Seattle Parks & Recreation
healthy people healthy environment strong communities

CHEASTY GREENSPACE TRAIL

Critical Areas Study and Conceptual Mitigation Plan

Prepared for
City of Seattle Parks and Recreation

August 2018

ESA

CONTENTS

1.0 INTRODUCTION 1
2.0 PROJECT HISTORY AND DESCRIPTION 2
3.0 METHODS 4
3.1 REVIEW OF EXISTING INFORMATION 4
3.2 WETLAND DELINEATION AND WATERCOURSE IDENTIFICATION 4
3.3 WILDLIFE HABITAT ASSESSMENT AND SURVEY 5
4.0 FINDINGS 6
4.1 EXISTING INFORMATION 6
4.2 WETLANDS 6
4.2.1 Wetland 1 6
4.2.2 Wetland 2 7
4.2.3 Wetland 3 7
4.2.4 Wetland 4 8
4.2.5 Wetlands 5 and 6 8
4.2.6 Wetland 8 9
4.2.7 Wetland 9 9
4.2.8 Wetland 11 9
4.2.9 Wetland 12 10
4.2.10 Potential Wetlands 7 and 10 10
4.2.11 Wetland Ratings and Buffer Requirements 10
4.3 WATERCOURSES 11
4.3.1 Watercourse 1 11
4.3.2 Watercourse Rating and Buffer Requirements 11
4.4 WILDLIFE HABITAT TYPES 12
4.5 WILDLIFE OBSERVATIONS 12
4.6 TREES 15
4.7 LITERATURE REVIEW 15
5.0 REGULATORY CONTEXT 17
5.1.1 U.S. Army Corps of Engineers and Section 404 17
5.1.2 Washington State Department of Ecology 17
5.1.3 Washington State Department of Fish and Wildlife 17
5.1.4 City of Seattle 17
6.0 PROJECT IMPACTS AND CONCEPTUAL MITIGATION APPROACH 20
6.1 AVOIDANCE 20
6.2 MINIMIZATION 20
6.3 UNAVOIDABLE PROJECT IMPACTS 21

6.4 COMPENSATORY MITIGATION APPROACH 21
6.5 MITIGATION GOALS, OBJECTIVES, AND PERFORMANCE STANDARDS 22
6.5.1 Mitigation Goals 22
6.5.2 Objectives and Performance Standards 22
6.6 MAINTENANCE AND MONITORING 22
6.6.1 Schedule 23
6.6.2 Data Collection 23
6.6.3 Reporting 23
6.7 MAINTENANCE 23
6.8 CONTINGENCY 24
6.9 SITE PROTECTION 24
6.10 CONCEPTUAL MITIGATION PROJECT TEAM 24
7.0 LIMITATIONS 25
8.0 REFERENCES 26

LIST OF APPENDICIES

FIGURES AND PHOTOGRAPHS 29
APPENDIX A: METHODS 1
APPENDIX B: WETLAND DETERMINATION DATA SHEETS 1
APPENDIX C: ECOLOGY RATING FORMS 1
APPENDIX D: BIRD SURVEY DATA SHEETS 1
APPENDIX E: TREE INVENTORY 1
APPENDIX F: TRAIL DESIGN 1

LIST OF TABLES

TABLE 1. SUMMARY OF WETLANDS IN CHEASTY GREENSPACE 7
TABLE 2. SUMMARY OF 2014 WETLAND RATINGS AND BUFFERS 11
TABLE 3. SUMMARY OF BIRD SPECIES OBSERVED AND EXPECTED IN CHEASTY GREENSPACE 13
TABLE 4. SUMMARY OF EXCEPTIONAL TREES NEAR THE TRAIL 15

LIST OF FIGURES

Figure 1. Vicinity Map
Figure 2. Wetland Delineation and Trail Design
Figure 3. Wildlife Habitat Map
Figure 4. Geologic Hazard Areas

Acronyms and Abbreviations

ATV	all-terrain vehicle
BMPs	best management practices
Corps	U.S. Army Corps of Engineers
dbh	diameter at breast height
DNS	Determination of Non-Significance
DP	data plot
Ecology	Washington State Department of Ecology
ESA	Environmental Science Associates
FWHCA	Fish and Wildlife Habitat Conservation Area
GIS	geographic information system
GMA	Growth Management Act
HPA	Hydraulic Project Approval
IMBA	International Mountain Bicycling Association
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OHWM	ordinary high water mark
SPR	Seattle Parks and Recreation Department
PHS	Priority Habitats and Species
RCW	Revised Code of Washington
SDCI	Seattle Department of Construction and Inspections
SEPA	State Environmental Policy Act
SMC	Seattle Municipal Code
USFWS	United States Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WRIA	Water Resource Inventory Area

1.0 INTRODUCTION

The Seattle Parks and Recreation Department (SPR) proposes to construct a pilot trail project in the Cheasty Greenspace on Beacon Hill in Seattle, Washington (Figures 1 and 2). The preliminary layout of the proposed trail system consists of a two-loop, trail system for use by bicycles and pedestrians. A bridge is proposed where the trail would cross a watercourse; the trail would not cross any wetlands. The bicycle trail would be designed for beginner cyclists. Six entry points are proposed along the perimeter of the greenspace to allow public access to the trail system. The trail is intended as a neighborhood park rather than a destination park and thus no parking would be provided. The bicycle trail would be soft surface, with native mineral soils and the pedestrian trail would be crushed gravel.

In 2014 and early 2015, Environmental Science Associates (ESA) conducted a wetland reconnaissance and a wildlife habitat assessment to provide a baseline of existing conditions, inform the project design process, and determine potential regulatory requirements. The City used the *Wetland Reconnaissance and Wildlife Habitat Assessment* Memorandum (ESA, 2015) to support preparation of the State Environmental Policy Act (SEPA) Checklist. The City SEPA Official issued a Determination of Non-Significance (DNS) on August 17, 2015. This determination was successfully appealed on January 26, 2016. The Hearing Examiner concluded that the "City did not consider all environmental factors" to comply with the procedural requirements of SEPA. The intent of this Critical Areas Study and Conceptual Mitigation Plan is to provide the City with sufficient information to meet the requirements of SEPA with regards to critical areas.

2.0 PROJECT HISTORY AND DESCRIPTION

The Cheasty Greenspace is a 28-acre parcel within the Cedar River-Lake Washington watershed in Water Resource Inventory Area (WRIA) 8, Cedar-Sammamish. The greenspace is near the western boundary of the watershed, which drains to Lake Washington. Land use in the watershed is highly urbanized, with residential and commercial uses dominating the area surrounding the greenspace. The Cheasty Greenspace contains one of the few areas of undeveloped forest in the vicinity. It is predominantly deciduous trees and includes some invasive species, although removal of invasive species and replanting with native species have been ongoing in the greenspace for many years. There are no official trails; however, there are social trails or trails developed for restoration work throughout the greenspace. Three narrow Seattle Housing Authority properties abut the greenspace to the east; the majority of these parcels are forested and function as an extension of the greenspace.

In 2012, a group of neighbors proposed the development of pedestrian and mountain bike trails at Cheasty Greenspace as a project through the Parks and Green Spaces Levy Opportunity Fund process. The Opportunity Fund is funded through the 2008 Parks and Green Spaces Levy approved by voters and allows the community to initiate park projects in neighborhoods. The project was contrary to SPR's bicycle policy, and thus the original project was not successful in the Opportunity Fund process. However, there was significant community interest for the trails project, with the North Beacon Hill Community Council voting to support it. Additionally, the North Beacon Hill Neighborhood Plan, in the Comprehensive Plan (City of Seattle, 2016a), includes policy NBH-P34: *Consider the development of pedestrian and bicycle trails through publicly owned greenbelts throughout North Beacon Hill*. In 2013, the group Friends of Cheasty Greenspace at Mountain View secured funding through the Department of Neighborhoods. The group used this funding to hire a landscape architect to develop a preliminary trail design.

The Board of Park Commissioners discussed and deliberated on the 2013 proposal at public meetings on November 14, 2013, and January 9, 2014. Their final recommendation to the SPR Superintendent was that SPR should initiate a pilot project to allow soft-surface mountain bike trails to be built at Cheasty Greenspace, in conjunction with restoration and foot trails. On May 28, 2015, the Board of Park Commissioners approved a pilot project for the pedestrian and bicycle trail. The SEPA Official issued a DNS on August 3, 2015. The SEPA decision was successfully appealed, with a decision made by the Hearing Examiner on January 26, 2016. ESA was retained by SPR to conduct wetland delineations and a wildlife assessment, and redesign the trail to minimize impacts to critical areas.

The original project design was a pedestrian and bicycle perimeter loop trail, with six entry points, primarily separated except near wetlands and steep slopes. The initial trail was redesigned to avoid impacts to wetlands, and minimize impacts to wetland buffers, the riparian watercourse, and the riparian management area. The proposed redesigned trail is a two-loop trail system but still has six entry points to allow public access (Figure 2). The two loops can be joined by traveling on 28th Ave S to the east of the greenspace and Cheasty Boulevard to the west. Cheasty Boulevard is proposed as a Neighborhood Greenway, a residential street with low motorized traffic volumes and speeds that is designated and designed to give people walking and biking safe and pleasant travel priority. Generally, the east-west portions of the trail would be multi-use with 4-foot wide standard park design trails. The remaining portions of the trails would be 1.5-foot wide one-way mountain bike trails. A bridge is proposed where the trail would cross a watercourse. The shared and one-way bicycle trail would each be approximately 1.1 miles in length, with a total of approximately 2.3 miles of trail. The use of the trails for mountain bikes would be a 15-month pilot trail project. Should trail use for mountain bikes be

deemed unsuitable after 15 months by SPR, the bicycle portions of the trail would be repurposed for pedestrians only, with no trail redesign. Evaluating the suitability of the trail after 15 months is outside the scope of this report.

The bicycle portion of the trail would have no special mountain bike trail features (e.g., jumps) and would be appropriate for beginner mountain bicyclists. Trail guidelines from the International Mountain Bicycling Association (IMBA) that minimize trail footprint were followed in trail design. The grade was kept to 10 percent or less on the trail and followed the "half-rule": that a trail's grade should never exceed half the grade of its side slope. Any trail construction would use full bench-cut construction cutting from the existing slopes and would outslope the tread of the trail so that rainfall drains easily off of the side of the trail rather than along it. Trail location has avoided what little flat areas were available to prevent any resulting collection basins for water. Existing social trails on the site would be used where feasible.

3.0 METHODS

3.1 Review of Existing Information

Prior to conducting the field investigations, ESA ecologists reviewed existing literature, maps, and other materials to identify wetlands, streams, vegetation types, and wildlife habitats in the Cheasty Greenspace and vicinity. Key data sources included the following:

- National Wetlands Inventory (NWI) (U.S. Fish and Wildlife Service [USFWS], 2017, 2018)
- Priority Habitats and Species (PHS) (Washington Department of Fish and Wildlife [WDFW], 2017, 2018)
- King County iMap (King County, 2017, 2018)
- SalmonScape (WDFW, 2016, 2018)
- City of Seattle geographic information system (GIS) data (City of Seattle, 2017, 2018)
- City of Seattle water and sewer map (City of Seattle, 2016b)
- Historic and current aerial imagery
- eBird data (Cornell Lab of Ornithology, 2017)

Potential wetlands and streams were identified using the above sources, and wildlife habitat was preliminarily mapped through the interpretation of aerial photographs. In addition to the list above, multiple literature sources were reviewed and are listed in Section 8.0, *References*, of this document.

3.2 Wetland Delineation and Watercourse Identification

Field investigations for wetlands and streams were performed over 4 days (October 19, 20, and 31, 2016; and April 5, 2017. Wetlands were identified based on conditions at the time of the field visits by applying the wetland determination method described in the Regional Supplement (Western Mountains, Valleys, and Coast) to the Corps of Engineers (Corps) 1987 Wetland Delineation Manual Corps (Corps, 2010). Wetland investigations were conducted during the growing season as recommended by the Corps manual. In the Seattle area, the growing season varies from year to year; however, it is generally accepted to be from February or March to October or November. Climate Analysis for Wetlands Tables (WETS) from the Natural Resources Conservation Service (NRCS) show the growing season to be February 7 to December 10 (NRCS, 2017). Both hydrophytic vegetation and hydric soil indicators depend on the growing season. Hydrophytic vegetation is present when the plant community is dominated by species that require or can tolerate prolonged inundation or soil saturation during the growing season. Hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Corps, 2010).

The boundaries of wetlands were flagged with plastic survey tape marked “WETLAND DELINEATION,” and the locations will be professionally surveyed by SPR [Note: not yet surveyed, impacts and mitigation based on GPS’ed wetlands]. Data plots (DP) were also established for all wetlands and potential wetland areas. The methods used to identify and delineate wetlands and determine the ordinary high water mark (OHWM) of streams are described in further detail in Appendix A. Wetland determination data sheets are presented in Appendix B.

Wetlands were classified according to the Washington State Department of Ecology's (Ecology) Wetland Rating System for Western Washington (Hruby, 2014). A description of the wetland rating system along

with the completed Wetland Rating Forms for all wetlands described in this document are included in Appendix C.

3.3 Wildlife Habitat Assessment and Survey

Wildlife habitat and wildlife species use in the Cheasty Greenspace and vicinity were evaluated in the field during 3 days over the winter and spring seasons (December 19, 2016; April 4 and May 4, 2017). The purpose of the field visits was to characterize habitats, further assess habitat quality, and conduct surveys to observe wildlife species using the greenspace and vicinity. ESA ecologists applied the assessment methods described in *Wildlife Habitat Relationships in Oregon and Washington* (Johnson and O'Neil, 2001) to describe and evaluate common habitat types in the study area. The Johnson and O'Neil study was developed with input from a panel of regional wildlife experts and information collected from more than 12,000 pertinent publications.

ESA ecologists recorded observations of wildlife use during the winter and spring field surveys. Wildlife species (primarily birds) were observed both aurally and visually along informal walking transects across different habitat types and vegetation communities. Animal tracks and sign such as scat, pellets, or excavations were also recorded. Surveys commenced within 1 hour of sunrise and lasted approximately 3 hours. Wildlife habitat in the greenspace was characterized and mapped on aerial photographs.

ESA also conducted a literature review of current wildlife science relevant to pedestrian and bicycle trail impacts on birds to inform impact assessment and mitigation planning.

4.0 FINDINGS

The following sections describe the results of the background review and field investigations for wetlands, streams, and wildlife.

4.1 Existing Information

The City of Seattle GIS data (City of Seattle, 2017) show no streams and six wetlands in the Cheasty Greenspace and on the Seattle Housing Authority properties to the east. The NWI data show the same six wetlands, and also depict a seventh wetland just north of Andover Street and just outside of the Cheasty Greenspace (USFWS, 2017, 2018). A wetland reconnaissance conducted in 2003 found one riparian wetland with an associated stream and a second stream in the study area (Sheldon & Associates, 2003). The wetland-stream complex corresponds to one of the wetlands in the City's GIS database, while the other does not correspond with the City or NWI mapping.

According to the WDFW PHS database, the majority of the Cheasty Greenspace is a considered "Biodiversity Areas and Corridors" (WDFW, 2017, 2018). No occurrences of threatened or endangered or other sensitive species have been documented on the site. No soil survey data are available for the study area.

No streams are documented in the WDFW SalmonScape database (2016) or on the City of Seattle GIS database in Cheasty Greenspace, nor up- or downslope of the site. Seattle's drainage map (City of Seattle, 2016b) shows that a combined (storm and sewer) main drains into a number of culverts along Cheasty Boulevard, including the culvert that feeds Watercourse 1 (described in Section 4.3 below).

4.2 Wetlands

ESA identified a total of 10 wetlands in Cheasty Greenspace (Figure 2; see Photographs). All of these wetlands, except for Wetland 12, were identified in the wetland reconnaissance conducted by ESA in December 2014. These 10 wetlands (Wetlands 1, 2, 3, 4, 5, 6, 8, 9, 11, and 12) are described below. Table 1 summarizes the characteristics of each wetland. Two other potential wetlands that were identified during the wetland reconnaissance (Potential Wetlands 7 and 10) were revisited and determined not to meet wetland criteria; data sheets for these sites are included in Appendix B.

4.2.1 Wetland 1

Wetland 1 is a depressional/slope wetland on the south boundary of Cheasty Greenspace (Photograph 1). It is a forested wetland with a canopy of black cottonwood, and understory vegetation of Himalayan blackberry, soft rush, and English ivy. It also has a large unvegetated area that is seasonally ponded; the unvegetated area is quite hard (compacted) and may have been previously disturbed. The hydrology of Wetland 1 appears to be supported primarily by groundwater (hillside seeps) and precipitation. In October 2016, hydrology indicators observed in the wetland were surface soil cracks and sparsely vegetated concave surface. In April 2017, the wetland was saturated to the surface, and there was ponding of approximately 3 inches in the area that was sparsely vegetated. Soils within the wetland met hydric soil indicator A11 (Depleted Below Dark Surface). Data plots W1, DP-1 and W1, DP-2 characterize this wetland and adjacent upland, respectively. Habitat functions are low due to the lack of diversity in vegetation communities and habitats and poor access to habitat.

The buffer to the north is forested with bigleaf maple, black cottonwood, and beaked hazelnut, with an understory of sword fern and English ivy. This wetland is on the edge of the greenspace and two houses within the buffer to the south would reduce the buffer function. However, the overall functions, values, and protection provided by the buffer are moderate as it is forested and relatively undisturbed for an urban park. Ongoing restoration work in the south portion of the park is improving habitat quality by the removal of invasive species.

Table 1. Summary of Wetlands in Cheasty Greenspace

Wetland ID	Total Wetland Area (square feet)[a]	Hydrogeomorphic Class	Cowardin Class
1	977	Depressional/Slope	Forested
2	2,523	Slope	Emergent and Forested
3	23,949	Slope	Scrub-shrub and Forested
4	92,768	Depressional/Slope	Scrub-shrub and Forested
5	790	Slope	Scrub-shrub
6	1,099	Slope	Scrub-shrub
8	874	Slope	Forested
9	132	Slope	Scrub-shrub
11	795+	Slope	Scrub-shrub
12	3,884	Slope	Scrub-shrub

[a] Wetland 11 was not fully delineated as it is re-forming; see description in Section 4.2.8.

4.2.2 Wetland 2

Wetland 2 is a slope, palustrine emergent and forested wetland in the southeast portion of Cheasty Greenspace, upslope of S Columbian Way (Photograph 2). Vegetation within Wetland 2 includes an emergent community dominated by giant horsetail and common ladyfern, and a forested community dominated by black cottonwood. The hydrology of Wetland 2 appears to be supported primarily by groundwater (hillside seeps) and precipitation. Hydrology indicators observed in the wetland include soil saturation to the surface and a high groundwater table. Soils within the wetland met hydric soil indicator F3 (Depleted Matrix). Data plots W2, DP-1 and W2, DP-2 characterize this wetland and adjacent upland, respectively.

The buffer of Wetland 2 is forested with bigleaf maple, black cottonwood, and beaked hazelnut with an understory of sword fern and English ivy. The overall functions, values, and protection provided by buffer are moderate as it is forested and relatively undisturbed for an urban park. Ongoing restoration work in the south portion of the park is improving habitat quality by the removal of invasive species. Wetland 2 is close to S Columbian Way (less than 100 feet), which is a busy and noisy roadway.

4.2.3 Wetland 3

Wetland 3 is a slope, palustrine mostly scrub-shrub wetland with a forested area at its east edge; it is located in the southeast corner of the park (Photograph 3). The wetland continues off the park property to the east and under the deck of an adjacent house. The scrub-shrub community is dominated by

salmonberry and red alder. The forested portion is dominated by red alder and non-native cedar (likely planted). Emergent vegetation is dominated by giant horsetail, common ladyfern, and English Ivy. English Ivy is quite invasive in this area of the park, including in the wetlands. The hydrology is supported primarily by groundwater (hillside seeps) as well as precipitation. A small channel is located within the boundaries of the wetland (Figure 2). The channel is approximately 1 to 2 feet wide and incised; it has concrete culvert placed in some areas, and it ends within the wetland where the slope flattens out. Additionally, a storm drain is immediately to the south of the wetland, which likely drains the wetland away from the downslope houses. Hydrology indicators observed in the wetland were a high groundwater table and soil saturated to the surface. There was also surface flow in the stream channel. Soils within the wetlands met hydric soil indicator F3 (Depleted Matrix). Data plots W3, DP-3 and W3, DP-4 characterize this wetland and adjacent upland, respectively.

The wetland buffer consists primarily of bigleaf maple with an understory of Indian plum and sword fern. The overall functions, values, and protection provided by the buffer are moderate as it is forested and relatively undisturbed for an urban park. Houses and a residential street are immediately adjacent to the east edge of the wetland, limiting the buffer in this location.

4.2.4 Wetland 4

Wetland 4 is the largest wetland in the Cheasty Greenspace; it is located in middle of the park in a natural valley, stretching from the west to the east edges of the park (Figure 2; Photograph 4). It is a slope-depressional, palustrine scrub-shrub and forested wetland. Vegetation is dominated salmonberry, black cottonwood, giant horsetail, and Himalayan blackberry. Hydrology is supported primarily by a high groundwater table and hillside seeps. Water also comes from the west under Cheasty Boulevard, but no culverts were found. There is a channel that begins within the wetland and is culverted at its downstream end, where it is channelized into a storm drain at the east edge of the greenspace. Hydrology indicators observed in the wetland include soil saturation to the surface, a high groundwater table, and seeps from adjacent slopes. Standing water was observed in the wetland during the December 2014 site visit, but not in October 2016. Soils in the wetland met hydric soil indicator A4 (Hydrogen Sulfide) and F6 (Redox Dark Surface). Data plots W4, DP-1 and W4, DP-2 characterize this wetland and adjacent upland, respectively. The wetland has a moderate habitat function as it has more than one plant structure, hydroperiod, and habitat types.

The buffer of Wetland 4 to the north and south is forested (primarily bigleaf maple), with sword fern, beaked hazelnut, cherry laurel, and English ivy in the understory. A portion of the southern wetland boundary and the buffer of the wetland had been modified by illegal activities, and it has since been restored; the restored portion was regraded and planted with native vegetation in 2015 and 2016. The buffer to the southwest is quite steep, in particular adjacent to the SPR work yard, which is 100–150 feet south of Wetland 4. The overall functions provided by the buffer are moderate as it is forested, but there is minimal buffer to the west and east outside of the park.

4.2.5 Wetlands 5 and 6

Wetlands 5 and 6 are small slope, palustrine scrub-shrub wetlands in shallow east-facing ravines. Wetland 5 is dominated by Himalayan blackberry, common ladyfern, and youth-on-age. Wetland 6 is dominated by Himalayan blackberry and red alder (Photograph 5). Hydrology in both wetlands is supported groundwater and precipitation. Soils within both wetlands meet hydric soil indicator F3 (Depleted Matrix); Wetland 5 also meets the criteria for F6 (Redox Dark Surface). Data plots W5, DP-1 and W6, DP1 characterize these wetlands, and W5, DP-2 and W6, DP-2 describe the adjacent uplands.

Habitat functions are low due to the dominance of invasive species and lack of diversity in vegetation communities, hydroperiods, and habitats.

The buffers immediately adjacent to Wetlands 5 and 6 are dense Himalayan blackberry; farther away, the buffers are dominated by bigleaf maple with sword fern and Oregon grape. No regulatory buffer is required for Wetland 5 due to its size (less than 1,000 square feet) and Category IV rating. The buffers provide moderate protection as they are forested, despite the invasive species in the immediate vicinity.

4.2.6 Wetland 8

Wetland 8 is a slope, palustrine forested wetland on the north end of the greenspace (Photograph 6). It is dominated by red alder with an understory of buttercup. The hydrology of the wetland is supported by a high groundwater table and precipitation. Hydrology indicators observed in the wetlands included soil saturation to the surface, a high groundwater table, and some surface ponding. Soils met hydric soil indicator A11 (Depleted Below Dark Surface). Data plots W8, DP-1 and W8, DP-2 characterize this wetland and adjacent upland, respectively. Habitat functions are moderate because of the landscape potential and proximity to priority habitats.

The buffer of Wetland 8 is forested, dominated by bigleaf maple and black cottonwood, with swordfern and some Himalayan blackberry in the understory. A cleared transmission corridor approximately 5 feet wide crosses the buffer of Wetland 8 from east to west along the Andover Street right-of-way. Also see Photograph 7. The buffer provides moderate protection as it is forested.

4.2.7 Wetland 9

Wetland 9 is a slope, palustrine scrub-shrub wetland in the north of the greenspace on the east edge, upslope of the Rainer Vista Dakota W P-Patch Community Gardens (Photograph 8). Subsurface hydrology likely continues downslope to the east outside of the Cheasty Greenspace but does not appear to be connected to Watercourse 1. Vegetation is dominated by Himalayan blackberry and red alder. The hydrology of the wetland is supported by a high groundwater table and precipitation. It is close to the watercourse but is not likely connected hydrologically because of its location in the landscape. Soils met hydric soil indicator F3 (Depleted Matrix). Data plots W9, DP-1 and W9, DP-2 characterize this wetland and adjacent upland, respectively.

Similar to Wetlands 5 and 6, the buffer adjacent to Wetland 9 is dense Himalayan blackberry, and farther away the buffer is dominated by bigleaf maple with swordfern. The overall functions, values, and protection provided by this buffer are moderate as it is forested, despite the prevalence of invasive species. No regulatory buffer is required for Wetland 9 due to its size (less than 1,000 square feet) and Category IV rating.

4.2.8 Wetland 11

Wetland 11 is a slope, palustrine scrub-shrub wetland in the middle of Cheasty Greenspace (Photograph 9). Wetland 11 has been substantially modified by illegal activities. It is difficult to determine what preexisting conditions were, but it appears that the east portion of the wetland was excavated or filled. It has since been regraded and restored with native vegetation. However, the majority of the plants used in the restoration are upland plants, some of which are not healthy as the wetland appears to be reforming due to the presence of a high groundwater table. Additionally, a small surface channel runs through the restored area. The restored portion of the wetland was not delineated as it is reforming and the trail is not proposed in this area; however, it was considered when rating the wetland. Vegetation is dominated by salmonberry. Hydrology indicators observed in the wetland included soil saturation to the

surface and a high groundwater table, and surface flow (channel forming). Soils within the wetland met hydric soil indicators F3 (Depleted Matrix) and F6 (Redox Dark Surface). Data plots W11, DP1 and W11, DP2 characterize the wetland and adjacent uplands, respectively. Testplot B also shows an upland area downslope of the wetland and is the approximately east edge of the reforming wetland.

The buffer area of Wetland 11 consists primarily of patches of Himalayan blackberry and bigleaf maple. There is also a large open area that has been restored to the south of the wetland. The overall functions, values, and protection provided by the buffer are moderate as it is primarily forested despite the invasive species.

4.2.9 Wetland 12

Wetland 12 is a slope, scrub-shrub wetland near the south boundary of Cheasty Greenspace. It is dominated by hardhack with some salmonberry (Photograph 10). Based on its position in the landscape, it may drain to Wetland 1, although no surface or subsurface connections were observed. A social trail crosses the north edge of the wetland, and this area has little vegetation. Some trees have been planted in the wetland buffer to the northeast and a little within the wetland. Hydrology indicators from the April 2017 site visit were saturation to the surface and a high water table. Soils met hydric soil indicator A11 (Depleted Below Dark Surface). Data plots W12, DP1 and W12, DP2 characterize the wetland and adjacent uplands, respectively. Testplot A is also in Wetland 12, but in October 2016, no hydrology indicators were found.

The buffer is forested with bigleaf maple, black cottonwood, and beaked hazelnut with an understory of sword fern. This wetland is on the edge of the greenspace, and Wetland 1 is within the buffer. Ongoing restoration work in the south portion of the park has improved habitat quality by the removal of invasive species.

4.2.10 Potential Wetlands 7 and 10

Potential Wetlands 7 and 10 were identified as needing further investigation in the wetland reconnaissance conducted in late 2014/early 2015 because these areas had some wetland vegetation and hydrology indicators, but lacked indicators of hydric soil to meet the definition of a wetland. Both potential wetlands were revisited and determined to not meet the wetland criteria; see data plot PW7, DP1 in Appendix B.

4.2.11 Wetland Ratings and Buffer Requirements

Under the Seattle Municipal Code (SMC), wetlands must be classified using Ecology's 2014 Wetland Rating System for Western Washington (SMC 25.09.160) (Hruby, 2014). According to SMC 25.09.160.B, the buffer width required for a wetland depends on the wetland rating, size, and scores for habitat function. Category IV wetlands that are less than 1,000 square feet in area require no buffer according to the SMC.

The ratings and City-required buffer widths for wetlands within the study area are presented in Table 2. Wetland rating forms are included in Appendix C.

Table 2. Summary of 2014 Wetland Ratings and Buffers

Wetland ID	Wetland Category (2014 Wetland Rating System)	2014 Habitat Score	Standard Buffer Width (feet)[a]
1	III	4 (low)	60
2	IV	4 (low)	50
3	III	5 (moderate)	110
4	III	5 (moderate)	110
5	IV	4 (low)	0 (<1,000 sq ft)
6	IV	5 (moderate)	50
8	III	5 (moderate)	110
9	IV	4 (low)	0 (<1,000 sq ft)
11	IV	4 (low)	50
12	IV	4 (low)	50

[a] Buffers as per SMC (25.09.160.B). No buffer required on Category IV wetlands less than 1,000 square feet in size.

4.3 Watercourses

4.3.1 Watercourse 1

One watercourse (Watercourse 1) is present in the study area; it flows west to east and extends across the north portion of the greenspace (Figure 2, Photograph 11). Water flows into the watercourse from a culvert under Cheasty Boulevard. The watercourse has a distinct bed and bank, and the OHWM is 1–2 feet wide. Channel depth varies greatly, ranging from non-distinct to quite incised, approximately 4 feet in some spots. A corrugated 12-inch plastic pipe has been placed in the channel and extends from Cheasty Boulevard to approximately three-quarters of the length of the watercourse. The watercourse flows both through and around the pipe; the pipe is not joined to the culvert at Cheasty Boulevard and is not continuous (i.e., there are breaks in pipe). It would be non-fish bearing and is likely seasonal. Riparian vegetation consists predominantly of bigleaf maple, cherry laurel, hawthorn, sword fern, horsetail, English holly, Himalayan blackberry, and Indian plum. The watercourse is in a small natural ravine and may have supported a natural watercourse pre-development. The OHWM of Watercourse 1 was flagged and GPS'ed and will be surveyed by SPR.

4.3.2 Watercourse Rating and Buffer Requirements

Although no up- or downstream connections were found, the watercourse conservatively meets the criteria of a Type Ns Water. Type Ns streams include all segments of natural waters within the bankfull width of the defined channels that are not Type S, F, or Np Waters. These are seasonal, nonfish habitat streams in which surface flow is not present for at least some portion of a year of normal rainfall, and are not located downstream from any stream reach that is a Type Np Water. Type Ns Waters must be physically connected by an above-ground channel system to Type S, F, or Np Waters.

Under SMC 25.09.012, the watercourse would be regulated as a riparian watercourse. "*A riparian watercourse is the watercourse of Type F, Np, and Ns waters defined in Washington Administrative Code (WAC) 222-16-030 and 222-16-031 that have fish or wildlife habitat. Pipes, culverts, flow control*

facilities, water quality facilities, and stormwater conveyances are not regulated as riparian watercourses." The riparian management area is the area within 100 feet of the riparian watercourse measured from the OHWM of riparian watercourses (together these are called a riparian corridor).

4.4 Wildlife Habitat Types

The Cheasty Greenspace contains three major habitat types as described by Johnson and O'Neil (2001): westside lowland conifer-hardwood forest; westside riparian wetlands; and herbaceous wetlands. Figure 3 shows the extent of habitat types in the study area. Riparian and herbaceous wetlands are combined on the figure (the majority of wetland area meets the definition of riparian wetland habitat type rather than herbaceous). Other habitat types in the vicinity of the greenspace include open water and urban/mixed environs.

Westside lowland conifer-hardwood forest, or mixed forest, is the most common habitat type on the site, accounting for over 80 percent of the area (Figure 3). The tree canopy is composed of mostly deciduous broadleaf species with red alder, black cottonwood, and bigleaf maple as the dominant species in the study area (Photographs 11 and 15). Only a few coniferous trees, such as western red cedar, are present. A few mature Pacific madrone are also present. The trees are medium to large, averaging 12 to 24 inches diameter breast height (dbh) with a few large black cottonwood trees measuring over 36 inches dbh (Photograph 13). Understory plants include vine maple, salmonberry, red alder, and Himalayan blackberry. The herbaceous layer contains sword fern, salal, Oregon grape, and trailing blackberry. The tree canopy is mostly multistoried and closed across the greenspace with only a few gaps. Habitat elements observed include snags, downed logs, stumps, moss and lichens, leaf litter, and pockets of forested or emergent wetland.

Westside riparian wetlands include palustrine forested and palustrine scrub-shrub wetlands (Photographs 13 and 14). These habitats in the greenspace are described previously, as well as herbaceous, or palustrine emergent wetlands. See Section 4.2 above.

In general, the forested and wetland habitats in the study area provide substantial wildlife habitat. Interruptions to connectivity are limited within the greenspace, and the habitats are well interspersed. Threats to habitat integrity include the dumping of refuse and multiple species of invasive or nonnative plants, including Himalayan blackberry, English ivy, and English holly, as well as escaped cultivated species such as English laurel (Photograph 17). However, activities to remove these species from the site have been highly successful in recent years, and planted native vegetation is becoming established. In the vicinity of the greenspace, other patches of deciduous or coniferous forest occur in patches disrupted by residential development, roads, and utilities. Habitat connectivity between the greenspace and landscaped habitats on the adjacent golf course (on the west side of the greenspace) exists in some areas. The greenspace is also adjacent to smaller undeveloped patches of forest on the east-facing slopes on both sides of Cheasty Boulevard to the northwest.

4.5 Wildlife Observations

The forested and wetland habitats contain a diverse community of trees and shrubs that provide food and shelter for a number of songbirds and woodpeckers, amphibians, and small mammals. Bird species observed during the winter field investigation included Steller's jay, northern flicker, downy woodpecker, American robin, golden-crowned kinglet, black-capped chickadee, Bewick's and Pacific wren, song sparrow, and Anna's hummingbird (Table 3). Pileated woodpecker excavations were

encountered in multiple trees and snags across the greenspace. These bird species are considered common residents in Puget Sound lowlands.

Bird observations during the spring field investigations included additional migratory species such as Wilson's warbler, Pacific flycatcher, vireo species, and Swainson's thrush. Several bird species were confirmed as nesting on the site during field investigations. Evidence of nesting included nest building, territorial behavior, and incubating birds on a nest. Confirmed breeders on the site included Cooper's hawk, red-breasted sapsucker, American crow, song sparrow, and European starling. Other species likely breeding in or in the vicinity of the greenspace include American robin, Bewick's wren, and spotted towhee.

Except for eastern gray squirrel, no mammals or amphibians were observed during field investigation. Species expected to be present in the greenspace include Northern raccoon, Virginia opossum, coyote, Pacific chorus frog, garter snake, and potentially deer.

General observations of wildlife use on the site were recorded during all field visits. Table 3 is a list of wildlife species observed and expected to occur, and includes both the winter and spring surveys. Field survey data sheets are included in Appendix D.

Table 3. Summary of Bird Species Observed and Expected in Cheasty Greenspace

Species Name	Observed	Expected (Resident or Seasonal)	Confirmed Nesting	Probable Nesting	Transient/ Migratory*
Canada Goose	X				X
Common Nighthawk					X
Vaux's Swift		X			
Anna's Hummingbird	X			X	
Rufous Hummingbird		X		X	
Glaucous-winged Gull	X				X
Double-crested Cormorant	X				X
Bald Eagle	X				X
Sharp-shinned Hawk		X			
Cooper's Hawk	X		X		
Red-tailed Hawk	X				
Western Screech-Owl		X			
Barred Owl		X			
Northern Saw-whet Owl		X			
Red-breasted Sapsucker	X		X		
Downy Woodpecker	X			X	
Northern Flicker	X			X	
Pileated Woodpecker	X				
Merlin		X			
Olive-sided Flycatcher		X			
Western Wood-Pewee		X			
Willow Flycatcher					X
Hammond's Flycatcher					X
Pacific Flycatcher	X			X	
Vireo sp.	X				
Cassin's Vireo		X			
Warbling Vireo		X			
Red-eyed Vireo		X			
Steller's Jay	X			X	
California Scrub-Jay		X			
American Crow	X		X		

Species Name	Observed	Expected (Resident or Seasonal)	Confirmed Nesting	Probable Nesting	Transient/ Migratory*
Tree Swallow		X		X	
Violet-green Swallow		X		X	
Barn Swallow		X			
Black-capped Chickadee	X			X	
Chestnut-backed Chickadee	X				
Bushtit	X			X	
Red-breasted Nuthatch	X			X	
Brown Creeper	X				
Pacific Wren	X			X	
Bewick's Wren	X			X	
Golden-crowned Kinglet	X				
Ruby-crowned Kinglet	X				
Swainson's Thrush	X			X	
Hermit Thrush		X			X
American Robin	X			X	
Varied Thrush	X				
European Starling	X		X		
Bohemian Waxwing					X
Cedar Waxwing		X			X
House Finch	X			X	
Purple Finch		X			
Pine Siskin		X			
American Goldfinch	X				
Orange-crowned Warbler		X		X	
Nashville Warbler					X
MacGillivray's Warbler					X
Yellow Warbler		X		X	
Yellow-rumped Warbler	X				
Black-throated Gray Warbler					X
Townsend's Warbler					X
Wilson's Warbler	X			X	
Spotted Towhee	X			X	
Chipping Sparrow					X
Fox Sparrow		X			
Song Sparrow	X		X		
Lincoln's Sparrow					X
White-crowned Sparrow		X			
Golden-crowned Sparrow					X
Dark-eyed Junco	X				
Western Tanager		X			
Black-headed Grosbeak		X			
Brown-headed Cowbird		X		X	

* Includes “flyover” and migratory species not associated with the habitats provided in Cheasty Greenspace.

4.6 Trees

In spring 2018, SPR arborists inventoried all trees greater than 6-inches diameter at breast height (DBH) within 6 feet on either side of the center line of the trail (12 feet total). Two hundred and seventeen trees were inventoried and determined if they met the criteria of an exceptional tree (See Figure 2 and Appendix E for list of inventoried trees). A tree can be rare or exceptional by virtue of its size, species, condition, cultural/historic importance, age, and/or contribution as part of grove of trees as determined by the method outlined in the Director's Rule 16-2008. The majority of the trees inventoried were Bigleaf Maple (*Acer macrophyllum*) which are exceptional if they are larger than 30-inches DBH. Also found were red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera ssp. trichocarpa*), and bitter cherry (*Prunus emarginata*) which are only exceptional as part of a grove. A grove is a group of 8 or larger than 12-inches DBH that form a continuous canopy. As Cheasty Greenspace is mainly forested with trees larger than 12-inches, it was assumed that inventoried trees larger than 12-inches were part of a grove. Trees that fail to meet the risk criteria, are not exceptional. See Table 4, for a summary of exceptional trees.

Table 4. Summary of Exceptional Trees near the Trail

	Exceptional		
Species	Size	Grove	**Total**
Acer macrophyllum	33	61	**94**
Alnus rubra	0	4	**4**
Malus sp.	1	0	**1**
Populus balsamifera ssp. trichocarpa	0	5	**5**
Prunus emarginata	0	1	**1**
Total	34	71	**105**

4.7 Literature Review

ESA also conducted a literature review of current wildlife science relevant to pedestrian and bicycle trail impacts on birds to inform planning for impact assessment and mitigation. All of the studies found that looked at different types of recreation (e.g., mountain biking, walking) were conducted in large national parks or wilderness areas with quite different habitat and wildlife than found in an urban park such as the Cheasty Greenspace. Only one study was found that included effects of mountain biking specifically on birds (Miller & Knight, 1998). That study concluded that recreational use changed species composition, but it did not examine differences between types of recreation activities. For other wildlife species, studies by Taylor and Knight (2003), Wisdom et al. 2004, and Herrero & Herrero (2000) were the only studies found that distinguished between impacts from mountain biking and other recreation types (usually hiking) on animal behavior. Taylor and Knight (2003) studied bison, mule deer, and pronghorn antelope in Antelope Island State Park, Utah and concluded that there was no significant difference between the response of wildlife to mountain biking and hiking. Wisdom et al. (2004) looked at the effects of off-road recreation (all-terrain vehicles [ATVs], mountain biking, horseback riding, and hiking) on mule deer and elk. They concluded that movement rates and probabilities of flight for elk were higher for ATV and mountain bike riding than for horseback riding and hiking, although elk did not flee about a third of the time. Mule deer showed little measureable response to off-road recreation. Herrero and Herrero (2000) showed that grizzly bear encounters were more common with mountain bikers than hikers along the Highline Trail in Banff National Park. They attributed this to the speed and relative silence of mountain bikes, which allowed mountain bikers to get closer to bears before being detected by the bear. A literature review conducted for Parks Canada in Quinn and Chernoff (2010) looked at the

ecological effects of mountain biking on soils, vegetation, water, and wildlife. They found that available published literature indicates that trail-based mountain biking results in similar environmental effects as other forms of summer season trail use. However, they also identified significant data gaps. Many studies have been conducted on large mammals in large wilderness areas, and often did not distinguish between impacts from different recreation types. Erosion and compaction from mountain bikes were the most commonly studied issues; these studies found that soil type, terrain, and technique were all factors in impacts. They found little research on mountain bikes being a vector for the spread of invasive plants, and it was assumed to be similar to hiking and horseback riding. They were not able to find published research on the effects of mountain biking on water quality.

5.0 REGULATORY CONTEXT

The proposed trails have been designed to avoid and minimize impacts to wetlands, wetland buffers, the watercourse and its buffer, and exceptional trees. There would be no wetland fill, shading of wetlands, work within the OHWM of the watercourse, or removal of exceptional trees. However, the project would result in permanent wetland buffer impacts, and impacts to the riparian management area (stream buffer) (see Section 6.0 for details). This section summarizes the regulatory context for federal, state, and local authorities likely to require permits or approvals.

5.1.1 U.S. Army Corps of Engineers and Section 404

Wetlands are regulated at the federal and state levels by the Corps and Ecology, respectively. At a federal level, the Corps regulates wetlands and streams (i.e., Waters of the U.S.) under the Clean Water Act through the Section 404 permit process (also known as a Department of the Army permit). The trail would not cross any wetlands and thus avoid wetland shading and wetland fill. As there would be no fill, a Section 404 permit would not be required. See the additional discussion in Section 6.0 below.

5.1.2 Washington State Department of Ecology

Ecology regulates wetlands under Section 401 of the Clean Water Act, which is triggered by the Section 404 permit. Issuance of a 401 Certification means that Ecology has reasonable assurance that the applicant's project will comply with state water quality standards and other aquatic resource protection requirements under Ecology's authority. The trail would not cross any wetlands and thus avoid wetland shading and wetland fill. As there would be no fill or shading, a Section 401 Certification would not be required. See the additional discussion in Section 6.0 below.

5.1.3 Washington State Department of Fish and Wildlife

There would be no work within the OHWM of the watercourse, and thus no Hydraulic Project Approval (HPA) is expected to be required (pending confirmation by WDFW). Only projects that use, divert, obstruct, or change the natural bed or flow of state waters require an HPA from WDFW. The HPA permit is authorized through Chapter 77.55 Revised Code of Washington (RCW), and administered through rules in WAC.

5.1.4 City of Seattle

Critical Areas

The City regulates critical areas under SMC 25.09, *Regulations for Environmentally Critical Areas*. The City updated and adopted changes to their critical areas regulations in early 2017. This section summarizes regulations applicable to the project, but the reader is referred to SMC 25.09 for the complete regulations. Within the Cheasty Greenspace, multiple areas are designated critical areas including a Fish and Wildlife Habitat Conservation Area (FWHCA), wetlands, and geologic hazard areas (Figures 2 and 4).

SMC 25.09.045.H.3.f states that public projects are exempt from SMC 25.09

> "if the purpose is to benefit the public's passive enjoyment of the environmentally critical area, such as, but not limited to, walking trails providing access to a creek or wetland area, when located and designed to minimize environmental disturbance and adverse impacts to the environmentally critical area and buffer. The applicant shall protect vegetation and trees pursuant to a tree and

vegetation plan consistent with best management practices (BMPs). The plan shall be prepared by a qualified environmental professional with experience related to the type of environmentally critical area or buffer where work will occur. In landslide-prone areas, the plan shall also be approved by a geotechnical engineer licensed in Washington with experience in analyzing geological hazards related to slope stability and tree and vegetation removal on steep slope erosion hazard areas. Trail projects shall be:

1. Limited to pervious surface or raised boardwalk, using non-treated wood or other non-toxic material;
2. No more than 5 feet wide;
3. For pedestrian use only;
4. Located in the outer 25 percent of the wetland buffer area; and
5. Located to avoid removal of trees."

Because the proposed trail includes mountain bike use, this exemption does not apply.

Wetlands. Wetland buffer averaging and buffer reductions are allowed under SMC 25.09.160.E. Buffers can be reduced to no less than 75 percent of required buffer widths as long as it will not reduce functions or values and the area is the same as would be required with a standard buffer. Buffers of Category I, II, and III wetlands can be reduced by 20 percent if a vegetated corridor at least 100 feet wide is protected between the wetland buffer and any other priority habitats defined by WDFW. Buffers can be reduced for Category IV wetlands if they do not meet criteria for buffer averaging or for granting a variance.

Fish and Wildlife Habitat Conservation Areas (FWHCAs). The Cheasty Greenspace is mapped and designated by the WDFW as biodiversity areas and corridors; thus, the entire greenspace meets the criteria for an FWHCA. The riparian watercourse together with its riparian management area (i.e., buffer) are a riparian corridor, which is also regulated as an FWHCA. The riparian management area is 100 feet from the top of bank or OHWM (see SMC 25.09.012). Review of proposed development impacts on FWHCA is required under SMC 25.09.200. Development is prohibited within or over the watercourse, and within the riparian management area unless it can be demonstrated that no other access is available; access is provided by a freestanding structure that maintains the natural channel and floodway of the watercourse; that disturbance of the riparian watercourse and corridor is kept to a minimum; and durable and non-toxic materials are used for construction of structures.

Geologic Hazard Areas. Development is allowed on steep slope erosion hazard areas if the applicant demonstrates that all other provisions of SMC 25.09 and all applicable provisions of Title 23 and Chapters 22.800 through 22.808 are met (SMC 25.09.090). No adverse impact on the stability or erosion potential of the steep slope erosion hazard areas may result. The development must also meet criteria outlined in SMC 25.09.090. The Director may require a geotechnical report to verify site conditions and to evaluate the impacts of the development in the steep slope erosion hazard area. A geotechnical report was conducted by HWA Geosciences (2015), and updated based on the redesigned trail in 2018.

Tree Protection

The City regulates trees under SMC 25.11, *Tree Protection*. Per SMC 25.11.040, there are restrictions on tree removal and topping, except as provided in SMC 25.11.030.

The Director's Rule 16-2008 clarifies the definition of "exceptional tree" in SMC 25.11.020. This rule also clarifies the SEPA Plants and Animals Policy (SMC 25.05.675.N.2.c) for the purpose of determining the

value of "rare, uncommon, unique or exceptional" trees on sites undergoing environmental review, in order to establish appropriate tree protection mitigating measures. The Director's Rule states that an exceptional tree is a tree that:

- Is designated as a heritage tree by the City; or
- Is rare or exceptional by virtue of its size, species, condition, cultural/historic importance, age, and/or contribution as part of grove of trees as determined by the method outlined in the Director's Rule 16-2008.

A tree that meets the size threshold or grove definition is not considered exceptional if it should be removed based on a risk assessment produced by a qualified professional.

State Environmental Policy Act

SEPA Rules are outlined in SMC 25.05, *Environmental Policies and Procedures*. The SPR is the lead SEPA agency for the project. A SEPA analysis is required for any proposal that requires a state or local agency decision to license, fund, or undertake a project. SEPA requires governmental agencies to consider the environmental impacts before project approval. The SEPA Official issued a DNS on August 3, 2015, but the SEPA decision was successfully appealed. This Critical Areas Study will be used to support the revised SEPA analysis for the trail project.

6.0 PROJECT IMPACTS AND CONCEPTUAL MITIGATION APPROACH

SPR has designed the proposed trails to avoid and minimize impacts to wetlands and watercourses and their buffers in accordance with the following preferred sequence of mitigation (SMC 25.09.065):

a. Avoiding the impact altogether by not taking a certain action or parts of an action.
b. Minimizing the impact by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, BMPs, and/or by taking affirmative steps to avoid or reduce impact.
c. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
d. Reducing or eliminating the impact over time by preservation and maintenance operations.
e. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments.
f. Monitoring the impact and the compensation projects and taking appropriate corrective measures.

The following sections describe each step of the mitigation sequence for the project.

6.1 Avoidance

SPR has redesigned the proposed trail alignment to avoid wetlands and their buffers, the watercourse, and steep slopes to the greatest extent possible. The redesign took into account the wetland and watercourse delineation results, geotechnical input, and community input. The new proposed trail alignment includes two independent loops instead of a single perimeter loop inside the greenspace.

The new proposed trail alignment now avoids all wetland crossings, including Wetlands 3, 4, and 11 (which would have been crossed with the previous trail design). The new alignment would avoid several areas with steep slopes, including the area near the SPR work yard east of Cheasty Boulevard. The trail would still cross the watercourse and its riparian management area as well as a portion of the buffer of Wetland 8. The crossing of the watercourse would be via a bridge and would not be within the OHWM of the watercourse. No exceptional trees would be removed within the wetland or watercourse buffer.

6.2 Minimization

The redesigned trail alignment also minimizes impacts to wetlands and their buffers in comparison to the previous design. The preliminary trail designs called for separate pedestrian and bicycle trails, while the new proposed trail design includes more shared portions of trail, decreasing the total footprint of disturbed area for the trails. Existing social trails would also be used where possible. For example, the proposed Andover Entry would use an existing social trail and transmission line right-of-way within the wetland buffer to provide access to the greenspace from the northwest corner instead of the creation of a new trail. The trail was designed with the IMBA trail guidelines and the principle of minimizing trail footprint. The grade was kept to 10 percent or less and follows the “half-rule” that a trail’s grade should never exceed half the grade of its side slopes. The trail would be constructed using full bench-cut, cutting from the existing slopes so that rainfall drains off the side of the trail rather than along it. In addition, flat areas would be avoided to prevent creating collection basins for water. Where possible, the trail would use pre-existing trail on the site. These trails will have no special mountain bike trail features (e.g., jumps). Additionally, exceptional trees will be avoided.

Appropriate BMPs would be used for pollution, sediment, and erosion control during construction. Erosion and sediment control measures include mulching, matting, netting, and filter fabric fencing. Significant short- or long-term water quality impacts are not expected if erosion control BMPs are properly implemented, monitored, and maintained during construction.

6.3 Unavoidable Project Impacts

Although impacts have been avoided and minimized, the project would result in unavoidable impacts to a wetland buffer and a riparian management area (i.e., watercourse buffer). Project impacts are based on the 30 percent trail design plans (Appendix F). No temporary impacts are anticipated; wetlands, wetland buffers, the watercourse, and the riparian management area would be clearly marked to avoid disturbance during trail construction. We have assumed that no impacts to the watercourse would occur; however, this will need to be verified by WDFW, through the HPA process during permitting. Potential impacts are as follows and shown in Appendix F, Trail Design, Sheet L-1:

- The Andover Entry and approximately 82 feet of the 4-foot wide trail would impact 327 square feet of the buffer for Wetland 8. (The buffer of Wetland 8 would be reduced by less than 1 percent.)
- The one-way 1.5-foot wide mountain bike trail would cross the width of the riparian management area of Watercourse 1. This would impact 1,645 square feet of buffer.
- Watercourse 1 would be crossed with a bridge approximately 4 feet wide and at least 6 feet long; no footings would be placed within the OHWM.

Watercourse 1 crosses most of the width of Cheasty Greenspace from west to east. Crossing Watercourse 1 with the trail is avoided on the downstream (eastern) edge of the watercourse, but it is not possible to avoid crossing it on the upstream side. There would be no impacts to the watercourse itself, and it would be crossed with a bridge approximately 4 feet wide. The watercourse is 1–2 feet wide, and the bridge would be at least 6 feet long and thus outside of the OHWM.

6.4 Compensatory Mitigation Approach

SPR plans to provide compensatory mitigation to offset unavoidable impacts to a wetland buffer (327 square feet) and the riparian management area (1,645 square feet). Mitigation concepts were developed in accordance with the City's critical areas mitigation plan information standards (SMC 25.09.065) and *Wetland Mitigation in Washington State—Part 2: Developing Mitigation Plans* (Ecology et al., 2006). The SMC does not specifically address buffer mitigation ratios; however, areas of permanent buffer impact would be mitigated at a 1:1 ratio.

The proposed concept for compensatory mitigation for unavoidable impacts includes the following:

- Removal of invasive species from at least 327 square feet of the buffer of Wetland 8.
- Planting of the area with native shrubs including but not limited to sword fern and salmonberry. Native trees will not be used due to the proximity to the transmission line corridor.
- Closure of the portion of the social trail through the buffer of Wetland 8 that is not used for the project. Native shrubs will be planted along the reclaimed trail.
- Removal of invasive species from at least 1,645 square feet of the buffer of Watercourse 1.
- Planting of the area with native trees and shrubs including but not limited to sword fern, Douglas fir, and salmonberry.

Native vegetation would improve wetland and riparian functions for wildlife and provide additional protection to the adjacent wetland and watercourse. In addition, wetland and watercourse buffers reduce sediment and nutrients from entering the wetlands and streams, moderate temperatures, increase plant species diversity, provide wildlife habitat, and deter human disturbance of these resources.

6.5 Mitigation Goals, Objectives, and Performance Standards

The overall goal of the conceptual mitigation plan is to replace the habitats and functions lost or altered as a result of the proposed trail project.

6.5.1 Mitigation Goals

Specific mitigation goals include the following:

- Enhance 327 square feet of wetland buffer through the removal of invasive species and the planting of native shrubs.
- Enhance 1,645 square feet of the buffer of Watercourse 1 through the removal of invasive species and the planting of native trees and shrubs.
- Restore portion of social trail within the wetland buffer by planting of native shrubs.

6.5.2 Objectives and Performance Standards

Objective 1: Establish native shrub cover in the wetland and watercourse buffer areas.

> **Performance Standard 1a: Year 1—**100 percent survival of installed native trees and shrubs species within 1 year of mitigation installation. Survival will be determined by total counts as the area is small.
>
> **Performance Standard 1b: Year 2—**At least 20 percent coverage of native species in all areas (installed and desirable volunteer).
>
> **Performance Standard 1c: Year 3—**At least 30 percent coverage by native plant species in all areas (installed and desirable volunteer).
>
> **Performance Standard 1d: Year 5—**At least 80 percent survival of new trees and shrubs in buffer mitigation areas.

Objective 2: Remove non-native, invasive vegetation in wetland and watercourse buffer mitigation areas.

> **Performance Standard 2:** Himalayan blackberry, English ivy, and other invasive species will not exceed 20 percent coverage in all planting areas throughout the 5-year monitoring period.

6.6 Maintenance and Monitoring

The main objective for mitigation monitoring is to document the level of success in meeting the project's performance standards. The following describes the monitoring and maintenance approach for 5 years, as required by SMC 25.09.065.

6.6.1 Schedule

An initial stem count of the installed vegetation will be conducted following construction (an as-built count). Monitoring of mitigation areas will continue annually for 5 years post-construction. A qualified biologist or landscape designer will conduct the monitoring. The as-built plan will be used as the basis for monitoring of plant survival. Monitoring will begin the first full growing season after construction is complete and the plants have been installed.

6.6.2 Data Collection

Shrub and tree cover will be evaluated both quantitatively and qualitatively 1 year after construction, as well as in Years 2, 3, 4, and 5. Data collection will occur during the late summer (i.e., July–September). The following information will be recorded during each of the monitoring site visits:

- Survival rates of installed vegetation during plant warranty period based on total counts.
- General plant health assessment and plant aerial coverage from established sampling total counts.
- Presence of undesirable plants (weedy and/or non-native species) with estimated percent cover.
- Photo documentation of site conditions from established photo points.
- Impacts to the wetland and watercourse buffer from human use (e.g., dumping of debris, bicycle use).
- Signs of wildlife use.

6.6.3 Reporting

Monitoring reports will be prepared by a qualified biologist or landscape designer for review and approval by SPR and the Seattle Department of Construction and Inspections (SDCI) during monitoring Years 1, 2, 3, 4, and 5. The reports will compare the performance standards described in the mitigation plan to the field observations during monitoring, and will recommend species replacements or other maintenance activities, if necessary (see *Maintenance* section below). Reports will present data collected during the site visits and document success in meeting specific performance standards. Photographs will illustrate and document site conditions. Monitoring reports will be submitted by the end of each monitoring year to SPR and the SDCI.

6.7 Maintenance

Maintenance of the mitigation area will begin after completion of the project and continue, as needed, for 5 years. After the initial planting acceptance by the project biologist, the landscaping contractor (or SPR if planted by volunteers) will be responsible for plant survival for a period of 1 year. If the mitigation area is planted by volunteers, the plant survival requirement would not apply. SPR will provide maintenance to the mitigation site, as necessary. Maintenance could include, but may not be limited to, the following:

- Irrigate during dry periods.
- Remove non-native or invasive plant species.
- Add soil amendments and/or mulch.
- Install fencing around woody plants to prevent animal damage.

- Construct fencing to prevent vandalism or damage caused by humans.
- Install supplemental plantings as needed.

Based on monitoring results, SPR will implement the required maintenance and determine how corrective measures will be addressed should they be necessary.

6.8 Contingency

If any portion of the mitigation is not successful, a contingency plan will be implemented. Such plans are prepared on a case-by-case basis to remedy aspects of the mitigation that do not meet the performance standards. The plan, if required, would be developed in cooperation with the regulating agencies.

6.9 Site Protection

Mitigation areas would be protected from future use (except for the purposes of enhancing or restoring the mitigation associated with this project). Development on and any disturbance of them would be prohibited.

6.10 Conceptual Mitigation Project Team

The conceptual mitigation plan for the project was developed by ESA biologists and landscape architects. SPR will be responsible for the implementation and monitoring of the mitigation project.

7.0 LIMITATIONS

Within the limitations of schedule, budget, scope-of-work, and seasonal constraints, ESA warrants that this study was conducted in accordance with generally accepted environmental science practices, including the technical guidelines and criteria in effect at the time this study was performed, as outlined in the Methods section (Appendix A). The results and conclusions of this study represent the authors' best professional judgment, based on information provided by the project proponent in addition to that obtained during the course of this study. No other warranty, expressed or implied, is made.

8.0 REFERENCES

City of Seattle. 2016a. Seattle 2035 Comprehensive Plan: Managing Growth to Become an Equitable and Sustainable City (2015 – 2035). November 2016. Available: http://www.seattle.gov/dpd/cityplanning/completeprojectslist/comprehensiveplan/documents/default.htm.

City of Seattle. 2016b. Development Services Office. Water and Sewer Map. Accessed November 30, 2016. Available at: http://gisrevprxy.seattle.gov/wab_ext/DSOResearch_Ext/.

City of Seattle. 2017. DPD GIS data. Accessed June 8, 2017 and May 22, 2018. Available at: http://seattlecitygis.maps.arcgis.com/apps/webappviewer/index.html?id=f822b2c6498c4163b0cf908e2241e9c2.

Cornell Lab of Ornithology. 2017. eBird data. Accessed May 2017. Available at: http://ebird.org/ebird/explore.

Corps (U.S. Army Corps of Engineers). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region. Version 2. Wetlands Regulatory Assistance Program. May 2010. ERDC/EL TR-10-3. http://www.usace.army.mil/CECW/Documents/cecwo/reg/west_mt_finalsupp.pdf.

Ecology (Washington State Department of Ecology), Corps (U.S. Army Corps of Engineers Seattle District), and EPA (U.S. Environmental Protection Agency, Region 10). 2006. *Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans* (Version 1). Washington State Department of Ecology Publication #06-06-011b. Olympia, WA. Available at: https://fortress.wa.gov/ecy/publications/documents/0606011b.pdf. Accessed: June 13, 2017.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

ESA (Environmental Science Associates). 2015. Wetland Reconnaissance and Wildlife Habitat Assessment Memorandum. Prepared for City of Seattle Parks and Recreation Department. January 22, 2015.

HWA Geosciences. 2015. Geotechnical Engineering Investigation - Cheasty Trail Pilot Project. Prepared for ESA and City of Seattle Parks Department. January.

HWA Geosciences. 2018. Draft Geotechnical Engineering Report – Cheasty Greenspace Mountain Bike Trail. Prepared for ESA and City of Seattle Parks Department. July.

Herrero, J., and S. Herrero. 2000. Management Options for the Moraine Lake Highline Trail: Grizzly Bears and Cyclists. Parks Canada.

Hruby, T. 2014. *Washington State Wetland Rating System for Western Washington: 2014 Update*. Publication #14-06-029. Olympia, WA.

Johnson, D.H., and T.A. O'Neil. 2001. *Wildlife Habitat Relationships in Oregon and Washington*. Oregon State University Press, Corvallis, Oregon.

King County. 2017. King County iMap, Interactive Mapping Tool. Accessed May 2017. Available at: http://www.kingcounty.gov/services/gis/Maps/imap.aspx.

Miller, S.G., and R.L. Knight. 1998. Influence of Recreational Trails on Breeding Bird Communities. Department of Fishery and Wildlife Biology, Colorado State University. 31pp.

NAIP (National Agriculture Imagery Program). 2015. NAIP Imagery website. Available: https://www.fsa.usda.gov/programs-and-services/aerial-photography/imagery-programs/naip-imagery/.

NRCS (Natural Resources Conservation Service). 2017. Climate Analysis for Wetlands Tables (WETS). Station Seattle Tacoma Airport. Accessed May 2017. Available at: https://www.wcc.nrcs.usda.gov/climate/navigate_wets.html.

OSM (OpenStreetMap). 2014 and 2016. Map data copyrighted OpenStreetMap contributors and available from: https://www.openstreetmap.org.

Quinn, M., and G. Chernoff. 2010. Mountain Biking: A Review of the Ecological Effects. A Literature Review for Parks Canada – National Office (Visitor Experience Branch). Final Report. February.

Sheldon & Associates. 2003. DRAFT Cheasty Greenspace Vegetation Management Plan. Prepared for City of Seattle Department of Parks & Recreation.

Taylor, A.R., and R.L. Knight. 2003. Wildlife Responses to Recreation and Associated Visitor Perceptions. Ecological Applications, 13(4), 2003, pp. 951–963.

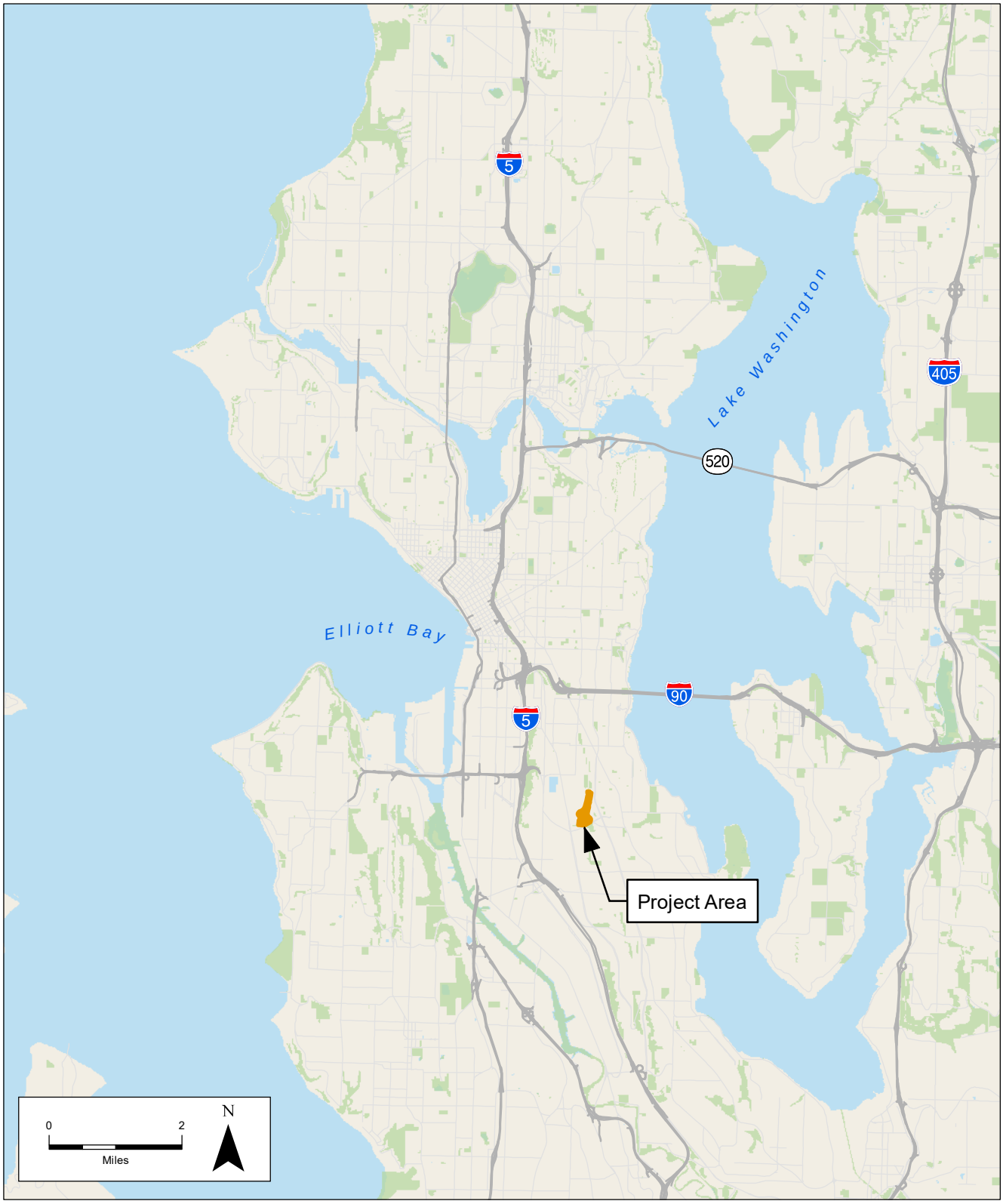
USFWS (U.S. Fish and Wildlife Service). 2017. National Wetlands Inventory Wetland Mapper. Accessed June 8, 2017. May 1, 2017 and May 22, 2018. Available at: http://www.fws.gov/wetlands/Data/Mapper.html.

WDFW (Washington Department of Fish and Wildlife). 2016. SalmonScape fish database and mapping application. Accessed November 30, 2016, and May 22, 2018. Available at: http://apps.wdfw.wa.gov/salmonscape/map.html.

WDFW (Washington Department of Fish and Wildlife). 2017. Priority Habitats and Species on the Web. Accessed May 1, 2017, and May 22, 2018. Available at: http://wdfw.wa.gov/mapping/phs/.

Wisdom, M.J., A.A. Ager, H.K. Preisler, N.J. Cimon, and B.K. Johnson. 2004. Effects of off-road recreation on mule deer and elk. Transactions of the North American Wildlife and Natural Resource Conference 69: 531–550.

FIGURES AND PHOTOGRAPHS



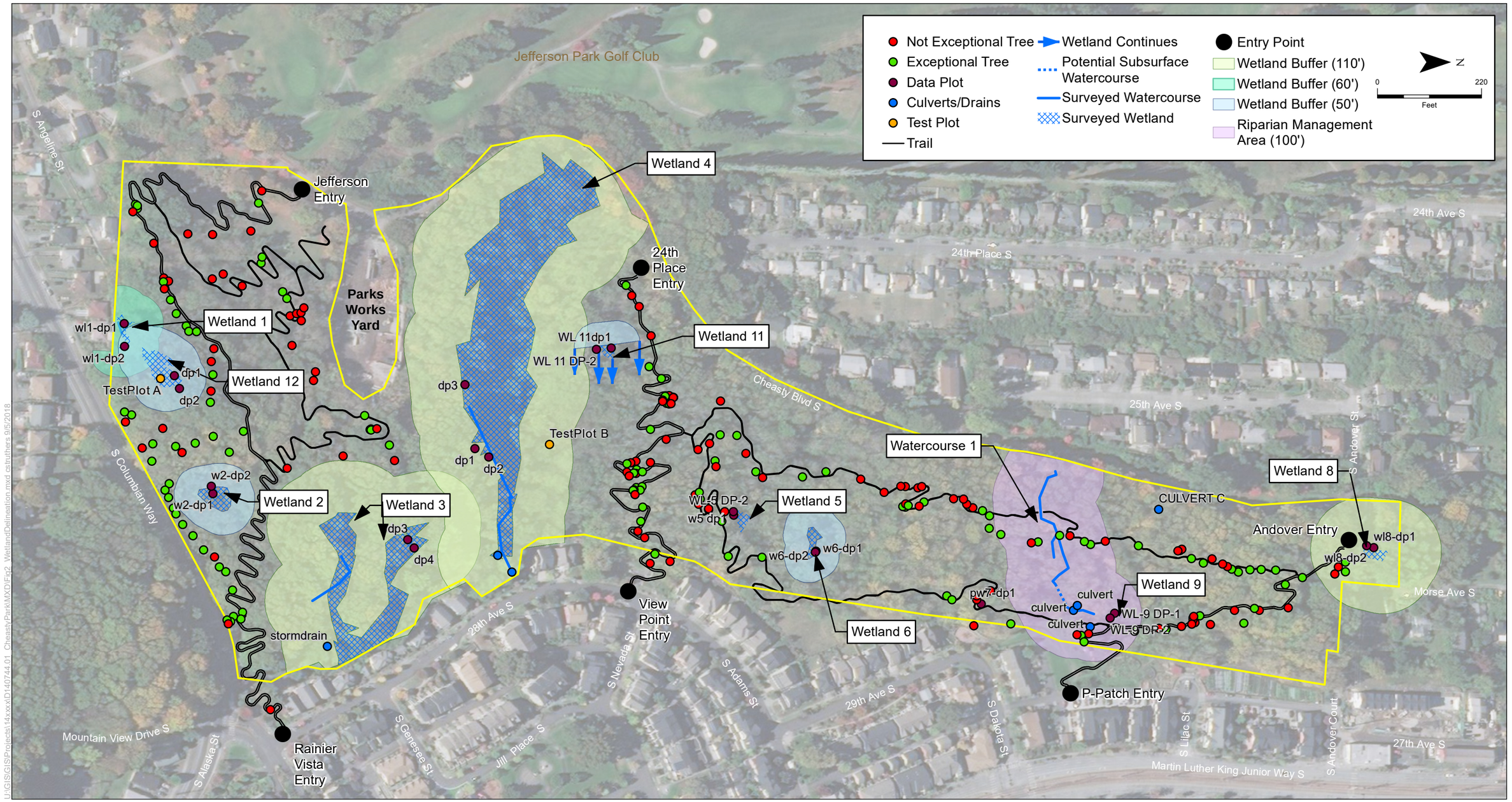
U:\GIS\GIS\Projects\14xxxx\D140744.01_CheastyPark\MXD\VicinityMap.mxd (cstruthers, 7/13/2017)

ESA 2016; OSM 2016

Cheasty Trail Environmental Review . 140744.01

Figure 1
Vicinity Map

DRAFT



SOURCE: NAIP, 2015, ESA 2017, OSM 2014

Cheasty Trail Environmental Review. 140744.01

Figure 2

Wetland Delineation and Trail Design

ESA

DRAFT

Path: U:\GIS\GIS\Projects\14xxxx\D140744.01_CheastyPark\MXD\Wildlife_Hab_NoTrail_20170609.mxd cstruthers 7/21/2017

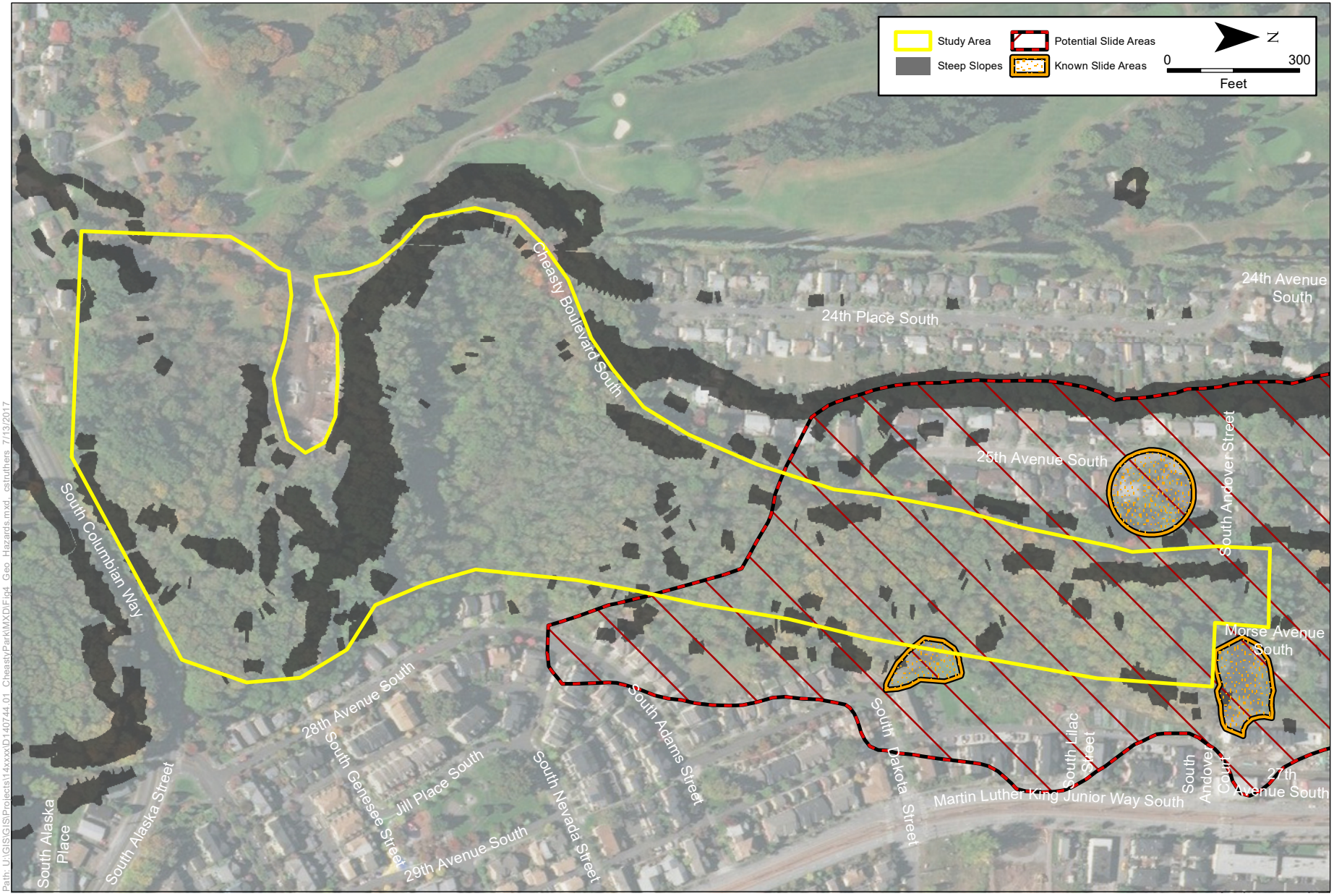
SOURCE: NAIP, 2015, ESA 2017, OSM 2014

Cheasty Trail Environmental Review

Figure 3
Wildlife Habitat Map

ESA

DRAFT



Path: U:\GIS\GIS\Projects\14xxxx\D140744.01_CheastyPark\MXD\Fig4_Geo_Hazards.mxd cstruthers 7/13/2017

SOURCE: NAIP, 2015, ESA 2017, OSM 2014

Cheasty Trail Environmental Review

Figure 4
Geologic Hazard Areas

ESA

Photograph 1. Wetland 1, ponding in April 2017

Photograph 2. Wetland 2, December 2015

Photograph 3. Wetland 3, October 2016

Photograph 4. Wetland 4, April 2017

Photograph 5. Wetland 6, October 2016

Photograph 6. Wetland 8, April 2017

Photograph 7. Wetland 8 buffer (facing west, toward Cheasty Boulevard), April 2017

Photograph 8. Wetland 9, October 2016

Photograph 9. Wetland 11, April 2017

Photograph 10. Wetland 12, April 2017

Photograph 11. Watercourse 1, October 2016

Photograph 12. Example of Westside Lowland Mixed Forest Habitat Type

Photograph 13. Snags and black cottonwood in Westside Lowland Mixed Forest Habitat Type

Photograph 14. Example of Westside Riparian Wetland Habitat Type

Photograph 15. Example of Westside Riparian Wetland Habitat Type

Photograph 16. Large bigleaf maples in Westside Lowland Mixed Forest Habitat Type

Photograph 17. Invasive species in Westside Lowland Mixed Forest Habitat Type