general, current and future urbanization in the region could result in continued reductions in native forest vegetation in the watershed in favor of establishing urban vegetation. While approximately 60 trees would be removed under the Redevelopment Alternative, these trees would be replaced with appropriate native deciduous and coniferous trees in the

corridor at a 1:1 ratio or greater. Therefore, the project is not expected to contribute to a reduction in overall forest vegetation types in the area.

Rare and sensitive species that are generally intolerant to disturbance have been largely removed from the region due to past development. Native plant species communities in urbanized areas are reduced in extent, occur in small fragmented patches, and are often replaced by non-native ornamental trees, shrubs, grasses, or fast growing weedy species that tolerate disturbance. Many native Pacific Northwest overstory species are completely absent in portions of these urbanized environments. Most of the vegetation that would be removed by the project is non-native. Replacement vegetation would be native or near-native (similar to native, but originating from other regions) providing a small reduction in non-native species in the area.

Wildlife Resources. Due to the urban nature of the area, habitat loss and changes in habitat structure have already occurred and continue to occur. Given the minimal habitat diversity found along the trail, the action alternatives would not add substantially to the cumulative effects of past, present, and future actions on wildlife resources.

Fish Resources. Overall, the Redevelopment and Rebuild Alternatives would not add substantially to the cumulative effects of past, present, and future actions on fish resources and aquatic habitat. The form and function of the aquatic habitat and fisheries resources in the study area, including Lake Washington, have been affected by the past development and impervious surfaces in the watershed.

Construction and ongoing maintenance and operation of the trail could lead to a slight alteration of stream hydrology and a temporary increase in localized sediment production in some portions of the stream located within the trail corridor. However, this increased sedimentation is not likely to adversely affect local fish resources.

3.4.5 Mitigation Measures

Mitigation is discussed generally for each resource type (i.e., vegetation, wildlife, and fish) and these discussions are followed by a matrix (Table 3.4-4) which outlines the mitigation measures that can be undertaken for each specific resource.

Vegetation. During construction for the Redevelopment and Rebuild Alternatives, impacts to vegetation would be avoided and minimized wherever possible. Where temporary disturbance cannot be avoided, vegetation would be restored following construction. Refer to Section 3.4.3.1 and the plan sheets in Appendix A for further details. Vegetation removal and replanting would be conducted in accordance with applicable local requirements. Trees would be replaced with appropriate native deciduous and coniferous trees at a 1:1 ratio or greater, in accordance with the City of Lake Forest Park's tree removal ordinance.

Fish Resources. Strategies to avoid and minimize stream and buffer impacts are incorporated into the design. Unavoidable impacts will be mitigated in accordance with regulations, guidance, and consultations with local, state, and federal resource protection agencies. The design and regulation process would ensure that adverse impacts would be mitigated so that no significant unavoidable adverse impacts would result. Most of the mitigation measures discussed in Table 3.4-4 could be applied to both the Redevelopment and Rebuild Alternatives, although the amount of mitigation needed varies by alternative, depending on the magnitude of the impacts (e.g., amount of riparian clearing).

3.4.6 Significant Unavoidable Adverse Impacts

None of the alternatives, including the No Action Alternative, would result in significant, unavoidable, long-term adverse impacts to vegetation, wildlife, or fish resources. Most short-term, construction-related impacts can be mitigated. Long-term operational impacts from trail use are also not expected to be significant and can be mitigated through the use of the mitigation measures described above.

Table 3.4-4. Mitigation Measures for Vegetation, Wildlife, and Fish Resources

Resource	Local Regulatory Requirement (if applicable)	Other Mitigation Measures
Vegetation	LFP Municipal Code (16.16.160) – vegetation management plan: must identify the proposed clearing limits and any areas where a sensitive area or buffer is proposed to be disturbed. Clearing limits must be marked within the field. LFP Municipal Code (16.14.040) - tree removal permit must be obtained prior to the removal of any significant tree. 16.14.080 Tree Replacement - a removal permit must require a tree protection and replacement plan.	<ul style="list-style-type: none"> • Fences would limit access to sensitive areas, as well as to some other areas with native vegetation. This fencing would reduce the risk of trampling impacts from humans and pets.
Wildlife Resources		<ul style="list-style-type: none"> • Birds are most sensitive to disturbance during the early part of the nesting season. Because noise disturbance can cause some birds to abandon their nests, use of noise-producing equipment where the trail passes near park areas during the early part of the nesting season (February to May) will be avoided.
Fish Resources	LFP Municipal Code (16.16.370) – Replacement or enhancement is required when a stream or buffer is altered pursuant to an approved development proposal. No net loss of stream functions on the site, and no impact on stream functions above or below the site due to permitted alterations is allowable. Any restoration must be in keeping with the standard required buffers.	<p><u>Erosion Control:</u></p> <ul style="list-style-type: none"> • BMPs would be implemented to control erosion and protect water quality in compliance with WAC and/or the construction NPDES permit. • Precautions would be taken when laying asphalt around stream crossings and while installing temporary fences to prevent silt, asphalt, or concrete from entering stream channels. • Trail shoulders would be stabilized where needed in areas adjacent to streams prior to trail surfacing to prevent erosion and sloughing. • Additional measures see Sections 3.1 and 3.2 <p><u>Protection of Fish during Stream Diversions:</u></p> <ul style="list-style-type: none"> • Dewatering to be conducted during the driest time of the year. • Diversions of streams around instream work areas (e.g., during culvert extensions or replacements) would be designed to minimize sedimentation and ensure fish removal. • Screening of work area to remove fish prior to dewatering and to prevent recolonization prior to completing construction. • Instream work would occur over the shortest period possible. <p><u>Construction Timing:</u></p> <ul style="list-style-type: none"> • Construction activities in or near fish bearing stream crossings to be completed during summer low-flow periods to the extent practical, and outside of the fish-spawning period. • All work windows to be established in consultation with WDFW (as listed within the HPA permits) and with USFWS and NOAA Fisheries.

3.5 Land Use and Shorelines

3.5.1 Studies and Coordination

Information was compiled from a variety of sources, including King County and local government sources. Information on existing conditions was verified through site visits.

3.5.2 Affected Environment

3.5.2.1 Current Land Use

The trail passes through the City of Lake Forest Park. Single-family residential use is the predominant land use along the trail. The majority of the area adjacent to the trail is zoned single-family residential (RS 7,200) (City of Lake Forest Park, 2005a). Private beaches, community parks, and undeveloped properties are located among the single-family residences. A small pocket of commercial businesses are located near the trail at Bothell Way NE and 41st Avenue NE. The Lake Forest Park Towne Centre is located on the west side of Bothell Way NE, opposite the trail, at Ballinger Way NE. The complex includes the public library, post office, police department, town hall, and approximately 30 shops and small businesses. It is also home to Shoreline Community College's Lake Forest Park satellite campus.

3.5.2.2 Local Comprehensive Plans, Land Use, and Shorelines

City of Lake Forest Park Comprehensive Plan

A goal of the land use element included in the City of Lake Forest Park Comprehensive Plan is to “coordinate the concurrency of new development with the adequate provision of transportation facilities[...] capital facilities [...] and recreation facilities.”

The transportation policies included in the City's Comprehensive Plan encourage “non-motorized travel by establishing and implementing non-motorized improvements, such as bicycle route signage and trail development.” The City's Comprehensive Plan also states that, when possible, the differing needs of non-motorized commuter travel and recreational travel should be considered when planning a non-motorized facility.

A goal of the recreation element of the City's Comprehensive Plan is “to coordinate with the Transportation Committee in promoting the establishment and maintenance of a safe, interconnected system of trails throughout the city, recognizing the important recreational and transportation roles played by regional and local bicycle and pedestrian trail systems.” Another goal of the recreation element is to “maintain a high standard for the development and maintenance of the City's parks for both active and passive use” (City of Lake Forest Park, 2005b).

City of Lake Forest Park Land Use

The land use designation for the trail is Recreation/Open Space (City of Lake Forest Park, 2005c). Land uses adjacent to the proposed trail are single family residential, recreation/open space, and neighborhood business.

City of Lake Forest Park Zoning

The zoning on the trail is single-family residential (RS 7,200) (City of Lake Forest Park, 2005a). Permitted uses in this zone include single-family dwellings, accessory buildings and structures, and day care facilities. Uses not specifically identified as permitted, including multi-use trails, are regulated as conditional uses.

In November 2006, the City Council adopted an ordinance (Ordinance 951) to enact a new conditional use permit (CUP) requirement for “multi-use and multipurpose trail facilities.” The ordinance put conditions on development and reserved the right to deny permits to redevelop the trail. The ordinance was adopted because some City officials and property owners were concerned about liability and safety related to the heavily used trail.

King County and the Cascade Bicycle Club appealed Ordinance 951 to the Central Puget Sound Growth Management Hearings Board. The ordinance would have set conditions on the trail that would make it impractical for King County to improve the trail to meet current and future demand and would have impeded the ability to meet federal, state, and county standards.

In its decision on July 23, 2007, the Central Puget Sound Growth Management Hearings Board determined the Burke-Gilman Trail to be a regional essential public facility and that Ordinance 951 precluded siting of an essential public facility (CPSGMHB, 2007). The Growth Management Act (GMA) defines the term “essential public facilities” to include “those facilities that are typically difficult to site” (RCW 36.70A.200(1)). It also concluded that the City failed to comply with SEPA when it adopted the ordinance, and that it did not meet the requirements of the GMA. The decision remands Ordinance 951 and requires the City to take action to amend it consistent with GMA. The Council has until January 2008 to modify its ordinance to comply with the Board’s ruling. At the time of the Draft EIS publication, the City was working on the development of a revised draft ordinance, which will be subject to SEPA review by the City, and will receive public comment prior to adoption.

City of Lake Forest Park Shoreline Regulations

The City of Lake Forest Park has unofficially adopted King County’s Shoreline Master Program. King County’s Shoreline Master Program establishes goals and policies, designates shoreline environments, and sets shoreline standards and uses. The trail is located within the regulated shoreline of Lake Washington and is designated Urban. Recreational uses are permitted in this environmental designation. The City reviews development within Shoreline areas for consistency with the policies and procedures of the 1978 version of the King County Shoreline Master Program. The City is currently preparing a Shoreline Master Program, which is expected to be adopted in late 2007.

3.5.3 Impacts

3.5.3.1 Redevelopment Alternative

Construction Impacts

Construction of the trail would result in short-term direct impacts to adjacent land uses, such as noise and dust from construction equipment and disruption of local traffic. These impacts would cease once construction is completed, and would not significantly modify land uses.

Operation Impacts

Supporting goals and policies are found in the City of Lake Forest Park Comprehensive Plan including in the land use, capital facilities, transportation elements, and recreation elements. The trail supports

policies to promote nonmotorized transportation and to provide adequate provision of transportation facilities, capital facilities, and recreation facilities necessary to support existing and future development.

Many neighbors have raised concerns about potential quality of life impacts such as loss of privacy and increased potential for crime and trespass with a redeveloped trail. These issues are discussed in Section 3.12, Socioeconomics.

As described above, Ordinance 951 has been remanded. As such, amendments to Lake Forest Park Municipal Code (LFPMC) Section 18.54.047, Multi-use or Multi-purpose Trails, are now invalid. The valid portion of Section 18.54.047 provides that a multi-use or multi-purpose trail facility may be altered as a conditional use in any land zone of the City subject to other requirements under LFPMC Chapter 18.54, Conditional Uses. King County will monitor the progress of the City's ordinance process and coordinate with the City as appropriate.

All improvements would occur within the King County's existing right of way; no land acquisition would be required and therefore no impacts to adjacent land uses or zoning designations would occur. Because the trail has been in use for more than 30 years, the impacts to surrounding land uses are not expected to be substantially different than those that currently occur. Increases in trail usership, as discussed in Section 3.12 may result in quality of life concerns for trailside residents. Proposed mitigation measures would help to alleviate these impacts.

Trail redevelopment is allowed by the County's shoreline regulations. A Shoreline Substantial Development Permit would be needed because the project would be located within 200 feet of the shoreline, and the project would exceed \$5,000 in cost.

3.5.3.2 Rebuild Alternative

Construction Impacts

Construction of the Rebuild Alternative would result in temporary construction impacts as described for the Redevelopment Alternative. These impacts would be over a shorter construction period because of the fewer construction elements associated with the Rebuild Alternative.

Operation Impacts

Development criteria for the non-motorized transportation network include distinguishing between non-motorized commuter travel and recreational travel and considering the differing needs of the two types of travel when planning the non-motorized facility. The Rebuild Alternative would not be fully consistent with this policy. Current trail width is insufficient to support current and future use levels and would continue to create potential for conflicts between trail users.

As described above for the Redevelopment Alternative, the Rebuild Alternative would also not require land acquisition and therefore would not impact adjacent land uses or zoning designations.

3.5.3.3 No Action Alternative

3.5.3.4 Construction Impacts

No construction activities related to redeveloping or rebuilding the trail would result. The County would continue to perform periodic maintenance along the trail.

3.5.3.5 Operation Impacts

Policies included in the City's Comprehensive Plan promote the development of safe multi-use paths through and throughout the city. The No Action Alternative would not be fully consistent with this policy as it would not address needed traffic control signage changes and other trail improvements. The City's Comprehensive Plan specifies that the City must provide additional housing units to meet housing targets under the GMA. Growth in the city, coupled with additional population growth in neighboring jurisdictions, will result in additional pressure on the trail and other regional recreational and transportation facilities. The trail's existing size, alignment, and signage through the city do not meet current trail design criteria and are insufficient to support current and future use levels.

3.5.4 Cumulative Impacts

Increased population growth in the region may lead to traffic, parking, access and circulation problems. To a great extent these impacts are already anticipated and addressed in the City's Comprehensive Plan that plans for and accommodates growth. The City's Comprehensive Plan calls for suitable land uses in areas supported by transportation facilities. The local plan also allows for increased multi-use transportation, capital, and recreation facilities to serve future growth.

When considered in combination with population growth, the proposed redevelopment project would not add to adverse cumulative impacts in the corridor or vicinity but instead would continue to provide an option for nonmotorized transportation and recreational use.

3.5.5 Mitigation Measures

Few negative land use or shoreline impacts would result from the proposed redevelopment project. Impacts would be associated primarily with temporary construction activity. The following mitigation measures could be used to address the impacts on land use and shorelines resulting from the Redevelopment or Rebuild Alternatives.

- Plan and construct the trail in accordance with adopted land use plans and policies.
- Work closely with affected neighborhoods to minimize land use impacts during construction by notifying residents and businesses of the construction schedule.
- Maintain access to residential areas in the vicinity of the corridor during construction.

Mitigation measures to address quality of life issues are discussed in Section 3.12, Socioeconomics, and Section 3.11, Transportation.

3.5.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse land use impacts are anticipated from the construction or operation of the Redevelopment or Rebuild Alternatives.

3.6 Recreation

This section describes existing parks and trails in the project vicinity, regional and local recreation plans and trail user conflicts. Potential impacts of the project alternatives are discussed for each action alternative and the No Action Alternative. Mitigation measures are identified.

3.6.1 Studies and Coordination

Information was compiled from King County, state, and local government sources, geographic information systems (GIS), and field visits. The evaluation included trails, developed parks, and private open spaces.

3.6.2 Affected Environment

3.6.2.1 Current Use of Trail

The approximately 2-mile long section of the Burke-Gilman Trail is currently used as a non-motorized transportation and recreational trail. User counts and surveys have been conducted for the Burke-Gilman Trail, along with the Sammamish River Trail, every five years from 1980 to 2005. Use of these trails has increased over the years since the trails opened. The most notable increases in usage have occurred as the undeveloped gap in the trail system between the Burke-Gilman and Sammamish River Trails was developed in two phases between 1985 and 1993.

According to a recent user survey conducted by William E. Moritz with the University of Washington, weekend cyclists on the Burke-Gilman and Sammamish River Trails made up approximately 72 percent of the users, while pedestrians made up approximately 25 percent. Use is primarily recreational on weekends. Bicyclists average between 11 and 18 miles per trip and pedestrians average between 4 and 5 miles per trip (Moritz, 2005). King County hired The Transpo Group, a traffic engineering and transportation planning firm, to collect trail volume data along the Burke-Gilman Trail within the trail corridor. In June 2004, data were collected at NE 147th Street. The number of trail users passing the data collection site on a Wednesday was 1,262. Of these trail users, 78 percent were bicyclists and 17 percent were pedestrians. The number of trail users passing the same location on a Saturday in June 2004 was 1,496, of which 79 percent were bicyclists and 13 percent were pedestrians (The Transpo Group, 2005).

King County Code Section 7.12.480 establishes the general hours of operation for all facilities in the County's regional park system as dawn to dusk. King County understands that people who use the trail for commuting have been constrained by such hours of operation, and trail usage has been noted by local residents after dusk on some occasions. Although it has the authority to tailor specific hours of operation for each facility within its regional system, including trails, King County presently has no plan to alter the hours of operation on the Burke-Gilman Trail. However, it could propose to do so in the future if demand warrants.

3.6.2.2 Adjacent Recreational Facilities

Sheridan Beach Club

The Sheridan Beach Club is a private homeowners club for residents of the Sheridan Beach and Sheridan Heights communities. It is located near the intersection of the Burke-Gilman Trail and NE 165th Street (see Figure 1-1). The waterfront property is approximately 0.74 acre in size. The club contains a heated swimming pool, beach access for swimming, a playground, tables and chairs, a pickleball court, and a boating pier (City of Lake Forest Park, 1994; City of Lake Forest Park, 2005).

Lake Forest Park Civic Club

The Lake Forest Park Civic Club is also a private homeowners club located east of the Burke-Gilman Trail and Ballinger Way NE intersection (see Figure 1-1). The waterfront property is approximately 1.5 acres in size. The club contains a playground, restrooms, beach access for swimming, boat launch and pier, cooking facilities, and a clubhouse. Lyon Creek runs north through the property to Lyon Creek Waterfront Property, described below (City of Lake Forest Park, 2005; Lake Forest Park Civic Club, 2007).

Lyon Creek Waterfront Property

Immediately north of the Lake Forest Park Civic Club is the Lyon Creek Waterfront Property (see Figure 1-1). This waterfront preserve is a passive public park located where Lyon Creek enters Lake Washington. A grant from the King Conservation District enabled the City to purchase the 0.75-acre property. The former home site was then restored with the installation of 5,000 native plants. The preserve has trails, picnic tables, benches, and a public pier (City of Lake Forest Park, 2005).

Log Boom Park (Tracy Owen Station Park)

Log Boom Park is located immediately beyond the western boundary of the redevelopment alternative in the City of Kenmore. The public park is approximately 4.2 acres in size and is located along Lake Washington. Recently, the first phase of improvements recommended in the *Final Master Plan: Tracy Owen Station at Log Boom Park* (City of Kenmore, 2005) was completed. The improvements included construction of a new play area, installation of an interpretive structure, and pedestrian and landscape enhancements to the park entrance. In addition to the new facilities, the park includes picnic tables and benches, cooking facilities, beach access for swimming, and daytime moorage.

Phase 2 improvements recommended in the master plan are currently in the planning phase and are proposed to be constructed by 2010. Phase 2 improvements would include expansion of the current beach along the waterfront, installation of a log boom to protect the swimming area, installation of artwork, relocation of the restroom facilities closer to the playground and parking area, improved pedestrian access to the shoreline via a raised boardwalk, additional landscaping, and wetland restoration and other environmental enhancements. In addition, the King County Wastewater Treatment Division may be upgrading the existing pump station at the park. At that time, the portion of the Burke-Gilman Trail located in the park could be temporarily relocated and upgraded during construction.

3.6.2.3 Relevant Recreation Plans, Policies, and Regulations

King County

As early as 1971, planning documents for King County and incorporated jurisdictions identified the Burke-Gilman Trail as a future regional trail facility. The trail has since been featured in numerous King County documents as an important recreational facility and transportation corridor (King County, 1996, 1994, 1993, 1992, 1975). The document that specifically identifies the proposed redevelopment

alternative for the trail is the King County *Regional Trail Inventory and Implementation Guidelines* (2004a).

King County's *Comprehensive Plan* (2006) includes a Parks, Open Space, and Cultural Resources element. This element contains the following policies which relate to trails:

- King County shall be a regional leader in the provision of a regional open space system of parks, trails, natural areas, working resource lands, and flood hazard reduction lands. The regional network of open spaces provides benefits to all county residents including: recreation facilities, conservation of natural and working resource lands, flood hazard protection and related programs, and services. Preservation will include wildlife corridors and riparian habitat, as well as open space areas separating urban and rural areas.
- King County shall provide regional parks and recreational facilities that serve users from many neighborhoods and communities. Regional parks include unique sites and facilities that should be equitably distributed.

The Transportation element in the County's *Comprehensive Plan* also contains policies that relate to trails, as included below.

- Efforts should be made to improve nonmotorized transportation countywide to increase safety, public health, mobility and convenience for nonmotorized modes of travel. These efforts should emphasize the ability of nonmotorized modes to extend the efficiency of regional transit, promote personal mobility in a range of land use areas and expand the transportation alternatives available to the public to form a complete or connected network.
- The essential maintenance, preservation, safety and operations costs of the transportation system should be funded prior to other costs for capital improvements so that existing investment is protected and current mobility is not degraded.

King County's *Open Space System: Parks, Trails, Natural Areas and Working Resource Lands* (2004b) provides recommendations on implementing policies listed in the *Comprehensive Plan*. Some of those recommendations relate to trails, as included below:

- Regional trails should be planned and designed to accommodate all users on alignments and surfaces appropriate to their use.
- King County will develop and maintain a schedule for major maintenance and rehabilitation of park sites and facilities to insure safe public use and to reduce lifecycle costs.

City of Lake Forest Park

The City of Lake Forest Park has set forth recommendations and an action plan for its Parks and Recreation Department in its *Comprehensive Park, Recreation and Open Space (PRO) Plan* (City of Lake Forest Park, 1994). The Recreation and Open Space element in *City of Lake Forest Park Comprehensive Plan* (2005) serves as the most current update to the PRO plan. The PRO plan recommends that bicycle and pedestrian trails should be extended throughout Lake Forest Park. The purpose of the trail system would be to provide safe travel routes that connect neighborhoods. The trail system could also provide linkages to the Burke-Gilman Trail and become a part of the regional trail system.

As part of developing the PRO plan, the City undertook a public participation process and community survey. One hundred and six city residents were surveyed. In response to a question about the priorities for future park development, safe walking and jogging trails ranked as the highest in importance out of 6 potential priorities. Preserved "forest" feeling ranked second in importance with 93 responses and safe biking ranked third in importance with 84 responses. The Burke-Gilman Trail was cited by 55 percent of

the survey respondents as being the most often or occasionally used recreation area in the city. Survey respondents also indicated that the most popular recreational activity was walking and jogging and the second most popular was biking.

The 1994 PRO plan established standards for park and recreational facilities. Walking, hiking and jogging trails were given a higher priority than biking trails. Walking, hiking and jogging trails were recommended to be provided at a frequency of 1.1 miles per 1,000 residents and bicycling trails at 0.7 mile per 1,000 residents. As an added criterion, the PRO plan also recommended that the community trail system be linked to regional trails.

The City is currently developing a new PRO plan called the Legacy Project which will provide a 100-year vision for the City's Green Infrastructure. Green Infrastructure refers to a term used in *Seattle 2100*, an open space plan currently being developed by a group of citizens, community groups, and the University of Washington. Green Infrastructure is considered to be a "comprehensive network of parks, civic spaces, streets, trails, shorelines, and urban forests that will bind neighborhoods to one another, create ecological conduits from the city's ridgelines to its shorelines, and ensure a wealth of green spaces for all citizens to enjoy" (Open Space Seattle, 2006). The Legacy Project is anticipated to be completed in 2008.

3.6.2.4 Conflicts Between Trail Users

During the scoping process, people expressed concerns about conflicts between cyclists and pedestrian trail users on the Burke-Gilman Trail. Scoping comments are discussed in more detail in Table 2-1 in Chapter 2. Accidents that occur on multi-use trails result from various factors, as reported in existing studies. These include overcrowded trails, reckless and irresponsible behavior by cyclists and/or pedestrians, poor user preparation or judgment, and unsafe trail conditions (Craig and Wake, 1993; Moore et al., 1992; Moore, 1994; Dolesh, 2004).

Of the existing trails within the King County trails system, the Burke-Gilman and Sammamish River Trails are the most highly utilized multi-use paved trails. Surveys of trails users on the Burke-Gilman and Sammamish River Trails in 1995 and 2000 indicated that the most common accidents on these trails are falls and riding into a fixed object (Moritz, 1995, 2003). The 2000 survey asked 2,585 trail users to choose five serious safety problems along the trails from a list of ten. Inattentive walkers (1,647 respondents) was considered the most serious safety problem followed by intersections (1,517 respondents), speeding cyclists (1,432 respondents), failure to warn other trail users (1,285 respondents) and animals (1,020 respondents) (Moritz, 2003).

Both trail users and nearby residents have expressed concerns about speeding bicyclists on the trail. Such behavior is perceived to be dangerous to pedestrians and other trail users. The posted speed limit on the Burke-Gilman Trail in Lake Forest Park is 10 miles per hour. However, King County Code (KCC) requires a maximum speed limit of 15 mph on trails (KCC 7.12.295). To ensure consistency with the county code, the Redevelopment and Rebuild Alternatives would change the posted speed limit from 10 mph to 15 mph. The Citizens Advisory Group (CAG) appointed by King County discussed the appropriate speed limit for the trail. In response to trailside homeowners' concerns about trail speed for cyclists, 2 of the 13 CAG members felt that the speed limit on the trail should remain at 10 mph. Most members of the CAG disagreed since they believed the typical cyclist speed of 10-15 mph is not dangerous or threatening to other trail users (CAG, 2006).

Data on bicycle speeds were collected by The Transpo Group (2005) along the Burke-Gilman Trail south of NE 151st Street in the City of Lake Forest Park. In June 2004, bicycle speeds were measured from a random sampling of 500 bicyclists. Eighty-four percent of the measured bicyclists were traveling over the posted speed limit of 10 mph. Average bicycle speeds were measured at 13.6 mph. See Section 3.11, Transportation for more information.

King County strives to provide separated modes of use to reduce trail user conflicts and promote safety and a positive trail experience. When trails generate volumes of over 2,000 users per day, or are estimated to do so, the King County *Regional Trail Inventory and Implementation Guidelines* (2004a) recommends a paved surface at least as wide as that recommended in the current American Association of State Highway and Transportation Officials (AASHTO) guidelines (1999) for shared-use trails. The King County Guidelines also recommend a separated pedestrian facility to the greatest extent possible along the length of the trail (King County, 2004a). The AASHTO *Guide for the Development of Bicycle Facilities* recommends a 12-foot-wide paved surface trail with minimum 2-foot shoulders and 1-foot clear zones for multi-use and shared-use trails (AASHTO, 1999).

Since the AASHTO guidelines were published, a number of communities and advocate groups have called for a paved surface of 14 feet, or separating uses by separating facilities. According to the U.S. Department of Transportation (USDOT) (2004), trail design should also consider new devices such as recumbent bicycles, kick scooters, and inline skates. Such devices may require design standards that are different than what is currently used. Sprinkle Consulting, Inc was hired by the National Cooperative Highway Research Program (NCHRP), a research agency sponsored by AASHTO, to issue recommendations for the AASHTO bicycle guidelines update. Sprinkle Consulting reviewed the USDOT article on devices new to trails and recommended that additional travel modes besides bicycles be incorporated in the new AASHTO guide.

3.6.3 Impacts

3.6.3.1 Redevelopment Alternative

Construction Impacts

Trail users along the Burke-Gilman Trail would be impacted by temporary detours and possible trail closures during the 5-to 6-month construction period. Due to the length of the trail, construction sequencing and timing, the trail would likely be constructed in segments and be completed within one or two construction seasons (see Chapter 2). The contractor would determine how to most efficiently construct the project in order to be cost effective and to minimize disruption to trail users and the neighborhood. To minimize disruption to trail users, the County could require the construction contractor to limit trail closure durations, provide access through the construction zone, or provide detours around the construction zone. As described in Chapter 2, it is the County's goal to provide safe alternative detour routes around construction areas where possible. At locations where there are no safe alternatives, it is the County's goal to avoid shutting the trail down by providing safe passage through the construction corridor. There may be locations and points during construction when access through the construction corridor cannot be provided. In these instances, the County will require the Contractor to limit trail closure periods. Advance notice and signage would be provided.

Impacts would also occur during construction if fugitive dust, odors from paving operations, noise, or construction light and glare affect users of the trail, private clubs, and public parks located along the trail. Residents along the corridor would also likely experience some disruption to recreational activities within their yards and on their patio or decks. Construction activities expected to generate the most noise include asphalt cutting and back up warning devices for construction equipment. Construction equipment moving down the trail within the corridor would create a potential hazard for people and animals crossing or using the corridor. However, because of the short duration of construction and the safety measures proposed (see Chapter 2), no substantial impacts are expected.

Construction impacts to trail users would be similar to the SR-522 improvement project in the City of Kenmore. The project includes roadway and pedestrian improvements along SR-522 and construction of a pedestrian tunnel on the Burke-Gilman Trail at 73rd Avenue NE. During the summer of 2007, the trail

was closed between 68th Avenue NE and 83rd Place NE. Trail users were detoured to NE 175th Street, a local residential street.

Operation Impacts

Impacts to Existing Recreational Uses. Trail amenities would be improved by replacing deteriorated trail furniture with new benches, drinking fountains, bike racks, and trash receptacles. The removal of mature vegetation and fencing to improve visibility/sight distance at crossings and the replacement of vegetation and fencing to allow for the widening of the trail could reduce the perception of privacy of adjacent passive recreation activities for some individuals. The increase in disruption would be temporary for some once the replaced vegetation grows to sufficient screening size. The vegetation cleared for the visibility/sight distance at crossings would not be replaced and may therefore result in long term disruption for some adjacent residents.

The redeveloped trail could create a continued and possible increased potential of disruption for people who find the presence of trail users distracting. The presence of the trail users would disturb some people more than others; a concern expressed by homeowners adjacent to the trail at public meetings and during the scoping process. Trail usage is anticipated to increase in the future as the general population and popularity of alternative forms of transportation continues to grow, which could increase disruption to adjacent residents. There may be a more immediate increase in trail usage if people not currently using the trail start using it because of the improvements to quality and safety.

The Redevelopment Alternative is not expected to negatively affect other recreational opportunities in the area. Visitors to the public and private parks in the area may notice increased traffic on the trail, but this is not expected to be a negative impact.

Consistency with Recreation Plans. Under the Redevelopment Alternative, the widened Burke-Gilman Trail would create a safer walking and bicycle path which is consistent with the Lake Forest Park Comprehensive Plan policy to promote the development and maintenance of safe walking and bicycle paths through and throughout the city (see Section 3.5, Land Use and Shorelines for additional policies on trails). As the population of Lake Forest Park and the surrounding area continues to grow, demand for trails is expected to increase. The Redevelopment Alternative is also compatible with the intent of the King County's *Comprehensive Plan* which calls for expanding non-motorized transportation networks.

Trail User Conflicts and Safety Issues. By design, multi-use trails accommodate a variety of trail users. Trail user conflicts can result in disruption and negative effects on trail user experiences, as well as potential safety issues. User conflicts occur when there is competition or perceived incompatibility of use by different types of users. The different speeds of travel between pedestrians and cyclists, and other wheeled trail users, is a common type of user conflict. Accidents that occur on multi-use trails result from such factors as reckless and irresponsible behavior, poor user preparation or judgment, and unsafe trail conditions (Moore et al., 1992; Moore, 1994). The potential for conflicts between trail users and vehicles is evaluated in Section 3.11, Transportation.

Complaints were received during the scoping process from residents living next to the Burke-Gilman Trail regarding speeding bicyclists and how they endanger pedestrians and other trail users. Potential conflicts between trail users have increased as the use of the trail increased. There is a wide range of speeds among trail users, who include competitive bikers, recreational bikers, families with children on tricycles or small bicycles, runners, walkers, and people with children in strollers. Similar concerns and complaints relating to speeding bicyclists have been recorded in the past for the Burke-Gilman Trail (City of Seattle, 1987; Moore, 1994) and for other trails in the United States (Craig and Wake, 1993; Moore et al., 1992).

Because the trail is a multi-use facility (for walkers, joggers, and cyclists), reconstructing the asphalt trail would benefit some users and could be perceived as a negative impact by others. Pavement irregularities

and root heave would be removed, which would improve safety on the trail but could encourage bicyclists to travel at higher speeds. The change in traffic signage at the majority of intersections requiring vehicles instead of trail users to stop may also encourage some bicyclists to travel at higher speeds. Higher speeds create potential user conflicts and safety problems.

To help minimize some of the potential conflicts, the Redevelopment Alternative would be developed to provide the greatest amount of separation between trail users based on current King County guidelines (King County, 2004a). The trail would be 18 feet wide to provide adequate space for multiple-users to avoid conflicts. Beginning on the west side of the trail and moving east, it is proposed to include a 1-foot trail edge, a 3-foot soft-shoulder pedestrian trail, a 12-foot paved trail, a 1-foot soft-shoulder pedestrian trail, and a 1-foot trail edge (see Chapter 2). Faster modes of travel (bicycling and rollerblading) would occur on the paved section of the trail, and slower modes of travel (pedestrian) would generally occur on the soft-shoulder section of the trail. The trail would narrow to 12 feet at the McAleer Creek Bridge. However, a separated soft shoulder would be added on the east side of the trail between NE 165th Street and the bridge. Providing 12-feet of pavement accommodates the projected volume of users and provides predictability for the higher speed bicycle use. The wider shoulder and separated soft-surface trail provides better separation of different trail uses and thus improves trail safety. This alternative meets current King County and AASHTO guidelines for ideal trail widths on multi-use trails (King County, 2004a).

Bollards would be replaced at all trail/roadway crossings. The placement of removable bollards provide access for maintenance and emergency vehicles, but block the trail from use by other motor vehicles. Many bicyclists have argued against the use of bollards stating that there is ample evidence that bollards are hazardous to trail users, especially to bicyclists when it is dark and the trail surface is slippery. They have also stated that the second most common accident to cyclists is colliding with an obstacle, such as a bollard. Efforts to minimize this potential hazard include: providing predictable placement at each crossing; providing warning striping around the central/removable bollard; and minimizing the number of times bollards are used as well as the number used at each location. King County has agreed to research the potential for other means to reduce hazards associated with bollards, including use of “padded” bollards or other design methods. Bollards and their associated spacing would be based on King County standard details and layout, which are consistent with the recommendations for “barrier posts” in the AASHTO Guide for the Development of Bicycle Facilities. See Section 3.11, Transportation for further discussion.

3.6.3.2 Rebuild Alternative

Generally, impacts to recreation under the Rebuild Alternative would be similar to those described for the Redevelopment Alternative. The discussion below is focused on the differences between the two alternatives.

Construction Impacts

Impacts to recreation users under the Rebuild Alternative would be similar to those described for the Redevelopment Alternative. While construction activities that generate the most noise (asphalt cutting and construction equipment backup audio warnings) would occur under this alternative, overall activity would be less intensive. The duration of construction activity would be for 2 to 3 months and would occur over one construction season.

Operation Impacts

Impacts to Existing Recreational Uses. Impacts to existing recreational uses near the trail would be similar to those described under the Redevelopment Alternative.

Consistency with Recreation Plans. The Rebuild Alternative would not be consistent with adopted plans and policies for providing safe walking and bicycle paths in the City of Lake Forest Park. The increase in trail users over time would not be accommodated in a safe and effective manner under the Rebuild Alternative. The Rebuild Alternative is also not consistent with the King County *Regional Trail Inventory and Implementation Guidelines* (2004a) which specifically calls for redevelopment of the Burke-Gilman Trail to better separate different modes of use.

Trail User Conflicts and Safety Issues. There would be a continued potential for accidents between trail users. Because of the narrow width, the lack of trail user separation, and the projected increase in trail user volumes, this alternative would potentially result in more trail user conflicts. Similar to the Redevelopment Alternative, resurfacing the pavement and changing traffic control may encourage bicyclists' to travel at higher speeds. Higher speeds without a wide enough facility to accommodate different trail users would create more potential user conflicts and safety problems than the Redevelopment Alternative.

3.6.3.3 No Action Alternative

Construction Impacts

There would be limited construction activities, associated with spot repairs and typical maintenance activities; and therefore no construction-related impacts to existing recreational users, associated with the No Action Alternative.

Operation Impacts

Impacts to Existing Recreational Uses. The No Action Alternative is similar to the Rebuild Alternative in that the increase in trail users would create an increased potential of disruption for adjacent recreational users who find the presence of trail users distracting.

Consistency with Recreation Plans. Similar to the Rebuild Alternative, the No Action Alternative would not be consistent with adopted plans and policies for providing safe walking and bicycle paths in the City of Lake Forest Park and for accommodating the increase in trail users in a safe manner. Based on the estimated amount of trail users, this alternative is not consistent with AASHTO guidelines and the King County *Regional Trail Inventory and Implementation Guidelines* for shared-use trails. It is also inconsistent with King County policies to improve non-motorized transportation facilities and to accommodate all regional trail users.

Trail User Conflicts and Safety Issues. There would be a continued potential for accidents between trail users, and incidents or accidents between trail users and residents. Because of the narrower width, the lack of trail user separation, and the projected increase in trail user volumes, this alternative would potentially result in more trail user conflicts. As the trail continues to deteriorate, safety concerns would likely increase. Conflicts between trail users and vehicles at trail crossings would likely continue or increase as trail volumes increase in the future.

3.6.4 Cumulative Impacts

Under the No Action Alternative the increase in trail volumes would not be accommodated on the Burke-Gilman Trail. This may lead trail users to utilize other regional trails or the roadway system. Without appropriate planning, safety and congestion issues could arise on SR-522 or other regional trails.

Construction for the SR-522 improvement project located in the City of Kenmore began in the summer of 2007 and would continue through 2009. The construction timing of both the Redevelopment and Rebuild

Alternatives could coincide with the SR-522 project. Burke-Gilman Trail users could be impacted by detours and possible trail closures in both Kenmore and Lake Forest Park city limits.

While still in the early planning stages, King County Wastewater Treatment Division may be redeveloping the Burke-Gilman Trail at Log Boom Park in Kenmore to a similar design standard as part of the renovation and expansion of their Log Boom Park Regulator Station. The City of Seattle is also planning to undertake redevelopment of the trail south of the proposed project. These trail redevelopment projects are expected to achieve a similar design standard as the proposed project.

3.6.5 Mitigation Measures

3.6.5.1 Existing Recreational Uses

The following mitigation measures could be used to minimize impacts on existing recreational activities:

- Notify all adjacent residents about the proposed construction schedule.
- Limit the hours of trail operation to daylight hours only for safety.
- Utilize construction best management practices (BMPs) such as wetting and covering disturbed soils, washing tires and undercarriages of vehicles, and shutting off idling equipment to control fugitive dust and vehicle emissions.
- Replant landscaping where possible to provide visual screens and/or restore trail edge plantings in accordance with the planting plan described in Chapter 2, Alternatives.
- Replace fences where possible in accordance with the fencing scheme described in Chapter 2, Alternatives.

3.6.5.2 Trail User Conflicts and Safety Issues

The following mitigation measures could be used to minimize trail user conflicts and enhance safety:

- Redevelop the trail to meet applicable current design standards for curves and sight distance, based on a design speed for the fastest users, cyclists.
- Install fencing in areas where the trail poses potential safety hazards such as falling off a retaining wall or down a slope.
- Along areas of the trail adjacent to roads, residential driveways, or parking areas, install a guardrail or approved equivalent to separate the trail from areas used by vehicles (except on a case-by-case basis where line of sight distance would be impaired).
- Trim vegetation to maintain vertical and horizontal clearances from the trail for the safety of trail users.
- Install signage indicating limits of the trail right-of-way, trail etiquette, and maximum allowed speeds.
- Provide brochures, flyers and other printed materials at nearby trailheads, bicycle shops, and bicycle non-profit organizations on trail etiquette and trail rules. Work with retail stores to mail printed materials to recent purchasers of cycling equipment.
- Organize presentations on trail etiquette and trail rules at bicycle non-profit organizations, elementary schools, and retailers.
- Provide educational kits on appropriate trail behavior to elementary schools.
- Place advertisements in local newspapers and magazines on trail etiquette and trail rules.
- Utilize volunteer efforts through King County's Trails Ambassador Program.

- Create a neighborhood program of volunteers to enforce trail rules.

3.6.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse recreation impacts are anticipated from the construction or operation of any of the Burke-Gilman Trail alternatives.

3.7 Aesthetics and Visual Quality

This section describes the existing visual context of the Burke-Gilman Trail.

3.7.1 Affected Environment

3.7.1.1 Existing Landscape Character and Viewshed

The landscape character of the project vicinity vegetated hills sloping down to the shore of Lake Washington. The native vegetation was historically a Douglas fir-dominated forest; however, the area is now mostly developed with single-family homes. Native vegetation has been reduced to small pockets and vegetated corridors along stream; however, the area retains a visual character of a forested community because many large trees remain, and because many of the residences have mature landscaping. Scenic views across Lake Washington from the residences on the shoreline and on the hillsides are a significant part of the visual character. Views of Lake Washington from the trail corridor are limited. Tall, dense vegetation and fencing largely line the existing trail. This vegetation blocks views of the Lake in some locations. Trees provide a canopy for the trail for the majority of the project length.

3.7.1.2 Visual Simulation

A visual simulation to illustrate “before and after” conditions along the trail is shown on Figure 3.7-1. A photograph was taken of the trail view at a location north of NE 153rd Street and used as the base for the computer-generated simulation. The primary purpose of the simulation is to illustrate the effect of widening the trail. The view was selected to illustrate a typical trail section.

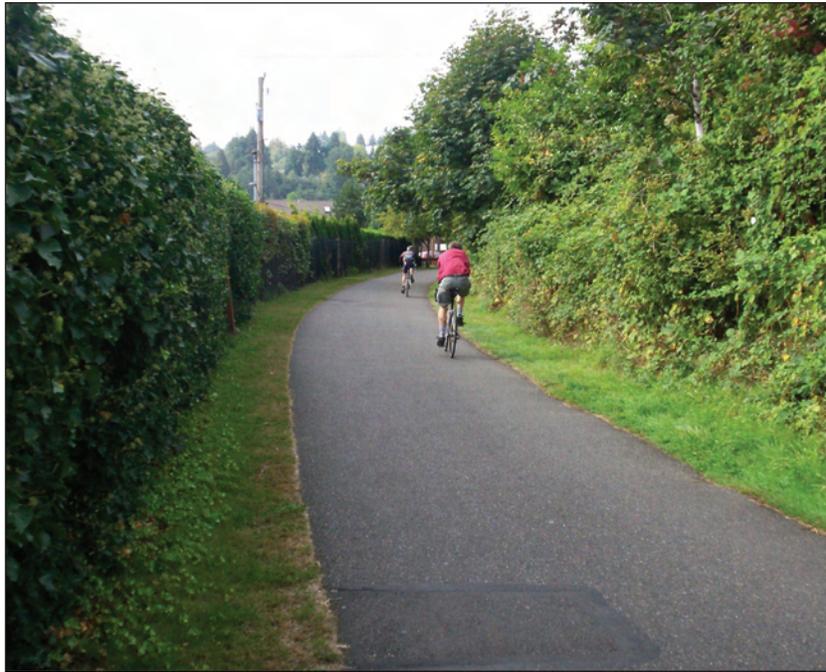
3.7.1.3 Visual Quality

Numerous roads and residential driveways traverse the trail corridor. The trail’s elevation relative to that of houses is generally consistent along the trail length. In general, the hillside topography slopes toward Lake Washington so the trail is above the level of houses to the west and lower than the level of houses to the east.

The homes in this area are of various ages and sizes. Newer homes (less than 20 years old) are generally larger and fill the lot with minimum setbacks. Additional features adjacent to or within the King County right of way include retaining walls, wood and chain-link fences, paved parking and driveway areas, hedges and other landscaping,

Residents and trail users are the primary viewers in the area. Both groups are likely to be sensitive to visual quality because of the views toward Lake Washington. In most cases, the trail is not visible from the residences to the east because it runs behind and below their homes, or is substantially blocked by vegetation or fences. In many cases, the trail is visible to residences on hillsides to the west as the trail is at a lower elevation.

For trail users, use of the right of way for residential purposes (e.g., dense landscaping and fencing) has reduced the available views of the trail and the lake. There are currently limited opportunities to view the lake from the trail due to the tall vegetation and fences.



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3.7.2 Impacts

3.7.2.1 Redevelopment Alternative

Construction Impacts

Visual impacts due to construction would include the presence of small- to medium-sized equipment, excavation of soil, and storage of construction materials for short time periods. These impacts would be temporary since all construction equipment and materials would be removed when the project is completed.

Construction of retaining walls would occur in some areas as a result of widening the trail; however, construction of the walls are not expected to generate additional impacts beyond those mentioned above. There would be limited visibility of the walls for most residents.

Within the corridor, approximately 60 trees would be removed to accommodate the widened trail. A reduction of trees along the trail would reduce the canopy cover in some areas, and provide for a more open feel to the trail in some areas. Trees would be removed throughout the length of the corridor; however, numerous trees would be removed from NE 170th Street and the Lyon Creek bridge, near Ballinger Way, and near the McAleer Creek bridge. King County will attempt to retain as many trees as possible during the widening efforts, where the trees will not impact the trail stability. Tree removal would be conducted in accordance with LFP Municipal Code 16.14. Trees would be replaced at a 1:1 or greater ratio with more appropriate species in more appropriate locations within the County-owned corridor. For further discussion related to tree removal, refer to Section 3.4, Vegetation and Wildlife.

Operation Impacts

Operation impacts would result from removal of vegetation (native vegetation, weeds, residential gardens, and landscaping) and/or structures (fences, retaining walls) in the County-owned corridor. Removal of vegetation or structures would be necessary in select areas to accommodate the wider trail and to improve sight distances near crossings. Some private residences have evergreen hedges and fencing for screening in the County-owned corridor that would need to be removed to accommodate the widened trail. Where vegetation or fencing is removed to accommodate the wider trail, new vegetation or fencing would be installed near the outer edge of the widened trail. The increased visibility or loss of mature landscaping would change the visual character, at least temporarily until newly planted vegetation matures, which will likely be perceived as a negative impact to some residents. Views of the Lake from the trail would be opened up south of NE 151st Street at the site of an undeveloped lot. Where possible, the County would attempt to provide other views of the Lake from the trail.

Vegetation will be replanted according to the Planting Plan depicted in Appendix A. Depending upon location, plants would be replanted according to a “low screening”, or “medium screening” as described in Section 3.4.3.1. Lower screening would be placed near intersections with roadways or driveways, or other locations that need improved sight distances. Medium screening would be placed further back from the trail, outside of sight distance triangles, in locations where tall hedges or other vegetation was removed to accommodate the widened trail or improve sight distances.

Comments were received from area residents regarding the removal of trees along the trail to maintain their views. King County has also received several letters and comments from residents in the past regarding trees and hedge vegetation within the corridor; some requesting that specific hedges be retained, others requesting the County remove or top trees to retain or open up views. Landscaping practices have changed substantially since the original landscape plan for the Burke-Gilman Trail was created in 1975. King County Facilities Management Division now considers topping of trees and closely planted, tall-growing evergreen trees for screening in a view corridor inappropriate. Because this is a trail

redevelopment project, vegetation would be removed only as needed to accommodate the widened trail or to improve sight distances associated with trail crossings. When replanting vegetation that is removed, the County would select species that are appropriate to the site and in appropriate locations within the County-owned corridor.

Where there is existing fencing that must be removed to accommodate the widened trail, fencing would be replaced where it does not conflict with the trail alignment or sight distance triangles. As described in Section 2.5.1.5, where existing chain-link fencing is removed to accommodate the widened trail, black-coated chain-link fencing would be placed. Where existing wood fencing is removed, equivalent wood fencing would be replaced. All fencing would be placed no closer than 1 foot from the outside edge of the widened trail shoulder to maintain a 1-foot clear zone. In general, there would be an overall reduction in the amount of fencing along this section of the trail as a result of the improved sight distance triangles at intersections.

New light fixtures would be installed along the trail at crossings. These fixtures would be mounted on low 12-to 14-foot (pedestrian-scale) poles selected specifically for trails. The luminaires would include cut-offs to focus the light downward to reduce light pollution and glare into the neighborhoods and would be placed in a staggered position at intersections.

3.7.2.2 Rebuild Alternative

Construction Impacts

Visual impacts due to construction would include the presence of small- to medium-sized equipment, excavation of soil, and storage of construction materials for short periods. These impacts would be temporary since all construction equipment and materials would be removed when the project was completed.

Construction impacts would be less for this alternative than for the Redevelopment Alternative because construction would only involve repaving the existing trail, thus resulting in shorter construction duration.

Operation Impacts

Reconstructing of the trail under the Rebuild Alternative would not result in visual changes to the trail corridor. Removal of vegetation for sight distance improvements would alter the visual character in some areas, but these changes are not expected to be substantial. Tree removal would not occur as a result of implementation of this alternative. Trees that are determined to be a safety hazard would continue to be removed as part of routine trail maintenance.

3.7.2.3 No Action Alternative

Construction

There would be no construction impacts for this alternative, other than from periodic spot maintenance activities.

Operation

There would be no visual impacts along the trail alignment under the No Action Alternative; the visual context would remain as it currently is. Vegetation trimming would continue to occur for maintenance purposes. Trees that are determined to be a safety hazard would continue to be removed as part of routine trail maintenance.

3.7.3 Cumulative Impacts

Tree removal associated with the Redevelopment Alternative would contribute to the overall trend toward urbanization. No cumulative visual impacts are anticipated as a result of the Rebuild, or No Action Alternatives.

3.7.4 Mitigation Measures

Mitigation concepts would be developed to identify design solutions that are site-appropriate and that reflect the preferences and requirements of community members, trail users, property owners, and other stakeholders. General concepts to be considered include:

- Reinstall appropriate landscaping where possible to provide visual screens and/or restore trail edge plantings, and without obstructing sight distance triangles.
- Choose retaining wall materials that are site-appropriate.
- Conduct regular vegetation maintenance to preserve sight distance triangles.

3.7.5 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse visual impacts would occur for the Redevelopment, Rebuild, or No Action Alternatives.

3.8 Utilities and Public Services

This section discusses existing public services and utilities in the project vicinity, potential impacts related to construction and operation, and potential mitigation measures.

3.8.1 Studies and Coordination

Information was collected from various utility and public service providers based largely upon information published on the individual utility websites, and site visits.

3.8.2 Affected Environment

3.8.2.1 Utilities

Currently, four water districts provide water service to Lake Forest Park, three of which provide service to the project area. At the south end of the Burke-Gilman Trail, water service is provided by the Seattle Water District. From approximately NE 160th Street to NE 170th Street, water service is provided by the Shoreline Water District. From roughly NE 170th Street to the northern city limits, water service is provided by the Lake Forest Park Water District. Northshore Utility District is the fourth water district within the city, and provides water to the northeastern portion of the city (City of Lake Forest Park, 2007).

Two sewer districts provide wastewater service to the City of Lake Forest Park. For the majority of the city, wastewater service is provided by the Lake Forest Park Sewer System. In the northeastern portion of the city, including the north end of the trail, wastewater service is provided by Northshore Utility District (City of Lake Forest Park, 2007).

Solid waste collection service (garbage, recycling, and yard waste) is provided by Allied Waste and Rabanco. Electrical service within the city is provided by Seattle City Light. Natural gas is provided by Puget Sound Energy. Qwest provides telephone service to the city, and Comcast provides television cable service to the area (City of Lake Forest Park, 2007).

3.8.2.2 Public Services

The Shoreline School District serves the communities of Shoreline and Lake Forest Park. The public school district provides pre-K through 12th grade, with numerous elementary schools, two middle schools, and two high schools (Shoreline School District, 2007).

Fire protection is provided by the Northshore Fire Department, which serves the cities of Kenmore and Lake Forest Park. The Lake Forest Park Police Department is located near the Towne Centre, on Ballinger Way NE (City of Lake Forest Park, 2007).

The Lake Forest Park Towne Centre serves as the community hub, and main commercial center. The Towne Centre contains a branch of the King County library system, a branch campus of Shoreline Community College, a post office substation, and the Third Place Commons. The Third Place Commons is a community gathering place that contains meeting facilities, restaurants, and a bookstore.

3.8.3 Impacts

3.8.3.1 Redevelopment Alternative

Utilities

Construction Impacts. The greatest potential for disruption of utilities during construction would result from excavation for retaining walls and grading. Some grading would occur to widen the trail, and some minor excavation would be needed to install fence posts, signposts, and bollards. All underground utilities would be located prior to construction activities that more than superficially disturb the soils. Underground water and sewer lines would not be relocated as a result of trail upgrades; however, some casements along the trail may need to be lowered. Disruptions to utilities are not anticipated as a result of construction activities.

Operation Impacts. Operation of the Redevelopment Alternative would not impact any utility levels of service.

Public Services

Construction Impacts. Access to properties for all emergency response services would be maintained during construction of the trail. A number of methods could be used to provide access to individual properties during construction (e.g., construction sequencing, diversions, temporary crossings). These are described in detail in Chapter 2, Alternatives. Access to some residences could be delayed during construction as a result of construction-related traffic, but this would be minimized through the use of proper traffic control and signage (see Chapter 2 and Section 3.11, Transportation). Construction activity at individual roadway and driveway crossings is anticipated to last for one to two weeks. Construction haul routes would likely include SR-522. It is not anticipated that the construction traffic would impact transit routes or stops along SR-522.

During construction, school buses traveling in the trail vicinity may experience occasional delays resulting from truck traffic and use of traffic control devices and flaggers. As stated in Section 3.11, Transportation, impacts to traffic flow during construction are not expected to be substantial. Construction of the Redevelopment Alternative is not likely to require detour routing of school buses. King County would work with the Shoreline School District to minimize construction delays on school buses.

During construction, impacts to traffic may result in minor, temporary delays for mail and newspaper delivery to homes along the trail.

Operation Impacts. Impacts to fire, police, and emergency medical response services from operation of the Redevelopment Alternative would not be expected. No substantial increases in demand for law enforcement or emergency services is anticipated as a result of the trail redevelopment.

In the event of an accident, emergency medical response vehicles would access the trail via a cross street or residential driveway. Vehicular access onto the trail itself is provided by removable bollards at a number of locations along the trail corridor. Emergency response providers serving the area have been provided with maps of all vehicular access locations and keys to the removable bollards. For additional discussion on trail user and public safety, see Section 3.6, Recreation.

Operation of the trail under this alternative would not impact mail and newspaper delivery services in the area, nor would it impact area schools.

3.8.3.2 Rebuild Alternative

Impacts associated with the Rebuild Alternative would be similar to those described above for the Redevelopment Alternative. Because the duration of construction would be less, potential impacts to utilities would be less. Operational impacts to utilities and public services associated with the Rebuild Alternative would be the same as those described for the Redevelopment Alternative.

3.8.3.3 No Action Alternative

Under the No Action Alternative, the trail would remain unchanged from current conditions. This alternative would not result in any disruption, operation, or relocation of any public facility or utility service.

3.8.4 Cumulative Impacts

Cumulative impacts related to public services and utilities serving Lake Forest Park are anticipated to result from ongoing population growth and urbanization in these communities. Growth and increased urbanization are anticipated to result in increased demand for all public services and utility service capacity. However, implementation of any of the alternatives would not measurably contribute to this demand.

3.8.5 Mitigation Measures

3.8.5.1 Public Services Mitigation Measures

King County could implement the following mitigation measures related to police, fire/medic, and ambulance services:

- Limit trail use to daylight hours for safety. King County regulates trails as linear parks; trails are subject to usage restrictions per King County Code Section 7.12.480.
- Implement Trail Ambassador Program.
- Provide updated maps of all trail access points and master keys to locked bollards and removable posts to all emergency service agencies serving the corridor.

3.8.5.2 Utilities Mitigation Measures

Mitigation measures related to utilities within and across the corridor could include:

- Close coordination with utility providers to identify and physically locate utilities prior to the initiation of any construction activity.
- King County would cooperate with utility providers to collocate utilities within the trail if appropriate or feasible.
- Notification of property owners prior to the initiation of any construction activity to obtain input on the locations of utility connections that may not be documented.
- Notification of property owners in advance of breaks in service to affected utilities.

3.8.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to public services or utilities are anticipated from the construction or operation of any of the alternatives.

3.9 Noise

This section describes local noise regulations and noise sources in the project vicinity. Potential impacts of the project alternatives are discussed for each action alternative and the No Action Alternative. Mitigation measures are identified.

3.9.1 Affected Environment

3.9.1.1 Regulatory Overview

The City of Lake Forest Park regulates nuisance noises and limits the level of sound emitted beyond the property line. These regulations provide a range of controls over noise sources associated with both trail construction and use, and are summarized below.

The City of Lake Forest Park regulates noise sources through their Municipal Code Chapter 8.24. Temporary construction sites and noises created by powered equipment (lawnmowers, powered hand tools, chainsaws) during the hours of 9:00 p.m. and 7:00 a.m. on weekdays, and 9:00 p.m. and 8:00 a.m. on weekends and holidays are not permitted. The Noise Control chapter also restricts “sound that is a public nuisance” and defines such noises as:

- “frequent, repetitive, or continuous noise made by any animal which unreasonably disturbs, or interferes with the peace, comfort, and repose of property owners or possessors”
- “frequent, repetitive, or continuous noise made by any horn or siren attached to a motor vehicle”
- “frequent, repetitive, or continuous noise made by starting, operating, repair, rebuilding or testing of any motor vehicle, motorcycle, off-highway vehicle, or internal combustion engine”
- “the making of any loud or raucous noise which unreasonably interferes with the use of any school, church, hospital, sanitarium, or nursing or convalescent facility”
- “the creation by use of a musical instrument, whistle, sound amplifier, stereo, juke box, radio, television, tape player, or other device capable of loud raucous noises which emanate frequently, repetitively or continuously”
- “the creation of frequent, repetitive, or continuous noise in connection with the starting, operating, or repair of heating, air-conditioning or other machinery”

The Noise Control chapter further states that “noise-producing equipment shall be baffled, shielded, enclosed or placed on the property so as to insure that the decibel (dBA – A-weighted) level does not exceed 55 by day or 45 by night at the property line.” A dBA level of 55 is approximately the noise level of light traffic 100 feet away and is perceived as a moderate level of sound. A dBA level of 45 is considered a faint sound and is the amount of noise typically heard in a quiet home.

3.9.1.2 Existing Noise Sources

The most prominent noise source in the vicinity of the Burke-Gilman Trail is traffic noise from SR-522 (Bothell Way NE), a high volume roadway adjacent to the trail. Other noise sources include the sound of float planes taking off and landing from Kenmore Air Harbor. Noise sources associated with the use of the Burke-Gilman Trail include bicycles traveling on pavement, occasional bicycle warning device sounds (e.g., bells), foot traffic on pavement and un-amplified human voices. Trail maintenance has involved occasional vehicular use of the trail (at slow speeds) and vegetation management (e.g., mowing in some areas and vegetation trimming). These occasional maintenance activities generate noise audible at nearby locations similar to existing neighborhood yard maintenance noise that occurs along the majority of the trail.

Along areas of the Burke-Gilman Trail near Bothell Way NE it is highly likely that noise from sources associated with trail use is largely obscured by noise from nearby traffic. In portions of the trail corridor that are shielded from the roadway ambient noise, levels are likely to be lower. In these areas, noise generated by users of the Burke-Gilman Trail could at times be noticeable to nearby residents. However, it is unlikely that noise generated by permitted trail uses would approach or exceed any of the City of Lake Forest Park noise criteria because such uses do not generate much noise. As a result, overall trail use noise is likely to be a minor source in the overall acoustic environment.

3.9.2 Impacts

3.9.2.1 Redevelopment Alternative

Construction Impacts

With the implementation of effective means to control noise from construction, no substantial noise impacts related to redeveloping the Burke-Gilman Trail are anticipated. Even with effective noise controls (see mitigation in Section 3.10.5, below), some construction activities could cause substantial but short-term changes in the existing acoustic environment near areas of active construction. Construction noise would be short-term, and regulated by the timing restrictions imposed by the City of Lake Forest Park. Construction of the trail is expected to occur only on weekdays, during daylight hours.

Construction would include use of equipment such as excavators, graders, compactors, trucks, and pavers. Portions of the trail construction would also require cutting pavement and demolition and reconstruction of the Lyon Creek bridge. Such construction requires equipment that can generate relatively high sound levels which could impact nearby locations. Because portions of the trail pass within 50 feet of existing homes, construction noise, backup audio warnings on construction equipment, and use of pavement cutters, could disrupt activities at nearby homes. Any such impacts would be short-term and temporary at most locations because construction activities near most receivers would be limited in duration. The total duration of construction would be 5 to 6 months. With the exception of construction traffic along roads and potentially prolonged activity in and around staging areas, construction in individual parts of the trail corridor might not last more than a few weeks. Construction noise could nonetheless be considered intrusive by some listeners unless measures are used to control the level of construction equipment noise experienced at nearby sensitive receivers.

Operation Impacts

No noise impacts would be expected to result from the redeveloped Burke-Gilman Trail. While the number of trail users would increase over time, the noises associated with trail users are minimal and are not expected to create an impact. Removal of existing vegetation in selected areas along the trail might

result in an increased awareness of the trail users for some trailside residents since dense vegetation might be providing for minor noise reduction.

3.9.2.2 Rebuild Alternative

Construction Impacts

Under the Rebuild Alternative the construction impacts described for the Redevelopment Alternative would be less since the construction duration would be for only 2 to 3 months and would not involve the reconstruction of Lyon Creek bridge or widening of the trail. However, asphalt cutting and backup audio warnings for construction equipment would still be a part of construction activity.

Operation Impacts

The minimal impacts associated with trail usage are the same as those identified for the Redevelopment Alternative.

3.9.2.3 No Action Alternative

Construction Impacts

There would be no construction activities, and therefore no construction-related noise, associated with the No Action Alternative.

Operation Impacts

The minimal impacts associated with trail usage are the same as those identified for the Redevelopment Alternative.

3.9.3 Cumulative Impacts

Construction activities that could occur in the general project area vicinity at the same time of this project would increase the potential for cumulative noise impacts. No specific projects have been identified within the immediate vicinity of the trail; however, development and redevelopment is occurring throughout the general area.

3.9.4 Mitigation Measures

Construction noise is exempt from compliance with City of Lake Forest Park noise regulations. However, potential construction noise impacts could be minimized or avoided by using a number of simple methods designed to reduce noise generation at the source, and/or techniques to control the transmission of construction noise to off-site receiving locations. Construction contractors can minimize construction noise by turning off idle equipment, limiting noise from backup audio warnings by minimizing vehicles driving in reverse or by using non-audible backup warning devices, using engine intake silencers and properly sized and functioning exhaust mufflers, and by locating stationary equipment and construction staging areas as far as possible from the nearest off-site receivers. In the event noisy equipment must be placed approximately within 200 feet of off-site receivers, the use of portable noise barriers could help control noise transmission and reduce the potential for construction noise impacts.

Because no substantial noise impacts are expected to occur from operation of the Burke-Gilman Trail, noise mitigation would not be warranted for trail use.

3.9.5 Significant Unavoidable Adverse Impacts

Because construction noise would be temporary and limited to daytime hours and operational impacts are not expected, no significant unavoidable noise impacts are anticipated.

3.10 Historical, Cultural, and Archaeological Resources

This section describes historical, cultural, and archaeological resource regulations at the federal, state and local level and investigates the prevalence of such resources in the project vicinity. Potential impacts of the project alternatives are discussed for each action alternative and the No Action Alternative. Mitigation measures are identified.

3.10.1 Studies and Coordination

This discussion is based largely upon a cultural resources report entitled *Cultural Resources Investigations for the Burke Gilman Trail Redevelopment: King County, Washington* (BOAS, Inc., 2007). This report evaluated the 50-foot-wide King County right-of-way corridor along the entire length of the Burke-Gilman Trail that is proposed for redevelopment.

The cultural resources report reviewed archaeological site forms, historic property records and ethnographic data to determine whether archaeological resources might be present in the project area. Archaeological site forms and survey reports at the Washington State Department of Archaeology and Historic Preservation (DAHP) and historic property documents filed with the King County Historic Preservation Program were reviewed. Indian Claims Commission documents were examined for ethnographic information. These documents include specialist reports and commission findings assembled in the 1950s and published in 1974.

In addition to the literature search, a site visit was conducted in February 2005 to examine the project area for archaeological sites and cultural resources. The entire land surface of the project area was examined. Areas of surface and subsurface exposure were scrutinized, although there were portions on the east side of the trail that were not accessible due to fences and dense shrubbery.

3.10.2 Affected Environment

Information about recorded archaeological and historic sites within 1 mile of the trail corridor is summarized below.

3.10.2.1 Regulatory Environment

Cultural resources are protected at the federal, state, and local levels. Cultural resources are defined as buildings, objects, sites, or structures that are of historic, cultural, archaeological, scientific, and/or architectural significance.

Federal Regulations

Federal laws that may apply include the Native American Graves Protection and Repatriation Act (PL 101-601), which regulates the inadvertent discovery of Native American human remains on federal or tribal land; the Archaeological Resources Protection Act (16 USC 470aa-470mm), which regulates excavation of sites on federal lands; and the American Indian Religious Freedom Act (42 USC §§ 1996, 1996a), which affirms the right of Native Americans to access their sacred places.

State Regulations

The DAHP and the Revised Code of Washington (RCW) Chapter 27.53 require properties that are determined to be historically and/or culturally significant to be accorded heightened levels of consideration or protection. Properties that possess historical, architectural, or archaeological significance are eligible to be listed on the Washington Heritage Register maintained by DAHP. The cultural resources report was prepared in part to determine if there were any significant resources as defined by the DAHP. Indian Graves and Records are also protected by state laws as required under RCW Chapter 27.44.

The State Environmental Policy Act (RCW Chapter 197-11) requires that state and local agencies evaluate and mitigate the impacts of their actions on cultural resources. SEPA requires that significant properties, including properties listed in or eligible for the Washington Heritage Register, must be given consideration when actions have the potential to affect them.

Local Regulations

The King County Historic Preservation Program (HPP) administers incentive programs, conducts environmental review, maintains King County's historic resource inventory and archaeological sensitivity model, and manages the King County Landmark Program. The King County HPP also reviews development proposals located on or adjacent to historic resources listed in the King County Historic Resources Inventory (HRI). The HRI includes districts, objects, cultural landscapes, and other historic sites in addition to archaeological sites, historic buildings, and historic structures.

The City of Lake Forest Park Municipal Code adopts by reference SEPA provisions as outlined above. The City Comprehensive Plan (City of Lake Forest Park, 2005) establishes the policy to "support the preservation of the City's rich history by implementing ordinances, interlocal agreements and administrative procedures as appropriate to assure identification, protection and preservation of its historic landmarks, landmark sites and districts, balance landmark designation programs, and inclusion in the county, state and federal registers of historic places, with sensitivity to other city objectives and to the varied needs of its citizens."

3.10.2.2 Existing Archaeological and Historic Resources

Native American History

The project area is within the aboriginal territory of the Native American group called tuobeda'bš who lived at the mouth of McAleer Creek in Lake Forest Park from 1792 to 1903. This group was one of at least seven Native American groups that lived along Lake Washington (formerly called Lake Duwamish). Groups living along the lake were collectively known as Xa'u'bšm (Lakes People or Lake Duwamish people). Up until 1903, the Snohomish Tribe also had a winter village situated on land in the Lake Forest Park/Kenmore area (Stein, 1998). In 1903, the influx of loggers and settlers disrupted the tuobeda'bš group and caused them to move elsewhere. (Barnes, 2007; Boas, Inc., 2007)

Several ethnographic place names are associated with the shores of the lake and may be located near and possibly along the Burke-Gilman Trail in King County. "Ethnographic place names" refer to areas occupied or used by native peoples, such as villages, encampments, and traditional use areas. The ethnographic place names are listed below:

B^stcetla "rock," for an enormous boulder on the lake shore

S³a'tsutsid "mouth of s³a'tsu"

S³a'tsu "face," for McAleer lake

Sta³kE³l "a certain small bird," for a small creek [possibly Lyon Creek]

Sta'tabEb “lots of people talking,” a spot where a sawmill stands at the north end of Lake Washington [now Log Boom Park]

TcEtca'L a small creek

Ts³Ebt-a³lt^u “elderberry’s house” (ts³abt “elderberry”), for level flat at the mouth of Swamp Creek

TuLq³a³b various translated, for Swamp Creek. Lq!ab means “the bark of a dog.” Another informant said that the present term means “the other side of something,” like the opposite surface of a log.

Lake Forest Park History

Residential development in Lake Forest Park did not begin until the early 1900s. Prior to that time the main activity that took place in the area was logging the old growth forest. Most of the logging that occurred was along Lake Washington with smaller logging operations dispersed throughout Lake Forest Park. By 1910, most of the area was cleared allowing for residential development. Ole Hanson and A. H. Reid, major landowners at the time, platted Lake Forest Park and sold vacant lots to people for home building. When the Montlake Cut was developed in 1916-1917, Lake Washington water level was lowered by 9 feet. This created marketable property on the east side of the Northern Pacific Railway Company rail line. Logging cleared out the land, and both sides of the railroad right-of-way were eventually platted for housing and commercial lots. After World War II, as was common throughout the United States, suburban growth exploded in Lake Forest Park. Fearing urban sprawl, residents incorporated in 1961 and created the City of Lake Forest Park (Stein, 1998).

Burke-Gilman Trail History

The Burke-Gilman Trail corridor was first purchased in 1886 by Judge Thomas Burke and Mr. D. H. Gilman to provide rail service to the undeveloped north end of Lake Washington. Tracks were laid down in 1887 and 1888 and rail service ran for the next 84 years. The Seattle, Lakeshore and Eastern Railroad Company managed the rail line until 1895 when it conveyed its western division to the Seattle and International Railway Company. The rail line changed hands again in 1901 to the Northern Pacific Railway Company. At that time, the line was mainly used to move coal to the University of Washington’s power plant. Rail service was stopped in 1972 once the university converted its boilers to gas. By that time the Northern Pacific Railway Company had become Burlington Northern. Burlington Northern abandoned the rail line in 1971. King County then purchased all property rights via a quitclaim deed in 1974. The rail line was then converted to the Burke-Gilman Trail in 1978.

Cultural Resources

No prehistoric or historic cultural materials were observed in the project area (BOAS, Inc., 2007). The entire project area is located on existing trail, railroad grade, and disturbed soils. According to DAHP site records no archaeological sites have been documented within the project area. There is a historical residence located within 1 mile of the project area which will not be impacted by the proposed project.

3.10.3 Impacts

The impacts of the alternatives are discussed below. No historic or cultural materials were identified in the project area (BOAS, Inc., 2007). Depending on the topography and proximity to water bodies, there is potential that unknown resources may be uncovered during construction activities. Areas near Lake Washington, McAleer Creek and Lyon Creek are likely to have been used by Native American people. Working near such areas in soils that are previously undisturbed may increase the probability of finding

historic or cultural resources. However, since most of the area along the trail has previously disturbed soils impacts to resources are not anticipated.

If cultural resources are identified during construction activities for the Redevelopment or Rebuild Alternatives, work will halt in the immediate area and the appropriate City of Lake Forest Park department, King County Historic Preservation Program, and the Washington State Department of Archaeology and Historic Preservation will be contacted.

3.10.3.1 Redevelopment Alternative

Construction Impacts

Trail Widening. Potential for impacts to cultural and historic resources range from low to moderate probability, depending on the location of construction activities. Replacing the existing asphalted portion of the trail has low potential of disturbing unknown cultural and historic resources since work will occur on the existing railbed in previously disturbed soils. Widening the trail to the east will have a lower risk of disturbing cultural and historic resources than widening the trail to the west because side cast construction was used to develop the former rail line. This involved cutting into the slope to the west side of the railbed and placing fill onto the east side of the railbed.

Bridge Replacement. Potential for impacts to cultural and historic resources range from relatively moderate to high probability depending on the installation method. Installing deep foundation support for the construction of the Lyon Creek bridge, will have a relatively higher potential to disrupt cultural resources since it involves the removal of native soils. Driven piles will have a moderate potential of impacting cultural or historic resources since the pre-fabricated pile will be driven into the ground through native soils. An archaeologist contracted by King County would review bridge replacement plans and proposed construction techniques to determine what mitigation measures are warranted. Appropriate mitigation may include monitoring or testing soils.

Retaining Walls. Potential for impacts to cultural and historic resources would range from relatively moderate to high depending on the location and construction methods used for retaining walls. The use of heavy equipment will increase the potential impact from these activities in previously undisturbed areas. The use of imported fill would have low to no impact on buried cultural resources, while earthmoving of intact soil, such as over-excavation to reach load-bearing soils, would increase the likelihood of disturbing unknown cultural resources.

Fencing and Bollards. Potential for impacts associated with replacement of fencing and bollards would depend on the location and type of installation. Direct drive installation of chain-link fence posts would have minimal potential to disrupt cultural resources, while excavation for split-rail or guardrail fence posts could disturb cultural resources in previously undisturbed areas. Installing bollards in the area of the existing rail bed would have a low potential to disturb cultural resources.

Drainage Improvements. If excavation into the native soil occurs during installation of a new culvert or excavation below existing culvert gravels, such as for replacement or resizing of a culvert, there is a potential that unknown cultural resources may be disturbed.

Traffic Control and Signage. Potential for impacts to cultural and historic resources are expected to be low because traffic control measures would consist predominantly of installing signage. Ground-disturbing activities into native soils would increase the probability of impacting cultural resources.

Vegetation Management. There is a low to moderate potential for disturbing cultural or historic resources during vegetation management depending on the management measures utilized. Spraying,

mowing, or hand removal of vegetation has low potential to disturb cultural resources, while grubbing or other mechanical means increase the likelihood of disturbing archaeological deposits.

Operation Impacts

Trail Use and General Maintenance. Potential for impacts to cultural and historic resources from use and general maintenance of the trail are expected to be low. Once the trail is redeveloped, trail use would continue as it currently occurs. Trail users would be required to stay on the trail. Measures such as fencing and signage would be used to ensure that they comply, minimizing potential impacts to cultural resources.

Vegetation Management. Potential impacts associated with ongoing vegetation management are the same as those identified for construction impacts.

Culvert Maintenance. Impacts resulting from culvert maintenance would range from low to moderate depending on the maintenance measures. General maintenance of culverts, such as sediment removal, has low potential to disturb unknown cultural resources.

3.10.3.2 Rebuild Alternative

Construction Impacts

Trail Rebuilding. Potential for impacts to historic and cultural resources are expected to be low for rebuilding the trail because work will occur on the existing railbed in previously disturbed soils.

Sight Distance Improvements. There is a low to moderate potential for disturbing cultural or historic resources during vegetation removal depending on the management measures utilized. Spraying, mowing, or hand removal of vegetation has low potential to disturb cultural resources, while grubbing or other mechanical means increase the likelihood of disturbing archaeological deposits. Most, but not all of these areas have been previously disturbed.

Traffic Control and Signage. Potential impacts associated with traffic control and signage are the same as those identified for the Redevelopment Alternative.

Operation Impacts

Potential impacts associated with trail usage are the same as those identified for the Redevelopment Alternative.

3.10.3.3 No Action Alternative

Construction Impacts

There would be no construction activities, and therefore no construction-related impacts on historic and cultural resources, associated with the No Action Alternative.

Operation Impacts

Potential impacts associated with trail usage are the same as those identified for the Redevelopment Alternative.

3.10.4 Cumulative Impacts

Excavation into native soils as a result of ongoing development in the area will increase the potential for impacts to cultural resources. No specific projects have been identified within the immediate vicinity of the trail, however, development and redevelopment is occurring throughout the area.

3.10.5 Mitigation Measures

The King County Historic Preservation Program and King County tribal coordinator will coordinate with an archaeologist, contracted by King County, and area tribes, including the Snohomish, Muckleshoot, and Tulalip Tribes, to ensure construction activities that have potential to disturb unknown historic and cultural resources are monitored and appropriate mitigation measures are developed. Potential mitigation measures are discussed below for each construction element.

3.10.5.1 Redevelopment Alternatives

Trail Widening

An archaeologist would be consulted for monitoring or testing depending on the locations proposed.

Bridge Replacement

An archaeologist would review plans for the bridge replacement at Lyon Creek to determine what mitigation measures are warranted. To mitigate potential disturbance of unknown buried archaeological deposits, archaeological testing may be required prior to any construction activity at the Lyon Creek bridge. Depending on the outcome of the archaeological testing and the installation methods proposed, additional archaeological fieldwork may be necessary.

Retaining Walls

An archaeologist would review all plans for proposed retaining wall construction to determine what mitigation measures are warranted. Depending on the location and wall type, mitigation may include archaeological testing prior to construction or monitoring during construction. Monitoring will necessitate work stoppage in the immediate area if archaeological deposits are discovered. Additional subsequent archaeological fieldwork may be necessary as well, depending on the results of initial investigations.

Fencing and Bollards

An archaeologist would be consulted regarding the placement of fencing and bollards outside of the existing railbed to determine the most appropriate installation method and avoid disturbing buried cultural deposits in identified high risk areas. Appropriate mitigation may include monitoring or testing depending on the location and installation methods proposed.

Drainage Improvements

An archaeologist and tribal representatives would be consulted to monitor drainage improvements when excavating into native soils. It is important to note that the tribes generally consider culverts to have potential cultural resources associated with them, and have specifically requested that tribal representatives monitor any excavations in these areas.

Traffic Control and Signage

No mitigation measures are required.

Vegetation Management

An archaeologist would be consulted regarding vegetation management that involves disturbing native soils.

Trail Use and General Maintenance

Install signage indicating limits of the trail right of way and maintain or replace fences wherever possible to discourage trail users from going beyond the railbed.

3.10.5.2 Rebuild Alternative and No Action Alternative

To mitigate potential disturbance of unknown cultural resources, an archaeological monitor would be present at all ground-disturbing activities that involve excavation into native soils. No additional mitigation measures would be required.

3.10.6 Significant Unavoidable Adverse Impacts

Significant unavoidable adverse impacts to cultural resources are not anticipated as a result of redevelopment or rebuild of the Burke-Gilman Trail. However, inadvertent loss, damage, or alteration to cultural resources is possible with any construction project. The anticipated impacts would be largely avoided and/or reduced by proposed mitigation measures.

3.11 Transportation

3.11.1 Studies and Coordination

Transportation information used to characterize the affected environment, potential impacts, and mitigation measures was obtained by reviewing the following resources and documents:

- *Burke-Gilman Trail Crossing Plan* (The Transpo Group, 2005); and
- *Burke-Gilman Trail Crossing Treatment Recommendations at Burke-Gilman Trail and NE 165th Street Intersection System (Draft)* (The Transpo Group, 2006).

Information in these documents was obtained from existing printed documentation, published traffic control standards, and through discussions with King County and City of Lake Forest Park staff. This information was supplemented by site visits to the project area conducted in 2004. Published trail user data compiled in 1995 and 2000 for the Burke-Gilman/Sammamish River Trail were also reviewed for trail usage and time-of-day usage patterns.

3.11.2 Affected Environment

3.11.2.1 Trails

The Burke-Gilman Trail is identified as a core component of the King County's Regional Trails Plan (King County, 1992), which established a network of multi-purpose trails connecting communities inside and outside of the County. It is also a core component of King County's Nonmotorized Transportation Plan (King County, 1993), which outlines a system of facilities for non-motorized transportation within and without road rights of way. The trail is also designed as an important regional non-motorized transportation corridor in "Destination 2030," a regional transportation plan managed by state and federal law and adopted by the Puget Sound Regional Council (PSRC, 2003).

In a recent ruling, the Central Puget Sound Growth Management Hearings Board found that regional multi-purpose or multi-use trails like the Burke-Gilman Trail constitute Essential Public Facilities (EPFs) under the GMA (CPSGMHB, 2007).

3.11.2.2 Roadways

Major roadways in the project vicinity are shown on Figure 1-1 in Chapter 1. Roadways crossing the trail include: NE 147th Street, NE 151st Street, NE 157th Street, NE 165th Street, NE 170th Street, Ballinger Way NE, and Beach Drive NE. Numerous private driveways also cross the trail.

The key intersections in the project area are described below and shown on Figure 1-1.

3.11.2.3 Crossings

Intersection 1 (NE147th Street/Edgewater Lane)

Intersection 1 is located where NE 147th Street crosses the trail. Edgewater Lane (a private road) is parallel to, and located immediately to the east of the trail in this area. This crossing provides driveway access to approximately 39 homes located along Edgewater Lane. This intersection currently includes stop control signage for both directions of trail traffic.

Intersection 2 (NE 151st Street/Residential Driveways)

NE 151st Street splits into two separate driveways as it crosses the trail. The southern driveway provides vehicle access to one home and the northern driveway provides vehicle access to two homes.

While treated as one intersection, this intersection consists of two distinct crossing points. The driveway east of the trail at the southern crossing is characterized by a steep grade, sloping down towards Lake Washington. This grade combined with ivy covered fence that abuts the driveway opening, limits approaching and entering sight-distance to un-safe levels for vehicles exiting the driveway. The northern driveway is aligned so that crossing vehicles must cross the trail at an angle that creates sight-distance limitations and requires vehicles to be in the trail intersection longer than would be typical at a 90-degree crossing. This intersection currently includes stop control signage for both directions of trail traffic.

Intersection 4-7 (Residential Access Drives North of NE 153rd Street)

Intersections 4-7 are a cluster of residential access drives located between intersections at NE 153rd Street and NE 157th Street. These four intersections occur within a distance of less than 410 feet. These four crossings provide vehicle access to a total of 11 homes located east of the trail. This intersection currently includes stop control signage for both directions of trail traffic at Intersections 4 and 5, and stop control signage southbound at Intersection 7 and northbound at Intersection 6.

Intersection 8 (NE 157th Street/Residential Access Drive)

Intersection 8 provides driveway access to four homes located directly east of the trail. This intersection includes yield signs for both directions of trail traffic.

Intersection 9 (NE 165th Street/Beach Drive NE)

Intersection 9 occurs where NE 165th Street crosses the trail and intersects with Beach Drive NE. Beach Dr NE is parallel to, and located immediately to the east of the trail in this area. This crossing is one of two access roads to the Sheridan Beach neighborhood. All-way stop control is currently in place for all vehicles approaching this intersection.

Intersection 10 (Bothell Way NE/NE 170th Street)

The trail crossing for Intersection 10 occurs as part of the signalized intersection located at Bothell Way NE and NE 170th Street. The trail crosses NE 170th Street on the east side of Bothell Way. This intersection includes signalized control for all vehicle and non-motorized approaches.

Intersection 11 (Bothell Way NE/Ballinger Way NE-Beach Drive NE)

The trail crossing for Intersection 11 occurs as part of the signalized intersection located at Bothell Way and Ballinger Way NE/Beach Drive NE. The trail crosses Beach Drive NE on the east side of Bothell Way. This intersection includes signalized control for all vehicle and non-motorized approaches.

3.11.2.4 Trail Volumes and Composition

King County characterized trail volumes from two locations along the trail from 7:00 AM to 7:00 PM on Tuesday, June 2; Thursday, June 3; and Saturday, June 5. All of the trail users were counted and categorized as bicyclists, pedestrians, skaters, and others. Over three-quarters of trail users were bicyclists. Pedestrian users accounted for 13 to 17 percent of trail users (The Transpo Group, 2005). Table 3.11-1 summarizes the findings.

Table 3.11-1. Trail Use Volumes and Composition

Burke-Gilman Trail at NE 147th Street (Edgewater Lane)			
	Wed, June 2 2007	Thurs, June 3 2007	Sat, June 5, 2007
12 Hour Total	1,262	1,361	1,496
% Pedestrians	16.56%	16.31%	12.57%
% Bicycles	77.65%	80.16%	79.14%
% Skaters	1.74%	0.59%	0.67%
% Other	4.04%	2.94%	7.62%
Peak Hour	4:30 to 5:30 PM	5:45 to 6:45 PM	11:45 AM to 12:45 PM
Total Peak Hour Volume	209	226	196
% During Peak	17%	17%	13%
Burke-Gilman Trail at NE 165th Street (Beach Drive NE)			
	Wed, June 2 2007	Thurs, June 3 2007	Sat, June 5, 2007
12 Hour Total	1,283	1,364	1,418
% Pedestrians	14.50%	13.86%	15.94%
% Bicycles	82.77%	85.19%	82.65%
% Skaters	1.95%	0.95%	1.41%
% Other	0.78%	0.00%	0.00%
Peak Hour	4:30 to 5:30 PM	5:45 to 6:45 PM	11:45 AM to 12:45 PM
Total Peak Hour Volume	210	237	196
% During Peak	16%	17%	14%

Source: The Transpo Group (2005)

3.11.2.5 Bicycle Stop Compliance and Travel Speeds

Observations were made of bicyclists' compliance with stop signs posted at the intersections in the locations where the counts were collected. The compliance observed was very low. Though many bicycles were observed to slow down in advance of these intersections, less than 3 percent of the bicycles came to a full stop before proceeding through the intersection.

Bicycle speeds were measured on a random sampling of a total of 500 bicyclists over the three-day period. The data indicated that:

- 84 percent of the bicyclists were traveling over the posted speed limit of 10 miles per hour (mph).
- The average bicycle speed was 13.6 mph.

- The speed at which 85 percent of the bicyclists were at or under the posted speed limit was 17 mph. 15 percent of the bicyclists travel at a higher speed.
- Bicycle travel speed ranged from 5 to 21 mph.

3.11.2.6 Roadway Volumes

Roadway volumes for motor vehicles crossing the trail at residential driveways and residential access drives were derived from Institute of Transportation Engineers trip general calculations of “single-family detached housing.”

In Lake Forest Park, the trail has substantially more traffic volume than the driveways or neighborhood streets that cross it. The data collected on trail usage indicated that, over a 12 hour period, the trail served from 980 to 1,184 bicyclists. In comparison, study area intersections 1 through 8 serve between 1 and 39 homes, with a high-end estimate of 390 vehicle crossings at any one intersection. Trail volumes were nearly three times as high as the estimated vehicle crossings. Trail users may rarely encounter vehicles crossing at these intersections and driveways. According to the Manual on Uniform Traffic Control Devices (MUTCD), compliance with trail stop or yield signs in such situations is not likely (FHWA, 2003). The data on bicyclists’ compliance with posted stop signs on the trail at these intersections confirm this assumption.

3.11.2.7 Accident History

Accident records were provided by the City of Lake Forest Park Police Department for the period of January 2000 to May 2005. Accident records include vehicle, pedestrian, and bicycle accidents. According to these records, no reports for accidents on the Burke-Gilman Trail were filed during this period. There was one vehicle/bicycle accident report at Beach Drive NE where a bicyclist did not stop at a stop sign. No other vehicle/bicycle accidents or pedestrian/vehicle accident reports on the Burke-Gilman Trail or cross streets in the vicinity immediately adjacent to the trail were found to be on file. However, there is anecdotal evidence that there have been at least a few accidents where bicycles and vehicles have collided. Accidents likely occur that do not get reported. Information obtained from the Northshore Fire Department Battalion indicated that there are approximately 3 accidents per year severe enough to warrant a call for an aid car; less severe accidents may not get reported. While there has been anecdotal information about minor accidents, and “near misses” as reported by neighbors and trail users, no official records of those incidents were found in Police Department or County Health records.

3.11.2.8 Current Signage

When the trail was originally designed and constructed, bicycles and pedestrians were stopped at all street intersections along the trail. Private crossings of the trail were not considered street intersections and were not signed or controlled, as the trail was granted right of way. Any controls at private driveways or multiple private driveways may have had either stop or yield controls installed for cars, depending on sight lines. The subsequent placement of stop control at several private driveways years after construction of the trail is contrary to current standard engineering practice and was not a part of the trail’s original design and construction. No record of an engineering study related to this subsequent placing of stop signs has been located. Discussions with King County staff indicate that the placement of stop signs for trail users at private driveways was based upon the direction of a former County Councilmember, in response to requests from residents.

3.11.2.9 Trail Design Standards

Under state law, the Washington State Department of Transportation (WSDOT) is responsible for providing a uniform system of signing paths and trails, including those of cities, towns, and counties (RCW 47.32.060). WSDOT has adopted an engineering design manual that includes bicycle facility design requirements. The WSDOT Design Manual (2006) specifies that multi-use paths should be signed consistent with the Manual of Uniform Traffic Control Devices (MUTCD) and has adopted and adapted the MUTCD (WAC 468-95-010). The MUTCD is the national standard for designing, applying, and planning traffic control devices installed on any street, highway, or bicycle trail open to public travel. The basic principles that should be observed when designing any type of traffic control are defined by the MUTCD:

“to be effective, a traffic control device should meet five basic requirements: fulfill a need, command attention, convey a clear simple meaning, command respect from road users and give adequate time for proper response.”

The MUTCD also provides guidance on the importance of uniformity:

“uniformity of devices simplifies the task of the road user because it aids recognition and understanding, thereby reducing perception/reaction time. Uniformity means treating similar situations in a similar way. A standard device used where it is not appropriate is as objectionable as a nonstandard device; in fact, this might be worse, because such misuse might result in disrespect at those locations where the device is needed and appropriate.”

The MUTCD further provides guidelines for determining the appropriate traffic control (regulatory) signs to use at intersections:

- Regulatory signs should be used conservatively because these signs, if used in excess, tend to lose their effectiveness.
- Stop signs should not be used for speed control.
- Stop signs should be installed in a manner that minimizes the number of vehicles having to stop.
- In most cases, the street carrying the lowest volume of traffic should be stopped, if stop control is warranted.

Federal Highway Administration regulations establish design and construction criteria for bicycle and pedestrian projects receiving federal funds. The regulations specify that the AASHTO Guide for Development of New Bicycle Facilities or equivalent accepted guidelines be used as standards for the construction and design of bicycle routes (23 CFR 652.13(a)). The AASHTO Guide specifies that traffic control devices, including signage on roadways and bicycle paths, should be provided in accordance with the MUTCD.

3.11.3 Impacts

3.11.3.1 Redevelopment Alternative

Construction Impacts

Approximately 2,300 cubic yards of export/haul, 4,700 cubic yards of import materials, and 2,300 cubic yards of paving materials would be needed to build the entire Redevelopment Alternative. Approximately 930 round trip truck trips would be generated (700 bringing materials in and 230 bringing materials out).

If these trips were spread out over 5 to 6 months, approximately 10 round trip truck trips per day would be generated assuming no hauling on weekends. As described in Chapter 2, the contractor would determine the most efficient way to construct the project and the number of truck trips would largely be dependent on the schedule for a particular construction element. Trucks would access the trail primarily from public streets. Access points would be determined jointly by King County and the contractor depending on construction needs.

Traffic flow and public access could temporarily be disrupted during construction; however, traffic control measures and other BMPs would be employed to minimize the impact.

Trail users would experience temporary disruptions during the construction period. At times, the trail could be closed for short periods of time or trail users would be directed onto detour routes around the construction zone. If a detour is used, the impact to trail users would be similar to the SR-522 improvement project in the City of Kenmore. The project includes roadway and pedestrian improvements along SR-522 and construction of a pedestrian tunnel on the Burke-Gilman Trail at 73rd Avenue NE. During the summer of 2007, the trail was closed between 68th Avenue NE and 83rd Place NE. Trail users were detoured to NE 175th Street, a local residential street.

The approach to trail construction and related temporary traffic control measures would depend on the surrounding conditions. As described in Chapter 2, the following three types of temporary traffic control would be used:

1. **Temporary Detours and Trail Closures.** It is the County's goal to provide safe alternative detour routes around construction areas where possible. At locations where there are no safe alternatives, it is the County's goal to avoid shutting the trail down by providing safe passage through the construction corridor. Advanced notice and signage would be provided.
2. **Driveway Crossings.** Access through driveways and roads would be maintained during construction. Vehicle and pedestrian access to homes along the trail would be maintained through use of traffic control devices and traffic control personnel. Construction activities would be temporary and would be minimized through proper traffic control. Signage, and homeowner notification. Construction at driveway and road crossings would typically last from one to two weeks per crossing.
3. **Construction along Roadways.** This type of traffic control would occur where the trail approaches and is adjacent to the roadway. The road shoulder would be closed, construction fencing and traffic control devices would be placed, and in some situations the adjacent roadway might be temporarily restriped. Along with the traffic control devices, flaggers would guide oncoming traffic through and around the work zone.

Operation Impacts

Trail Volumes. Based on trail user counts conducted in 2004, daily bicycle volumes on the trail range from approximately 1,000 to 1,200 bicyclists and are expected to increase as population growth continues. Trail usage on the redeveloped trail is expected to be similar to current usage. The redeveloped trail would be wider and would accommodate the number of current and future trail users in a safer manner by providing increased separation between bicyclists and pedestrians.

Parking. Data on trail user vehicle use was obtained from the Sheridan Beach area of the trail in years 1995 and 2000. Approximately 23 percent of trail users drove to the trail from outside the immediate area (Moritz, 1995; Moritz, 2000). This would be expected to remain at approximately the same percentage with the redeveloped trail.

Of the trail users that drive from outside the immediate area and park at the trail, some are found to park at or near Log Boom Park, at or near NE 165th, and at various locations both north and south of SR-522,

including on local streets. Public parking is prohibited along driveways. Parking demand may increase as use and popularity of the trail increases in the future and is expected to result in dispersed use of city streets and parking areas as currently occurs.

Sight Distance. According to existing guidelines, sight distance improvements and signage changes would decrease the potential for conflicts between trail users and vehicles at intersections with local access roads and driveways, compared to the existing trail (AASHTO, 1999; FHWA, 2003).

Sight distance is a principal consideration for path design. Stopping sight distance, which is the distance required for a vehicle or bicycle to react to the unexpected, is most important at intersection locations where stop or yield signs on the trail would not be present. Based on the *Guide for the Development of Bicycle Facilities* (AASHTO, 1999), a 127-foot minimum stopping sight distance would be required for a bicycle traveling at a design speed of 20 mph (posted speed limit would be 15 mph). For vehicles approaching the uncontrolled intersections, 19 feet of stopping sight distance would also be required, based on *A Policy of Geometric Design of Highways and Streets* (AASHTO, 2001).

At NE 165th Street, a pedestrian crossing of the Burke-Gilman Trail on each side of 165th is proposed. Research was conducted for traffic engineering guidance and “right of way” for this crossing. Sources reviewed included the *Burke-Gilman Trail Crossing Plan* (The Transpo Group, 2005), the *Manual of Traffic Control Devices* (FHWA, 2003), the *Pedestrian Facilities Guidebook* (WSDOT, 1997), the Washington Administrative Code (WAC) 132N-156-430, *Pedestrian Right of Way*, and other national reference documents on planning and guidance of pedestrian/bicycle facility design. It was determined that the operator of a vehicle (in this case a non-motorized vehicle or bicycle) should yield the right of way, slowing down or stopping if need be, to any pedestrian crossing any street, roadway, fire lane, or pathway with or without a marked crosswalk. At this location, standard pedestrian crossing signs would be installed across the trail and other signage would be provided at the trail approaches. Trail pedestrian yield signs would be placed at the approaches to NE 165th Street. Motor vehicles on NE 165th Street would stop for trail traffic (Figure 2-9, Trail/NE 165th - Signage) as at other crossings.

Sight distance observations were conducted along the entire length of the trail corridor to identify the locations where sight distance concerns exist. Sight distance deficiencies were identified based on information provided in the published guidelines mentioned above. Obstructions to meeting sight distance standards at crossings within the study area include: vertical limitations of driveways and roads on steep grades; horizontal curves in roadways and the trail; and the presence of trees, foliage, utility poles, fences, and other objects at the crossings. Local residents have expressed concerns about sight distance issues at the intersection of the trail with Ballinger Way NE. King County will work to establish adequate sight distance at that intersection, balancing the need to expand the crosswalk to accommodate trail users with the need for motorists to adequately establish line-of-sight for turning movements.

Trail Speed. Bicycle travel at speeds in excess of 15 miles per hour (mph) is not reasonable or prudent, and is a violation of King County Code, Section 7.12.295. The posted speed limit for trail users would be 15 mph, consistent with other areas of the Burke-Gilman Trail. After applying a safety factor, the design speed for the Redevelopment Alternative would be 20 mph, which is also the minimum design speed recommended by AASHTO for a shared use path. The design speed helps determine the horizontal geometry (minimum turn radius) of the trail, the distance needed for a trail user (bicyclist) to come to a complete stop, and thus the sight distances necessary when approaching an intersection.

A frequently cited concern in this segment of the Burke-Gilman Trail is the speed of some cyclists and the potential for speed-related vehicle/bicycle accidents. To the degree possible, design and signage would be used to modify trail user behavior. Although not directly related to trail design or the proposal being evaluated in this document, the enforcement of posted trail speeds has been an issue of concern for many

trailside residents. King County would continue to explore ways to influence trail user behavior, including the use of volunteer efforts through King County’s Trails Ambassador Program.

Traffic Control. Within the City of Seattle and elsewhere along the Burke-Gilman Trail, where minor “local access” roads intersect the trail, the trail is treated as the major crossing. While stop control is not provided to motorized or non-motorized vehicles at every location where trail and roadway cross, even where adequate sight distance may not be available, in locations where there is a safety concern, motor vehicles are typically stopped or must yield to crossing bike traffic. This is consistent with the most recent guidance of the MUTCD.

Trail signing plans were developed to be consistent with the most recent guidance related to traffic control on major and minor crossings. Figures 2-4 through 2-11 (in Chapter 2) show the trail signing plans that would be implemented for improving vehicular and non-motorized safety, depending traffic volumes and on the ability to achieve required sight distances. The trail signing plans, corresponding locations, and potential impacts associated with each crossing type are summarized in Table 3.11-2.

Table 3.11-2. Potential Impacts Associated with Different Trail Crossing Types

Crossing Type	Corresponding Locations	Traffic Control/Signing Plan	Potential Impacts
Local Residential Access	NE 147 th Street NE 151 st Street/Residential Driveways Residential Access Drives North of NE 153 rd Street NE 157 th Street/Residential Access Drive	Remove stop and yield signs for trail users. Place stop and yield signs for vehicles.	Minimal potential impacts if clearly signed, including advance warnings, and if vehicles obey signs.
Neighborhood Access	NE 165 th Street/Beach Dr NE	Remove stop sign for trail users and replace with yield to pedestrian signs. Place stop signs for vehicles.	Minimal potential for impacts if clearly signed and trail users and vehicles obey signs.
Signalized Intersection Crossing	Bothell Way NE/NE 170 th Street Bothell Way NE/Ballinger Way NE – Beach Dr NE	No changes.	No change – minimal potential for impact if trail users obey signals.

^a Crossings would be designed so that vehicles can safely stop or yield. These include locations where steep grades currently exist.

As shown in Table 3.11-2, the potential for safety impacts would be minimized through clear signing. It is likely that motorized vehicles may require longer to cross the trail under the new traffic control signage plan, which could create an inconvenience for drivers. There may also be a period of adjustment for drivers of motor vehicles in the area after the traffic control signage is changed. As trail usage increases over time, delays for vehicles crossing the trail may also increase.

Vehicle Access. Bollards would be replaced at all trail/roadway crossings. The placement of removable bollards provide access for maintenance and emergency vehicles, but block the trail from use by other motor vehicles. King County staff estimates maintenance inspections would occur 20 times per month. Access for all public service vehicles would continue to be via public streets.

Many bicyclists have argued against the use of bollards stating that there is ample evidence that bollards are hazardous to trail users, especially to bicyclists when it is dark and the trail surface is slippery. They have also stated that the second most common accident to cyclists is colliding with an obstacle, such as a bollard. King County recognizes that, as with any impediment in the trail, bollards can be a potential

safety hazard. King County also recognizes that bollards are desired to keep motorized vehicles from entering the trail for the safety of trail users. Efforts to minimize this potential hazard include: providing predictable placement at each crossing; providing warning striping around the central/removable bollard; and minimizing the number of times bollards are used as well as the number used at each location. King County has agreed to conduct research to determine if other means of hazard reduction have been effectively used elsewhere, for consideration of use on the Burke Gilman Trail. Bollards and their associated spacing would be based on King County standard details and layout, which are consistent with the recommendations for “barrier posts” in the AASHTO Guide for the Development of Bicycle Facilities. Installation of bollards in accordance with these standards, which state that bollards should be located no closer than 5 feet on center to allow the flow of traffic around it and that bollards should be colored for easy visibility with reflectorized paint or tape, would minimize the potential hazard.

3.11.3.2 Rebuild Alternative

Construction Impacts

Approximately 1,800 cubic yards of export/haul, 2,500 cubic yards of import materials, and 1,200 cubic yards of paving materials would be needed under the Rebuild Alternative. Approximately 600 round trip truck trips would be generated (700 bringing materials in and 230 bringing materials out), approximately 330 fewer truck trips than required for the Redevelopment Alternative. If these trips were spread out over 2 to 3 months, approximately 9 round trip truck trips per day would be generated assuming no hauling on weekends. As described in Chapter 2, the contractor would determine the most efficient way to construct the project and the number of truck trips would largely be dependent on the schedule for a particular construction element.

Trucks would access the trail primarily from public streets. Access points would be determined jointly by King County and the contractor depending on construction needs. To the extent possible, staging area for materials would be provided within the County right of way.

Traffic flow and public access could temporarily be disrupted during construction; however, traffic control measures and other BMPs would be employed to minimize the impact. Temporary traffic control measures would be as described in Chapter 2.

Operation Impacts

The Rebuild Alternative would provide some of the safety improvements described above for the Redevelopment Alternative, but would not include trail widening. As such, the ability of the trail to accommodate future use levels would remain unchanged from current conditions. Also, trail user safety would be lower than for the Redevelopment Alternative because there would be less room and separation for the range of trail users. In the long-term, the trail could become congested and could become less attractive to trail users, potentially discouraging their use of the trail as a non-motorized transportation corridor.

Parking demand and impacts, sight distance improvements, traffic control improvements, trail speed, and vehicle access would be the same as described for the Redevelopment Alternative.

3.11.3.3 No Action

The trail is reaching its capacity to serve the existing regional population and trail users; it will become more inadequate over time as more people move to the city and other nearby jurisdictions. Existing safety issues related to inadequate sight distances and non-standard traffic control signage will persist and likely worsen. In the long-term, trail conditions and capacity could be a deterrent to use, which could impact traffic congestion on the roads and SR-522 in particular.

3.11.3.4 Cumulative Impacts

To reduce the potential for cumulative construction impacts, efforts would be made to coordinate construction schedules with city, county, and state sponsored projects in the vicinity.

Construction for the SR-522 improvement project located in the City of Kenmore began in the summer of 2007 and will continue through 2009. The construction timing of both the Redevelopment and Rebuild Alternatives could coincide with the SR-522 project. Burke-Gilman Trail users could be impacted by detours and possible trail closures in both Kenmore and Lake Forest Park city limits during the time there is concurrent construction.

While still in the early planning stages, King County Wastewater Treatment Division may be redeveloping the Burke-Gilman Trail at Log Boom Park in Kenmore to a similar design standard as part of the renovation and expansion of their Log Boom Park Regulator Station. City of Seattle is also planning to undertake redevelopment of the trail south of the proposed project. These trail redevelopment projects are expected to achieve a similar design standard as the proposed project.

Increased population growth in the region may lead to traffic, parking, access and circulation problems. As described in Section 3.5, Land Use and Shorelines, to a great extent these impacts are already anticipated and addressed in the City's Comprehensive Plan that plans for and accommodates growth. When considered in combination with population growth, the proposed project would not add to adverse transportation cumulative impacts but instead would continue to provide an option for non-motorized transportation use.

Impact on Climate Change

By promoting use of non-motorized transportation, expansion of the Burke Gilman Trail will help to reduce contributions to climate change from motorized vehicles.

3.11.4 Mitigation Measures

3.11.4.1 Construction Traffic and Detours

For both the Redevelopment and Rebuild Alternatives, some standard construction safety measures can be taken, such as installation of advanced warning signs, highly visible construction barriers, and the use of flaggers. In addition, a public information program regarding hours of construction or parking impacts could be instituted. Truck traffic would be required to use public roads or property to access the County-owned right of way, unless otherwise negotiated. Any impacts to roadways by truck traffic would be mitigated according to haul route agreements (e.g., restoration of road surface).

The contractor would determine how to most efficiently construct the project in order to be cost effective and to minimize disruption to trail users and the neighborhood. To minimize disruption to trail users, the County could require the construction contractor to limit trail closure durations, provide access through the construction zone, or provide detours around the construction zone. As described in Chapter 2, it's the County's goal to provide safe alternative detour routes around construction areas where possible. At locations where there are no safe alternatives, it is the County's goal to avoid shutting the trail down by providing safe passage through the construction corridor. There may be locations and times during construction when access through the construction corridor cannot be provided. In these instances, the County will require the Contractor to limit the trail closure periods. Advanced notice and signage would be provided.

3.11.4.2 Parking for Trail Users

Parking demand is likely to increase incrementally as the use of the trail continues to increase. Trail users access the facility from locations throughout the region. User trips originate from varied parking locations (e.g., home, school, office, etc.). Redevelopment of the trail is not be expected to generate substantial new parking demand in Lake Forest Park because the redevelopment would be limited to safety and user enhancement only. Increases in use of the trail system throughout the region and the demand for parking would be expected to occur with or without the proposed project. In addition, proposed improvements will enhance a facility that is already used as an alternative to vehicle use, thereby reducing overall regional parking demand.

3.11.4.3 Driveway/Roadway Crossings

Traffic control signage would be changed at crossings for both the Redevelopment and Rebuild Alternatives as described above and in Chapter 2, Alternatives, to be consistent with currently accepted standards and practices. Informational and regulatory signs would also be installed and sight distances would be improved. In general, vegetation growth would be monitored and managed near all trail crossings to maximize sight distances for trail users and vehicles as described in Chapter 2, Alternatives. In addition, accident records would be monitored and problem areas addressed.

3.11.4.4 Vehicle Access

As described above, bollards would be installed at all trail crossings pursuant to AASHTO and King County Regional Trails Standards, but are controversial. The placement of removable bollards would provide access for maintenance and emergency vehicles, but block the trail from use by other motor vehicles.

3.11.4.5 Trail Speed

To the degree possible, design and signage would be used to modify trail user behavior. King County would continue to explore ways to influence trail user behavior, including the use of volunteer efforts through King County's Trails Ambassador Program.

3.11.5 Significant Unavoidable Adverse Impacts

There are concerns among many residents near the trail about the proposed traffic control signage changes and the potential for increased vehicle/bicycle conflicts at intersections. Existing research leading to the development of recognized standards indicate that the signage change will result in a safer condition. No significant unavoidable transportation-related adverse impacts would occur. Anticipated impacts would be largely eliminated or reduced by proposed mitigation measures.

3.12 Socioeconomic Resources

While not required under SEPA, socioeconomic issues are included to address comments received during the SEPA scoping process regarding impacts to the social environment, including personal safety and security and potential for impact to quality of life and property values. Potential impacts of the project alternatives are discussed for each action alternative and the No Action Alternative. Mitigation measures are identified.

3.12.1 Studies and Coordination

Information used to characterize the affected environment was compiled from a variety of sources including the King County Assessor's Office, local and regional government organizations, and recent studies and reports.

3.12.2 Affected Environment

3.12.2.1 Personal Safety and Security

During the scoping process, several individuals expressed concerns about security (see Table 2-1). Literature on previously established trails and other information sources were consulted to assess trends in public safety and security concerns related to crime on other trails. Individuals expressed concern about the potential for increased crime along the trail corridor.

For discussion of public safety risks related to trail user conflicts, see Section 3.6, Recreation. Public safety issues related to automobile and intersection accidents are discussed in Section 3.11, Transportation. Personal safety and security issues relating to potential increased crime risk are discussed below.

Existing Local Crime Statistics

Table 3.12-1 provides crime data for the City of Lake Forest Park and for King County. The crime rate for the city is generally lower than for King County, which includes incorporated as well as unincorporated areas. These numbers suggest that residents in Lake Forest Park are at a lower risk of experiencing a violent crime or property crime than King County residents in general.

Table 3.12-1. Crime Data for Lake Forest Park (2006)

Crime	Population	Violent ¹ (Total)	Violent (Rate per 1,000)	Property ² (Total)	Property (Rate per 1,000)
Lake Forest Park	12,770	8	0.6	331	25.9
King County	1,854,825	7,636	4.2	95,558	51.5

Source: Crime in Washington: 2006 Annual Report (Washington Association of Sheriffs and Police Chiefs, 2006)

¹ Violent crimes include murder, rape, robbery, and aggravated assault.

² Property crimes include arson, burglary, larceny (theft), and vehicle theft.

To establish a baseline for crimes and incidents reported by residents along the Burke-Gilman Trail, crime data from October 2005 to August 2007 was obtained from the Lake Forest Park Police Department. During this period, a total of 45 crimes and incidents were reported adjacent to the Burke-Gilman Trail.

The three most common types of reports were for vehicle prowls (16 incidents), burglaries (9 incidents) and malicious mischief (8 incidents), with the other 14 of the 45 reports consisting of thefts, motor vehicle thefts and suspicious activity. In general, the crime rate along the trail is lower than other parts of the city, except in the area of vehicle prowls (Freeman, personal communication, 2007).

Existing Trail Crime Statistics

Information on existing crime related to trails in the region is limited. Crimes and calls for service are not necessarily tracked by the local police departments according to where the crime occurred, and database queries are sometimes inconclusive about crime type or location. Of existing trails in the area, only crime and incident data specific to the 3-mile portion of the Burke-Gilman Trail on the University of Washington campus were available. Although this information is not directly comparable to the proposed redevelopment of the Burke-Gilman Trail since it is located within a very densely populated and highly used university campus, it is representative of activities that could take place along an urban trail. The section of the Burke-Gilman Trail within the University of Washington is used heavily as a commuting route to the University and serves an average of 2,000 to 3,000 users per day depending on season, weather, and day of the week. The University of Washington segment is also located in a much higher density setting than the single-family residential area located along the Burke-Gilman Trail in the City of Lake Forest Park. Several thousand students and other residents are housed in the vicinity of the Burke-Gilman Trail; the trail passes directly through and adjacent to several dormitories.

The University of Washington Police provided incident report data for the University of Washington's section of the Burke-Gilman Trail for 2003 through 2007. During this period, a total of 81 crimes and incidents were reported on this section of the Burke-Gilman Trail. The three most common types of reports were for vandalism (16 incidents), bicycle thefts (9 incidents and 2 attempts), and found property (11 incidents), with the other 43 of the 81 reports consisting of accidents, harassment, warrant service (suspects apprehended), traffic violations, drugs, sex offenses, burglary, trespass, information/suspicious circumstances or persons, DUI, assault, reckless endangerment, dangerous weapons, threats, lost property, or obstructing. These data are for reported incidents only. Since incident reports are not always classified as located on the Burke-Gilman Trail, more crimes or incidents might have occurred than indicated here (Carroll, personal communication, 2007).

3.12.2.2 Property Values

Several trailside residents have expressed the concern that the redeveloped trail will lower their quality of life and their property values. Many of the existing residences along the trail are large residences with views of the lake. These homes would generally be considered above average in value for the overall North King County area.

Specific interviews were not conducted for this EIS, but review of studies of rail-trails (trails developed on former railway rights-of-way) showed that a large percentage of trail neighbors view trail development as having either no effect or a positive effect on the value of their property and the ability to sell it (The Murphy's Realtors, 2006; Indiana University Purdue University Indianapolis, 2003; Vogt et al, 2002; Indiana University, 2001; Greer, 2001; NARPO, 1997; Feeney, 1997; The Conservation Fund and Colorado State Parks, 1995; PFK Consulting, 1994; Moore et al., 1992; Miller-Murphy, 1992; and City of Seattle, 1987). In general, study results indicate that the trails seem to be viewed as desirable quality of life enhancements that, despite occasional problems, make homes and property more desirable and improve the quality of neighborhood life. There are likely conflicting views among individual property owners, and other factors may affect property values and/or quality of neighborhood perceptions.

3.12.3 Impacts

3.12.3.1 Redevelopment Alternative

Construction Impacts

Construction equipment and trucks would access the trail corridor from public streets. Potential access streets include NE Bothell Way, NE 170th Street, Beach Drive NE, NE 165th Street, NE 151st Street, and NE 147th Street. The operation of construction equipment and trucks on these streets could cause temporary traffic, noise, and other disruptions to neighborhoods affected. Construction equipment would create a potential hazard for people and animals crossing a construction area to access their homes. Individuals would have to remain alert to the presence of equipment and construction activity and monitor the whereabouts and activities of children, the hard-of-hearing, and pets within and near the construction area. Construction-related impacts would be temporary and would be minimized through proper traffic control, signage and homeowner notification.

Operation Impacts

Personal safety and security. Several trailside residents have expressed the concern about potential liability if they hit a cyclist at an intersection. Residents have expressed concern that this risk would be higher under the proposed signage associated with the Redevelopment Alternative. With adherence to the traffic control signage, accidents are expected to be held to a minimum and liability would be accessed on a case-by-case basis. With the traffic control signage changes, drivers that currently are given the right of way would need to stop for trail traffic. This change may present an inconvenience for some drivers, because on some occasions it would increase the amount of time for vehicles to cross the trail. As trail usage increases over time, delays for vehicles crossing the trail may also increase. See Section 3.11, Transportation, for additional discussion. The proposed signage improvements are being implemented to improve safety for all trail users.

Some residents adjacent to the Burke-Gilman Trail perceive the potential for increased security issues such as trespassing on private property. Some residents also expressed concerns that the redeveloped trail would increase the use of the trail by transients and homeless people with the potential for increased trespass. Occasional incidents of trespass or other examples of security issues could occur on properties adjacent to the trail, but these are not expected to increase from existing conditions. King County's experience with other trails suggests that the risk of increased trespass is likely to be counterbalanced by the increased public presence on the trail. The model trail user code of conduct in the King County Code (KCC) addresses these issues [KCC section 7.12.295(H)(9)] by stating that "[t]rail users should respect private lands adjacent to county trails and stay on trails to avoid trespassing on or interfering with adjacent private property." Under KCC sections 7.12.650 and 7.12.670, anyone caught violating the code of conduct may be subject to a fine of up to \$500, and loss of park or recreation facility use privileges. With the incorporation of adequate public safety mitigation measures (see mitigation in Section 3.12.9, below), public safety impacts are not expected to substantially increase over current conditions. However, individually affected residents would likely view any increase in crime as being problematic. Residents' perception of safety issues would likely change over time if the threats they anticipate to their safety do not materialize.

Some trailside residents have also expressed concerns about the lack of restroom facilities along the trail segment, and have provided anecdotal descriptions of inappropriate use of the corridor and adjacent property by some trail users. This segment of the trail is located immediately south of public restroom facilities located at Log Boom Park and approximately 2.8 miles north of public restroom facilities available at Matthews Beach Park and accessible from the trail. This distance between restroom locations is consistent with other existing King County trails in the region. Increased public presence on the trail

may deter public urination and defecation on private property. As with any indecent exposure, violations should be reported to the City of Lake Forest Park police department.

Property values. As demonstrated in the studies described earlier, a large percentage of trail neighbors view trail development as having either no effect or a positive effect on their property values and on the salability of their property (The Murphy's Realtors, 2006; Indiana University Purdue University Indianapolis, 2003; Vogt, et al, 2002; Indiana University, 2001; Greer, 2001; NARPO, 1997; Feeney, 1997; The Conservation Fund and Colorado State Parks, 1995; PFK Consulting, 1994; Moore et al., 1992; Miller-Murphy, 1992; and City of Seattle, 1987). Some buyers may consider the trail an intrusion of privacy, while others may be attracted by the proximity to the trail for recreational and transportation uses. No effect on property values is expected since this alternative involves redeveloping an existing trail within an existing King County right-of-way. The trail has been operational in this area for more than 30 years. Many of the existing residents have moved into the area subsequent to development of the trail. There are a number of other factors that influence the value of any given property including employment patterns, market demand, development patterns, individual buyer preferences, and infrastructure improvements. These factors are both local and region-wide and are not related to adjacency to a recreational trail.

3.12.3.2 Rebuild Alternative

Construction Impacts

Construction-related safety and security impacts would be similar to those discussed for the Redevelopment Alternative. The impact to affected neighborhoods would be 2 to 4 months less than for the Redevelopment Alternative since the construction activity is limited to resurfacing, traffic control signage, and vegetation management for sight visibility.

Operation Impacts

Long-term impacts for the Rebuild Alternative would be similar to the Redevelopment Alternative.

3.12.3.3 No Action Alternative

Construction Impacts

The No Action Alternative would not require any construction and thus would not result in any short-term safety and security impacts.

Operation Impacts

Operation of the trail would continue as is. There would be no additional impacts under the No Action Alternative. Public safety impacts relating to pedestrian/bicycle conflicts would likely increase as trail ridership increases and trail conditions deteriorate. These impacts are discussed in the Recreation section.

3.12.4 Cumulative Impacts

Cumulative impacts related to safety and security are not anticipated.

3.12.5 Mitigation Measures

3.12.5.1 Safety and Security Mitigation Measures

King County could implement the following mitigation measures related to safety and security, which have proven effective in providing reasonable public safety in other King County parks:

- Implement trail patrols by volunteer trail ranger programs (e.g., King County Trails Ambassador Program) particularly in the period immediately following trail redevelopment, particularly in the period immediately following trail redevelopment.
- Monitor crime rates in the area; coordinate with the Lake Forest Park Police Department if crime rates increase.
- Maintain the trail in a safe and clean manner including regular vegetation pruning per identified standards.
- Provide master keys to open locked bollards to all emergency service agencies serving the corridor.
- Replace fencing where appropriate as described in Chapter 2, Alternatives.
- Provide guardrail to separate vehicles from trail users where the trail is immediately adjacent to a driveway.
- To avoid the possibility for personal injury, the trail design includes fencing along steep slopes.
- Provide signage and enforcement of trail rules and etiquette.
- Provide signage along the corridor to educate trail users about the limits of public right of way and to warn against trespass onto private property.
- Limit speed for bicyclists per King County's Trail Use Ordinance 8518, which establishes a speed limit of 15 mph for all trails.
- Notify adjacent property owners of the construction schedule.

3.12.6 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse socioeconomic impacts are anticipated from the construction or operation of any of the Burke-Gilman Trail alternatives.

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Chapter 5

Distribution List

To foster good lines of communication, enhance interagency coordination, acknowledge that this Draft EIS is a public document, and involve the public and Tribes in implementing SEPA procedures, the Draft EIS is being sent to the entities below.

Tribes

Muckleshoot Tribe

Snoqualmie Tribe

Tulalip Tribe

Duwamish Tribe

State/Regional

Washington State Department of Ecology, Environmental Review Section

Washington State Department of Ecology, Northwest Regional Office

Washington State Department of Fish and Wildlife

Washington State Department of Natural Resources

Washington State Department of Community, Trade, and Economic Development

Washington State Department of Transportation

Washington State Office of Archaeology and Historic Preservation

Local

City of Lake Forest Park, Parks Department

City of Lake Forest Park, Planning Department

City of Lake Forest Park, Public Works Department

City of Lake Forest Park, Mayor's Office

City of Lake Forest Park, Parks and Recreation Department

King County Department of Development and Environmental Services

King County Department of Natural Resources and Parks

King County Water and Land Resources

King County Department of Transportation, Roads Services Division

Libraries

Lake Forest Park Library

Seattle Library, Lake City Branch

Kenmore Library

Bothell Regional Library

Shoreline Library

Companies and Organizations

Burlington Northern Santa Fe

Audubon Society

Puget Sound Energy

Puget Sound Regional Council

Citizen's Advisory Group

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Tom French

Dean Peterson

Stuart Strand

Gary Elmer

Mark Withers

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Kate Comtois

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Sandy Koppenol

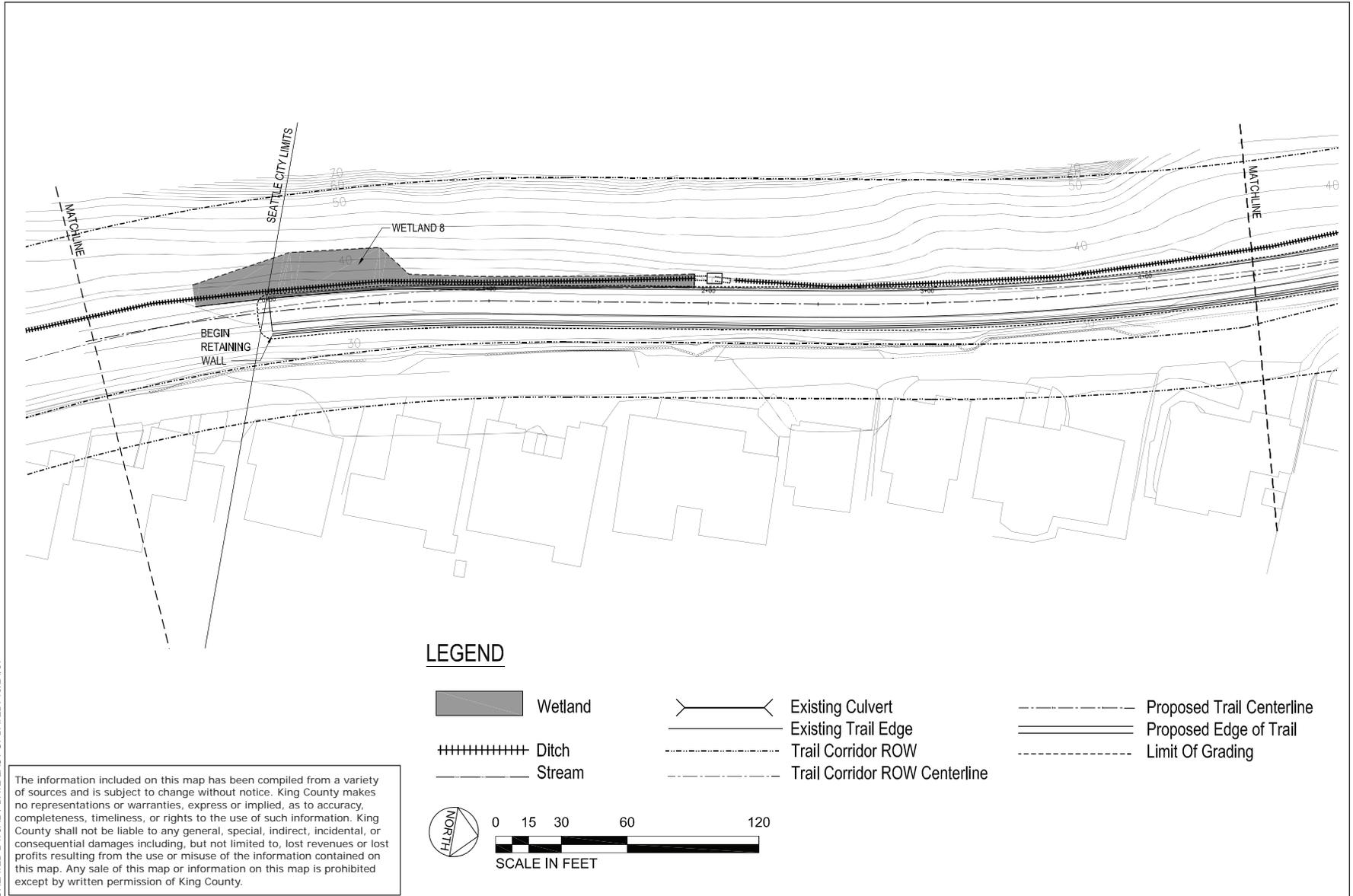
Alison Starling

Mark Gibbons

Michelle LeMoine

Ed Sterner

Appendix A – Plan Sheets



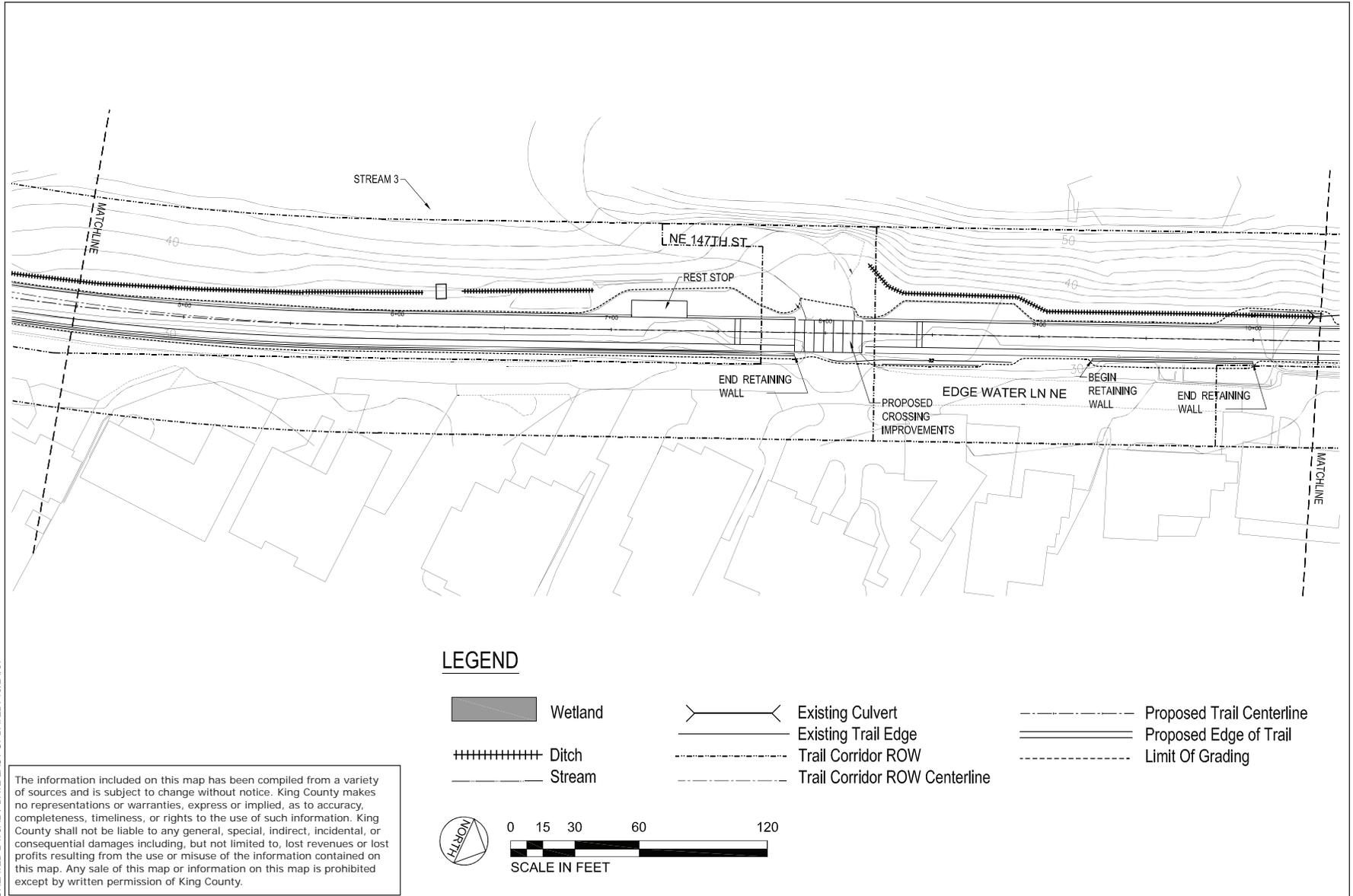
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Burke-Gilman Trail Redevelopment . 207286
Figure A-1
Redevelopment Alternative



SOURCE: MacLeod Reckord, 2007.

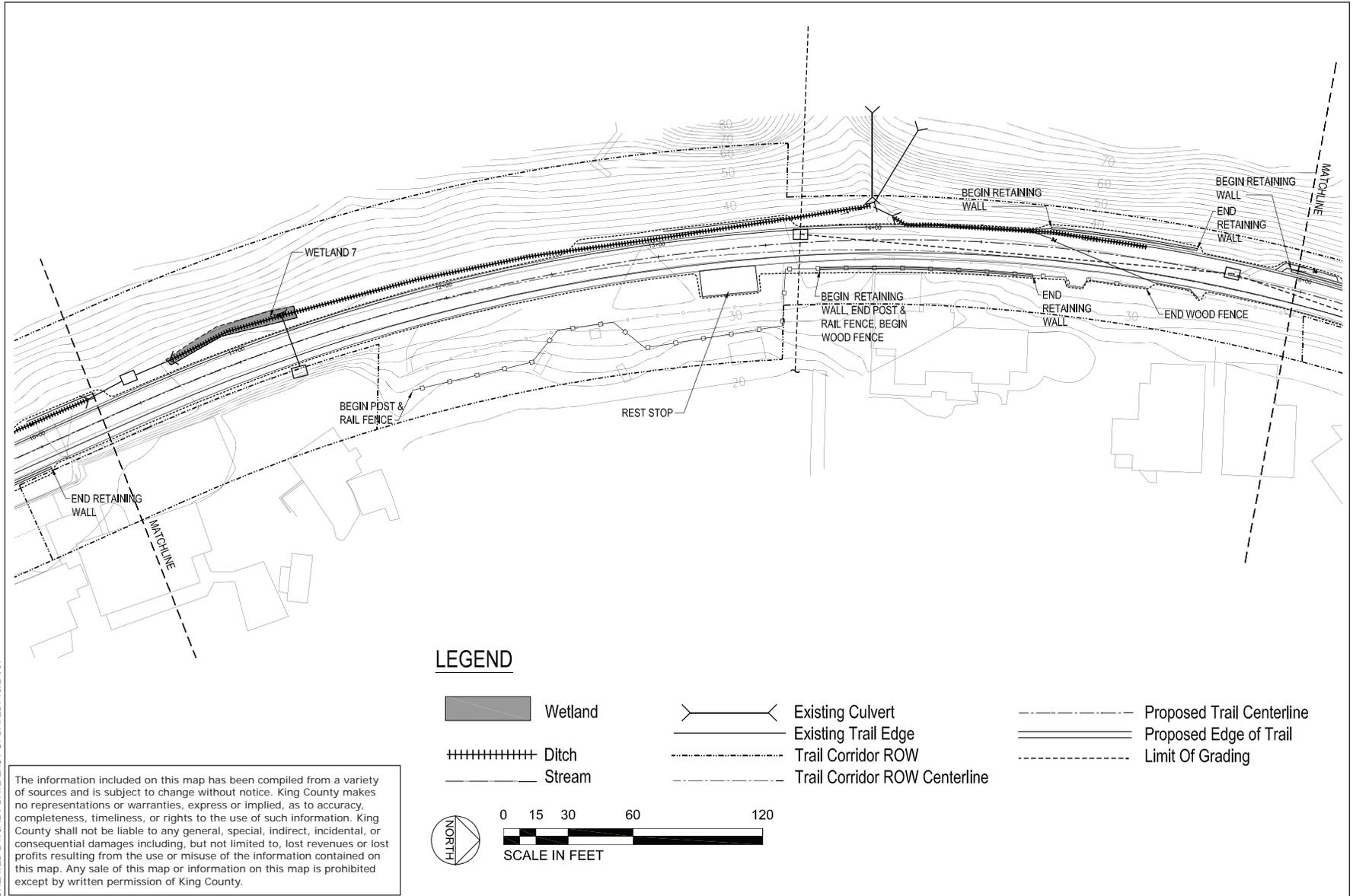


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Figure A-2
 Redevelopment Alternative



SOURCE: MacLeod Reckord, 2007.

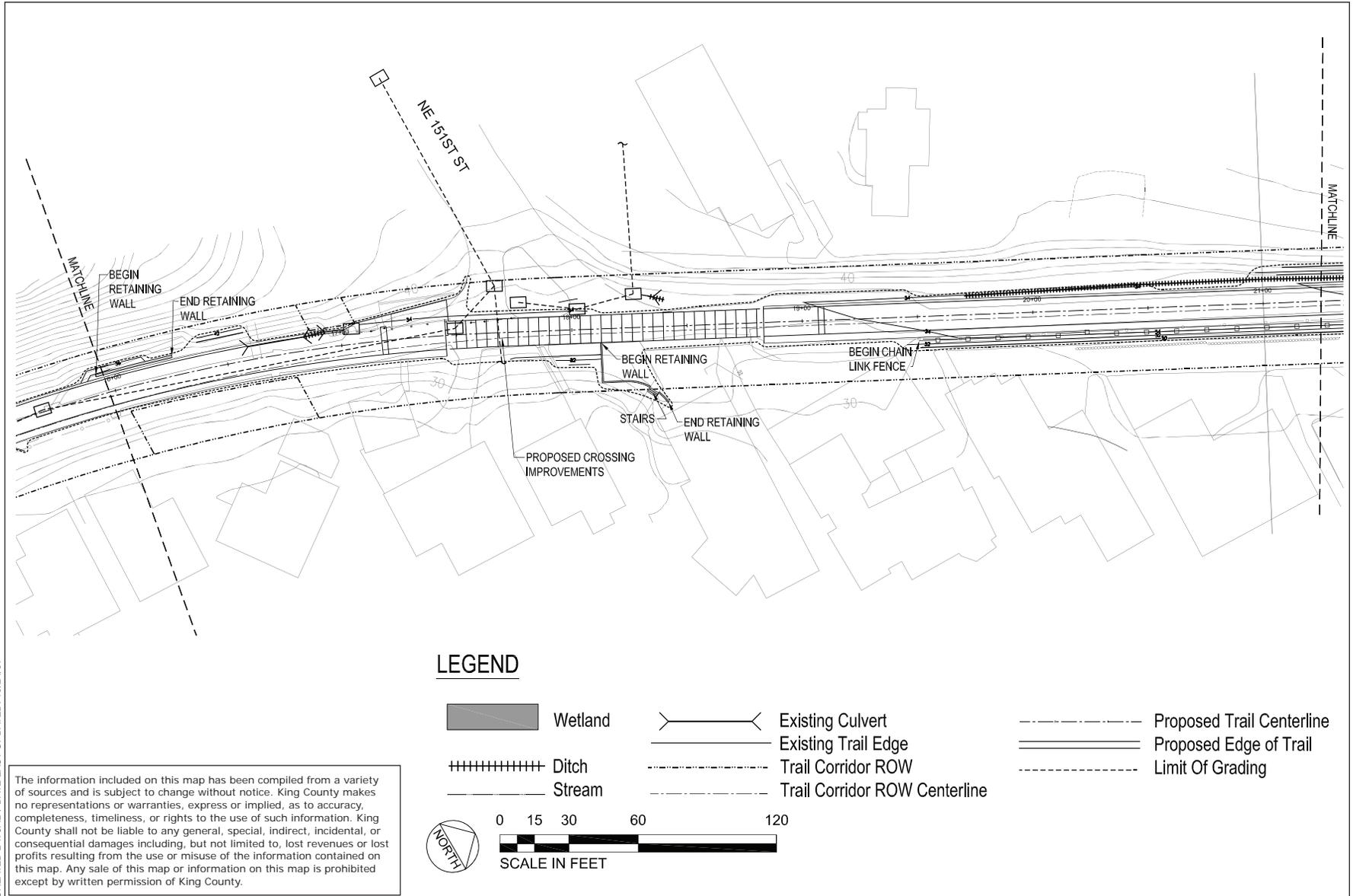


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Figure A-3
Redevelopment Alternative



SOURCE: MacLeod Reckord, 2007.

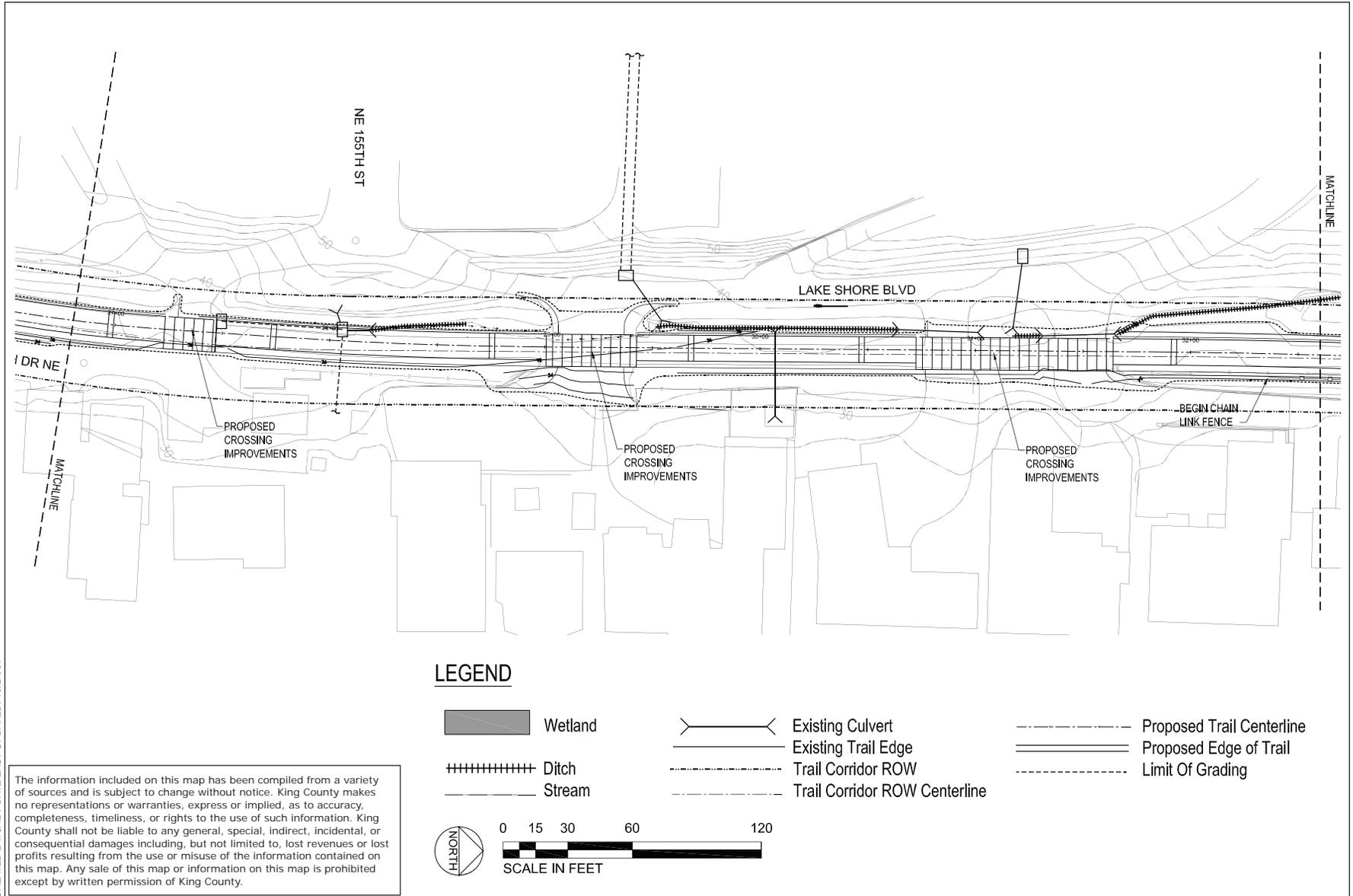


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Figure A-4
 Redevelopment Alternative



SOURCE: MacLeod Reckord, 2007.

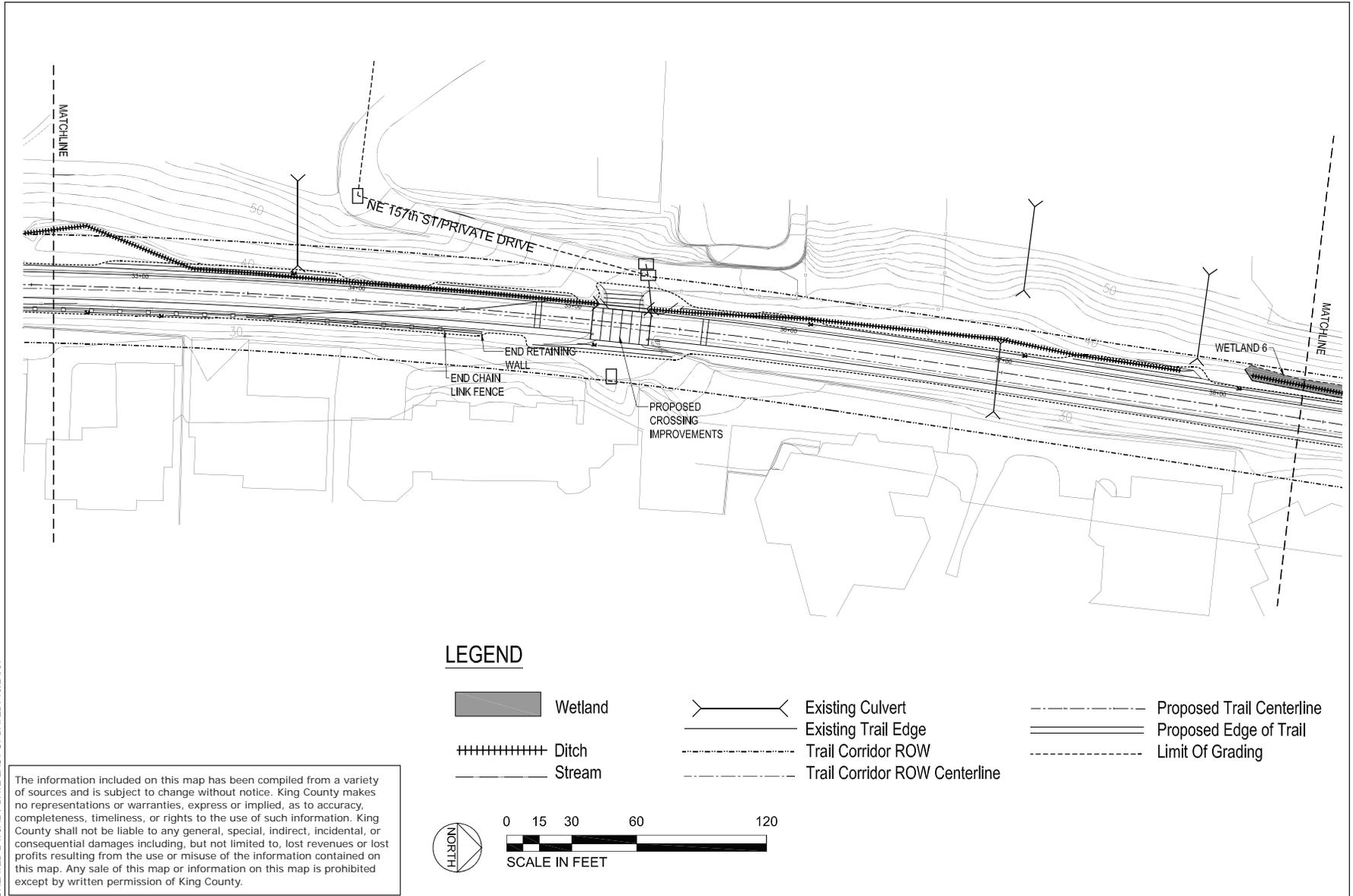


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Figure A-6
Redevelopment Alternative



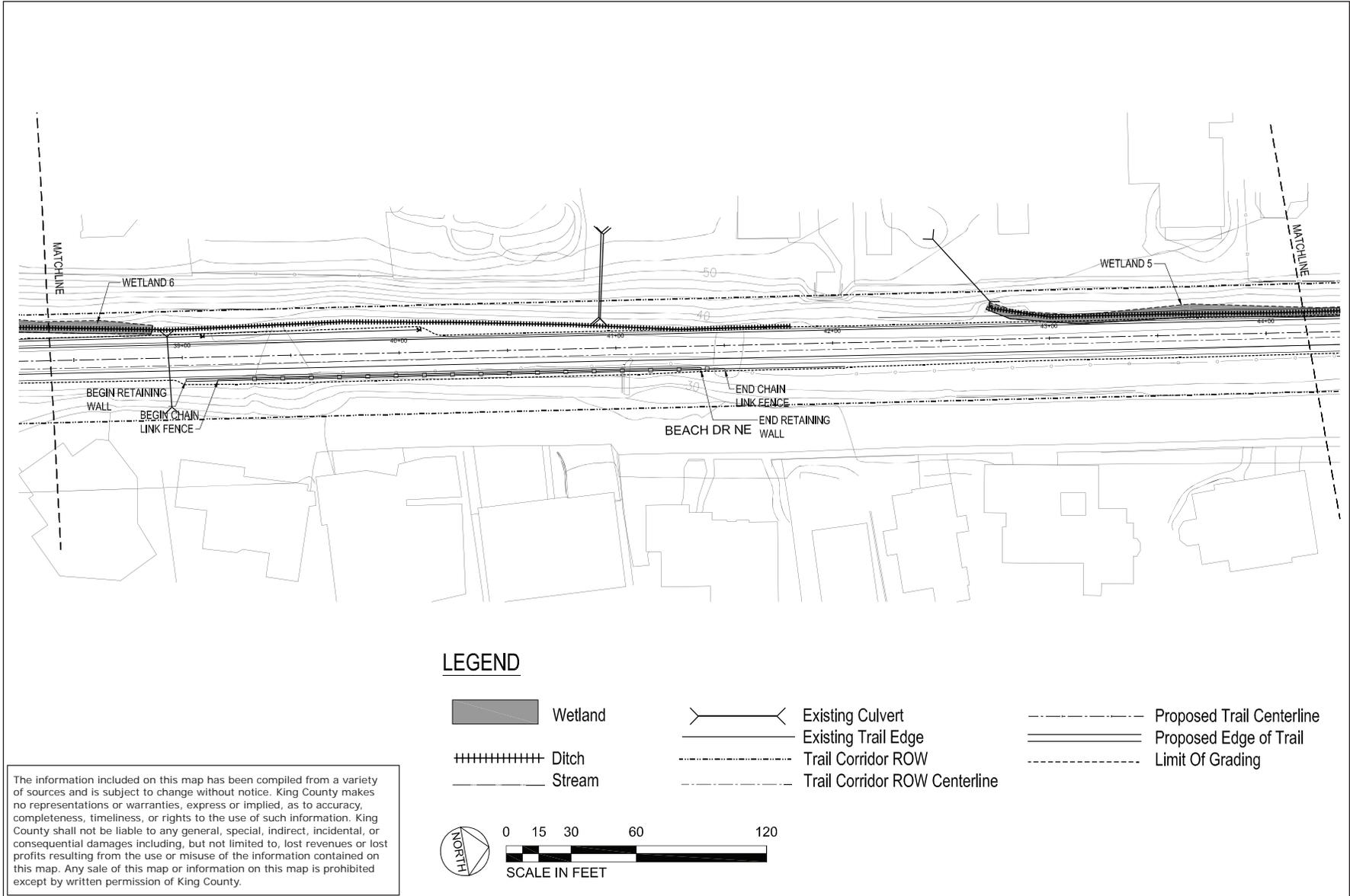
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Burke-Gilman Trail Redevelopment . 207286
Figure A-7
Redevelopment Alternative

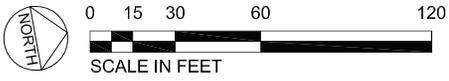


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LEGEND

- Wetland
- Existing Culvert
- Proposed Trail Centerline
- Ditch
- Existing Trail Edge
- Proposed Edge of Trail
- Stream
- Trail Corridor ROW
- Limit Of Grading
- Trail Corridor ROW Centerline



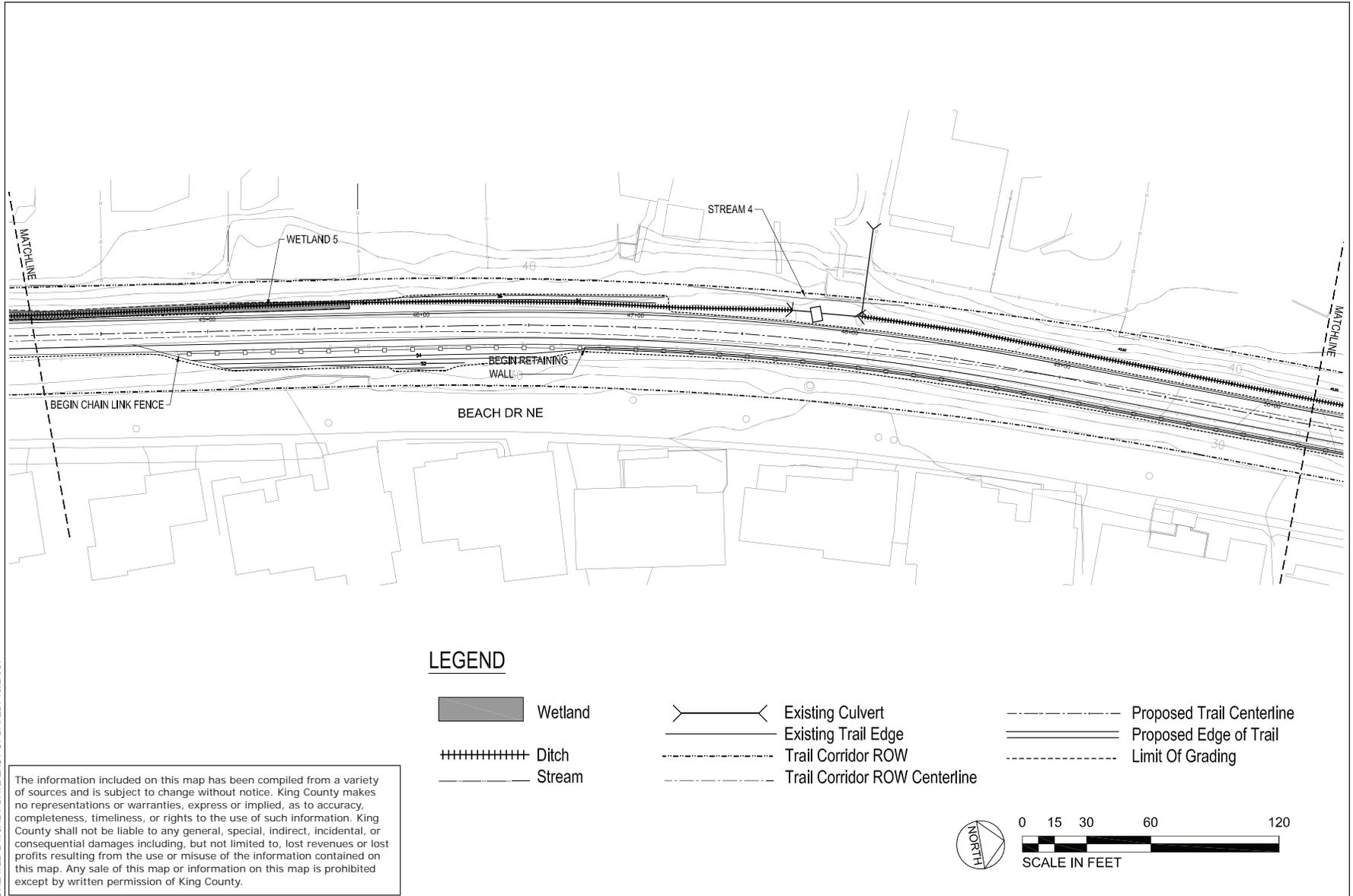
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Figure A-8
 Redevelopment Alternative



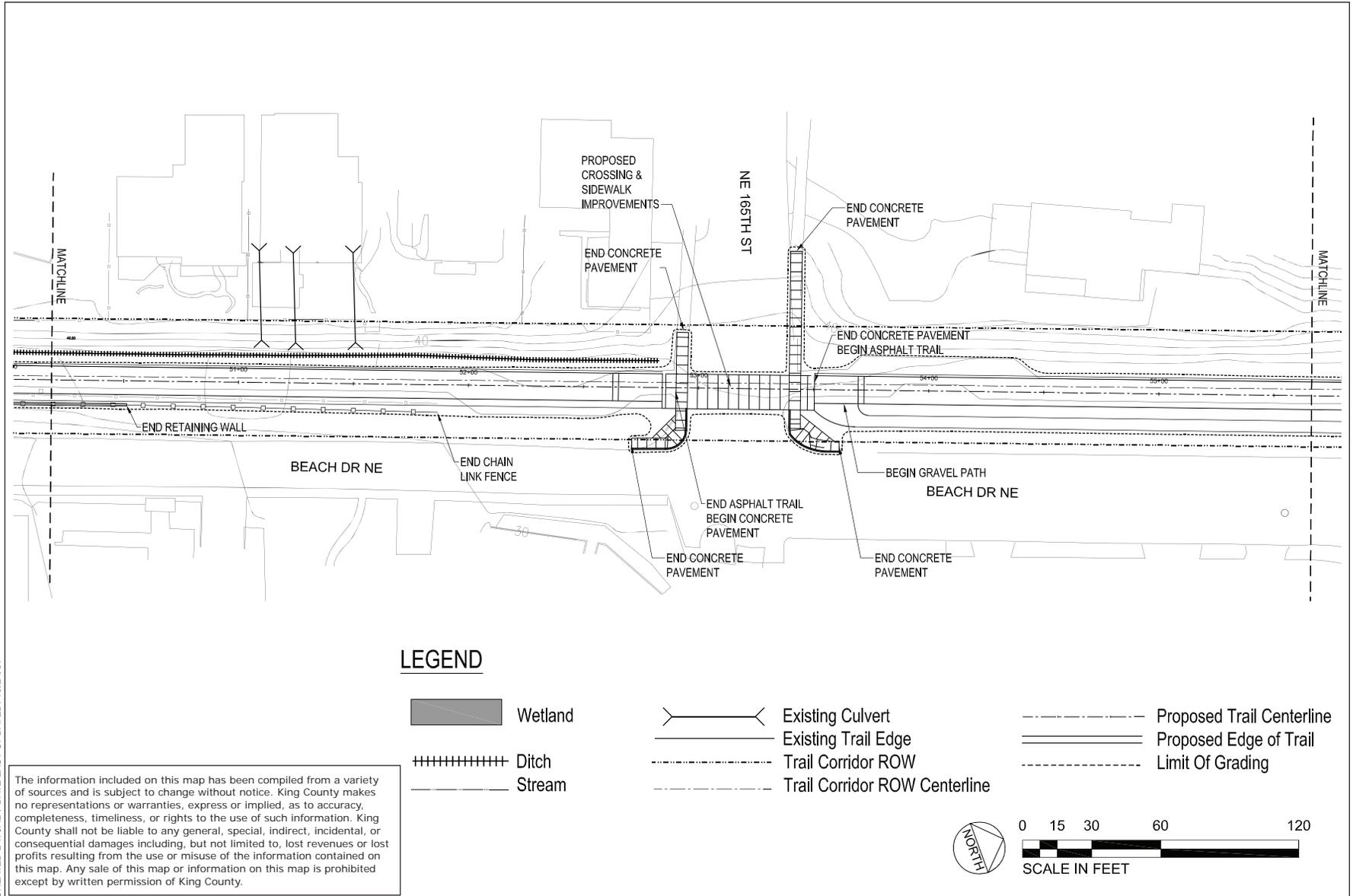
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Figure A-9
 Redevelopment Alternative



SOURCE: MacLeod Reckord, 2007.



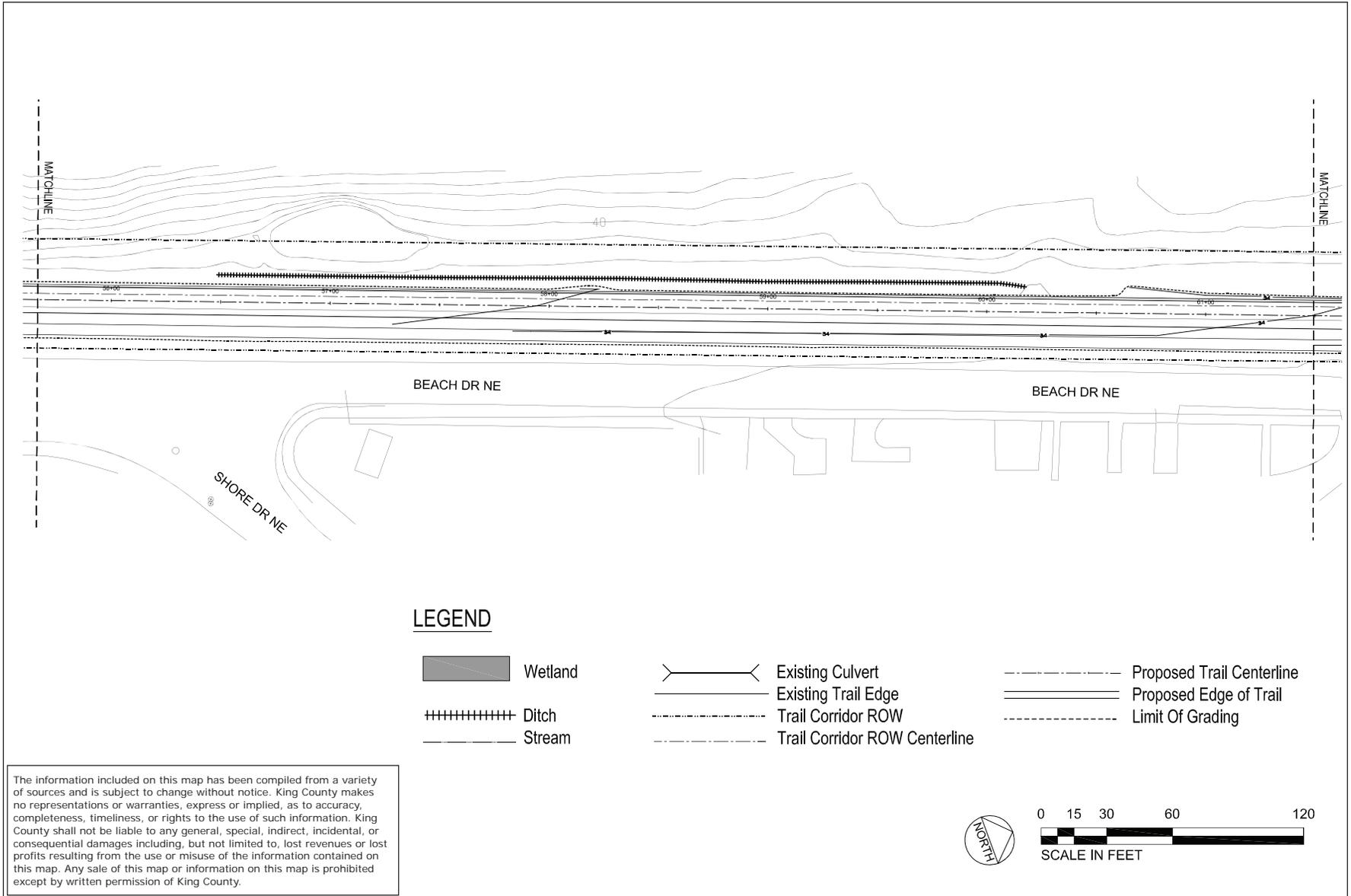
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Figure A-10
Redevelopment Alternative

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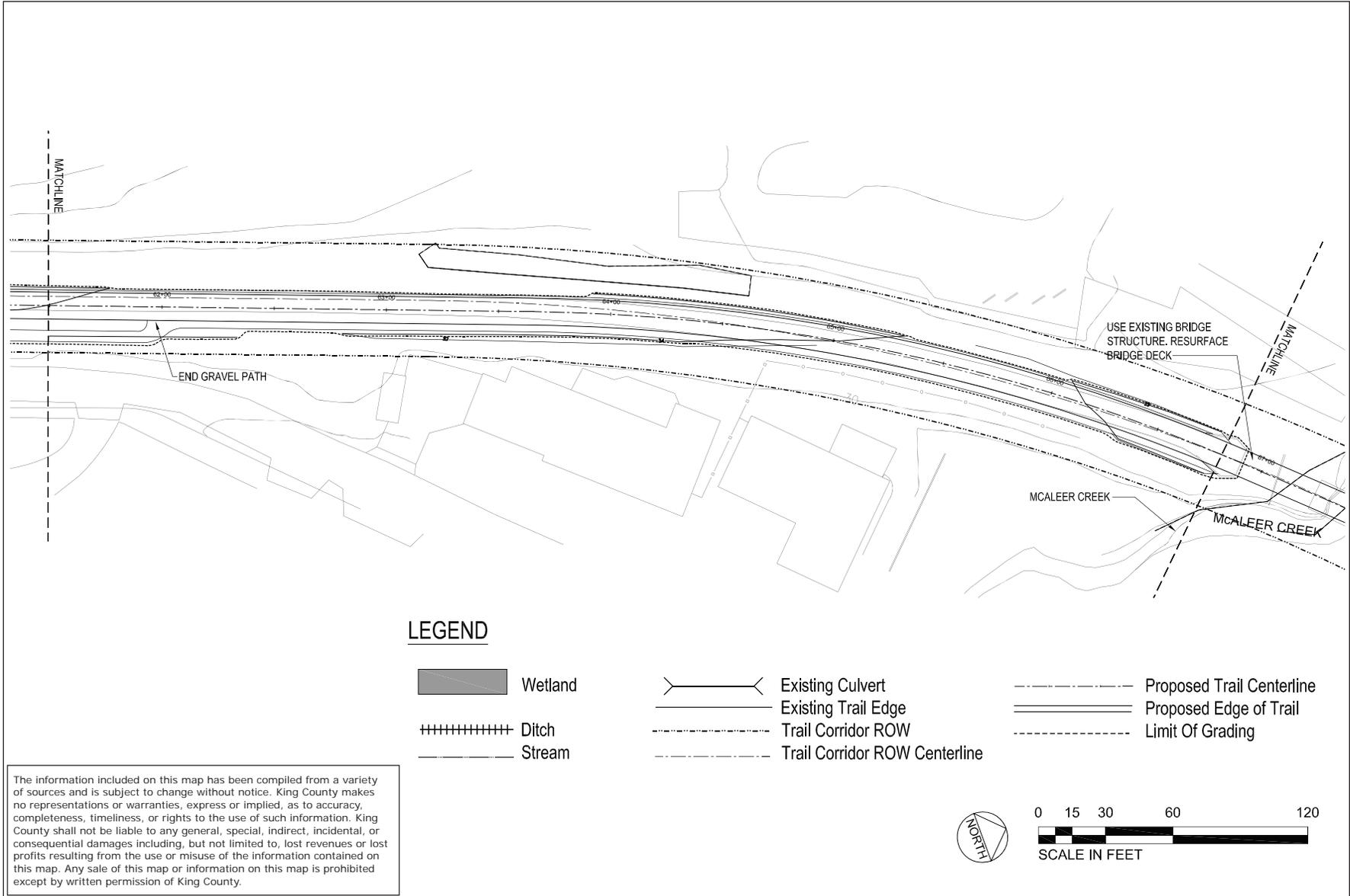
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Figure A-11
 Redevelopment Alternative

FILE NAME: A-12.ai
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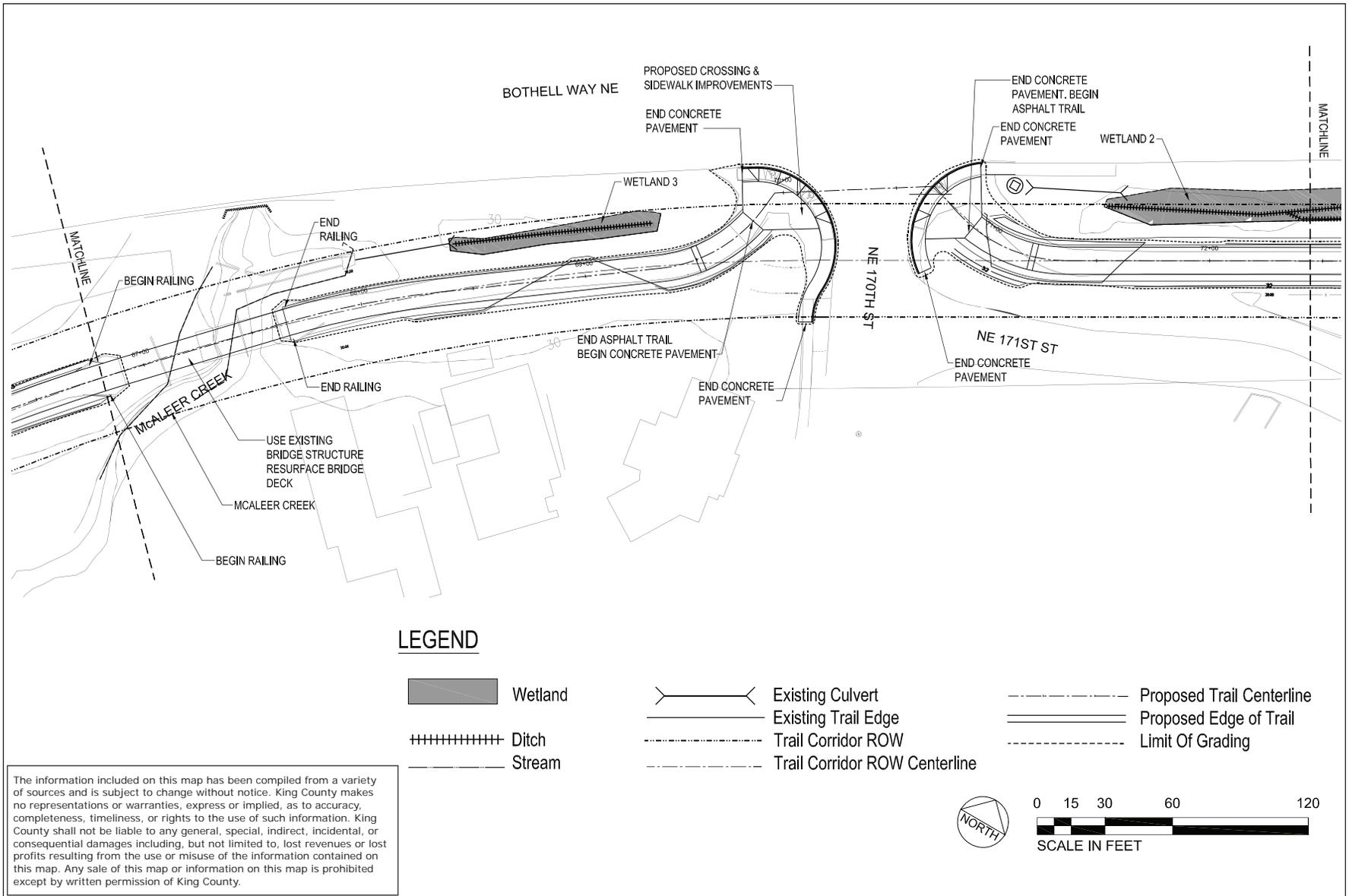


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Figure A-12
 Redevelopment Alternative

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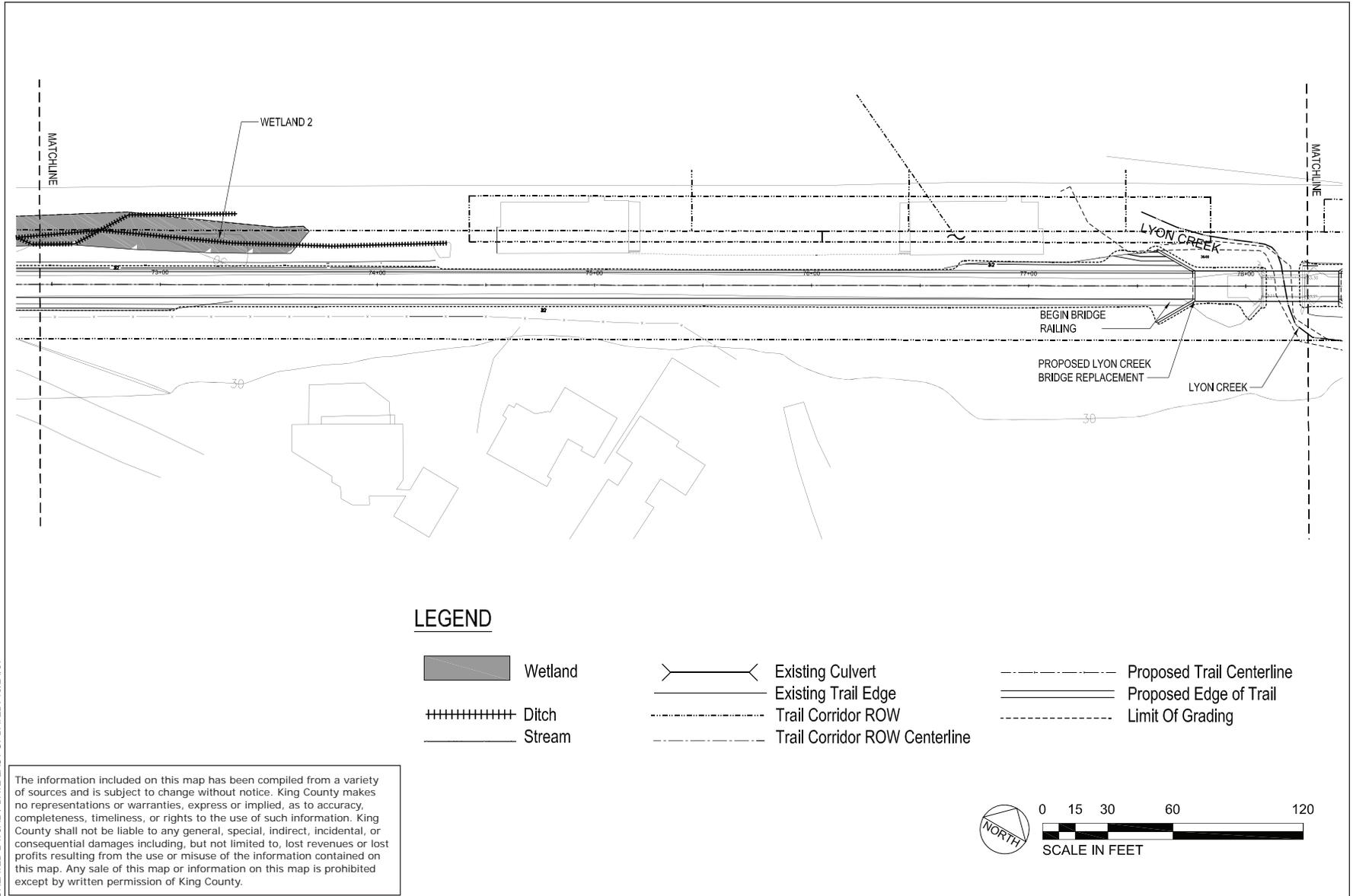


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Figure A-13
 Redevelopment Alternative



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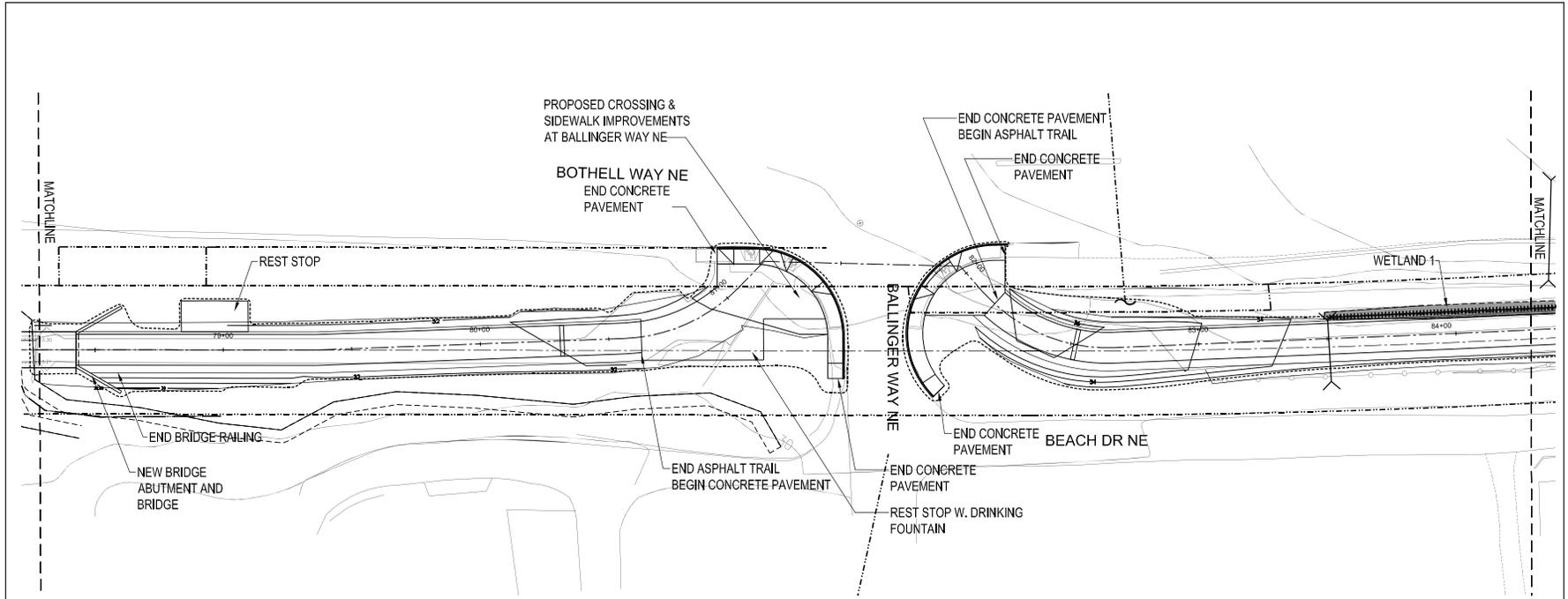
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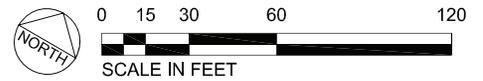
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Figure A-14
 Redevelopment Alternative



LEGEND

- Wetland
- Ditch
- Stream
- Existing Culvert
- Existing Trail Edge
- Trail Corridor ROW
- Trail Corridor ROW Centerline
- Proposed Trail Centerline
- Proposed Edge of Trail
- Limit Of Grading

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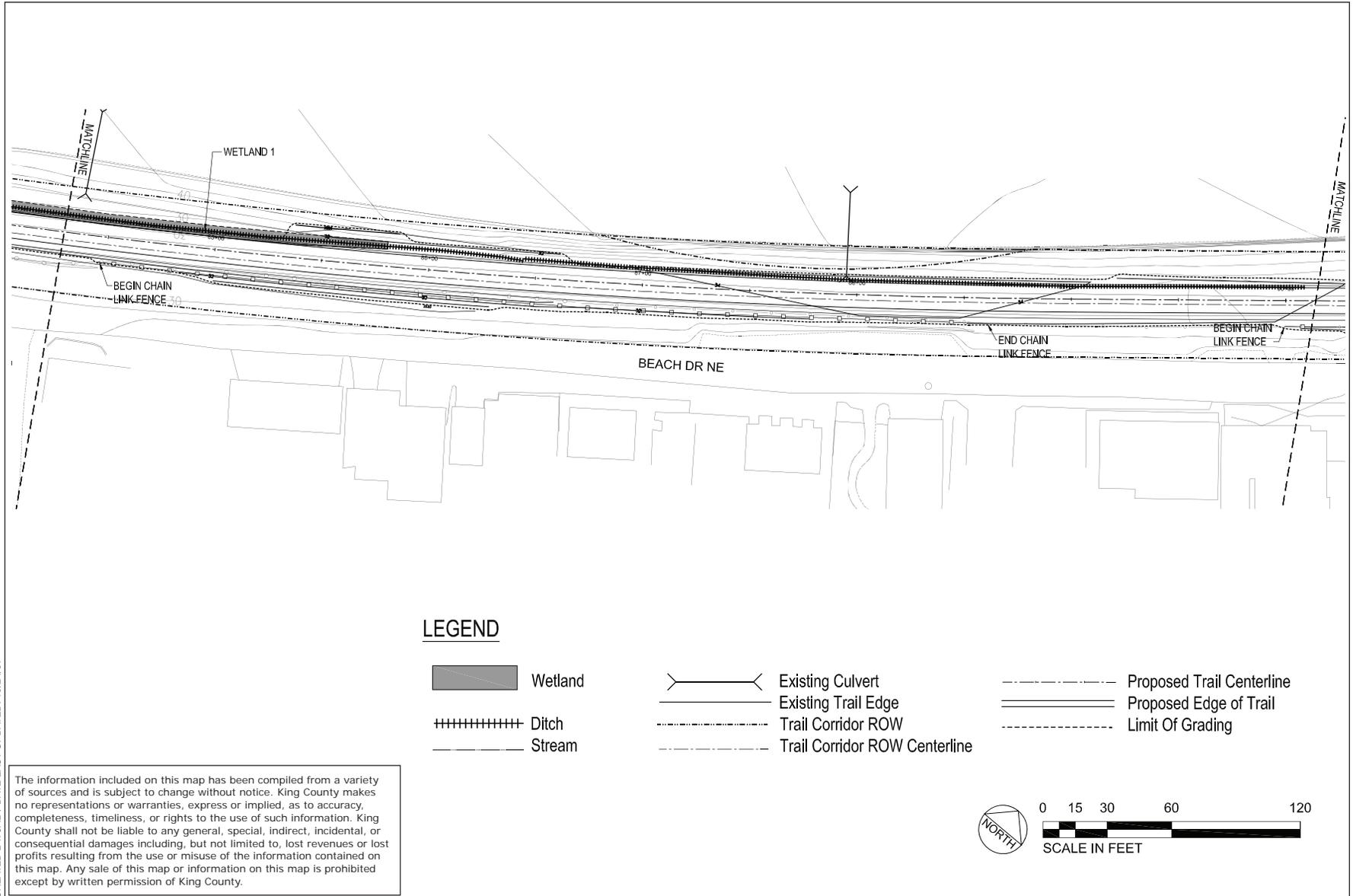
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Figure A-15
Redevelopment Alternative



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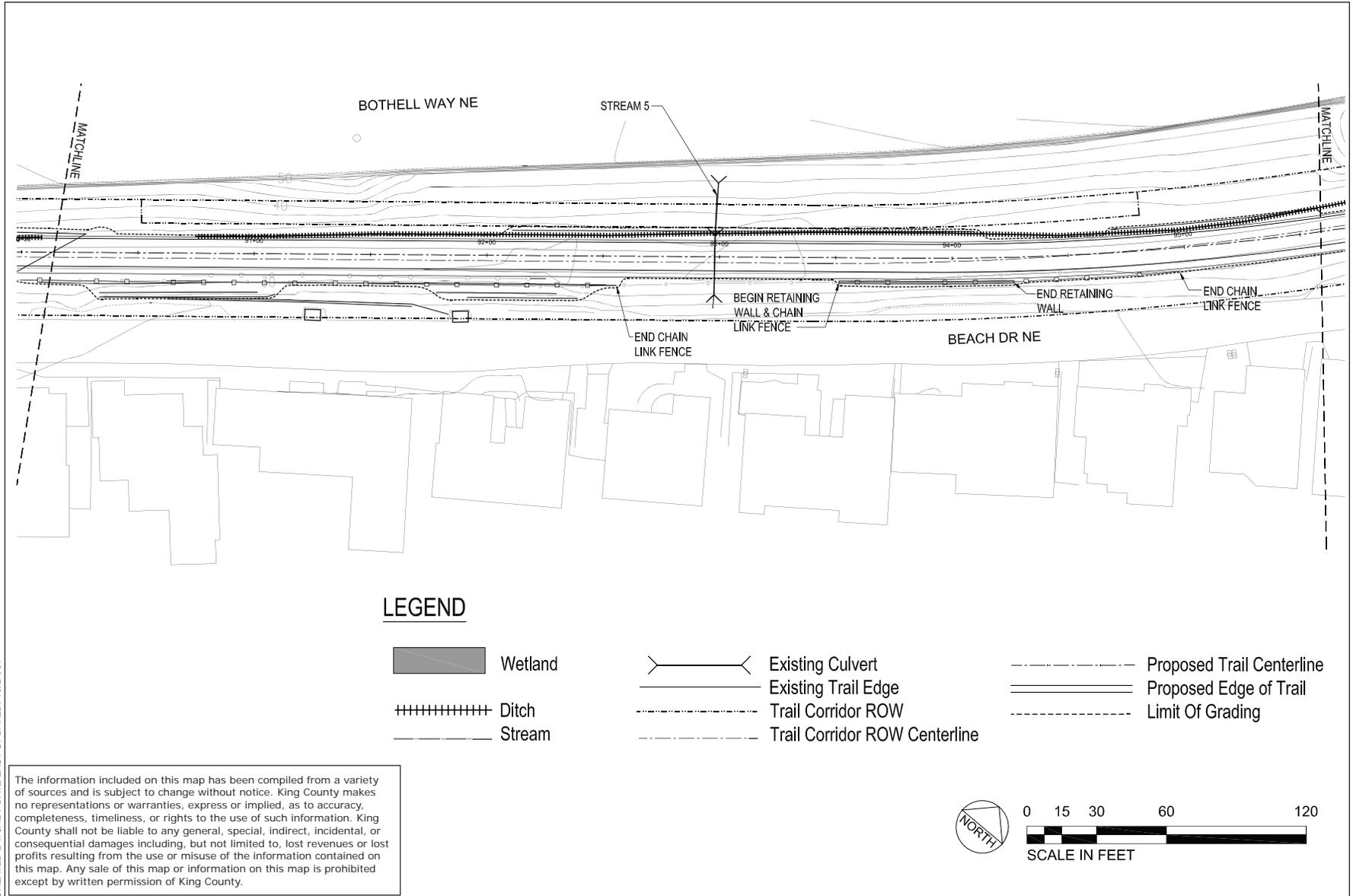
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Figure A-16
 Redevelopment Alternative



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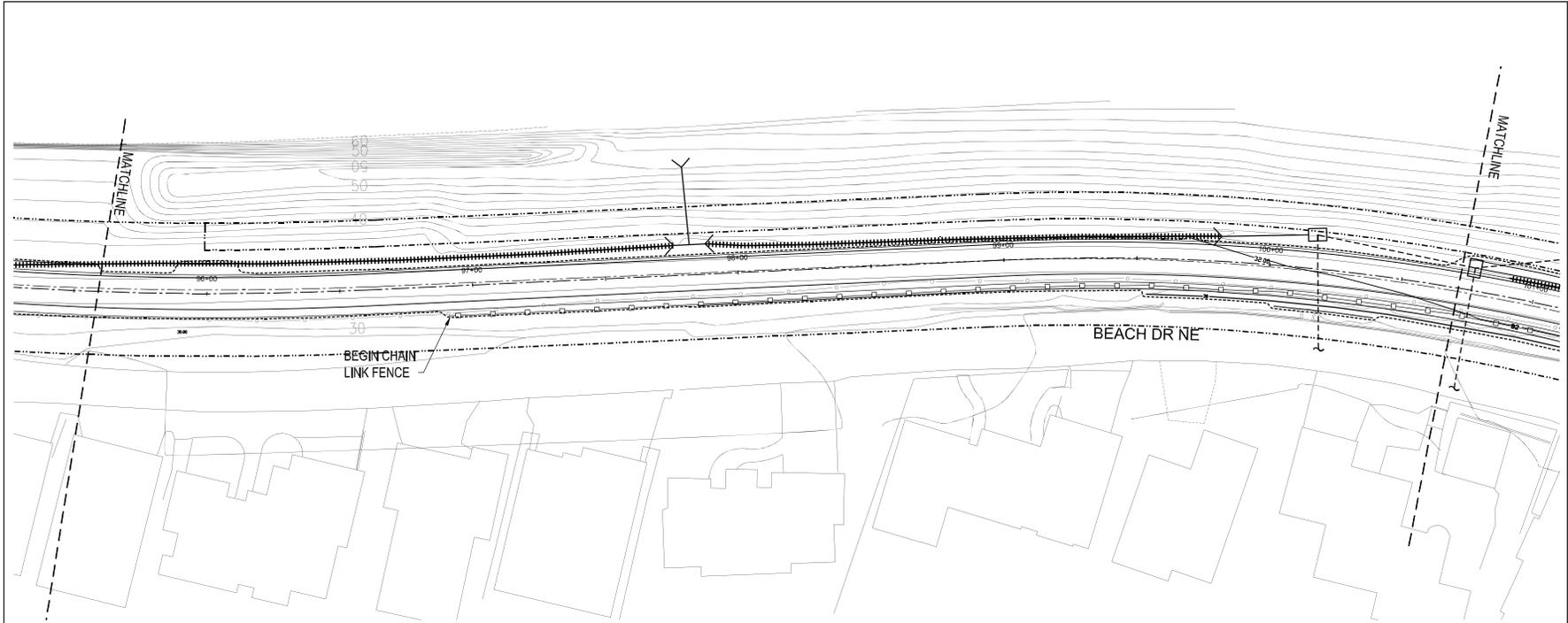


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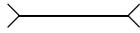
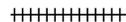
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Figure A-17
Redevelopment Alternative



LEGEND

- | | | |
|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
|  Wetland |  Existing Culvert |  Proposed Trail Centerline |
|  Ditch |  Existing Trail Edge |  Proposed Edge of Trail |
|  Stream |  Trail Corridor ROW |  Limit Of Grading |
| |  Trail Corridor ROW Centerline | |

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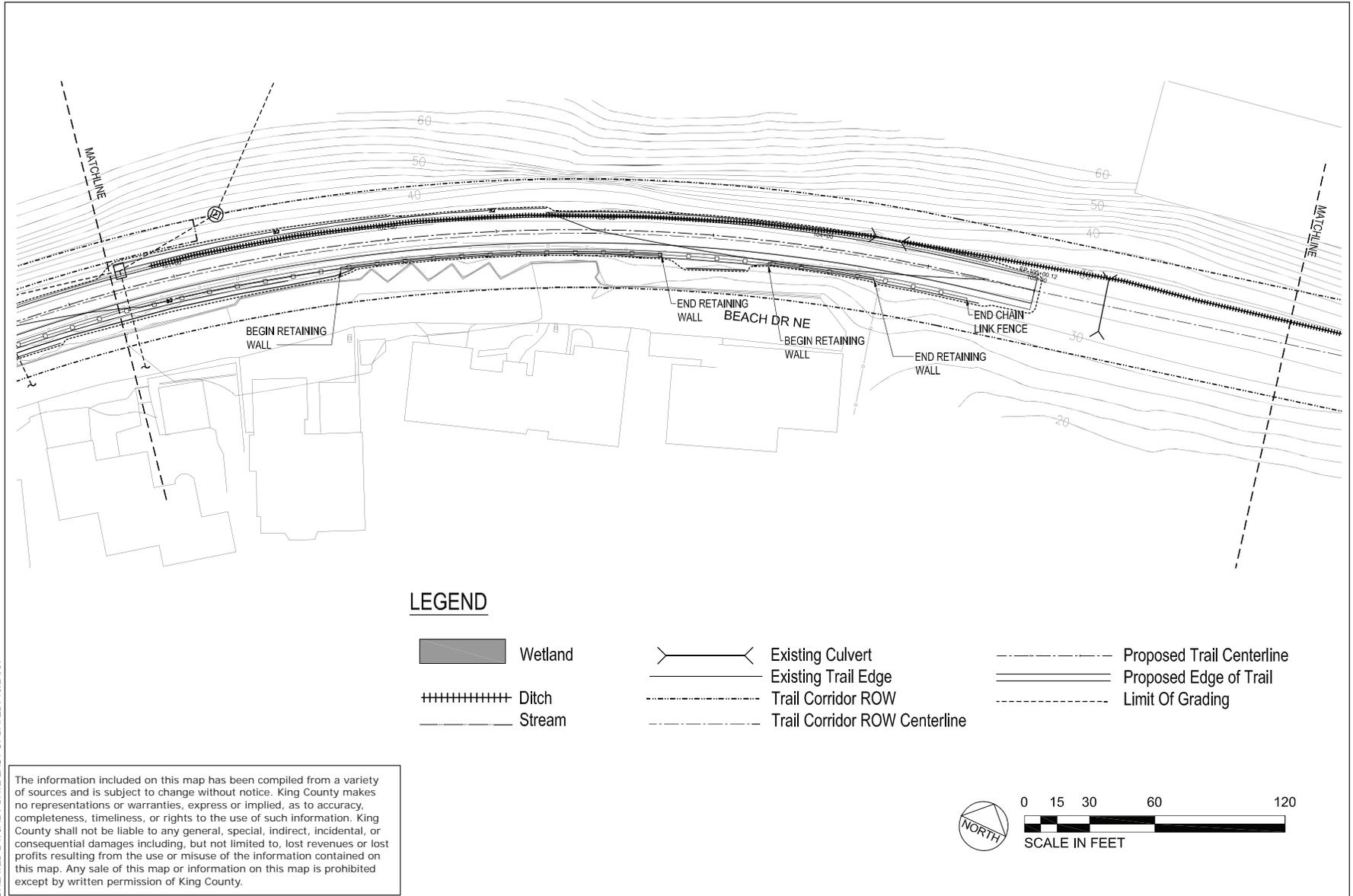
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Figure A-18
 Redevelopment Alternative



SOURCE: MacLeod Reckord, 2007.



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Burke-Gilman Trail Redevelopment . 207286
Figure A-19
Redevelopment Alternative