DRAFT

# NORTH SOUND TO OLYMPICS (NSTO) TRAIL PLANNING STUDY

## Connecting Communities, Parks, & Open Space

Summary Report
January 2024

*Kitsap County Public Works*

# ACKNOWLEDGMENTS

The project team, led by staff at Kitsap County and supported by the members of the Working Group, provided valuable insights, expertise, and support throughout the process of conducting research and field studies, analyzing data, determining path segments, and drafting the report. We extend our thanks to the local and regional jurisdictional representatives and community members who generously shared their time, knowledge, and perspectives on the issues addressed in this report. We appreciate their dedication to improving active transportation access in our state and their commitment to collaboration and partnership.

**Kitsap County**

David Forte - Transportation Planning

Melissa Mohr - Transportation Planning

**The Working Group**

Grady Martin - Kitsap County Parks Advisory Board

Jay Zischke - NKHP Stewardship Committee

Marsha Cutting - Kitsap Accessibility/Disability Committee

Alex Wisniewski - Kitsap County Parks Department

Aaron Nix - Kitsap County Parks Department

Linda Berry-Maraist - Rayonier (OPG)

Adrian Wolf - Great Peninsula Conservancy

Don Willott - North Kitsap Trails Association

Deborah Weinmann - Kitsap County Non-Motorized Facilities Community Advisory Committee

**Consultant Team**

Jennifer Dvorak, PE - Parametrix, Inc.

Jeff Bouma, RLA, ASLA - Fischer Bouma Partnership

Phil Struck - Struck Environmental, Inc.

Joe Westergreen, PE - HWA GeoSciences Inc.

Sarah Amell, MMA, RPA - Aqua Terra Cultural Resource Consultants

**Tribal Consultation**

Alison O'Sullivan - Suquamish Tribe

Tom Curley - Suquamish Tribe

Marla Powers - Port Gamble S'Klallam Tribe

**PREPARED BY:**

Parametrix

**Cover page photo:**

May 2022. Fischer Bouma Partnership.

Gratitude Way at the top of the Divide Block, looking west.

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ADA | Americans with Disabilities Act |
| CAO | Critical Area Ordinance |
| County | Kitsap County |
| GIS | geographic information systems |
| GPC | Great Peninsula Conservancy |
| KCC | Kitsap County Code |
| NKHP | North Kitsap Heritage Park |
| NSTO | North Sound to Olympics |
| OPG | Olympic Property Group |
| PGFHP | Port Gamble Forest Heritage Park |
| RCO | Recreation and Conservation Office |
| ROW | right-of-way |
| STO | Sound to Olympics |
| TIP | Transportation Improvement Program |

# EXECUTIVE SUMMARY

*Introduction*

The purpose of this planning study was to advance analysis of the North Sound to Olympics (NSTO) shared-use path concept identified and documented in prior outreach and planning efforts with the "String of Pearls" Plan (2011) and the adopted Kitsap County (County) Non-Motorized Facilities Plan (2013, amended 2018). These plans envisioned connecting communities, parks, and open space between Kingston and Port Gamble Forest Heritage Park. The study assessed feasibility, outlined benefits and impacts, and identified a preferred route for the NSTO as shown in Figure ES-1 on the following page.

Based on the analysis and results of this study, a connecting route though North Kitsap Heritage Park (NKHP), Grover's Creek Preserve (owned by Great Peninsula Conservancy), and the Divide Block (owned by Pope Resources, LLC and acquired by Rayonier, Inc. ) will provide an optimal and viable regional, shared-use path across the North Kitsap Peninsula in a way that balances the needs and values of the community, accessibility, user experience, and critical area protection.

*What is a Shared-Use Path?*

The U.S. Department of Transportation and Washington State Department of Transportation defines a shared-use path as being a minimum 10 feet wide, paved facility with 2-foot-wide gravel shoulders on each side (FHWA 2006, 1), (WSDOT 2023, 1515-3). Shared-use paths must be accessible by all users, including those with mobility devices and vision disabilities (AASHTO 2012), (Architectural and Transportation Barriers Compliance Board 2023). This study used this standard design as the basis of analysis. Where conditions did not allow use of the standard design, the study explored variances to comply with accessibility requirements to the maximum extent feasible.

*The Planning Process*

The planning process studied and narrowed the range of path alternatives in a phased analysis described as Tier 1 and Tier 2. The analyses were completed between 2022 and 2023, summarized in Figure ES-2 and described in more detail in the full report and appendices.

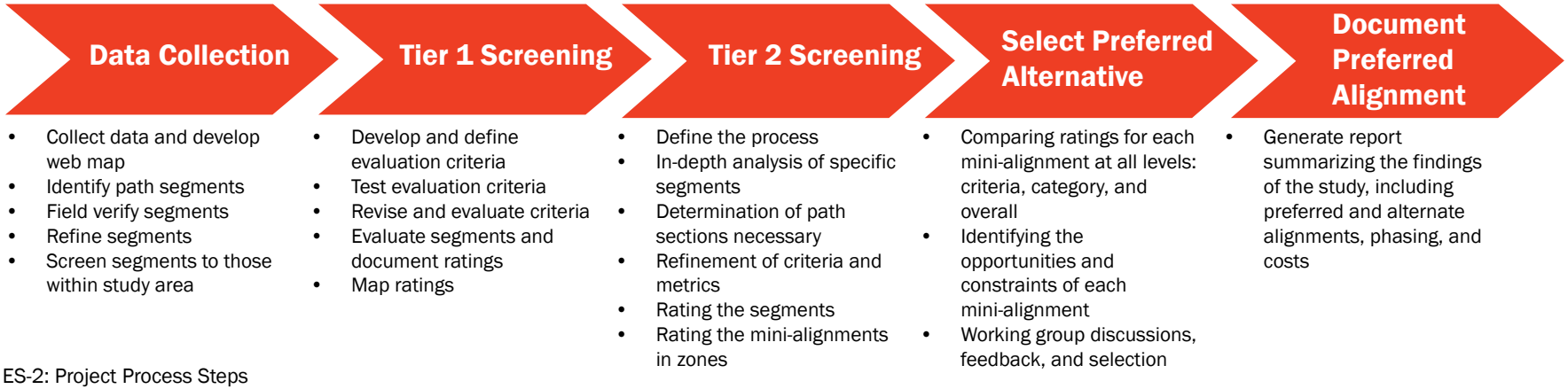



Figure ES-2: Project Process Steps

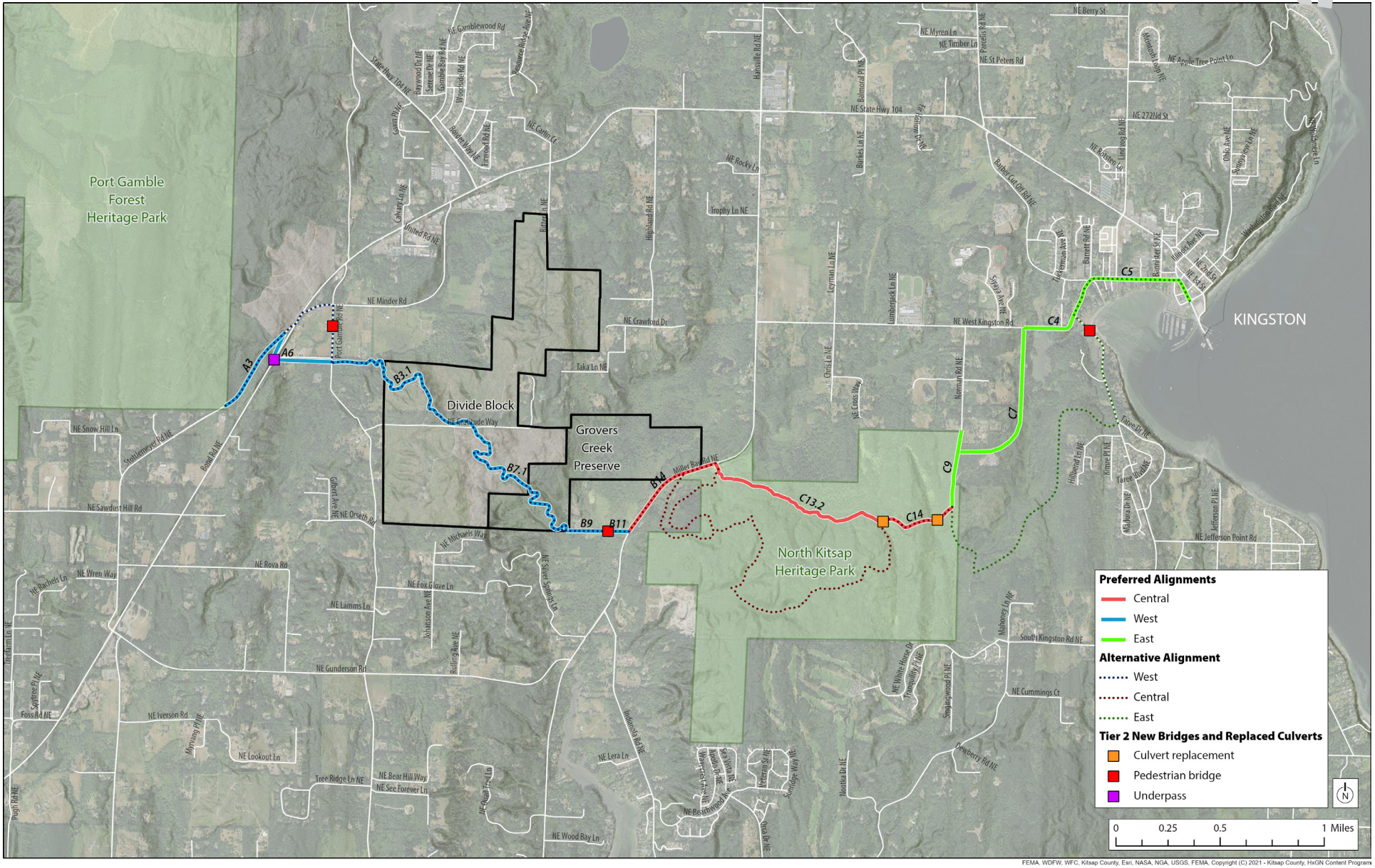



Figure ES-1: Preferred and Alternative Alignments

Stakeholder engagement and public outreach were important components of the planning study, and the planning process was frequently refined as a result. This was evident from the onset of the study when the County, based on community comments, adjusted the scope of the project to assess a much wider range of potential path alignments through the project area. Throughout the planning process, the project team coordinated closely with a Working Group, consisting of various members of the community with knowledge of the project area and trail system. Three public meetings were held during the project.

*Tier 1 Analysis*

The goal of the Tier 1 analysis was to study and evaluate over 60 different path segments and to combine the most suitable into longer alignments across the entire project area. The segments were studied using a qualitative screening and rating process using criteria within five categories including 1) Connecting Communities, Parks, and Open Spaces, 2) Environmental, 3) Safety, Health & Function, 4) User Experience, and 5) Project Delivery. For each criteria, a rating metric of high/medium/low impacts or positive/moderate/negative outcomes were determined. The evaluation criteria were then applied to all segments. A table (Appendix C in the report) was developed to organize the criteria, definitions, rating metrics, comments, and the ratings for each of the path segments. Segments were then mapped using color coding corresponding to the rating. Spatially representing the ratings identified visual patterns and allowed optimal segments to emerge. Based on the Tier 1 planning process, optional mini-alignments (combinations of segments) across the three study area zones were identified for further analysis in Tier 2.

*Tier 2 Analysis*

The Tier 2 analysis built upon the planning process established during the Tier 1 analysis. Whereas the Tier 1 analysis was generally qualitative, the Tier 2 analysis was both qualitative and quantitative. Path segments selected for further study continued to be analyzed at the segment scale in Tier 2. Segment routes were refined based on topography and critical areas and then rated with the Tier 2 evaluation criteria. The Tier 2 evaluation criteria were similar to those developed in Tier 1 but updated with more detailed metrics. The Tier 2 analysis then utilized cumulative segment ratings to calculate ratings for “mini-alignments” (combinations of segments) within different zones of the project area. The ratings for the mini-alignments were then assessed and optimal mini-alignments within each zone were combined to create a full alignment across the project area. This created a preferred, continuous route between Kingston and Port Gamble Forest Heritage Park (PGFHP). Alternative mini-alignments were also identified along this preferred route, which are shown on the map above.

*Phasing and Costs*

Due to the length of the preferred alignment (7.93 miles) and typical grant funds available for the project, it is likely that the selected path would be designed, engineered, permitted, and constructed in phases. As such, sections of the preferred alignment have been identified with logical termini (meaning they connect accessible points of interest, such as parks, trailheads, or parking lots) and independent utility (meaning they can function as independent path sections until others are connected to them). Nine potential phases of implementation were identified, generally starting in the east and working west towards PGFHP. Maps, description, and costs for each phase are provided in Section 9 of the report.

The project will be implemented over a 20-30 year timeframe, with a significant portion of the necessary funding obtained through grants. Partnerships with local agencies and other entities with shared interests, goals, and project elements will be developed during the course of any pre-design, design and permitting of project phases.

*Next Steps*

This study will inform Kitsap County Public Works prioritization of trail projects in the development of the County's Six-Year Transportation Improvement Program (TIP) and Annual Construction Program. During this process, the Board of County Commissioners conducts formal public hearings, and the public can provide input and suggestions for projects. An evaluation system is used for the selection of transportation projects for funding in the County's TIP. Projects placed into the process are scored and ranked using objective criteria.

# 1. INTRODUCTION

The purpose of the study is to advance analysis of the North Sound to Olympics (NSTO) shared-use path concept identified in the "grass roots" outreach and planning effort documented in the **"String of Pearls" Plan (2011)** and the **County's Non-Motorized Facilities Plan (2013, 2018)**. The plans envisioned connecting communities, parks, and open space between Kingston and Port Gamble Heritage Park with a shared-use path.

The study analyzed potential route alternatives to assess the feasibility, potential positive and negative impacts, and identify a preferred alternative route for the NSTO. This is the third feasibility study focusing on different sections of the NSTO. The **"Divide Block" (2015) study** identified a preferred alternative route for the NSTO section between Miller Bay Road and Port Gamble Road. The "Port Gamble Trail" (2018) study identified a preferred alternative route for the NSTO from Stottlemeyer Road to Port Gamble, through the Port Gamble Forest Heritage Park (PGFHP). Both studies were conducted with extensive public outreach and received near unanimous support from the community.

The STO shared use path concept came from the North Kitsap community. It was a signature outcome of an extensive public outreach process organized by the volunteer group "North Kitsap Trails Association" and was a key element to the County and private efforts to acquire large tracts of private property from the Olympic Property Group (OPG) for parks and open space.

The "String of Pearls" Plan (2011) expressed a "grass roots" vision of North Kitsap.

> "The String of Pearls Trails plan is envisioned as a way of enriching all of Kitsap County by connecting North Kitsap's unique communities with a trail system that will help create a myriad of community, regional, land and water trails, and link to each community and their neighborhood trails. These trails will enhance the quality of life for residents by connecting people with natural areas and creating options for active lifestyles. An integrated trail system will enhance the local economy with options for exercise, transportation, eco-tourism and enjoyment of beautiful natural settings. The trails will become a safe, pleasant, healthy and frequent choice for people of all ages, interests and abilities. The trails we plan and build today will shape a legacy for future generations." (North Kitsap Trails Association 2011, 6)

An extensive public outreach process evaluated a wide range of path system options to connect the communities, parks, and open spaces of North Kitsap and selected to:

> "...prioritized a single spine of paved bike routes combining the Sound to Olympics (STO) Trail and on-road community connectors bike routes....[and] supports a wider network of unpaved trails..." (North Kitsap Trails Association 2011, 11)

The "String of Pearls" Plan was adopted by the County and the STO was incorporated into the County's Non-Motorized Plan. Additional analysis and public outreach were conducted for the "Divide Block" (2015) section between Miler Bay Road and Port Gamble Road and for PGHFP ("Port Gamble Trail", 2018) to refine the path alignment within these two segments.

The "String of Pearls" Plan and the STO were key elements to County and private fundraising activities to purchase large blocks of property from the OPG that would expand the Port Gamble and North Kitsap Parks as well

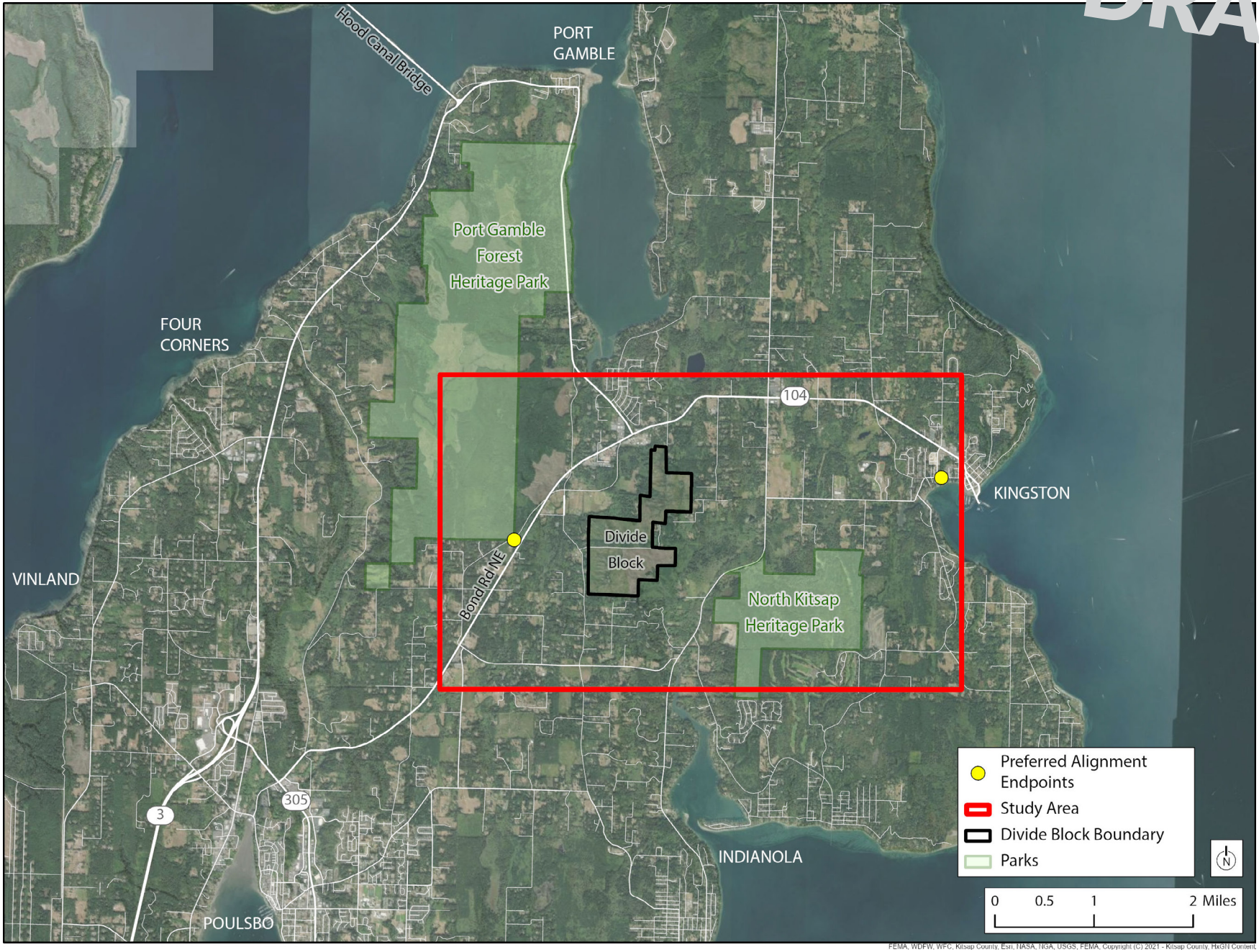



Figure 1: Vicinity Map

as large tracts of the "Divide Block" purchased by the Great Peninsula Conservancy (GPC).

> "…top priority is to obtain access through 8,000 acres of OPG [Olympic Property Group] land. Without this land there would be very few trails in North Kitsap." (North Kitsap Trails Association 2011, 11)

Since the "String of Pearls" portions of the STO shared-use path have advanced:

- "String of Pearls" was adopted by the County.
- 2013 – STO incorporated into County's Non-Motorized Plan and Non-Motorized Routes maps.
- 2014 – North Kitsap Heritage Park (NKHP) expanded with purchase of the "Expansion Block" property.
- 2015 – 175 acres of "Divide Block" property acquired by Great Peninsula Conservancy.
- 2015 – "Divide Block" feasibility study was completed to identify the STO alignment between Miller Bay Road and Port Gamble Road.
- 2018 – "Port Gamble Trail" feasibility study was completed to identify the STO alignment through PGFHP. The study analyzed various possible alignments within the park and identified a preferred alternative route.
- 2018 – Bainbridge Island constructs first mile of South STO along SR 305 from the Washington State Ferries Terminal. (City and Federal grant).
- 2018 – Non-Motorized Plan maps was updated to show revised alignments of STO.
- 2020 – 2020 STO Network Map was updated.

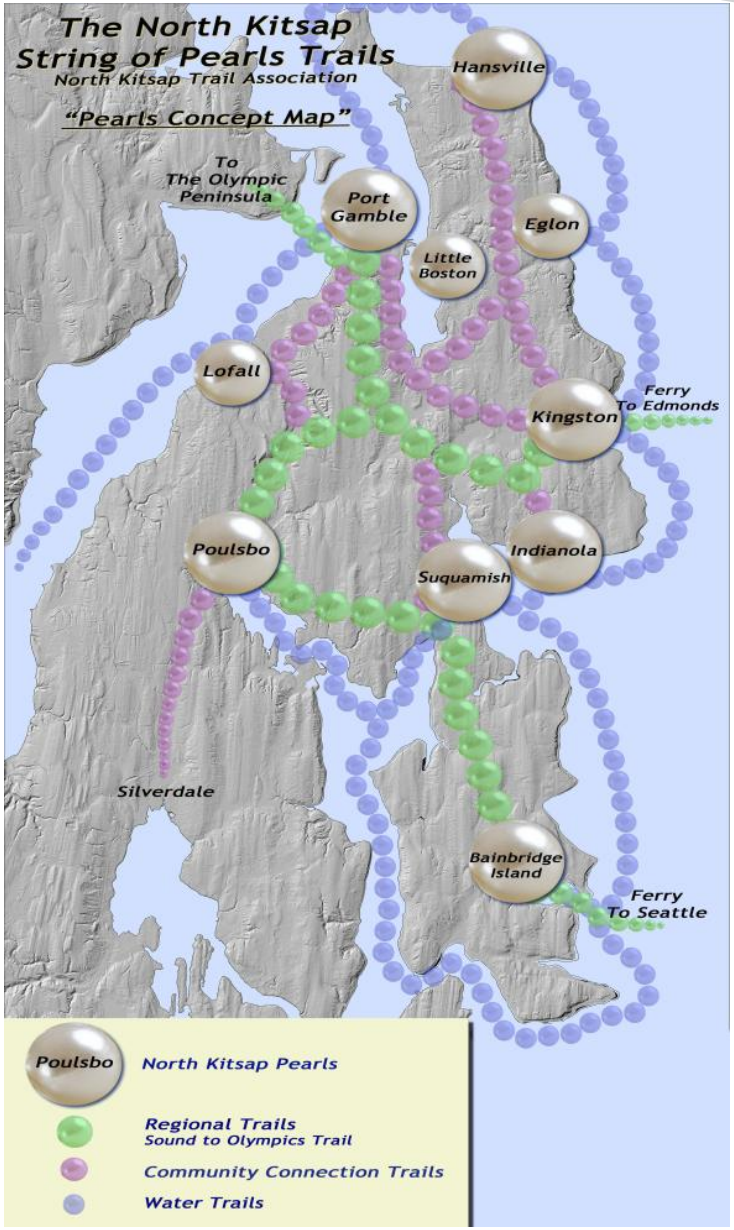



Figure 2: Kitsap County. 2011. North Kitsap String of Pearls Trail Plan.

- 2021 – Port Gamble Trail
  - Design and engineering (Kitsap Public Facilities grant) began for Segments A, B, & D. The path alignment shifted to the alternative A, E, and D segments.
  - Rayonier (formerly OPG) constructed the extension of Carver Drive (western portion of Segment E) 2023 and the County will pave the STO trial adjacent to the new road in 2024.

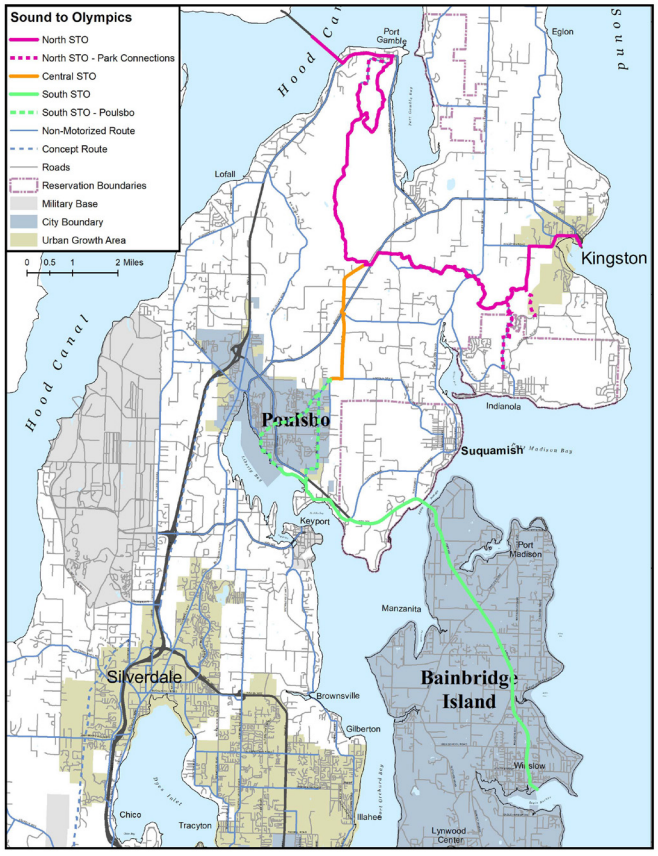



Figure 3: Kitsap County. 2020. 2020 NSTO Network Map.

- 2022 – NSTO Trail study (County and Federal grant).
- 2022 – Poulsbo constructs (City and Federal grant) portion of Noll Road corridor (South STO) and STO tunnel under SR 305 (City, Federal grant, and State funding).
- 2023 – Kitsap County received federal grants for pre-design studies for the Central STO between Poulsbo and Port Gamble Park in 2026 and South STO between Agate Pass Bridge and Poulsbo in 2030

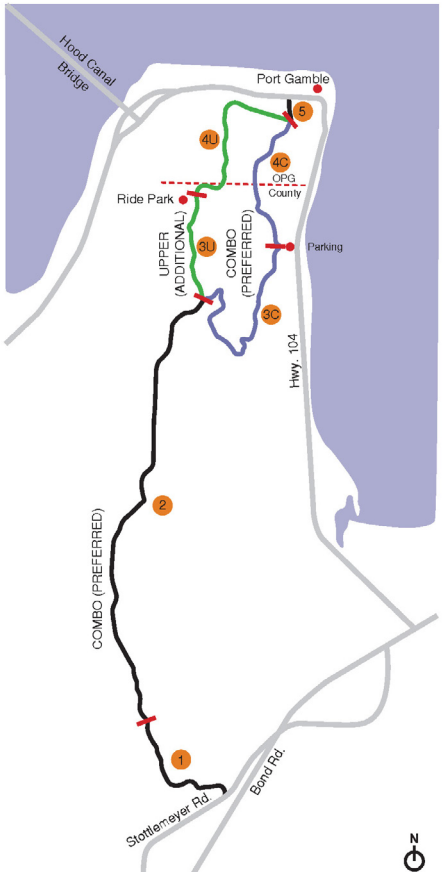



Figure 4: Kitsap County. 2018. Port Gamble Trail (STO) Feasibility Study.

## 2. DEFINING A SHARED-USE PATH

This study evaluated the feasibility of a standard shared-use path design. The U.S. Department of Transportation and Washington State Department of Transportation define a shared-use path as being a minimum 10 feet wide, paved, with 2-foot-wide gravel shoulders on each side (FHWA 2006, 1), (WSDOT 2023, 1515-3). Shared-use paths are required to be accessible by all users, including those with mobility devices and vision disabilities (AASHTO 2012), (Architectural and Transportation Barriers Compliance Board 2023).

The appropriate paved width for a shared-use path depends on the context, volume, and mix of users. The minimum paved width, excluding the shoulders on either side, is 10 feet (WSDOT 2023, 1515-3). Asphalt is the most common surface for shared-use paths (FHWA 2016, 4-8).

This study used the standard design as the basis of analysis. Where conditions did not allow use of the standard design, the study identified whether variances to the design were feasible.

The existing condition and context of the land beneath the proposed path dictates what type of 10-foot-wide path, or section, can be implemented. In turn, the path section influences the analysis and rating of each segment, with some segments consisting of multiple path sections along its length. For example, path sections will differ depending on their location, such as a steep side slope, next to a road, within a critical area buffer, within a clear cut or forest, or crossing a stream. Each path section has different disturbance and construction widths that attempt to balance cost with environmental impact. Some construction impacts within the path corridor will be permanent, such as the path itself and any walls that might need to be constructed to reduce the impact of disturbance to adjacent vegetation. Other construction impacts will be temporary, such as the removal of vegetation when grading side slopes—these areas will be replanted.

The following pages show several different trail sections that will be necessary in the project area to achieve a 10-foot wide path depending on the context of the underlying and adjacent landscape.

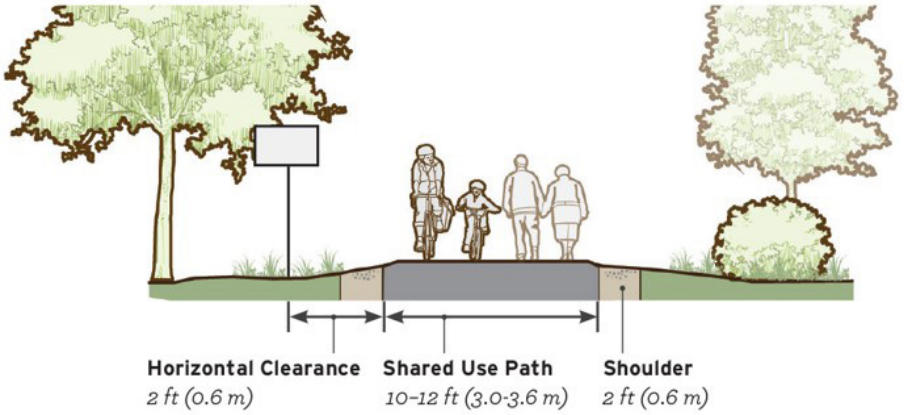



Figure 5: Small Town and Rural Design Guide. Shared-use path cross section.

*Section A1: Path in Forested Area, on Existing Logging Road (Green)*

This path section has the narrowest profile and preserves adjacent trees and habitat to the greatest extent possible. This path section occurs where the alignment can be placed on what was once a logging road and where the road-profile is wide enough to accommodate a 10-foot-wide path with 2-foot-wide gravel shoulders or where there are not steep side slopes that would be impacted by having to widen the path profile.

SECTION A1: **Trail in Forested Area, on Existing Logging Road**

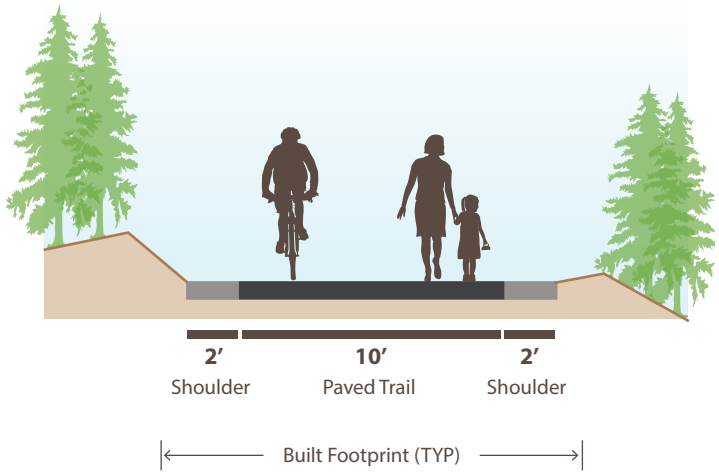



Figure 6

*Section A2: Path in Forested Area, New Alignment with Steep Terrain (Green)*

This path section also has a narrow profile to preserve adjacent trees and habitat to the greatest extent possible. However, this path section requires retaining walls on one or both sides to preserve adjacent, existing vegetation (so that steep side slopes don't have to be graded).

SECTION A2: **Trail in Forested Area, New Alignment with Steep Terrain**

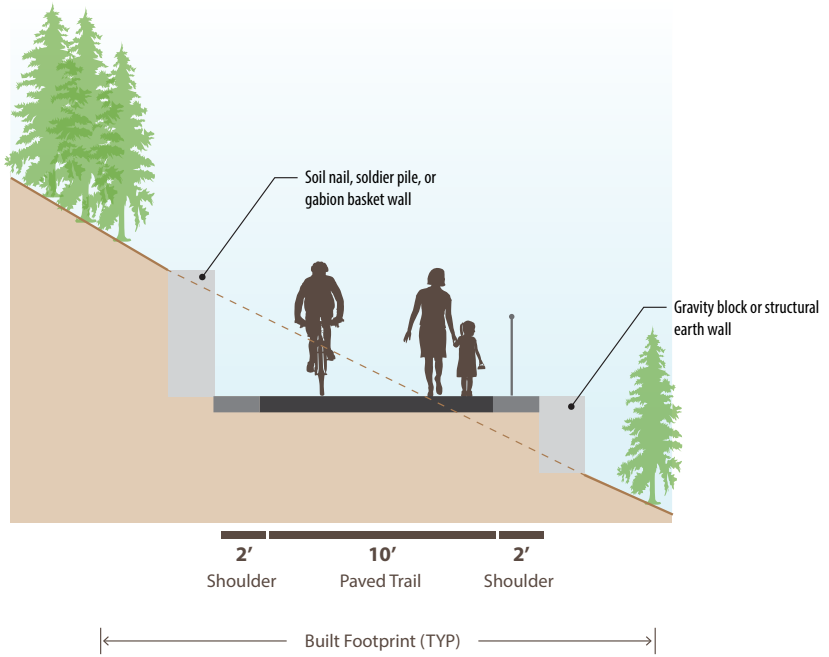



Figure 7

*Section B: Path in Cleared Area, within Critical Area Buffers (Orange)*

This path section does not have as narrow a profile as those in Sections A1 or A2 due to its location within recently cleared land (where forest management activities have occurred). In this case, there are no existing trees or habitat requiring preservation adjacent to the path, although restoration opportunities exist. This path section is located within critical area buffers (unlike path Section C), so the footprint is minimized to reduce the potential impact on the adjacent critical area. In some cases, where side slopes might be steep, retaining walls would also be used to minimize the impact on the adjacent critical area.

SECTION B: **Trail in Cleared Area, within Critical Area Buffers**

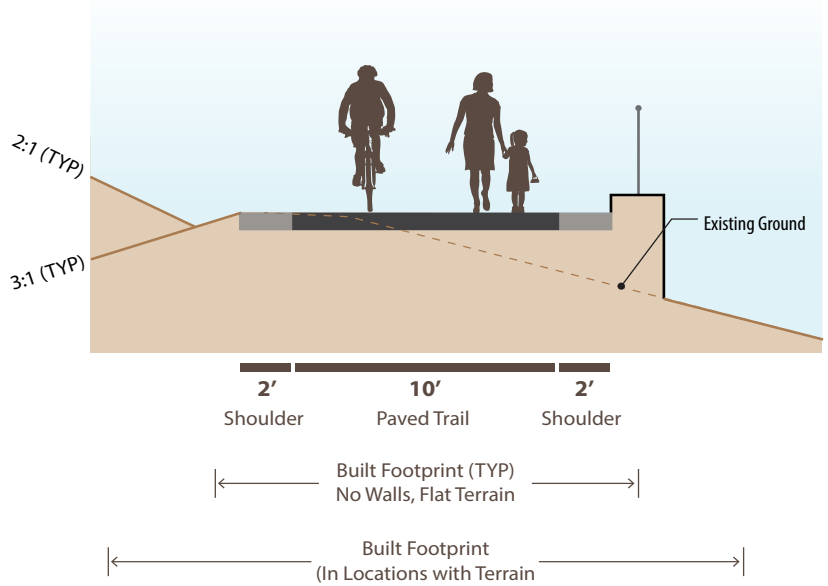



Figure 8

*Section C: Path in Previously Cleared Area, No Critical Area Buffers (Purple)*

This path section would have the widest profile of those proposed since it is located on land that has been recently cleared and is outside of critical area buffers. There would be limited need (if any) for expensive retaining walls to contain the area of disturbance created by the path corridor. Side slopes could simply be graded to tie into existing undisturbed slopes without impacting existing vegetation.

SECTION C: **Trail in Previously Cleared Area, No Critical Area Buffers**

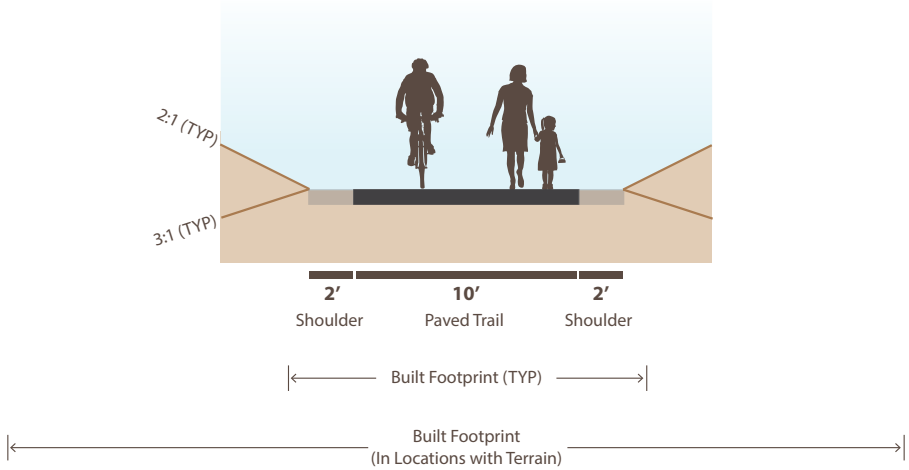



Figure 9

*Section D: Boardwalk over Wetlands and Some Streams (Blue)*

This path section would be utilized where the alignment crosses wetlands and some narrow streams. Where the stream is wider, a culvert is proposed for the stream instead of a boardwalk. Boardwalks are not proposed within the buffers of wetlands and streams (see path Section B above). The boardwalk would be a 14-foot-wide structure that would include railing on each side for safety and to keep users on the path, effectively reducing the usable width of the path to 12 feet wide. The boardwalk would be constructed on a pin-pile type footing to reduce impact to the underlying critical area. Recent innovations in boardwalk design, engineering, and construction would allow for the boardwalk to be built from sections of the structure already completed, resulting in less of an impact to the wetland below. The material for the boardwalk would be determined during future pre design and engineering projects. This path type would be located within parks and open spaces, or along roadways, wherever the path alignment crosses through a wetland.

SECTION D: **Boardwalk Over Wetlands and Some Streams**

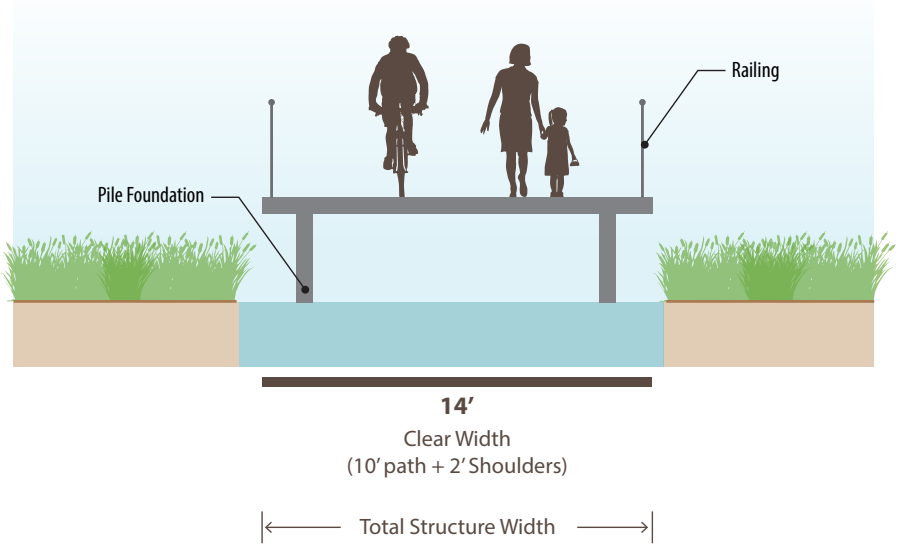



Figure 10

*Section E: Path along Roadway (Magenta)*

This path section would be adjacent to the road, typically within the right-of-way (ROW) if room allows, and would match the grade of the road. The path would be offset a distance from the road to allow room for stormwater conveyance, utilities, and safety. Walls or slopes adjacent to the path and opposite from the road would be utilized to minimize additional grading and impacts to private property. This path section would be located only along roads, except where it crosses a wetland or stream, in which case a boardwalk (Section D) or other structure would be utilized.

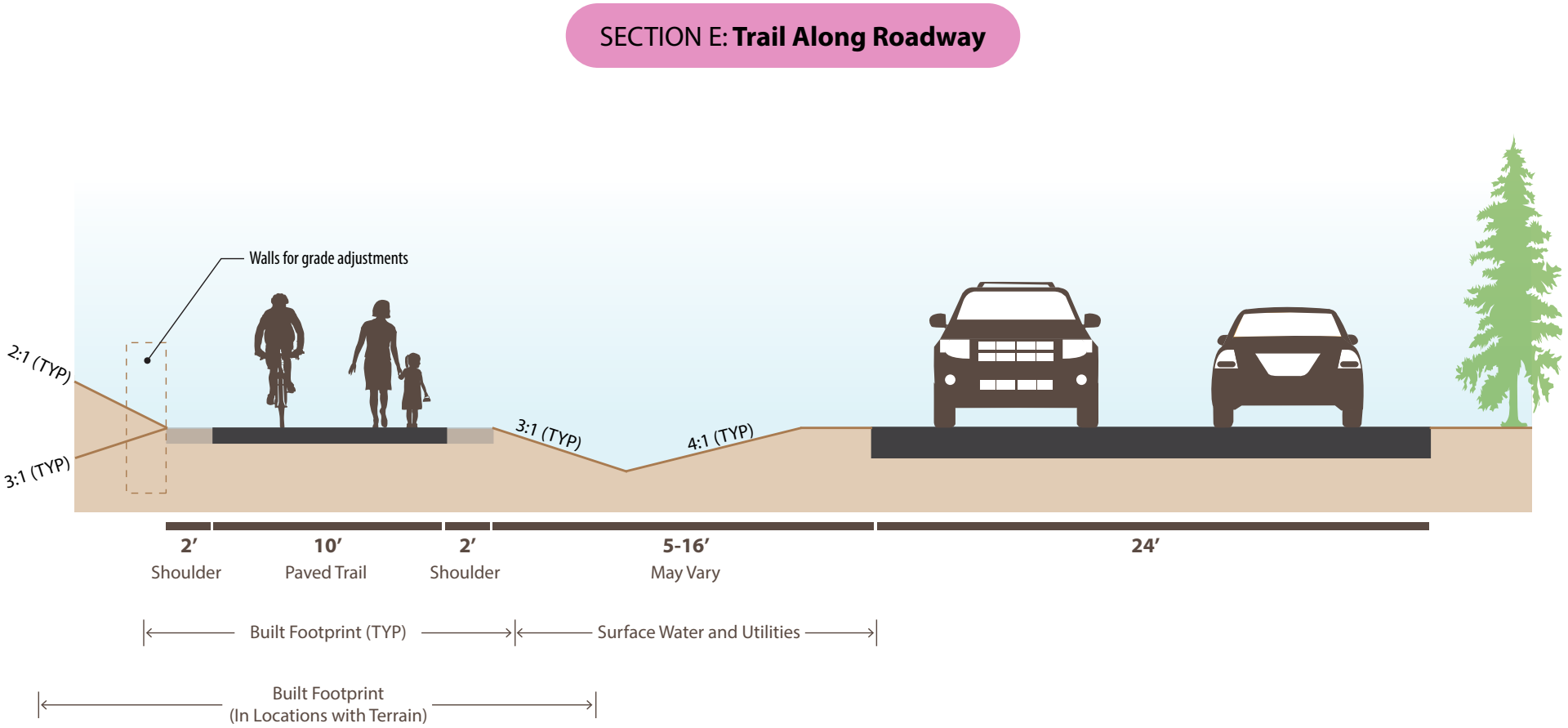



Figure 11

## 2.1 Path Surface

For the purpose of study, the shared-use path surface is assumed to be paved asphalt. A shared-use path is both a recreational and transportation facility, designed for multiple user types and accessible for all ages and abilities. The path must meet Americans with Disabilities Act (ADA) standards for a "firm, stable, and slip resistant surface".

The STO concept envisioned a paved, shared-use path that:

> "...prioritized a single spine of paved bike routes combining the Sound to Olympics (STO) Trail and on-road, community connector bike routes... [that] supports a wider network of unpaved paths..." (North Kitsap Trails Assocation 2011, 11)

A paved surface is consistent with shared-use path design standards:

> "The appropriate paved width for a shared-use path depends on the context, volume, and mix of users...The minimum paved width, excluding the shoulders on either side, is 10 feet." (WSDOT 2023, 1515-3)
>
> "Asphalt is the most common surface for shared use paths." (FHWA 2016, 4-8)

A paved surface provides the best surface for accessibility, persons of all ages and abilities, weather, and multiple user types.

Table 1 summarizes the pros and cons of each of the surface types.

Table 1: Paved and Unpaved Surfaces

| Pros | Cons |
|---|---|
| *Paved Surfaces* | |
| • More accessible for all ages and abilities – meets ADA[1] surface standards<br>• Lower maintenance requirements initially<br>• Consistent surface quality<br>• Firm, stable, and slip resistant surface | • More expensive to install (initial investment)<br>• Material choices can have potential environmental impacts |
| *Unpaved Surfaces* | |
| • Less expensive to install (initial investment) | • Typically less accessible for all ages and abilities – less likely to meet ADA surface standards<br>• Higher maintenance requirements<br>• Higher erosion potential can have environmental impacts<br>• Loose gravel can create safety issues and less stability |

1 Americans with Disabilities Act (ADA)

### 2.2 The Study Area

The study area (Figure 12) included a large portion of north Kitsap County, with the goal of identifying a preferred shared-use path alignment from the community of Kingston to the south boundary of PGFHP at Stottlemeyer Road. The northern boundary of the project area is generally State Highway 104, which runs east to west. The southern boundary of the project area is generally Gunderson Road.

Due to the large size of the study area, it was divided into three zones. The three zones were referred to as East, Central, and West. The East Zone extended from the community of Kingston to the east side of NKHP. The Central Zone included much of West Kingston Road and NKHP, with the western boundary being Miller Bay Road. The West Zone included GPC's Grovers Creek Preserve and Rayonier's "Divide Block" between Miller Bay Road west to Stottlemeyer Road.

The purpose of the study is specific to the feasibility of the NSTO shared-use path concept which was identified in extensive public planning processes over many years. The study utilizes existing North Kitsap and County plans and does not conduct additional transportation planning.

The study considers how the NSTO may also contribute, support, or fulfill other transportation needs. For example, the segment/alignment along West Kingston Road passes two schools with identified improvements for students to walk, biking, or roll to and from school. When analyzing this segment/alignment, the fact that it may provide additional transportation needs is recognized. If that segment/alignment is not selected as part of the preferred alternative alignment for the NSTO, the need for improvements for students will still be advanced as an independent project into the annual Transportation Improvement Program (TIP) process.

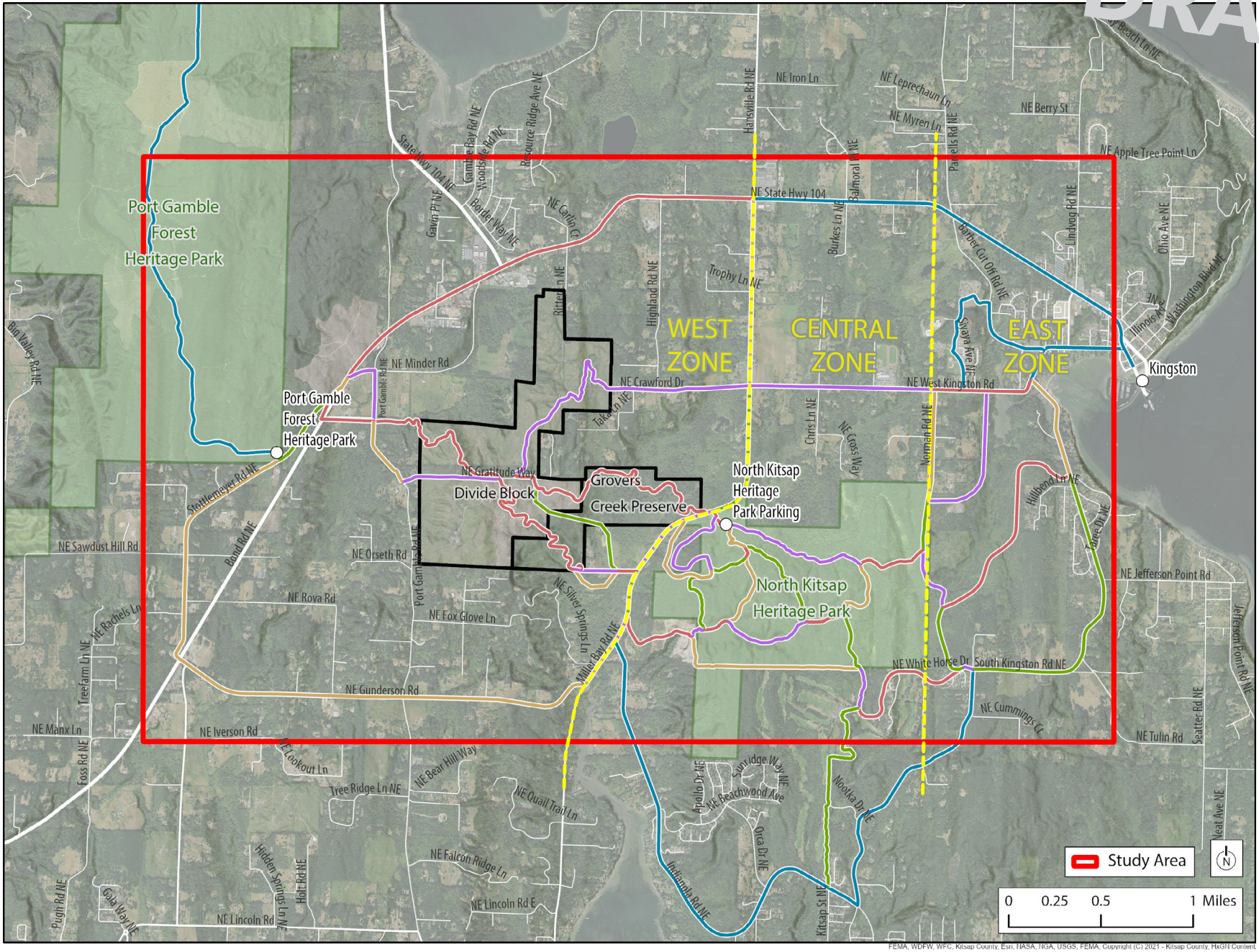
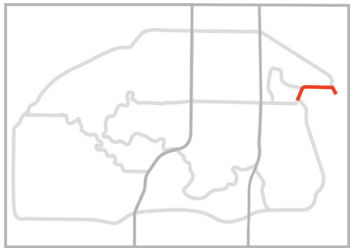


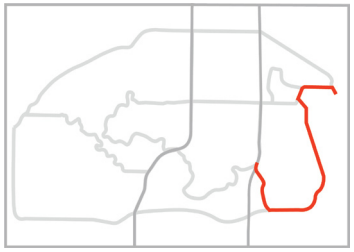

Figure 12: Study Area Map (note: path segments shown on the map are those analyzed in the study)

## 2.3 Definitions



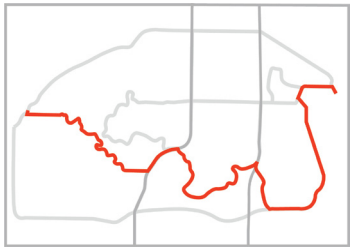
*Path Segment*

The shortest distance of path between two nodes. Path segments vary in length depending on logical beginning and ending points, such as road crossings or connection intersections with other path segments. This is the smallest unit analyzed and rated.



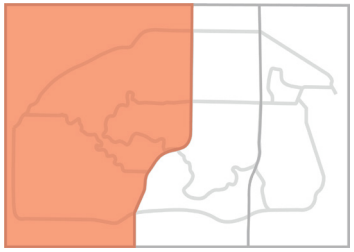
*Path Mini-Alignment*

A combination of individual path segments that in succession, provide a continuous route across a project zone (East, Central, or West Zones) but not across the entire project area.



*Path Alignment*

A combination of path mini-alignments that, when linked together, provide a continuous route from the beginning and ending points in the study area (from PGFHP to downtown Kingston).



*Zone*

A portion of the project area defined as East, Central, or West Zones for the purpose of analysis and organizing data. The East Zone is defined as the area between the east side of NKHP and the town of Kingston. The Central Zone is defined as the area between Miller Bay Road and the east side of NKHP (including the park). The West Zone is defined as the area between PGFHP and Miller Bay Road.

# 3. SUMMARY OF THE PLANNING PROCESS

The planning process consisted of several major activities, as shown in Figure 13 below. In each step of the planning process, the consultant team coordinated closely with the Working Group. The planning process and discussion outcomes were frequently refined during each outreach activity with the Working Group (see next section) and the public outreach events.

## 3.1 Stakeholder and Public Outreach

Stakeholder engagement and public outreach were important components of the planning study, and the planning process was frequently refined as a result. This was evident from the onset of the study when the County, based on community comments, adjusted the scope of the project to assess a much wider range of potential path alignments through the project area. For the duration of this process, the project team worked closely with the Working Group, including two field visits, one in-person meeting, and online meetings.

The Working Group consisted of various members of the community. They included:

Grady Martin – Kitsap County Parks Advisory Board

Jay Zischke – NKHP Stewardship Committee

Marsha Cutting – Kitsap Accessibility/Disability Committee

Alex Wisniewski – Kitsap County Parks Department

Aaron Nix – Kitsap County Parks Department

Linda Berry-Maraist – Rayonier (OPG)

Adrian Wolf – Great Peninsula Conservancy

Don Willott – North Kitsap Paths Association

Deborah Weinmann – Kitsap County Non-Motorized Facilities Community Advisory Committee

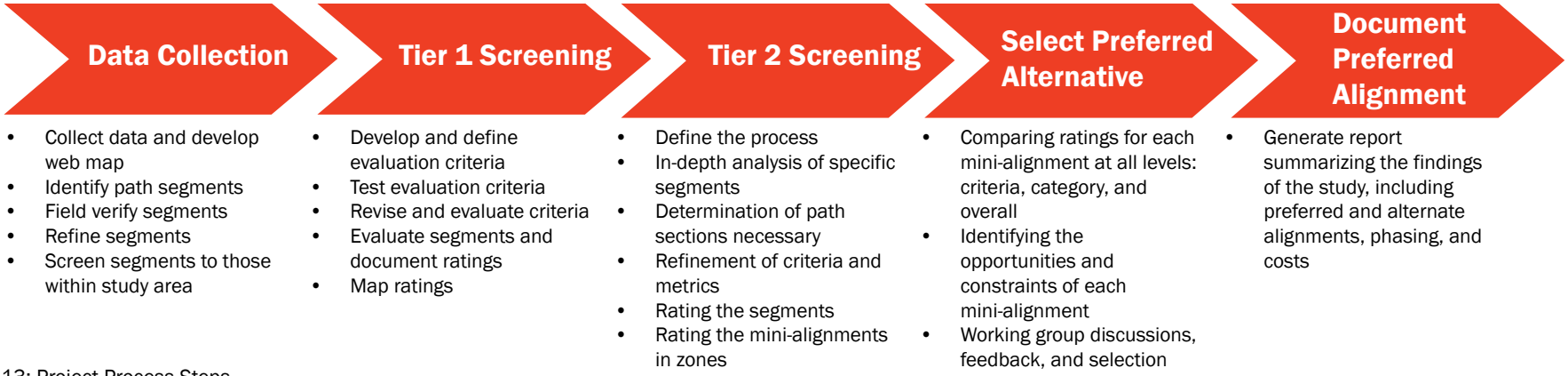



Figure 13: Project Process Steps

Three public meetings were held at the Village Green Community Center in Kingston. Public comments received before and after this process have been assembled in Appendix A. The presentations and frequently asked questions have been assembled in Appendix G.

- *June 21, 2022 (Public Meeting #1):* Reviewed North Kitsap path planning history and context, introduced the path planning process, and presented potential path segments and draft criteria for assessing path feasibility.
- *January 24, 2023 (Public Meeting #2):* Reviewed the path planning process to date (Tier 1) and presented the results of the Tier 1 analysis including optimal potential path alignments between Kingston and PGFHP.
- *October 25, 2023 (Public Meeting #3):* Reviewed the path planning process to date (Tier 1 and Tier 2) and presented the results of the Tier 2 analysis, including a preferred alignment and alternative alignments between Kingston and PGFHP.

Discussions were also held with local Tribes during the planning process, including the following:

- *June 9, 2022:* Meeting with Port Gamble S'Klallam Tribe for project briefing (Marla Powers and Roma Call).
- *June 15, 2022:* Meeting with Suquamish Tribe for project briefing (Alison O'Sullivan).
- *January 24, 2023:* Meeting with Port Gamble S'Klallam Tribe (Marla Powers) at Public Meeting #2.

The County maintained a project website throughout the course of the study. Materials presented at all public events were shared in this forum.

Figure 14: Fischer Bouma Partnership. May 2022. Divide Block, looking southeast.

# 4. DATA COLLECTION AND VERIFICATION

### 4.1 Identification of potential path segments

Path segments were identified and mapped over the course of several weeks based on previous studies, existing knowledge of the County, consultant team members, input from Working Group members, and input from the community. While some segments aligned with an existing or previously planned path, others were straight conceptual lines through an area to indicate a connection, not the actual route. Path segments were then reviewed over the course of several internal and Working Group meetings to verify routes for study.

### 4.2 Field verification and data collection of path segments

During the spring and summer of 2022, the consultant team and County performed field visits of most of the identified segments. Two, day-long field visits with Working Group members were held in May and June of 2022. The first day focused on the west side of the project area, from Port Gamble Road to Miller Bay Road through the Divide Block. The second day focused on the east side of the project areas, primarily within NKHP.

### 4.3 Desktop analysis of path segments

Based on information gathered during field visits, segments were analyzed based on existing data mapped in geographic information systems (GIS). Modifications were made to potential segments based on critical areas, topography, land ownership, and other spatial information available.

### 4.4 Initial screening

During an initial screening of segments and in discussion with the Working Group, some segments were eliminated from further study because they were outside of the study area or study purpose. For example, spur paths linking Indianola to the south were considered outside of the project area. Smaller loop paths, such as those servicing the high school, were considered supplementary to the NSTO. Approximately 60 path segments were advanced for the next step in the planning process.

Figure 15: Don Willott. December 2014. Divide Block feasibility study field visit.

# 5. TIER 1 SEGMENT SCREENING

## 5.1 Goal of Tier 1 analysis

The goal of the Tier 1 analysis was to study and evaluate numerous different path segments and combine those that were most suitable into longer path alignments that would traverse the entire project area. The segments were studied using a qualitative screening and rating process.

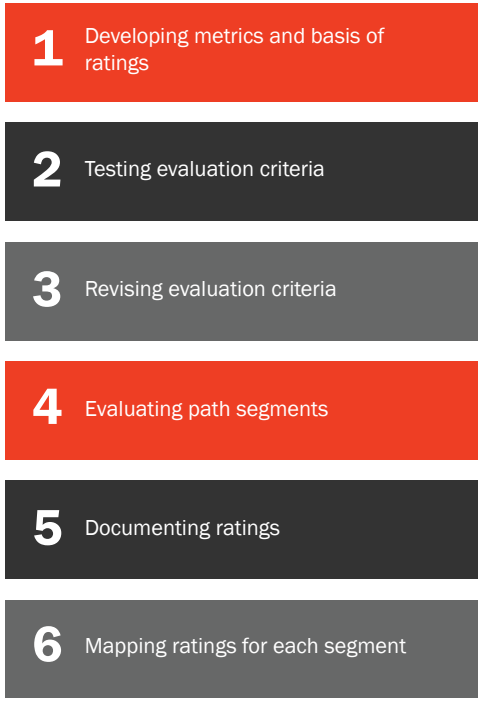



Figure 16: Tier 1 Segment Screening Steps

## 5.2 Tier 1 Evaluation Criteria

Evaluation criteria were developed to analyze the 60 path segments within the study area.

The following criteria were developed by the consultant team, County, and Working Group for screening path segments in Tier 1:

Category #1 – Connecting Communities, Parks, and Open Spaces

- (1.1) Access to communities
- (1.2) Access to parks and open spaces
- (1.3) Consistency with adopted County plans, policies, and requirements
- (1.4) Places of interest

Category #2 – Environmental

- (2.1) Habitat connectivity and fragmentation
- (2.2) Wetland impacts
- (2.3) Wetland buffer impacts
- (2.4) Stream impacts
- (2.5) Stream buffer impacts
- (2.6) Restoration potential

Category #3 – Safety, Health, and Function

- (3.1) User safety and health
- (3.2) User-vehicle conflicts at driveways

Category #4 – User Experience

- (4.1) Low stress path design
- (4.2) Meeting ADA criteria in the built condition
- (4.3) Quality of outdoor experience

Category #5 – Project Delivery

- (5.1) Design/construction and mitigation/restoration costs
- (5.2) Rights-of-way/easements

### 5.3 Evaluation Criteria: Developing metrics and basis of ratings

For each of the evaluation criteria, a specific definition was determined. For example, for Criteria 4.2 "Meeting ADA criteria in the built condition," the definition was:

> "Level to which segment can be designed to meet ADA grade criteria in the built condition, and the potential need for design variances."

For each criteria definition, a rating metric of high/medium/low impacts or positive/moderate/negative outcomes were determined for each criteria. Details of all evaluation criteria are in Appendix C. Using the same example criteria as above, the rating metrics were described as follows:

> *High = Can be engineered < than 5%, OR follows roadway profile*
>
> *Med = Can be engineered < 8.3% WITH mitigation*
>
> *Low = Engineering unlikely to avoid > 8.3%, regardless of mitigation*

The basis of rating was also defined for each criterion; in other words, an information source was identified to make the rating determination. This may have included plan review, GIS information, field reconnaissance, existing plans and policies, Kitsap Critical Areas Ordinance (CAO), State databases, Google Street View, traffic count data, and posted speed.

### 5.4 Testing evaluation criteria

The consultant team identified typical segments in the project area to test the evaluation criteria and rating process. Three segments were selected in each of the East, Central, and West zones of the project for a total of nine test segments. Each zone included a segment along a roadway, in an open space or park, or in a unique location or situation. These segments were then rated by the consultants, reviewed by the County, reviewed by the Working Group, and the segment ratings were adjusted based on review and discussion. The test run applied 17 criteria across each of the nine segments.

### 5.5 Revising evaluation criteria

Based on the test, updates were made to the criteria, ratings, and process in consultation with the Working Group prior to proceeding with a full assessment of all segments.

### 5.6 Evaluating path segments

The evaluation criteria were then applied to all segments. This was initiated by the consultant team with different consultants focusing on various categories. Once completed, the ratings were then reviewed by the other consultants, and minor modifications were made based on follow-up discussions. The full ratings were then reviewed by the County, and additional minor modifications were made after discussion about those changes. The same review and modification process was then undertaken with the Working Group. At the end of this process, ratings reflected the diverse viewpoints of many different practitioners, stakeholders, and County representatives.

### 5.7 Documenting ratings

A table (Appendix C and Figure 17) was developed to organize the criteria, definitions, rating metrics, comments, and the actual ratings for each of the path segments. This table allowed for organized tracking of the process and the ratings and resulted in more than 1,000 individual ratings. Figure 18 is a zoomed-in snapshot of the table, showing an example of how Criteria 4.2 was rated. For clarity and analysis purposes, each rating received a numerical value and color:

1= Poor rating or low-performing  2 = Average rating or performing  3 = Good rating or high-performing

These same color designations were used in the mapping in the next section. The ratings, while given numerical values to match color values, were still intended to be used for qualitative, not quantitative comparisons. The full Master Ratings Table is in Appendix C.

Figure 17: Snapshot of the Master Ratings Table

| Code | CRITERIA | Tier 1 Criteria | T1 Ratings | C25 | | C26 | | C27 | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Tier 1 Notes | Score | Tier 1 Notes | Score | Tier 1 Notes | Score |
| 4.2 | Meeting ADA criteria in built condition | Level to which segment can be designed to meet ADA grade criteria in the built condition, and the potential need for design variances. | High = Can be engineered < than 5%; OR follows roadway profile<br>Med = Can be engineered < 8.3% WITH mitigation<br>Low = Engineering unlikely to avoid > 8.3%, regardless of mitigation | Green space may limit potential to engineer fully-ADA compliant path. Potential for small sections > 5%. | 2 | Significant disturbances in existing land forms may limit removal of some barriers. Trail would follow existing driveway for some portions. | 1 | Generally flat, and existing land disturbances would allow design to remove barriers | 3 |

Figure 18: Snapshot of Criteria 4.2 from the Master Ratings Table

Figure 19: Fischer Bouma Partnership. June 2022. Beaver Pond Crossing on east side of NKHP, looking northwest.

Figure 20: Fischer Bouma Partnership. June 2022. Trees along Gratitude Way in Divide Block, looking north.

### 5.8 Mapping the ratings for each segment

Each segment was color-coded in the mapping, consistent with the rating shown on the previous page. Spatially representing the ratings identified visual patterns and allowed optimal and suboptimal segments to emerge. Instead of mapping each of the 17 individual criteria, combinations of individual criteria or criteria categories were averaged and then mapped for easier comparison, study, and discussion with the County and Working Group, as shown in Figures 21 through 26 on the following pages. Note the criteria that were grouped together in each of the figure names, as these represented core priorities of the many criteria used in the evaluation process

These six maps were then combined, or overlayed, into a single map to spatially depict the optimal and suboptimal segments from previous criteria maps. By doing so, “suboptimal links” became spatially evident. The map in Figure 27 helped identify segments that were more optimal (shown as green) and segments that were suboptimal (shown as gray). At this point in the planning process, no segment was eliminated due to its ratings or assigned map color, it simply remained in a suboptimal category while conversations around more optimal segments unfolded.

Patterns emerged from this overlay map; corridors of green lines were somewhat connected, separated by suboptimal segments. The questions then became: “How can the optimal segments be linked to create complete alignments?” and “Which suboptimal segments best complete an alignment?”

The consultant team, County, and Working Group reviewed the ratings for each “suboptimal link” and determined whether there was justification for further study. Based on this effort, some of these weak links were incorporated into longer path alignments and advanced for additional study in Tier 2.

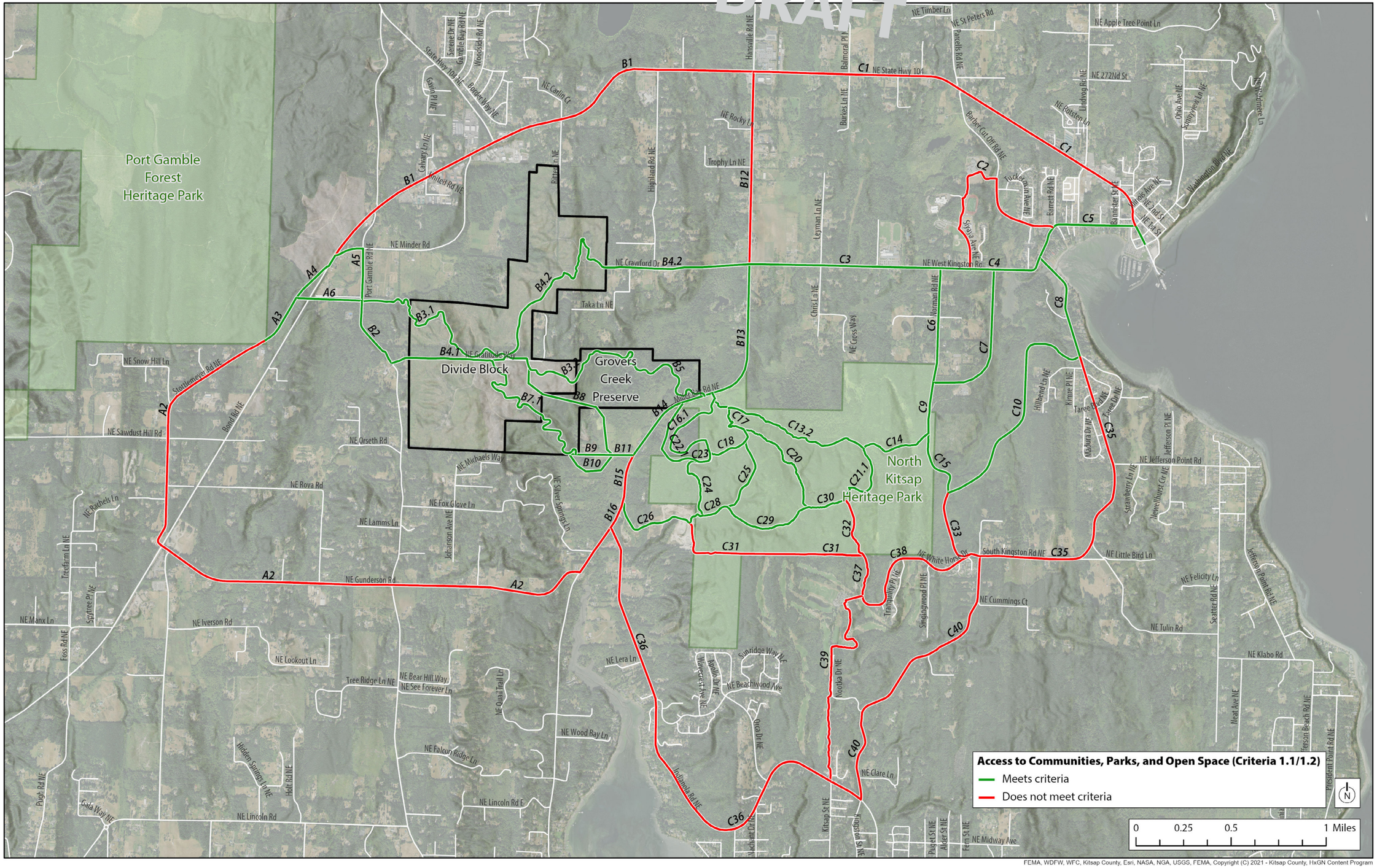



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Figure 21: Criteria 1.1 and 1.2: Provides Access to Communities, Parks, and Open Spaces

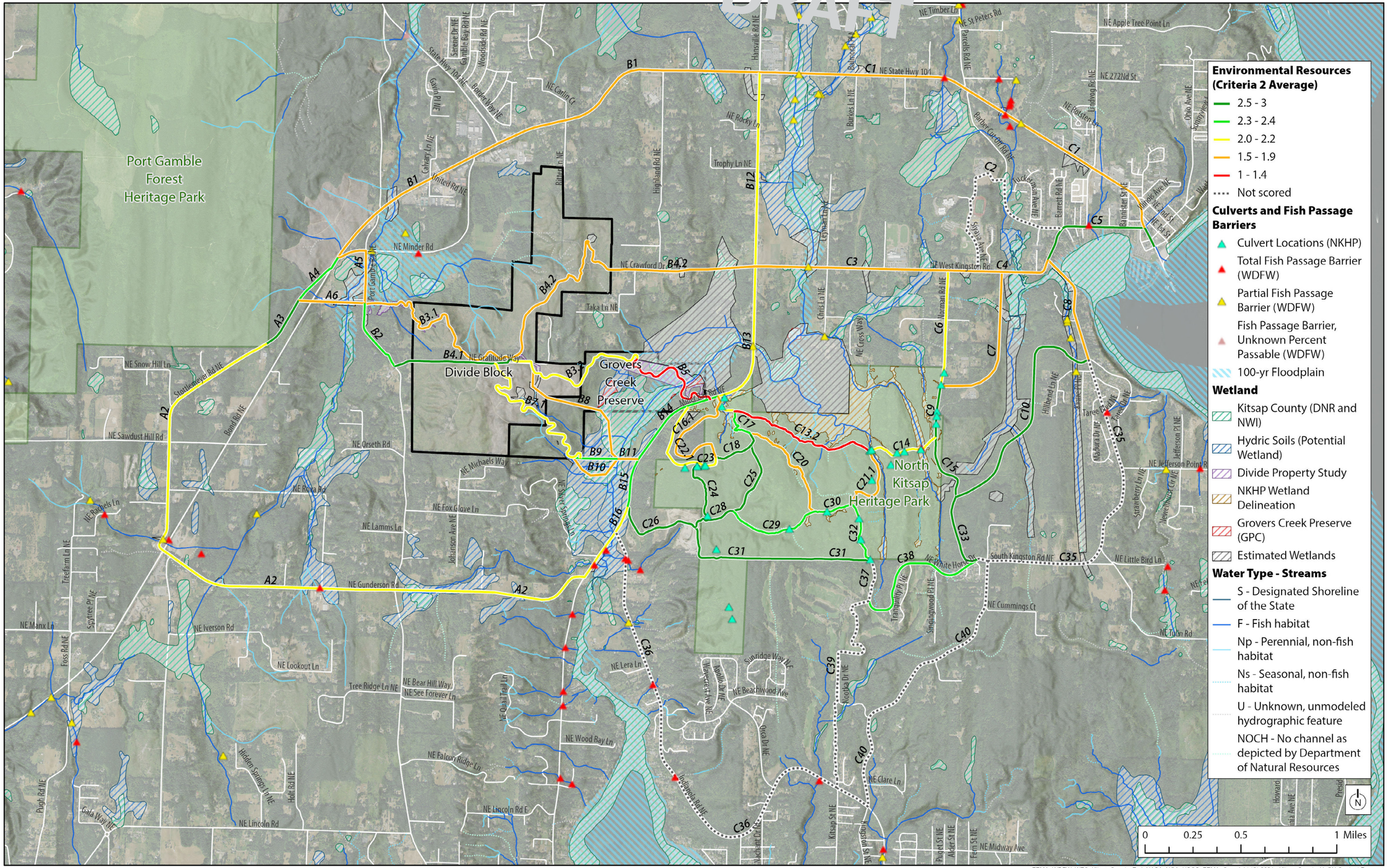




Figure 22: Criteria 2.1 to 2.6: Environmental

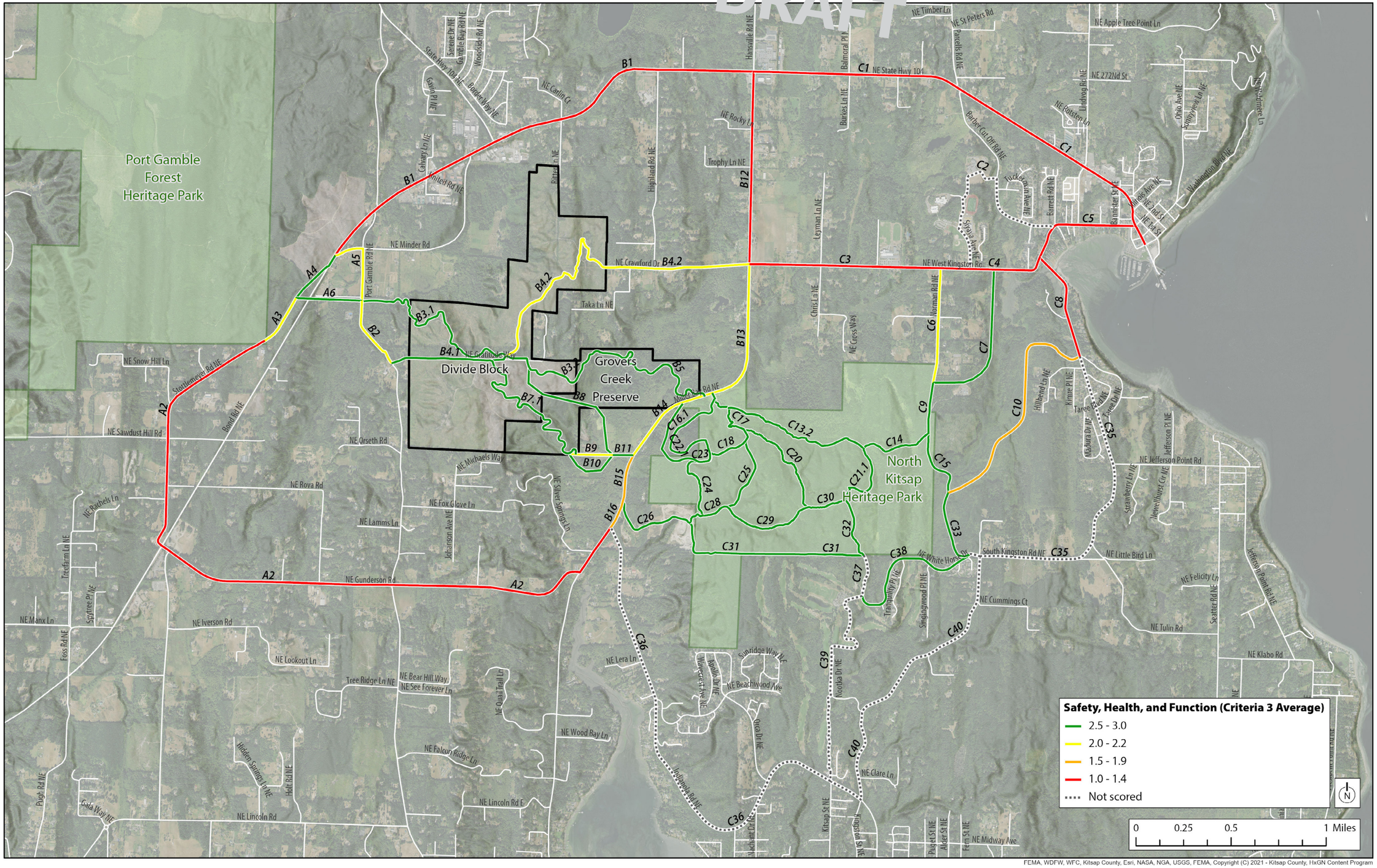




Figure 23: Criteria 3.1 and 3.2: Safety, Health, and Function

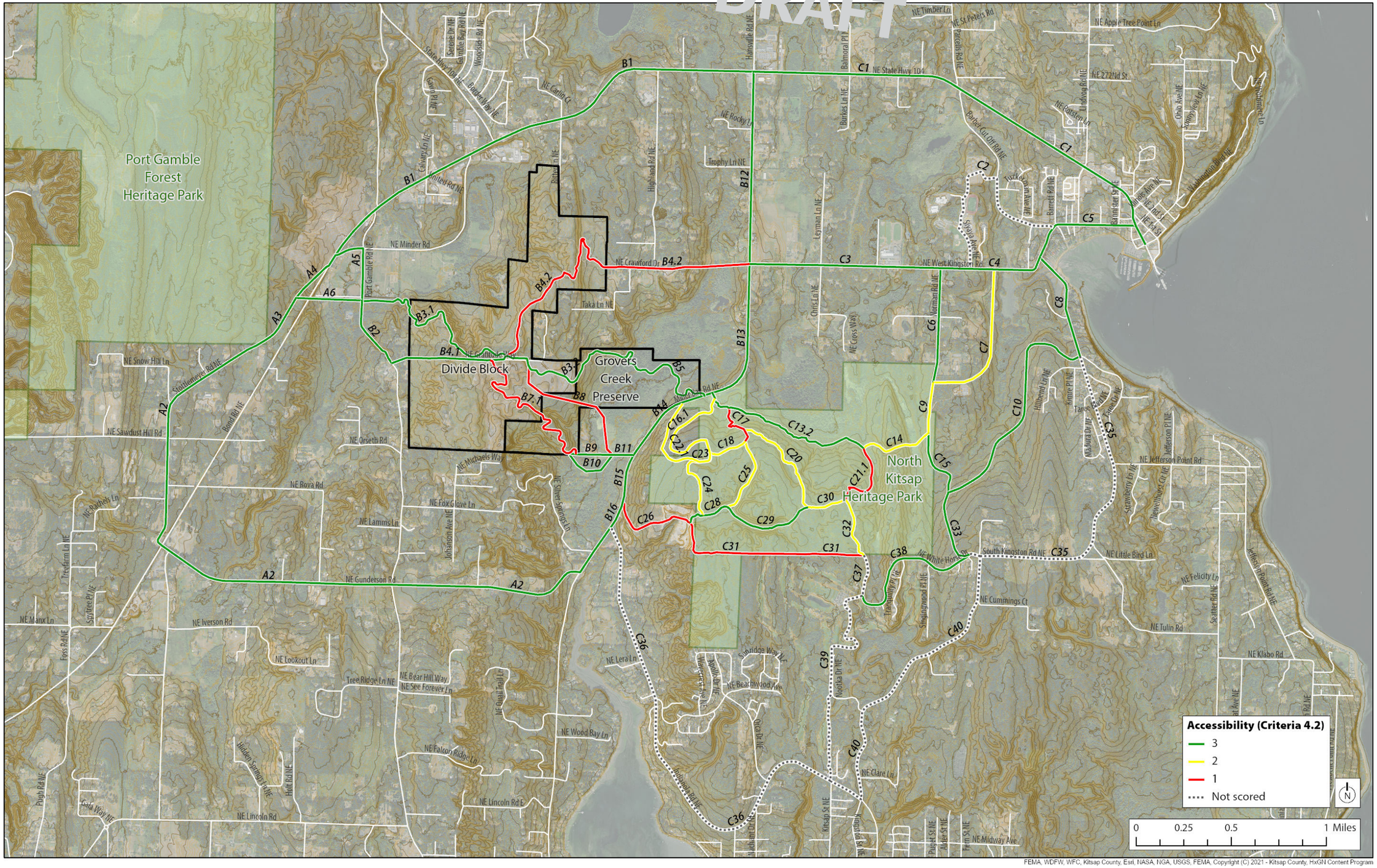


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Figure 24: Criteria 4.2: Accessibility

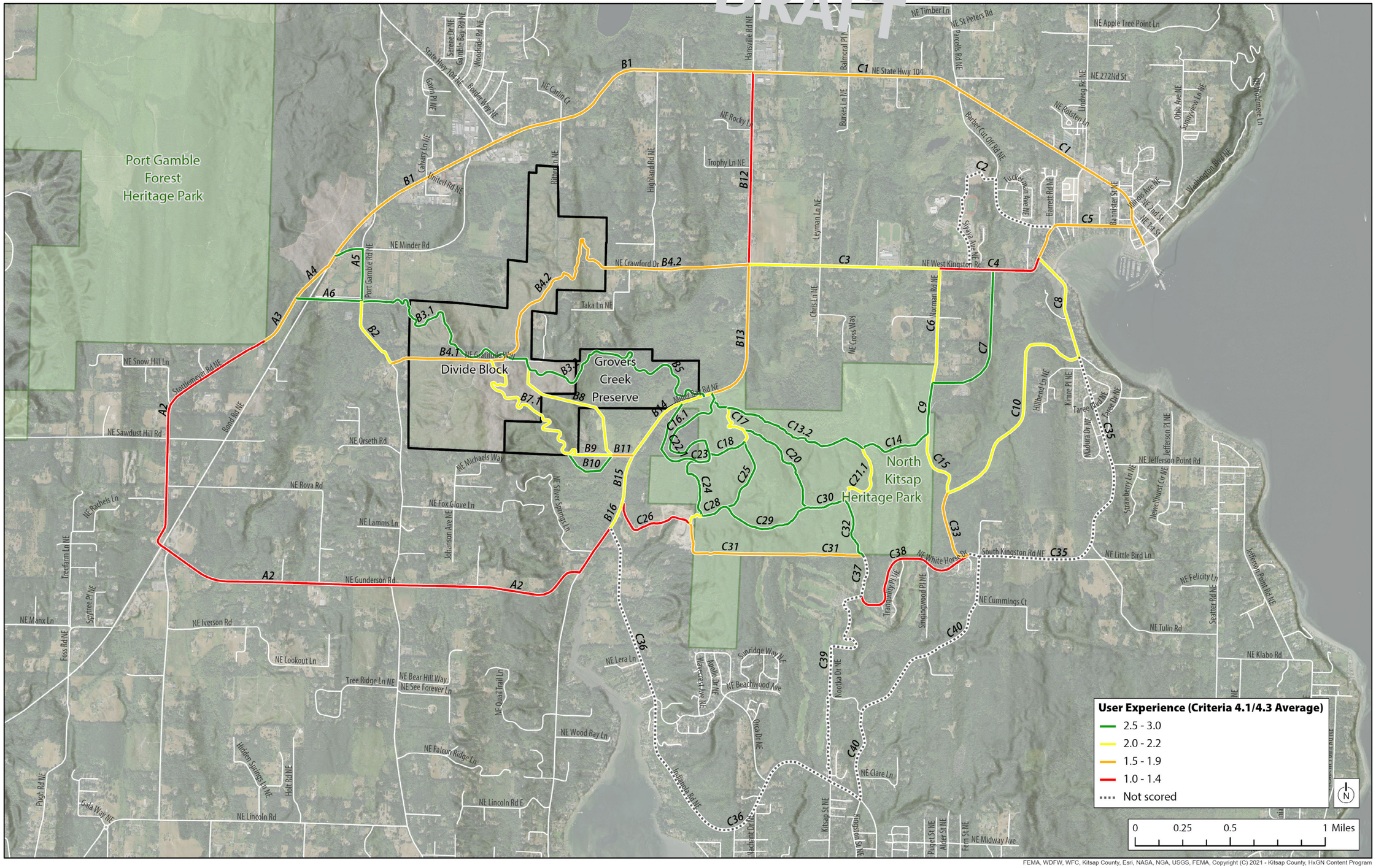





Figure 25: Criteria 4.1 and 4.3: User Experience

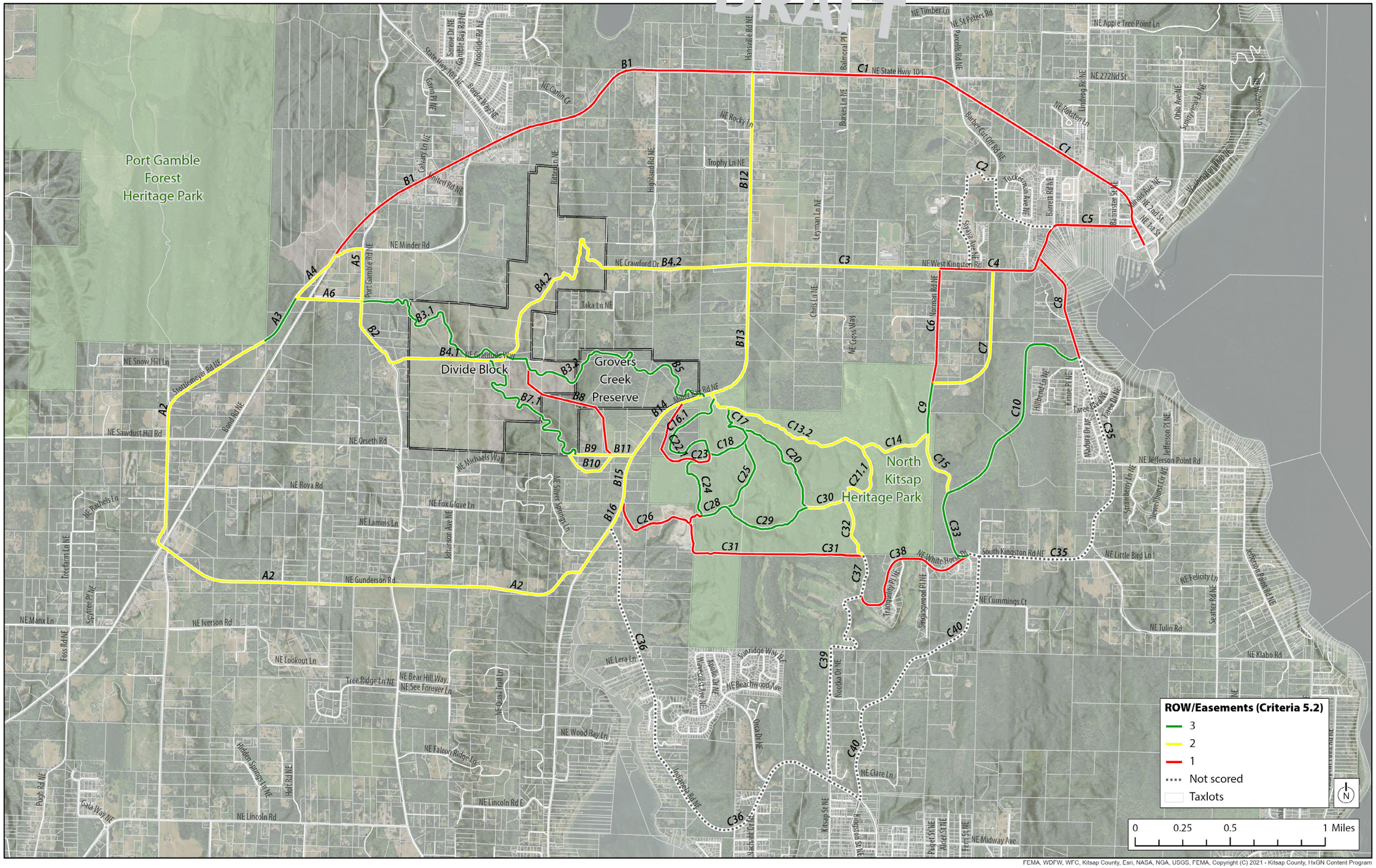



Figure 26: Criteria 5.2: Right-of-Way and Easements

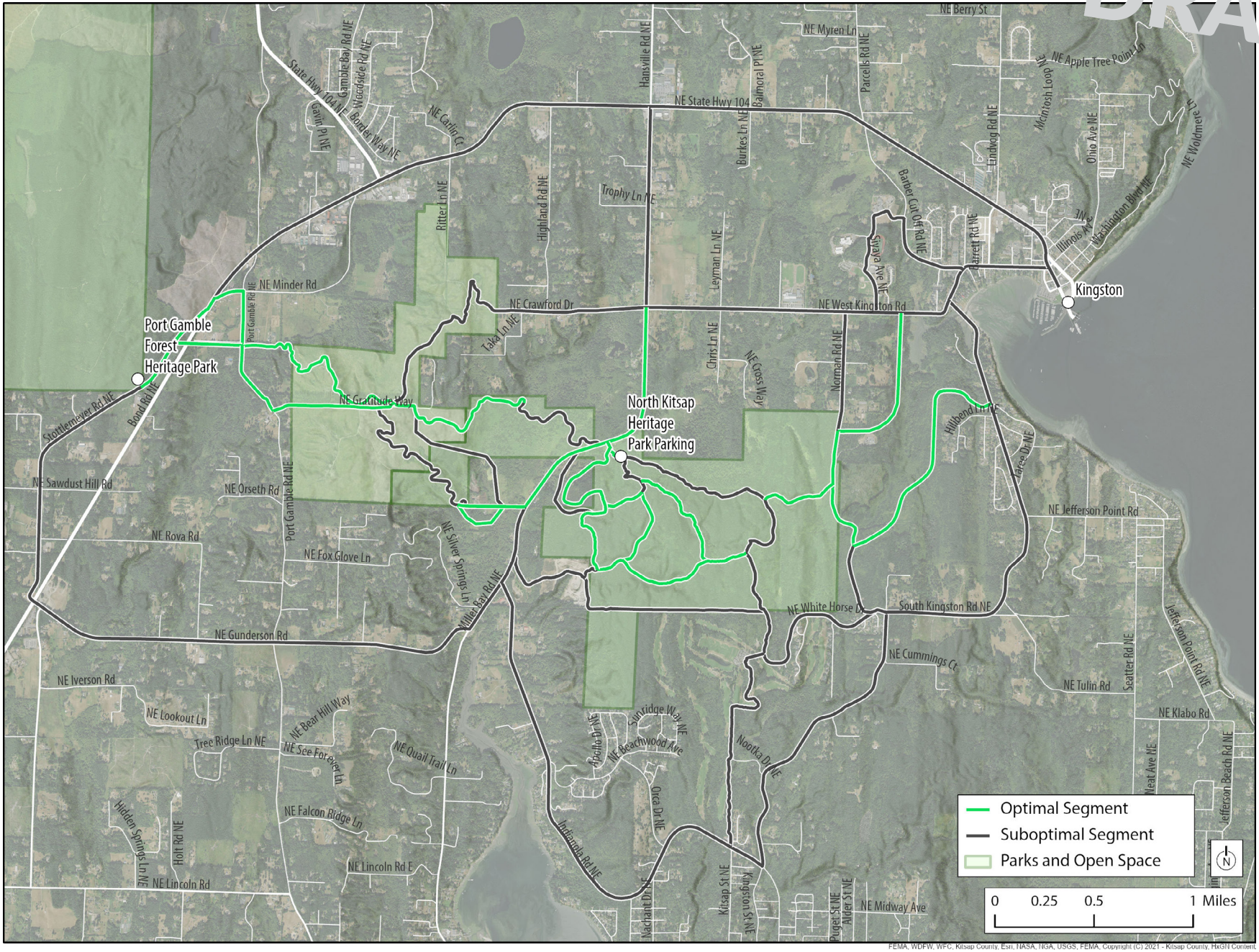



Figure 27: Optimal Segments Map

# 6. RESULTS OF THE TIER 1 ANALYSIS

Based on the Tier 1 analysis process, a summary map was developed that identified sub-alignments across the study area for analysis in Tier 2. See Figure 30 on the next page. As the mapping shows, there are not three distinctive alignments separated spatially from each other. Instead, several alignments are possible with sub-alignments crossing over each other.

The Tier 1 analysis eliminated approximately 40% of the 60 original path segments. These suitable alignments were established within the context of the three project zones (East, Central, and West) as shown in Figure 12. Each zone has various alignments possible and allow for different possibilities for full path alignments across the study area. Further study in the Tier 2 analysis identified which of the alignments were appropriate, resulting in a preferred alternative for recommendation.

Note, a “road only” option was included in Figure 30. This was important for comparison with other potential alignments located within parks and open spaces. Alignments within parks and open space rely on other entities and landowners to provide easements and access on their properties. Topographic and environmental challenges may be insurmountable as more detailed analysis proceeds.

Figure 28: Fischer Bouma Partnership. May 2022. Divide Block, looking southeast.

Figure 29: Fischer Bouma Partnership. June 2022. Path within NKHP.

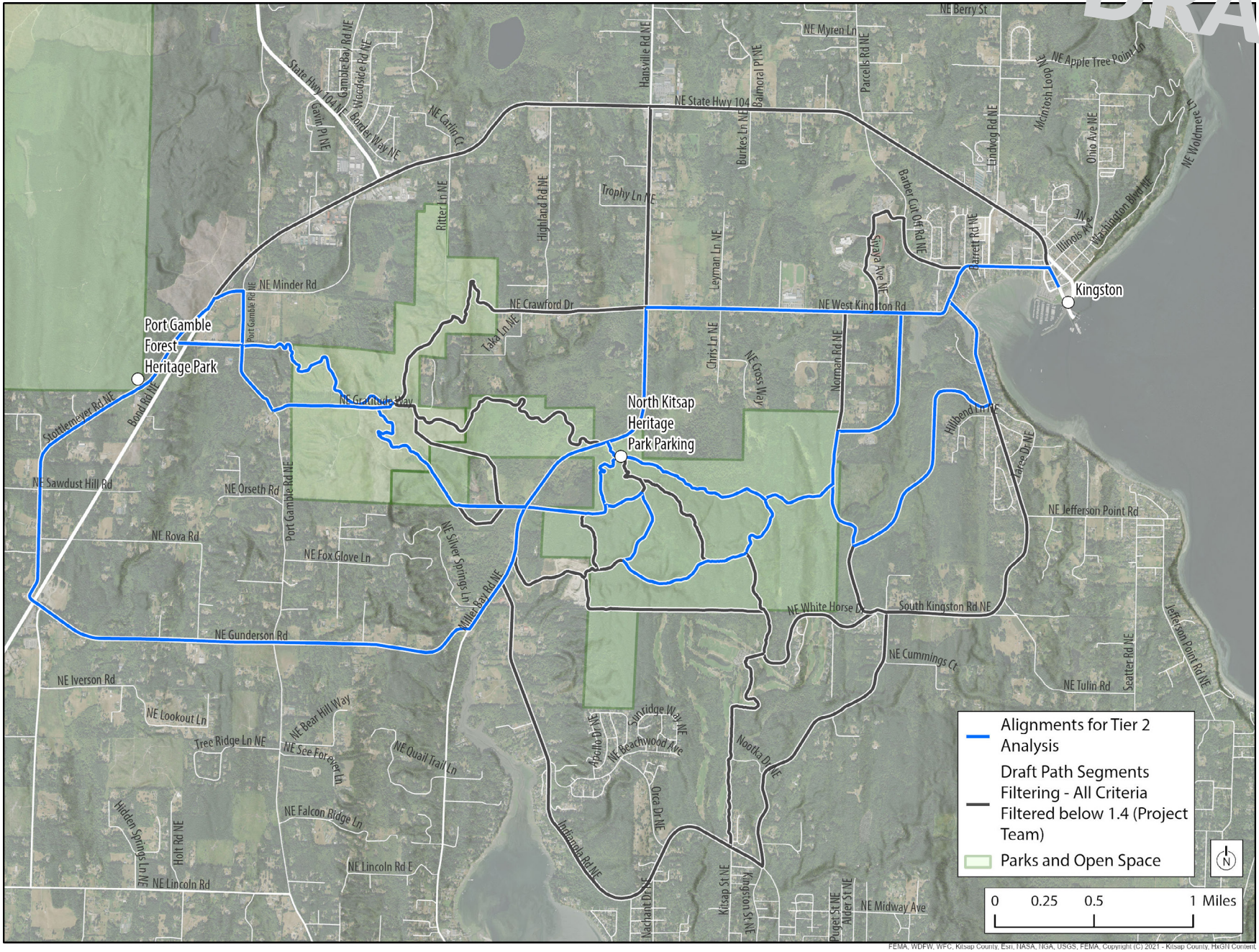



Figure 30: Alignments Advanced for Tier 2 Screening

# 7. TIER 2 ANALYSIS

The Tier 2 analysis built upon the planning process established during the Tier 1 analysis. Whereas the Tier 1 analysis was qualitative in general, the Tier 2 analysis was both qualitative and quantitative. Path segments selected for further study from Tier 1 and depicted in Figure 30 continued to be analyzed at the segment scale in Tier 2. Segment alignments were refined based on topography and critical areas and then rated with the Tier 2 evaluation criteria. (See next section for additional information about this process.) The evaluation criteria were similar to those developed in Tier 1 but updated with more detailed metrics. The Tier 2 analysis then utilized cumulative segment ratings to calculate ratings for "mini-alignments" within different zones of the project area. The ratings for the mini-alignments were then assessed to determine a full alignment across the project area using the optimal mini-alignments within each zone. This created a preferred, continuous route between Kingston and PGFHP. Alternative mini-alignments were also identified along this preferred route.

## 7.1 Specific studies of various segments and determinations of conceptual alignments

Several path segments underwent additional study in Tier 2 to accurately assess and rate the segments (Figure 31). In these cases, the specific location and length of the path segment influenced a qualitative rating process. For example, potential segments that were shown as a "straight line" between point A and point B in Tier 1 were conceptually designed utilizing existing topography and critical area information to create a more realistic route for ratings. The following section addresses each of the segments studied and purpose for refinements. See Appendix B for exhibits associated with most of these segments, where applicable.

*Segment B7.1*

Segment B7.1, on the west side of Miller Bay Road and at the west end of Orseth Road, was a segment identified in Tier 1 utilizing an existing abandoned logging road). This segment connects Orseth Road to the Divide Block through GPC property. In Tier 2, GIS data and mapping were used to refine a route that minimized impacts to critical areas and their buffers while also accommodating grades to improve accessibility and user experience (Figure 32). The longitudinal slope of the path was reduced from a slope of more than 10% over a 1,200-foot length to a maximum slope of less than 8% for approximately a 1,100-foot length. During the study in 2023, GPC completed Forest Practice Act-approved gap cuts (thinning) around proposed path segment B7.1 to improve forest stand diversity and habitat over time. Compared to the original Segment B7, Segment B7.1 reduced the length of path within wetland and stream buffers from approximately 2,000-feet, to approximately 1,400-feet, which is an approximate 30% reduction in buffer impact. According to GPC, there are no long-term restrictions with building a path through the units where tree thinning occurred. If County development/building permits are required, which is likely for a shared-use path, development is not allowed for six years, and GPC must maintain sufficient seedling stocking for at least three years. Improvements to forest habitat and user experience will be realized over time through effective forest managment.

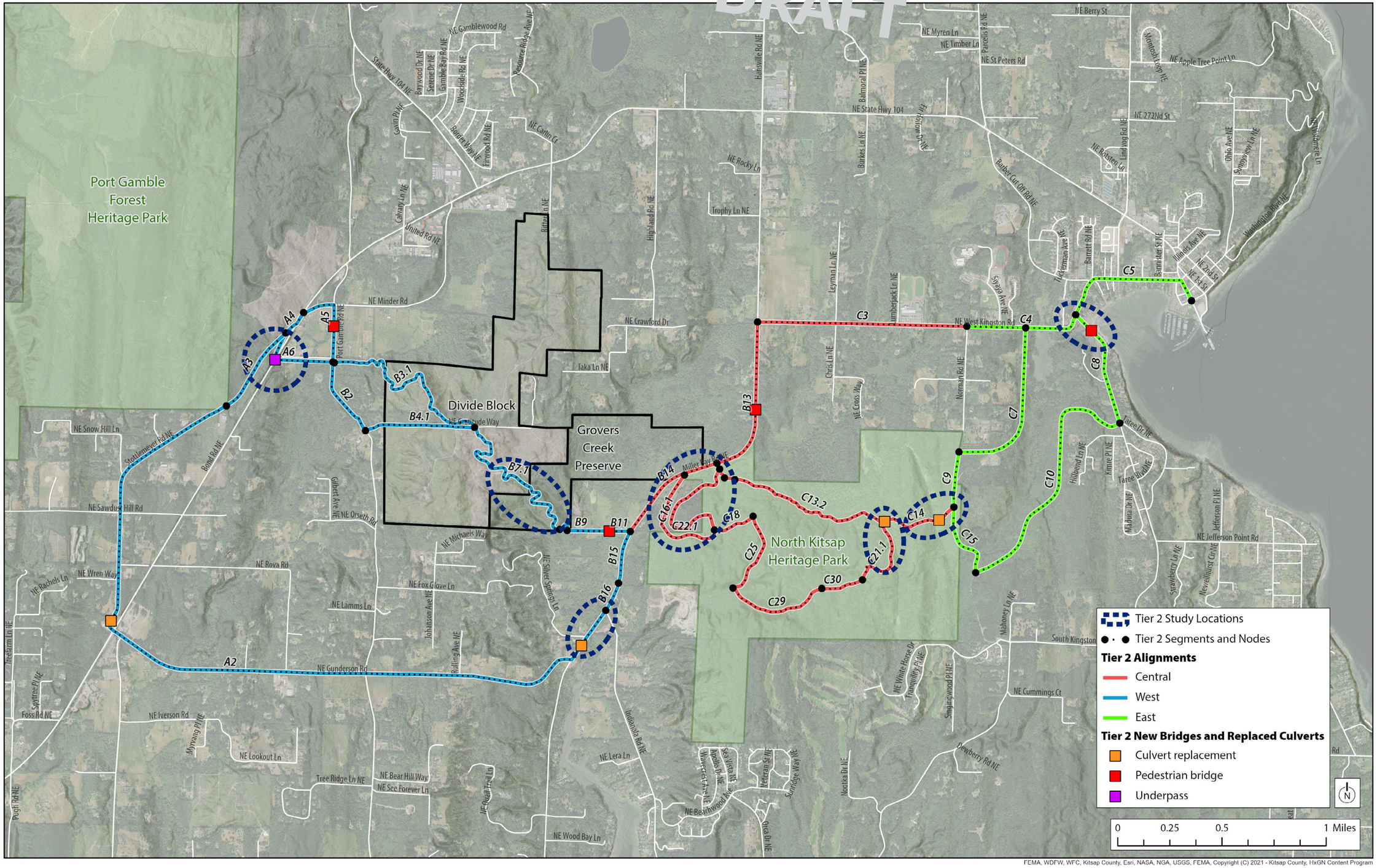
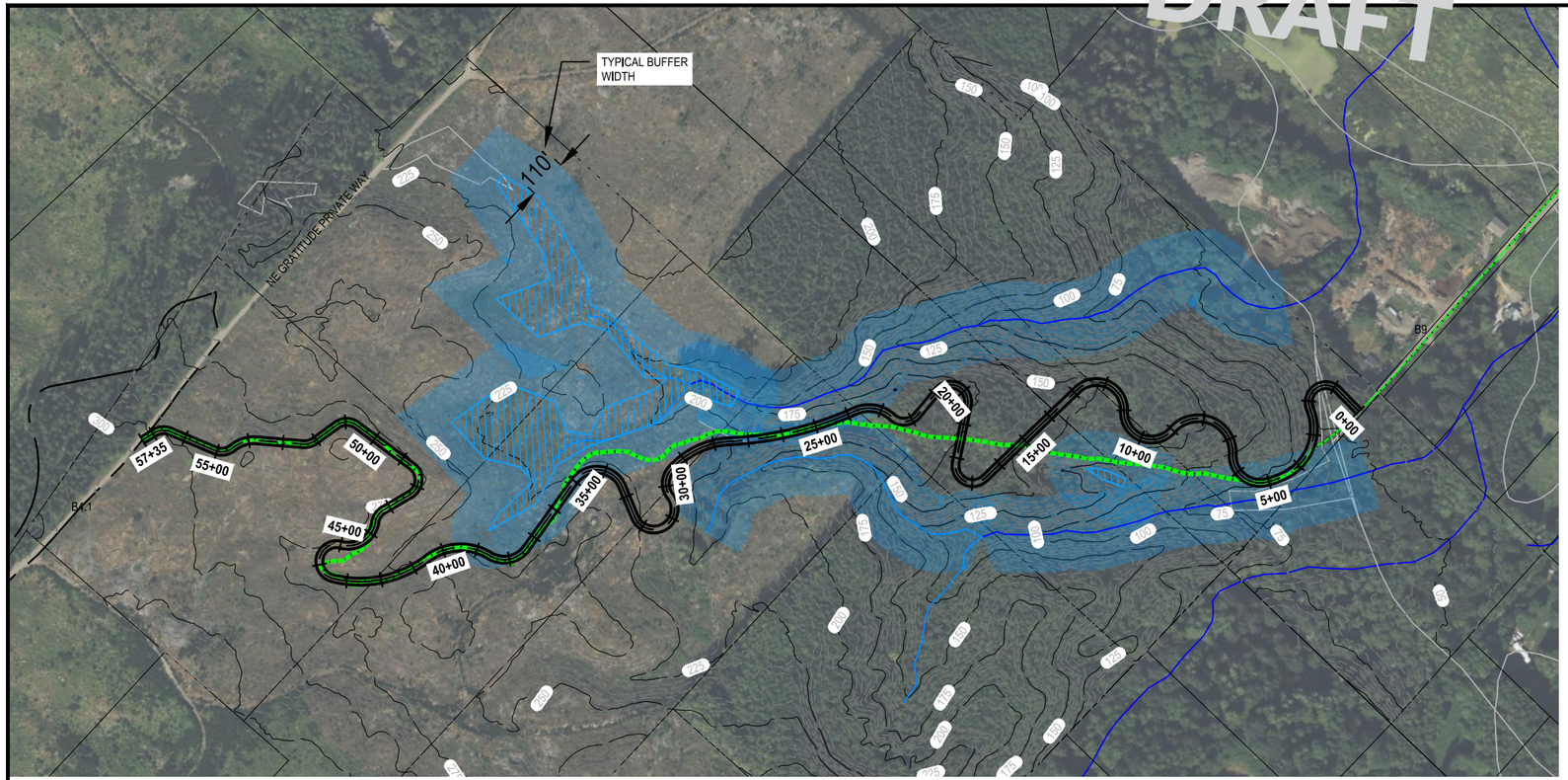


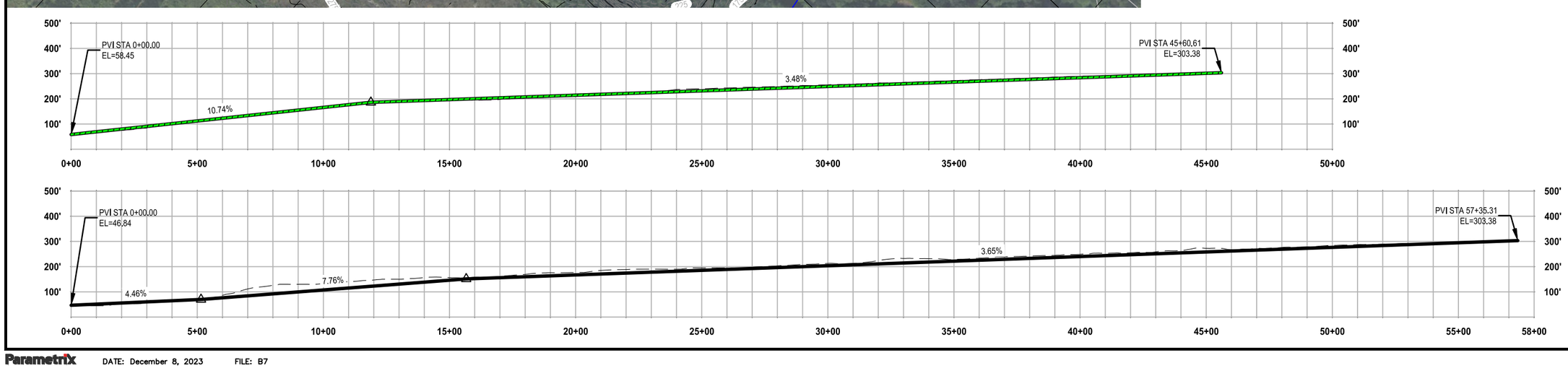

Figure 31: Various Study Locations




**LEGEND:**

- SEGMENT AS DRAFTED IN TIER 1 (OLD ALIGNMENT)
- RE-ALIGNED/NEW SEGMENT
- WETLANDS/BUFFERS
- STREAM TYPE F
- STREAM TYPE N

CONTOUR DATA USES GIS LIDAR FROM KITSAP COUNTY WITH +/- 5 FEET ACCURACY. PROFILE SHOWN DEMONSTRATES GENERAL CONFORMITY WITH SHARED USE PATH STANDARDS IN THE VICINITY SHOWN ON THE PLAN. FIELD SURVEY AND DETAILED DESIGN IS REQUIRED TO VERIFY A PRECISE ALIGNMENT AND PROFILE.




Parametrix DATE: December 8, 2023 FILE: B7

0 400
1 INCH = 400 FT.

**Segment B7 Feasibility**
NORTH SOUND TO OLYMPIC TRAIL

Figure 32: Segment B7

*Segments C16 and C22*

In Tier 1, these two potential segments were identified as options to connect a potential "Spine" path within NKHP, with the existing parking lot off Miller Bay Road or to a spur path running along the road south of the parking lot. GIS was used to refine a route that minimized impacts to critical areas and their buffers while also accommodating grades to improve accessibility and experience. For segment C16, the longitudinal slope of the path was reduced from over 17% to a maximum slope of less than 8%. For segment C22, the longitudinal slope of the path would have maximum slope of less than 8% for about 1,500 linear feet (see Appendix B for both segments). Both refined segments leave the NKHP property boundary and would require the acquisition of property that is not currently developed.

*Segment C21*

Segment C21, which is located within NKHP, ascends to the Spine path on the east side of NKHP. In the Tier 2 analysis, GIS was used to identify a revised route that minimized impacts to critical areas and their buffers while also accommodating grades to improve accessibility and experience. The longitudinal slope of the path was reduced to less than 7.5% for about a 1,400-foot length.

*Segment A6*

A high-level conceptual study was competed for the feasibility of a tunnel under Bond Road at the west end of Stevens Uhler Road versus a bridge over Bond Road. Initial cost estimates showed that a tunnel would be significantly less expensive than a bridge, so a more detailed concept was developed. While a tunnel is feasible based on slopes and environmental considerations, it comes with some caveats regarding user experience and costs relative to other options (such as an at-grade crossing at NE Minder Road). The conceptual tunnel plan depicts a box culvert under Bond Road with switchback ramps to keep path slopes under 5% (see Appendix B). The path and tunnel would need to utilize private parcels on either side of the Bond Road ROW, which are owned by Rayonier, a company that generally supports a regional path in the area.

*Segment A2*

Segment A2 is located on Miller Bay Road between Gunderson Road and Indianola Road. While the alignment of this path segment did not change between the Tier 1 and Tier 2 analyses, it was studied in more detail—both in GIS and during field reconnaissance—to better understand potential impacts to private parcels, the preferred side of roadway for the improvements and locations, and potential impacts to stream crossings and adjacent wetland and buffers. The understanding of these parameters for this segment affected the ratings in the Tier 2 analysis for this segment. See photo below.

Figure 33: Google Maps. October 2021. Miller Bay Road with Indianola Road signal (background), looking north.

*Segment C8*

Segment C8 includes the existing bridge on South Kingston Road just south of the intersection with West Kingston Road. The bridge crosses the inlet to Appletree Cove at Arness Roadside Park. It was determined that the current vehicle bridge is not wide enough to accommodate a full-width shared-use path and a new pedestrian bridge would need to be installed, likely on the northeast side. These assumptions were built into the ratings for this segment in the Tier 2 process. See photo below.


Figure 34: Fischer Bouma Partnership. August 2022. Bridge on South Kingston Road over estuary, looking northwest.

*Segment C14*

Segment C14 is located within NKHP. There has been some confusion within the community about the history of land acquisition for the park and the conditions associated with the funding for acquisition of those parcels. Grants from the Washington State Recreation and Conservation Office (RCO) were used to acquire various parcels of land that have become portions of the park. Kitsap County has and is continuing to discuss with RCO the concept of the STO shared-use regional path going through the park. Early in the planning study, RCO initially indicated that a shared-use regional path was not compatible with the grants that were used to acquire the park. However, RCO provided two mechanisms to Kitsap County that may allow RCO to approve the path through the park and the parcels acquired with grants. Kitsap County will continue to confer with RCO about which of the two options might be considered.

### 7.2 Mapping of path sections

Figure 35 maps the locations of the different path sections, as defined earlier in Section 2, as one of five different colors. The sixth color, pale yellow, indicates paths that already or will exist: 1) a shared-use path that will be installed in the Arborwood neighborhood by the developer and 2) roadway bike lanes and adjacent sidewalks that have already been installed on the NE West Kingston Road in the town of Kingston.

*Section A1: Path in Forested Area, on Existing Logging Road (Green)*

This path section has the narrowest profile and preserves adjacent trees and habitat to the greatest extent possible. This path section occurs where the alignment can be placed on what was once a logging road and where the road-profile is wide enough to accommodate a 10-foot-wide path with 2-foot-wide gravel shoulders or where there are not steep side slopes that would be impacted by having to widen the path profile. This path section primarily occurs within NKHP in the Central Zone and within the Divide Block in the West Zone.

*Section A2: Path in Forested Area, New Alignment with Steep Terrain (Green)*

This path section also has a narrow profile to preserve adjacent trees and habitat to the greatest extent possible. However, this path section requires retaining walls on one or both sides to preserve adjacent, existing vegetation (so that steep side slopes don't have to be graded). This path section would also occur within NKHP, within the Divide Block, and within a privately owned parcel south of West Kingston Road.

*Section B: Path in Cleared Area, within Critical Area Buffers (Orange)*

This path section does not have as narrow a profile as those in Sections A1 or A2 due to its location within recently cleared land (where forest management activities have occurred). In this case, there are no existing trees or habitat requiring preservation adjacent to the path, although restoration opportunities exist. This path section is located within critical area buffers (unlike path Section C), so the footprint is minimized to reduce the potential impact on the adjacent critical area. In some cases, where side slopes might be steep, retaining walls would also be used to

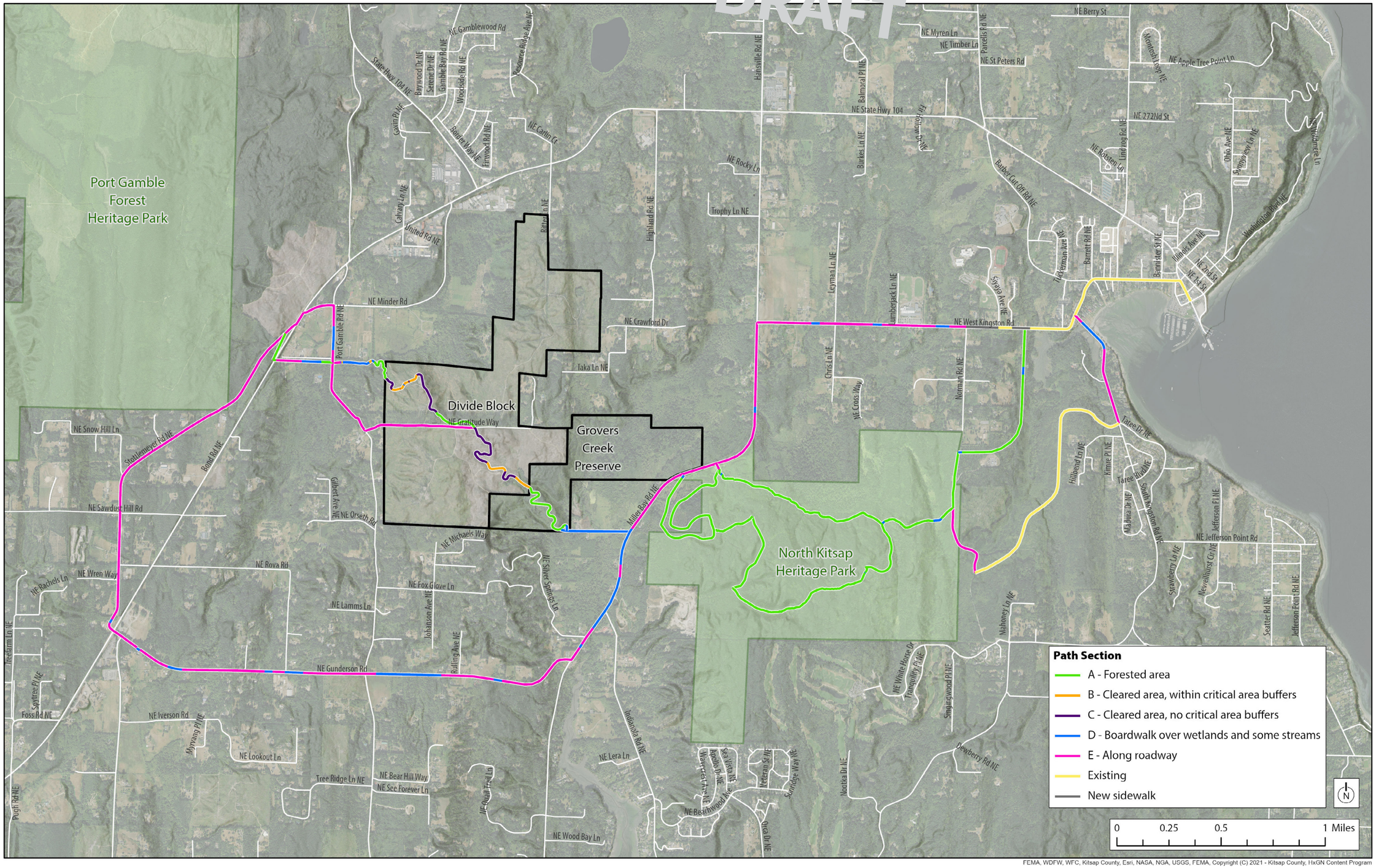



Figure 35: Path Sections

minimize the impact on the adjacent critical area. This path section would occur within the Divide Block on both Rayonier and GPC parcels that have recently been logged and are within critical area buffers.

*Section C: Path in Previously Cleared Area, No Critical Area Buffers (Purple)*

This path section would have the widest profile of those proposed since it is located on land that has been recently cleared and is outside of critical area buffers. There would be limited need (if any) for expensive retaining walls to contain the area of disturbance created by the path corridor. Side slopes could simply be graded to tie into existing undisturbed slopes without impacting existing vegetation. This path section would occur within the Divide Block on both Rayonier and GPC parcels that have been recently logged but are not within critical area buffers.

*Section D: Boardwalk over Wetlands and Some Streams (Blue)*

This path section would be utilized where the alignment crosses wetlands and some narrow streams. Where the stream is wider, a culvert is proposed for the stream instead of a boardwalk. Boardwalks are not proposed within the buffers of wetlands and streams (see path Section B above). The boardwalk would be a 14-foot-wide structure that would include railing on each side for safety and to keep users on the path, effectively reducing the usable width of the path to 12 feet wide. The boardwalk would be constructed on a pin-pile type footing to reduce impact to the underlying critical area. Recent innovations in boardwalk design, engineering, and construction would allow for the boardwalk to be built from sections of the structure already completed, resulting in less of an impact to the wetland below. The material for the boardwalk would be determined during future pre design and engineering projects. This path type would be located within parks and open spaces, or along roadways, wherever the path alignment crosses through a wetland.

*Section E: Path along Roadway (Magenta)*

This path section would be adjacent to the road, typically within the ROW if room allows, and would match the grade of the road. The path would be offset a distance from the road to allow room for stormwater conveyance, utilities, and safety. Walls or slopes adjacent to the path and opposite from the road would be utilized to minimize additional grading and impacts to private property. This path section would be located only along roads, except where it crosses a wetland or stream, in which case a boardwalk (Section D) or other structure would be utilized.

### 7.3 Refinement of the criteria and metrics for the Tier 2 Analysis

For the Tier 2 ratings process, similar criteria were used to those identified during the Tier 1 ratings process. The analysis and rating process for potential path sections continued at the smallest scale: the segment scale. Below are the five criteria categories and 18 individual criteria that were used for the Tier 2 analysis. Specific metrics were identified for each of the evaluation criteria and are discussed in Section 7.4.

*Criteria 1: Access to Communities, Parks and Open Spaces*

Criteria 1.1 Access to communities

- Direct connections to communities for all ages and abilities

Criteria 1.2 Access to parks and open space

- Direct connections to parks and open spaces for all ages and abilities
- Direct connections within parks and open spaces for all ages and abilities

Criteria 1.3 Consistency with adopted County policies and other requirements

- Level to which segment demonstrates general consistency with String of Pearls Plan, 2011
- Level to which segment demonstrates general consistency with Non-Motorized Facilities Plan, 2013/2018
- Level to which segment demonstrates general consistency with Parks, Recreation, and Open Space Plan

Criteria 1.4 Places of Interest

- Number and type of interest points, educational and recreational opportunities, parks, connecting paths

*Criteria 2: Environmental Resources*

Criteria 2.1 Wetlands

- Wetland area impact
- Impact type (fill = high, shade = moderate)
- Estimated mature tree removal
- Estimated extent of wetland fragmentation
- Category of primary wetland impacted

Criteria 2.2 Wetland buffers

- Buffer area impact
- Length of existing path within any portion of wetland buffer limits
- Existing buffer conditions
- Potential extent of mature tree removal
- Category of primary wetland impacted

Criteria 2.3 Streams

- Number of crossings of Type F streams
- Number of Type N streams
- Existing fish presence at Type F crossings

Criteria 2.4 Stream buffers

- Linear feet of path within Type F buffer limits
- Linear feet of path within Type N buffer limits

- Existing buffer conditions
- Potential extent of mature trees removal

Criteria 2.5 Restoration potential

- Estimated extent to which land acquisition, if required for the segment, would enhance or protect wildlife corridors
- Estimated area of existing wetland disturbance that could be removed/mitigated as part of path construction
- Estimated area of disturbed wetland buffer that could be enhanced via revegetation/management
- Number of Type F stream fish passage barrier culverts that could be removed, and estimated habitat area made available after replacement
- Estimated extent of disturbed/degraded Type F stream buffer that could be enhanced via vegetation management

Criteria 2.6 Mitigation needs and opportunities

- Mitigation required for impacts to wetlands, streams, and buffers
- Mitigation cost

*Criteria 3: Safety, Health, and Function*

Criteria 3.1 User health

- Level to which segment provides a safe and healthy experience for users based on location (roadside versus open space), including consideration of health impacts related to poor air quality near high-volume roadways

Criteria 3.2 User safety – Conflicts at driveways

- Adjacent use intensity (low = commercial/industrial, medium = mixed use, high = rural/residential/forest)
- Number of major driveways (commercial/industrial)

*Criteria 4: User Experience*

Criteria 4.1 Low-stress path design

- % of path ≤ 5% grades in built condition

Criteria 4.2 Meeting ADA criteria in the built condition

- Along roadway = meets criteria (high rating)
- All greenfield segments, % of path meeting following criteria:

  High = 90% of path is <5%, remaining 5 to 8.3%

  Med = 70% of path is <5%, remaining 5 to 8.3%

  Low = Any portion >8.3%

Criteria 4.3 Quality of the outdoor experience

- % of length within natural environment
- % of length NOT as side path to a road

*Criteria 5: Project Delivery*

Criteria 5.1 Segment design, mitigation/restoration, and construction costs relative to typical linear foot costs for standard shared-use paths

- Length of segment
- Degree to which costs exceed standard path section—relative comparison per unit length

Criteria 5.2 ROW/Easements

- Acquisition necessary, by # of parcels affected
- Tribal Trust land easement/agreement needed (yes/no)

- Other restrictions (yes/no)

Criteria 5.3 Long-term maintenance costs

- Degree to which maintenance may exceed typical path maintenance due various elements—structures, for example

*Ratings*

Each path segment was rated for each of the criteria above based on the established metrics for each. The ratings were organized and compiled in a large table developed during the Tier 1 analysis and revised to accommodate the Tier 2 metrics, Tier 2 ratings, and supporting notes. Refer to Figure 38 for a snapshot of the table showing four of the environmental criteria and four of the segments within the West Zone. The full table for all segments and all criteria reside in Appendix C. In all, there were 35 path segments rated for each of the 18 individual criteria. Ratings were reviewed by various members of the consultant team, then reviewed by both County staff and Working Group members. Adjustments were made based on these reviews and subsequent discussions.

As shown in Figure 38, which is a portion of the larger table provided in Appendix C, many segment ratings from Tier 1 were adjusted based on refinements and additional data/information collected and described in Sections 7.1 and 7.2. The following section provides more information about the ratings process for each category of criteria.

Figure 36: Fischer Bouma Partnership. June 2022. Path within NKHP.

Figure 37: Fischer Bouma Partnership. May 2022. Top of Divide Block, looking northwest.

| Code | CRITERIA | Tier 1 Criteria | Tier 2 Criteria | A2 Located in Alignment WEST- 1 | | | | A3 Located in Alignment WEST- 2,3,4, & 5 | | | | A4 Located in Alignment WEST- 3 & 5 | | | | A5 Located in Alignment WEST- 3 & 5 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Tier 1 Notes | Tier 2 Notes | T1 Score | T2 Score | Tier 1 Notes | Tier 2 Notes | T1 Score | T2 Score | Tier 1 Notes | Tier 2 Notes | T1 Score | T2 Score | Tier 1 Notes | Tier 2 Notes | T1 Score | T2 Score |
| 2 | Environmental Resources | | | | | 2.2 | 1.3 | | | 2.7 | 2.5 | | | 2.3 | 2.5 | | | 1.8 | 1.6 |
| 2.1 | Wetlands | Estimated segment impacts to wetlands relative crossing length, preliminary/estimated wetland category, path type (existing or new) and mitigation sequencing requirements. | Wetland area impact | Expands existing crossing over Gamble Creek and Grovers Cr. trib. headwater wetlands. Assumes embankment not bridge. C-II/III wetland impact. | 0.64 | 1 | 1 | No wetland crossings | 0 | 3 | 3 | No wetland crossings | 0 | 3 | 3 | Path would be located in Gamble Creek riparian wetland | 0.03 ac | 1 | 2.25 |
| | | | Impact type (fill = high, shade = mod.) | | mod: shading | | | | 0 | | | | 0 | | | | mod | | |
| | | | Estimated mature tree removal | | low: adjacent to roadway | | | | 0 | | | | 0 | | | | low | | |
| | | | Estimated extent of wetland fragmentation | | low: existing roadway | | | | 0 | | | | 0 | | | | low | | |
| | | | Category of Primary Wetland Impacted | | mod (CII/III) | | | | 0 | | | | 0 | | | | mod (CII/III) | | |
| 2.2 | Wetland buffers | Estimated potential impacts to wetland buffers relative to preliminary/estimated wetland category, path type (new or existing), and Kitsap County Critical Areas Ordinance (CAO) requirements. | Buffer area impact | Crosses through Gamble Cr. and Grover Cr. wetland buffers. Utility corridor on N. side. | 1.3 | 2 | 1 | Wetland on west side of road | 0.08 | 3 | 2.75 | Small wetland buffer | 0.04 | 3 | 2.75 | Wetland buffer typ. disturbed with pasture, develop.and existing utilities | 0.7 | 2 | 1.25 |
| | | | Length of existing path within any portion of wetland buffer limits | | 3538 | | | | 220 | | | | 100 | | | | 1900 | | |
| | | | Existing buffer conditions | | low: adjacent to roadway | | | | mod | | | | 0 | | | | low | | |
| | | | Potential extent of mature tree removal | | low: existing roadway and utility corridor | | | | low | | | | 0 | | | | low | | |
| | | | Category of Primary Wetland Impacted | | mod (CII/III) | | | | CIII/IV | | | | CIII | | | | mod | | |
| 2.3 | Streams | Estimated potential impact to stream relative to stream type, fish use and crossing type (existing or new). | No. of crossings Type F streams | Existing roadway crosses Gamble Cr. and Grover Cr. trib. | 5 | 2 | 1 | Type N stream based on field recon. | 0 | 3 | 2.75 | Stream present but not fish habitat Type F. Type N est. | 0 | 2 | 2.75 | Existing roadway crosses Gamble Cr. | 2 | 2 | 1.5 |
| | | | No. of crossings Type N streams | | 3 | | | | 1 | | | | 1 | | | | 0 | | |
| | | | Existing fish presence at Type F crossings | | high, mult. spp | | | | 0 | | | | low | | | | high, mult. spp | | |
| 2.4 | Stream buffers | Estimated potential impact to stream buffer relative to stream type, crossing type (existing or new), and requirements of Kitsap County Critical Areas Ordinance. | Linear ft of path within Type F buffer limits | Gamble Cr. and Grover Cr. trib crossing Type F. | 1500 | 2 | 1 | Type N stream based on field recon. | 0 | 3 | 2.75 | Existing stream crossing | 0 | 2 | 2.5 | Gamble Cr. Type F. | 400 | 2 | 2 |
| | | | Linear ft of path within Type N buffer limits | | 200 | | | | 100 | | | | 100 | | | | | | |
| | | | Existing buffer conditions | | low: existing roadway and utility corridor | | | | mod | | | | mod/low | | | | low | | |
| | | | Potential extent of mature trees removal | | low: existing roadway and utility corridor | | | | low | | | | mod | | | | low | | |

Figure 38: Snapshot of the Tier 2 Criteria and Ratings by Segment Table

### 7.4 Rating the segments: a more quantitative approach

The following section provides a brief description of the rating process for each of the five categories of criteria. This description includes a summary narrative for the assessment approach, analysis and calculations, and ratings. The most in-depth and quantitative analysis, based on the information available, was for the environmental rating process. Tabular data can be found in Appendix C.

*Criteria 1: Access to Communities, Parks and Open Spaces*

*Assessment Approach*

The criteria relates to the ability of the path segment to provide access to communities, parks, and open spaces within the project area. "Connection" was determined by the cumulative ratings for four specific criteria. Metrics were determined for each of the criteria in this category and then the path segment was rated based on those metrics. Metrics were mostly qualitative for this category of criteria, whereas metrics for most other criteria were more quantitative.

*Analysis*

To assess Criteria 1.1, Access to Communities, each segment's ability to provide access for all ages and abilities between existing or planned non-motorized facilities in Kingston and Port Gamble was considered. GIS mapping was used to assess segments spatially relative to the surrounding context of the project area. This was challenging at the segment scale because each small path section needed to be looked at within the context of connections to other potential segments. Segments were assessed simply on the directness of their contributing connection between the project start and end points.

To assess Criteria 1.2, Access to Parks and Open Spaces, two metrics were considered, including 1) direct connection to parks and open spaces for all ages and abilities and 2) direct connections within parks and open spaces for all ages and abilities. For each of these metrics, GIS maps and aerial photos were studied to understand the relationship between the proposed path segment and parks and opens spaces nearby.

To assess Criteria 1.3, Consistency with Adopted County Policies, three metrics were considered: 1) consistency with the 2011 String of Pearls plan, 2) consistency with the County's 2018 Non-Motorized Plan, and 3) consistency with the County's 2018 Parks, Recreation and Open Space Plan. Each of these plans address, in general and/or specific detail, regional path opportunities on the North Kitsap Peninsula based on years of planning and community participation.

To assess Criteria 1.4, Places of Interest, GIS mapping, Google Street View, and field reconnaissance were used to determine the number and types of interest points along a given segment of path, including parks, connecting paths, educational facilities or opportunities, and other recreational opportunities.

*Segment Ratings*

For Criteria 1.1, a segment was given a low rating of 1 if it was an indirect connection. Only segments B15 and B16, which made up the road option in the West Zone (Miller Bay Road and Gunderson Road), were rated low due to their significant length and indirectness. Segments were given a medium rating of 2 if they were generally direct, east to west, between Kingston and PGFHP. Segments were given a high rating of 3 if they were the most direct. Very few of the ratings in the Tier 2 analysis changed from the Tier 1 analysis since the segments studied did not change location substantially. Also, many of the lower (1) rated segments for this

criteria were dropped from consideration after Tier 1, which is why most remaining segments were rated as medium (2) or high (3).

For Criteria 1.2, a segment was given a low rating of 1 if it did not connect to a park or open space or exist within a park or open space. A segment was given a medium rating of 2 if one of the two metrics was affirmative. For example, there are path segments that provide access to a park or open space but are not located within the park or open space. A segment was given a high rating of 3 if the path provided access to a park or open space and was located within a park or open space.

For Criteria 1.3, a segment was given a low rating of 1 if not consistent with any of the three metrics. This was very rare since most of the segments in the Tier 2 analysis are supported by the general objectives in these plans and policies. A segment was given a medium rating of 2 if consistent with at least one of the metrics. A segment was given a high rating of 3 if consistent with at least two of the metrics.

For Criteria 1.4, a segment was given a low rating of 1 if there were no places of interest along the path segment. A segment was given a medium rating of 2 if there was at least one significant place of interest. A segment was given a high rating of 3 if there were at least two significant places of interest. Adjustments were made to the ratings on a case-by-case basis, according to the context of the path, the surrounding parcels, and the size, significance, or quality of the place of interest. Notes in the master table list the places of interest for each segment.

*Criteria 2: Environmental Resources*

*Assessment Approach*

The development of a regional path would occur within portions of wetlands, streams, and buffer areas and would therefore be subject to multiple Federal, State, and County environmental regulations. The type and extent of path development within these critical areas would be significantly influenced by these regulations, and specific measures would be required to avoid, minimize, and mitigate potential impacts. In order to determine whether a specific segment of the path is feasible, a minimum level of quantitative information must therefore be obtained on the type and location of the critical area, as well as the type and extent of potential impact from path construction.

Figure 39: Struck Environmental. May 2022. Carpenter Creek estuary at segment C4/C7 looking south.

To reflect this regulatory context, the Tier 2 alternatives environmental analysis used a more quantitative assessment of the type and extent of specific critical areas, as well as the type and extent of potential construction needed to build the path. By overlaying these two types of information, the potential impacts of an alternative segment can be calculated and compared. Completing this analysis required mapping of critical areas, assessment of critical area regulatory category (e.g., wetland category or stream type), and calculation of potential area impacts due to the path crossing over or adjacent to the critical area and/or its buffer zone.

The level of detail associated with this environmental assessment reflects the concept level of design that was developed for the planning phase of the project. This environmental assessment therefore did not develop a level of detail that is associated with final engineering design, permitting, and construction, which typically includes detailed delineations and ratings, surveys, and impact analysis. The quantitative analysis performed for this study should therefore be considered preliminary and subject to revision as more detailed future designs and assessments are completed.

*Summary of Regulatory Requirements*

For the purposes of this assessment, the primary regulatory requirements for development of a path in wetlands, streams, and buffers are contained in the Kitsap CAO, which is codified in **Kitsap County Code Title 19**. The CAO specifies what types of development activity are allowed in critical areas, as well as applicable buffer and mitigation requirements. In accordance with the State Growth Management Act, the Kitsap County CAO reflects best available science for protection of critical areas, as well as wetland assessment and mitigation requirements that are codified at the State and Federal level. Table 2 summarizes the primary Kitsap County CAO information used in this assessment.

Table 2: Summary of Kitsap County CAO buffers, path development, and mitigation requirements

| CAO Element | CAO Requirement | As Applied in NSTO Study |
|---|---|---|
| Wetland Buffers | Ranges from 40' buffer (Cat. IV) to 225' buffer (Cat. I)[1] | 225' for Cat. 1; 200' for North Kitsap Heritage Park wetlands; 110' for all other wetlands |
| Stream Buffers | 50' Type N Stream (non-fish)<br>150' Type F (fish habitat) | 50' for Type N stream<br>150' for Type F stream |
| Path Standards[2] | Use existing roads and utility corridors where feasible. Locate path in outer 25% of buffer where feasible | Generally applied as described in the CAO |
| Wetland Mitigation | Minimum 2:1, maximum 16:1 replacement ratio, depending on wetland category and type of mitigation | Average 4:1 mitigation ratio used |
| Buffer Mitigation | Replace/compensate for buffer function that has been lost/disturbed | 1:1 mitigation ratio in disturbed areas<br>2:1 mitigation ratio in undisturbed areas |

1 Buffer for moderate impact land use (Kitsap County Code (KCC) 19.200.220).

2 Regional public path standards (KCC 19.200.225.F.6).

3 Kitsap County Critical Areas Ordinance (CAO) codified in KCC Title 19

*Critical Area Mapping and Regulatory Category Determination*

Existing GIS mapping available from Kitsap County and other data sources (including the NKHP wetland and stream study) were used to create a base map of existing wetland and stream critical areas. This existing data was supplemented with additional field mapping near alternative path alignments to provide a more complete inventory of potential wetland and stream areas. Figure 40 shows the environmental critical areas in the study area that were used for this assessment, as well as the Tier 2 segments and their respective ratings. Stream buffers were determined based on existing stream type mapping, and wetland buffer requirements were based on estimated wetland category, with a minimum Category III rating.

*Determination of Potential Impacts*

Potential project impacts were calculated based on an overlay of the proposed path section shown in Figures 6 through 11 in Section 2 (e.g., boardwalk, existing forest road) on wetland, stream or buffer area. The impact area calculation generally consisted of

Impact Area for Segment = Path Width in Critical Area x Path Length in Critical Area

Restoration areas were also calculated where the path might be relocated to allow an existing forest road to be restored or an existing fish passage barrier culvert to be replaced.

*Impact Rating Criteria*

Impacts were rated based on type and extent. Ratings were developed for increments that spanned the range of calculated impact, typically from 0 (no impact) to the maximum value calculated for that criteria. Ratings reflect both the quantity (area) of impact, as well as quality (type of critical area) impacted. For example, higher impacts (i.e., lower ratings) were given to segments that impacted high quality Category I wetlands, mature forest buffer areas, and/or Type F (fish bearing streams). Conversely, lower impacts were given a higher rating, with "no impact" representing the highest rating. Table 3 summarizes Tier 2 environmental rating criteria. Refer to Appendix C for additional details.

Table 3: Summary of Tier 2 Environmental Rating Criteria

| **CRITERIA** | **RATING** | | |
|---|---|---|---|
| | **Highest Rating** | → | **Lowest Rating** |
| WETLANDS | No impact | Rating decreases as impacts increase | Impact >0.5 acres to sum of wetland area, or any impact >0.1 acres to Category I wetland |
| WETLAND BUFFERS | No impact | Rating decreases as impacts increase | Impact >1 acre to all wetland buffers, or >0.5 acre impact to Category I buffer |
| STREAMS | No impact | Rating decreases as impacts increase | 3+ Type F and/or Type N stream crossings |
| STREAM BUFFERS | No impact | Rating decreases as impacts increase | Type F stream crossing in mature forest buffer with multiple fish spp. present |
| RESTORATION POTENTIAL | >1-acre restored or 50-acre property acquired | Rating decreases as restoration opportunity decreases | No potential restoration |
| MITIGATION NEEDS AND COSTS | No mitigation costs | Rating decreases as impacts increase | Over $1M in mitigation costs |

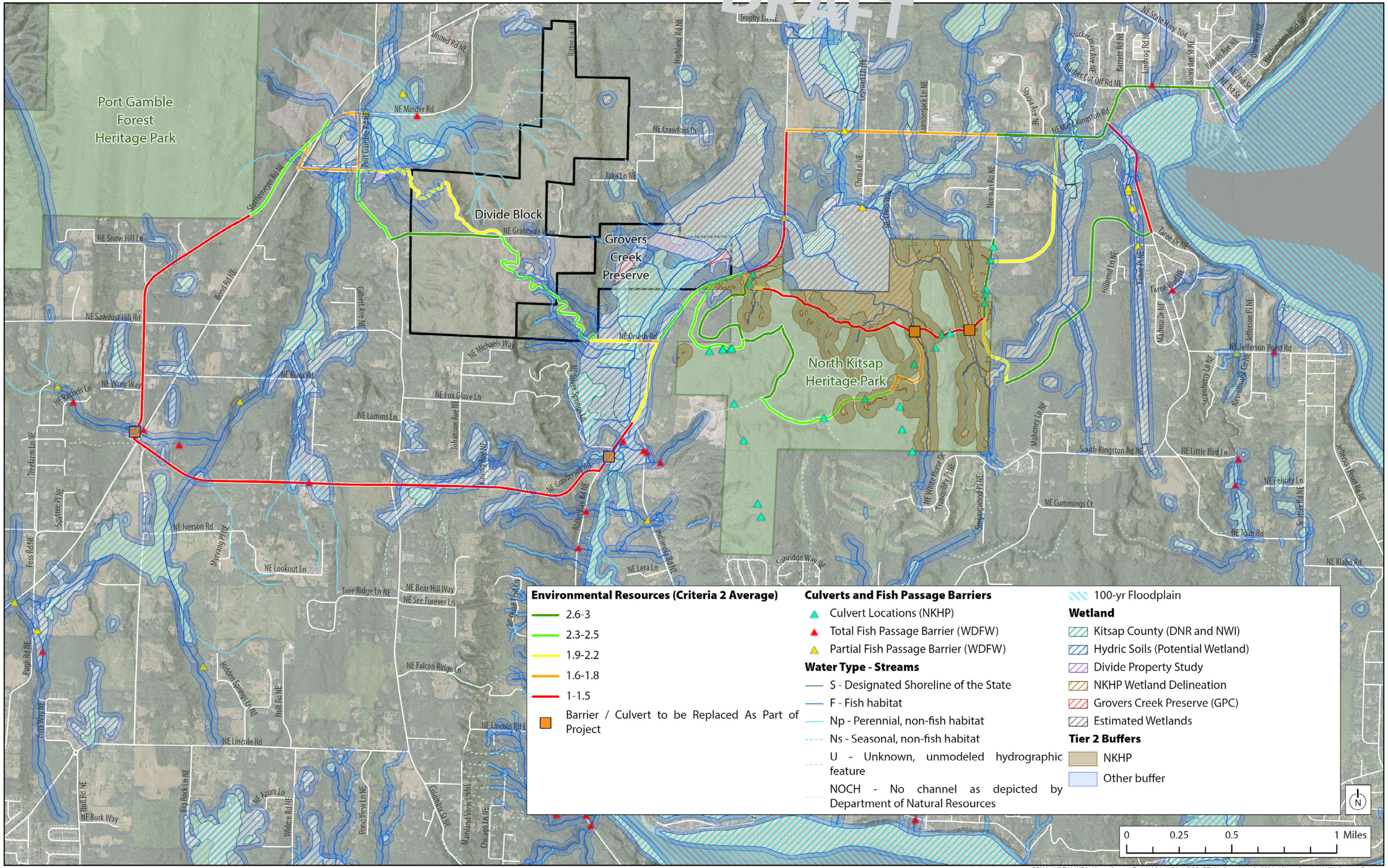



Figure 40: Criteria 2.1 to 2.6, Tier 2 Analysis

*Impact and Mitigation Calculations*

Potential impacts and mitigation requirements were calculated for each segment based on the above methodology. Potential impacts and mitigation costs for the segments and mini-alignments are summarized in Section 8. Detailed assessment results for each segment, as well as the basis for mitigation cost estimates, are provided in Appendix C.

*Segment Summary Ranking*

The criteria summarized in Table 3 were used in combination with the environmental assessment data summarized in Appendix C to rate each segment in the Tier 2 rating spreadsheet. The environmental rankings were then combined with other planning criteria to determine an overall segment summary rating.

*Criteria 3: Health, Safety, and Function*

*Assessment Approach*

The level to which a path segment provides a healthy and safe experience for users is based on the path's location. Health impacts related to poor air quality adjacent to high-volume roads was a consideration. The potential for user-vehicle conflicts at driveway crossings was another consideration. Potential conflicts between different types of path users (between bicyclists and pedestrians, for example) are a concern but likely to be consistent throughout the project and not nearly as significant as potential conflicts between pedestrians, bicycles, and vehicles. Metrics were determined for each of the two criteria in this category and then the path segment was rated based on those metrics. Metrics were mostly quantitative with established thresholds for various rating levels; however, qualitative information was not discounted and could impact the rating of a specific path segment based on information gathered during in-field investigations.

Conflicts at roadways could be not be assessed at this level of the planning study, because some segments connected to other segments in different locations with different levels of vehicular interaction (i.e., intersection, mid-block, or no crossing where a tunnel might be explored).

*Analysis/Calculations*

To assess Criteria 3.1, User Health, County road type, and volume data from various counts between 2017 and 2022 were utilized to determine the character of the road for path segments proposed along roadways.

To assess Criteria 3.2, User Safety, GIS was utilized to determine ratings for two metrics. The first was the intensity of land use for the parcel in which the path resides or is adjacent to, as this increases the need for vehicular access across the path. The second was the number of current driveways for each path segment. The quantity of crossings is understandably higher for those segments proposed along roadways and therefore rate lower.

*Segment Ratings*

For Criteria 3.1, a segment was given a low rating of 1 if the path segment was located adjacent to a high-volume road. Path segments adjacent to Gunderson Road, Miller Bay Road, West Kingston Road, and South Kingston Road are examples with low ratings. Path segments along lower-volume roads, such as Stottlemeyer Road, Port Gamble Road, NE Minder Road, and Gratitude Way and those in the Arborwood neighborhood, received a medium rating of 2. Path segments through parks and open spaces or very low-volume roads, such as the County road to the wastewater treatment plant, received a high rating of 3.

For Criteria 3.2, a segment was given a low rating of 1 if the adjacent land use intensity was commercial or industrial and there were more than

three major driveway crossings. A segment was given a medium rating of 2 if the adjacent land use intensity was mixed use and there were three or fewer major driveway crossings. A segment was given a high rating of 3 if the adjacent land use intensity was rural, residential, or forested/open space and there were no major driveway crossings. Ratings were adjusted as needed based on contextual analysis and other factors such as the number of minor driveways.

*Criteria 4: User Experience*

*Assessment Approach*

User experience was determined by the cumulative ratings for difficulty, accessibility, and the quality of the outdoor experience associated with each path segment. Metrics were determined for each of the criteria in this category, and the path segment was then rated based on those metrics. Metrics were mostly quantitative with established thresholds between various rating levels; however, qualitative information was not discounted and could impact the rating of a specific path segment based on information gathered during in-field investigations.

*Analysis/Considerations*

To assess Criteria 4.1, Low Stress Path Design, GIS was utilized to determine the percentage of the path segment length that was less than or equal to 5% slope in the potential built condition. This essentially is a measure of potential difficulty. Topography from GIS was used to assess each path segment and provide a percentage of the path that was below that threshold. For potential routes along road corridors, the slope of the path was determined by measuring the slope of the existing adjacent roadway.

To assess Criteria 4.2, Meeting ADA in the Built Condition, GIS was utilized to determine the percentage of path segment length in various slope ranges that meet the legal definition of accessibility provided in the 2011 Public Right-of-Way Accessibility Guidelines. The focus of this criteria was on accessibility as legally defined versus the difficulty resulting from the slope of a proposed path segment. As such, any path running adjacent to an existing road may match the slope of that road, even when exceeding the 5% running grades typically used for shared-use path design. Due to this allowance, all separated, shared-use paths adjacent to roads received high ratings. For path segments not adjacent to roadways but within greenfield locations, higher ratings were given to path segments that were less steep and lower ratings were given to path segments that were more steep.

To assess Criteria 4.3, Quality of the Outdoor Experience, GIS was used to generate a table of path type lengths for each path segment. See Appendix D. The data generated for path sections was used as a proxy for other analyses, including Criteria 4.3. For this criteria, two quantitative metrics, in combination with more qualitative in-field reconnaissance, were used to determine ratings for each of the path segments. One metric included the percentage of path within the natural environment—whether the path setting was in a forested/wetland, non-forested, and/or roadside landscape. This was also confirmed in person and with aerial Google Street View. The other metric included the length of the path segment that was not adjacent to an existing roadway. The GIS data was used to calculate the percentage of the segment that was or was not adjacent to a road. Other landscape scale considerations that could affect the rating included potential long-range views. Location of a path segment relative to a roadway (and the volume of traffic on that roadway, as provided by County traffic data) was also factored into the rating for this criteria.

*Segment Ratings*

For Criteria 4.1, a segment was given a low rating of 1 if the percentage of that segment length containing 5% slopes (or greater) exceeded 30% of the segment length in the built condition. The segment was given a medium rating of 2 if the percentage of that segment length containing 5% slopes (or greater) was between 10% and 30% of the segment length in the built condition. The segment was given a high rating of 3 if the percentage of that segment length containing 5% slopes (or greater) was less than 10% of the segment length in the built condition.

For Criteria 4.2, a segment was given a low rating of 1 if any of that segment length was over 8.3% slope. The segment was given a medium rating of 2 if 70% or more of its length was under 5% slope. The segment was given a high rating of 3 if 90% or more of its length was under 5% slope, with the remaining length between 5% and 8.3%.

For Criteria 4.3, a calculation of 0% to 33% for path length within natural areas was given a low rating of 1, a calculation of 34% to 67% was given a medium rating of 2, and a calculation of 68% to 100% was given a high rating of 3 for both metrics described above. If a different rating was given to the path segment due to qualitative considerations other than those indicated by the calculation, then it was recorded in the notes section of the table in Appendix C.

*Criteria 5: Project Delivery*

*Assessment Approach*

Project delivery was determined by relative cost (design, mitigation/restoration, construction), ROW and easement considerations, and long-term maintenance costs associated with each path segment. Metrics were determined for each of the criteria in this category, and then the path segment was rated based on those metrics. Metrics were mostly quantitative, with established thresholds between various rating levels; however, ratings for specific path segments were adjusted based on unique features of that segment, such as the cost impact of a bridge or tunnel within a particular segment.

*Analysis/Calculations*

To assess Criteria 5.1, Implementation Cost, the length of path segment and the type of path section were taken into consideration. Since detailed design or engineering plans were not developed for all potential routes during this planning study, the ratings for the cost criteria were based on a relative comparison to standard shared-use path development costs. A relative cost value was assigned to each path section type: the baseline cost of a standard shared-use path being assigned a cost value of 1.0. A cost value of 1.5 indicated a cost that would be approximately 50% more than the baseline cost, and a cost value of 2.0 indicated a cost that would approach twice (or 100%) that of the baseline cost. These cost values are not the same as high/low/medium criteria ratings assigned scores of 3, 2, and 1 respectively. However, cost values directly influenced the criteria rating for each path segment. See Appendix D.

- The following path section was assigned a cost value of 1.0: Section C – Cleared Land, No Buffer.
- The following path sections were assigned a cost value of 1.5: Section B – Cleared Land, In Buffer, and Section E – Separated from Roadway.
- The following path sections were assigned a cost value of 2.0: Sections A1 and A2 – Forested Land and Section D – Boardwalk.

Since path segments consisted of different section types, the distance of each section type was multiplied by the assigned cost value and were added together then divided by the length of the segment to provide an average, relative cost value between 1.0 and 2.0 for each path segment.

To assess Criteria 5.2, Right-of-way/Easements, three different metrics were assessed, including 1) whether acquisition would be necessary (and the number of parcels involved) and whether private property owners were engaged and willing partners, 2) whether the path segment was on Tribal Trust lands, and 3) whether there were other considerations, such as possible conditions on publicly owned properties. The cumulative response to each of these metrics determined the rating for that segment.

To assess Criteria 5.3, Long-term Maintenance Cost, a single metric was analyzed: the degree (high, medium, or low) to which maintenance would likely exceed typical path maintenance due to various elements or factors within that segment (for example, a bridge or tunnel).

### 7.5 Rating the mini-alignments - a zoned approach

Individual path segments were combined into mini-alignments across each zone. See Appendix E for detailed ratings and averages.

Mini-alignments were configured into three zones, per Figure 12, for a total of 11 mini-alignments. See Figure 41 depicting the selected mini-alignments. Within each of the project zones a potential road route was considered and rated as an alternative to regional path options through parks and potentially available open spaces.

Ratings of the segments that comprise the mini-alignments were averaged according to the proportional length of the segment within the mini-alignment. This produced a rating for individual and categories of criteria for each mini-alignment. Calculating average ratings based on proportionality was important so that the ratings of shorter segments did not disproportionately impact the average rating for the entire mini-alignment. The average ratings for each of the five categories of criteria were then added to give an overall score for each of the mini-alignments.

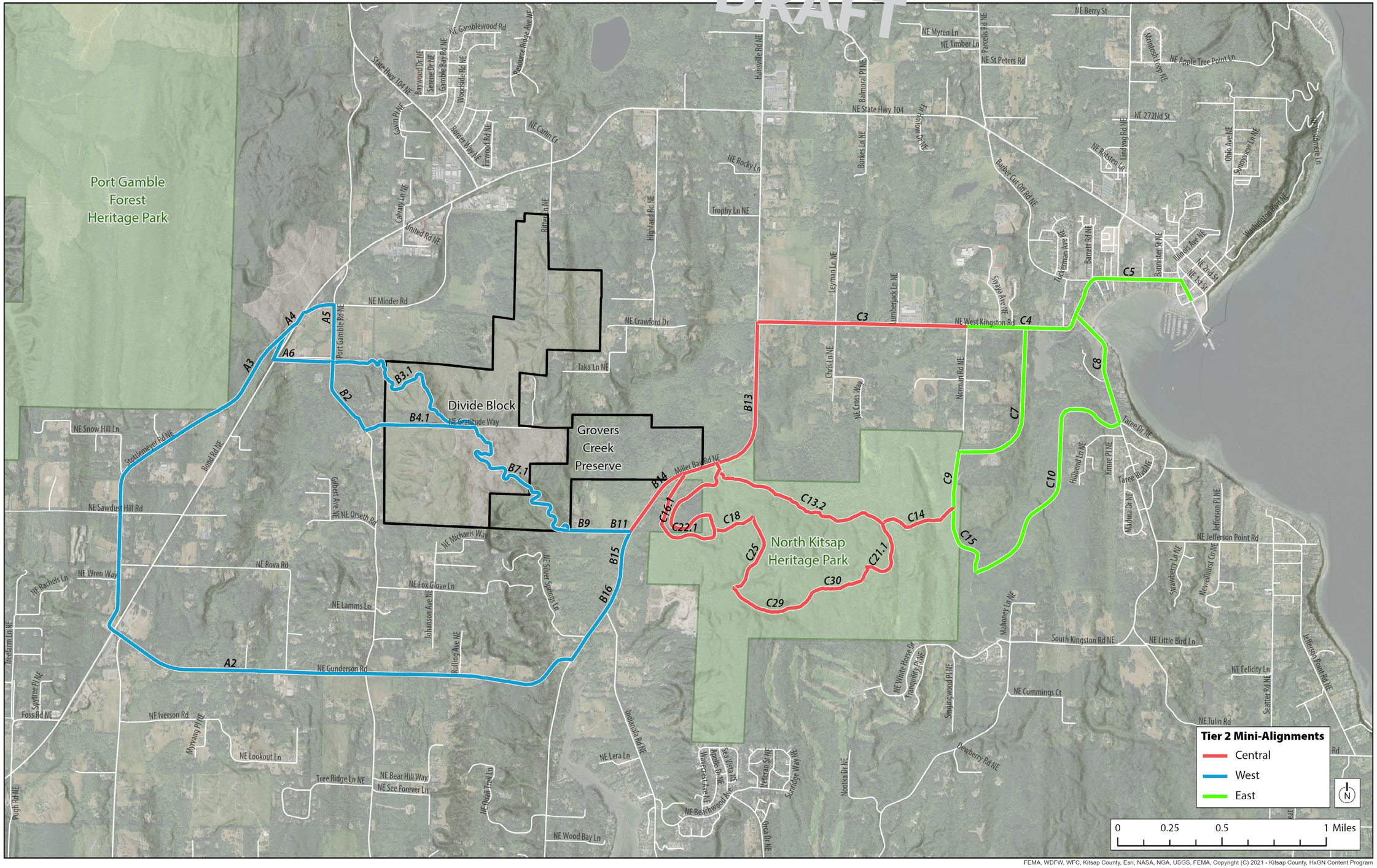



Figure 41: Tier 2 Mini-Alignments

# 8. CONCLUSIONS

## 8.1 Opportunities and constraints for each mini-alignment

The following pages in this subsection summarize information for each of the 11 mini-alignments and include:

- Mini-alignment name
- Zone the mini-alignment is within
- Path segments that comprise the mini-alignment
- Length of mini-alignment
- Opportunities
- Constraints
- Environmental data for the mini-alignment
- A map showing the mini-alignment within the project zone
- The Tier 2 Ratings Table (also located in Appendix E)

Each table presents the averages of all the individual ratings contained in the Tier 2 Segment Analysis and Ratings Table for each of the eleven mini-alignments. Average ratings are provided for individual criteria and for the category of criteria. This is important as it provides transparency of the ratings for each of the criteria at different levels (individual and category). This summary allowed the project team to discuss various issues with various mini-alignments based on each criteria, if necessary. Each mini-alignment can be evaluated by a single criteria, a category of criteria, or all the criteria together by simply scanning and comparing along a row. As for the calculation process, the ratings for each segment within a mini-alignment were averaged proportionally as discussed. Those averaged ratings for each criteria were then again averaged for the entire category of criteria. Average ratings for the five categories were then added together for each mini-alignment for a final overall rating, or score. Each mini-alignment was then evaluated as a “whole” versus the sum of the segments. The original calculated average ratings were used as a tool that were re-evaluated at the mini-alignment scale for various criteria. Those that were manually changed, were documented as to why, and highlighted in a dark border as seen in each of the following tables.

| | | | | |
|---|---|---|---|---|
| **Mini-Alignment** | **West 1 - Road** | | | |
| **Zone** | West | | | |
| **Segments** | A2, B15, and B16 | | | |
| **Length (miles)** | 4.36 | | | |
| **Opportunities** | • Provides direct connection to a future extension of the STO path from Poulsbo at the Gunderson Road and Stottlemeyer Road intersections. | | | |
| **Constraints** | • Longest mini-alignment in West Zone and entire study at 4.36 miles.<br>• High number of critical areas and buffers, resulting in low ratings for criteria in the environmental category.<br>• Meets ADA by following roadway grades, but still has steep sections that increase difficulty and reduce quality of outdoor experience for users, particularly along a busy road.<br>• Proximity to roadway and high volume of driveway crossings.<br>• The north side of the road was identified as the best side for a path, based on topography, land ownership, and critical areas. This would require ROW easements along the entire route. There is an existing power line with poles on that side of the road that would be expensive to relocate. As such, the path would need to be located beyond the power poles, likely requiring additional easements from properties along the path. | | | |
| **Environmental Assessment Summary** | *Buffer Impact (acres)* | 1.41 | *No. Stream Crossings* | 8 |
| | *Wetland Impact (acres)* | 0.64 | *Stream Buffer Impact (linear feet* | 1,800 |

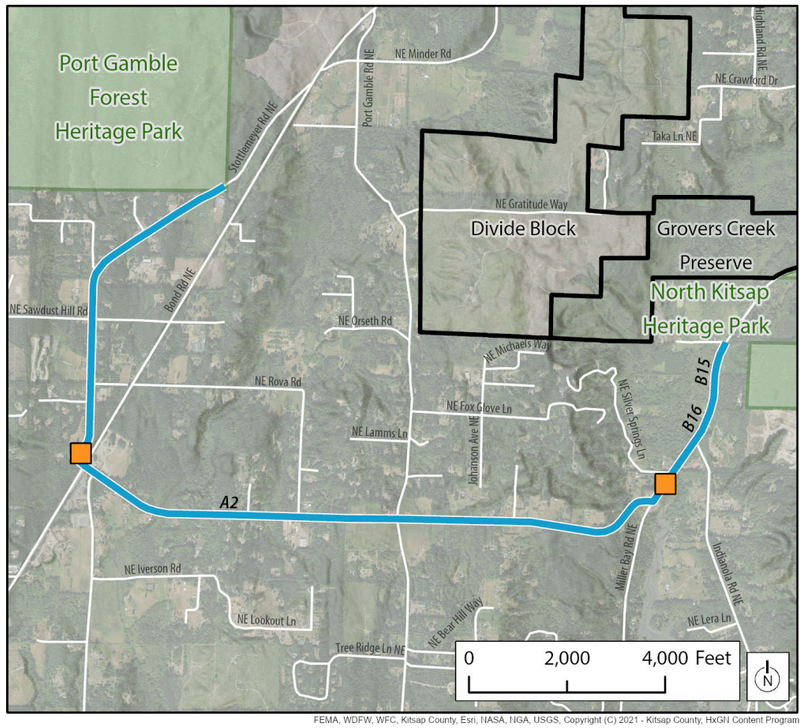



Figure 42: Mini-Alignment West 1

| TIER 2 RATINGS | | | |
|---|---|---|---|
| **Criteria Name** | | | |
| Category 1 - Connections | | T2 Avg Rating | Adjusted |
| 1.1 | Access to communities | 1.91 | 3.00 |
| 1.2 | Access to parks and open space | 1.91 | 1.50 |
| 1.3 | Consistency with County plans | 2.00 | 2.00 |
| 1.4 | Places of interest | 1.91 | 2.00 |
| **Category Average** | | **1.93** | **2.13** |
| Category 2 - Environmental | | T2 Avg Rating | Adjusted |
| 2.1 | Wetlands | 1.05 | 1.05 |
| 2.2 | Wetland buffers | 1.13 | 1.13 |
| 2.3 | Streams | 1.18 | 1.18 |
| 2.4 | Stream buffers | 1.15 | 1.15 |
| 2.5 | Mitigation needs and opportunities | 1.08 | 1.08 |
| 2.6 | Restoration potential | 2.36 | 2.36 |
| **Category Average** | | **1.32** | **1.32** |
| Category 3 - Health & Safety | | T2 Avg Rating | Adjusted |
| 3.1 | User health | 1.00 | 1.00 |
| 3.2 | User safety - Conflicts at driveways | 1.15 | 1.15 |
| **Category Average** | | **1.08** | **1.08** |
| Category 4 - User Experience | | T2 Avg Rating | Adjusted |
| 4.1 | Difficulty | 1.18 | 1.18 |
| 4.2 | Meeting ADA criteria- built | 3.00 | 3.00 |
| 4.3 | Quality of the outdoor experience | 1.00 | 1.00 |
| **Category Average** | | **1.73** | **1.73** |
| Category 5 - Project Delivery | | T2 Avg Rating | Adjusted |
| 5.1 | Capital costs | 1.91 | 1.91 |
| 5.2 | Rights of Way and easements | 1.09 | 1.09 |
| 5.3 | Maintenance costs | 2.05 | 2.05 |
| **Category Average** | | **1.68** | **1.68** |
| **Total of Averages** | | **7.74** | **7.94** |

Table 4: Mini-Alignment West 1

| | | | | |
|---|---|---|---|---|
| **Mini-Alignment** | **West 3 - Gratitude Road Option (No Tunnel)** | | | |
| **Zone** | West | | | |
| **Segments** | A3, A4, A5, B2, B4.1, B7.1, B9, and B11 | | | |
| **Length (miles)** | 3.48 | | | |
| **Opportunities** | • Flexibility of path design exists within the Divide Block and on GPC parcels since much of the land is undeveloped open space and much of the Divide Block was recently cleared of trees. Accessibility can be addressed adequately per initial conceptual designs.<br>• Private entities (including Rayonier and GPC) own most parcels in this zone and value accessibility to paths, open space, and nature.<br>• User experience was generally rated high.<br>• Consistent with past planning efforts and adopted plans. | | | |
| **Constraints** | • Easements would be required along the west end of Gratitude Way.<br>• A separated shared-use path adjacent to Port Gamble Road would be steep, impact existing large trees along the road, and require easements. Pedestrian bridge will be needed.<br>• At-grade crossing at the intersection would be less expensive than a tunnel (see West 4) but is at-grade with risk of pedestrian/vehicle conflicts increases due to high speed and volumes on SR 3045 Bond Road. Requires agreement with WSDOT.<br>• At the east side of this zone, the path would require a boardwalk along Orseth Road and bridge across Grover's Creek due to the narrow width of the existing vehicle bridge. Orseth Road is currently used for industrial purposes associated with the topsoil facility northwest of the road.<br>• Significant elevation changes within route impact user experience. | | | |
| **Environmental Assessment Summary** | *Buffer Impact (acres)* | 2.05 | *No. Stream Crossings* | 4 |
| | *Wetland Impact (acres)* | 0.46 | *Stream Buffer Impact (linear feet* | 1,780 |

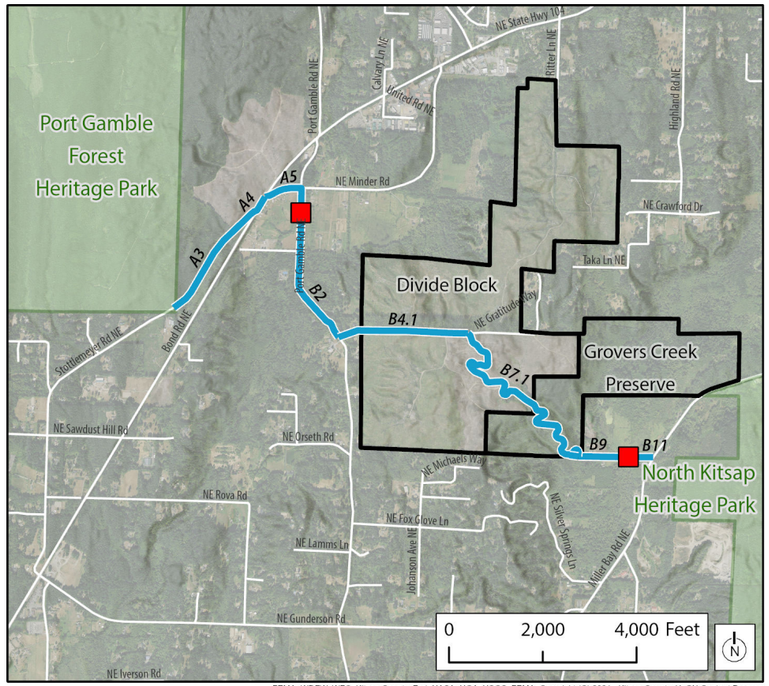



Figure 43: Mini-Alignment West 3

| TIER 2 RATINGS | | | |
|---|---|---|---|
| **Criteria Name** | | | |
| Category 1 - Connections | | T2 Avg Rating | Adjusted |
| 1.1 | Access to communities | 2.59 | 2.59 |
| 1.2 | Access to parks and open space | 2.37 | 3.00 |
| 1.3 | Consistency with County plans | 2.59 | 2.75 |
| 1.4 | Places of interest | 2.28 | 2.28 |
| **Category Average** | | **2.46** | **2.65** |
| Category 2 - Environmental | | T2 Avg Rating | Adjusted |
| 2.1 | Wetlands | 2.65 | 2.65 |
| 2.2 | Wetland buffers | 2.03 | 2.03 |
| 2.3 | Streams | 2.72 | 2.72 |
| 2.4 | Stream buffers | 2.43 | 2.43 |
| 2.5 | Mitigation needs and opportunities | 2.29 | 2.29 |
| 2.6 | Restoration potential | 1.66 | 1.66 |
| **Category Average** | | **2.30** | **2.30** |
| Category 3 - Health & Safety | | T2 Avg Rating | Adjusted |
| 3.1 | User health | 2.31 | 2.31 |
| 3.2 | User safety - Conflicts at driveways | 2.88 | 2.88 |
| **Category Average** | | **2.60** | **2.60** |
| Category 4 - User Experience | | T2 Avg Rating | Adjusted |
| 4.1 | Difficulty | 2.02 | 2.02 |
| 4.2 | Meeting ADA criteria- built | 2.69 | 2.69 |
| 4.3 | Quality of the outdoor experience | 2.19 | 2.19 |
| **Category Average** | | **2.30** | **2.30** |
| Category 5 - Project Delivery | | T2 Avg Rating | Adjusted |
| 5.1 | Capital costs | 2.57 | 2.57 |
| 5.2 | Rights of Way and easements | 2.61 | 2.61 |
| 5.3 | Maintenance costs | 2.09 | 2.09 |
| **Category Average** | | **2.42** | **2.42** |
| **Total of Averages** | | **12.07** | **12.27** |

Table 5: Mini-Alignment West 3

| | | | | |
|---|---|---|---|---|
| **Mini-Alignment** | **West 4 - Gratitude Road Option (Tunnel)** | | | |
| **Zone** | West | | | |
| **Segments** | A3, A6, B2, B4.1, B7.1, B9, and B11 | | | |
| **Length (miles)** | 3.18 | | | |
| **Opportunities** | • Flexibility of path design exists within the Divide Block and on GPC parcels since much of the land is undeveloped open space and much of the Divide Block was recently cleared of trees. Accessibility can be addressed adequately per initial conceptual designs.<br>• Private entities (including Rayonier and GPC) own most parcels in this zone and value accessibility to paths, open space, and nature.<br>• User experience was generally rated high.<br>• Consistent with past planning efforts and adopted plans. | | | |
| **Constraints** | • Easements would be required along the west end of Gratitude Way, Stevens Uhler Road, and Stottlemeyer Road.<br>• A separated shared-use path adjacent to Port Gamble Road would be steep, impact existing large trees along the road, and likely require easements.<br>• The cost of a tunnel under Bond Road could be prohibitive. Design of the tunnel needs further development to improve potential issues with user experience.<br>• At the east side of this zone, the path would require a boardwalk along Orseth Road and bridge across Grover's Creek due to the narrow width of the existing vehicle bridge. Orseth Road is currently used for industrial purposes associated with the topsoil facility northwest of the road.<br>• Significant elevation changes within route impacts user experience. | | | |
| **Environmental Assessment Summary** | *Buffer Impact (acres)* | 1.61 | *No. Stream Crossings* | 3 |
| | *Wetland Impact (acres)* | 0.43 | *Stream Buffer Impact (linear feet* | 900 |

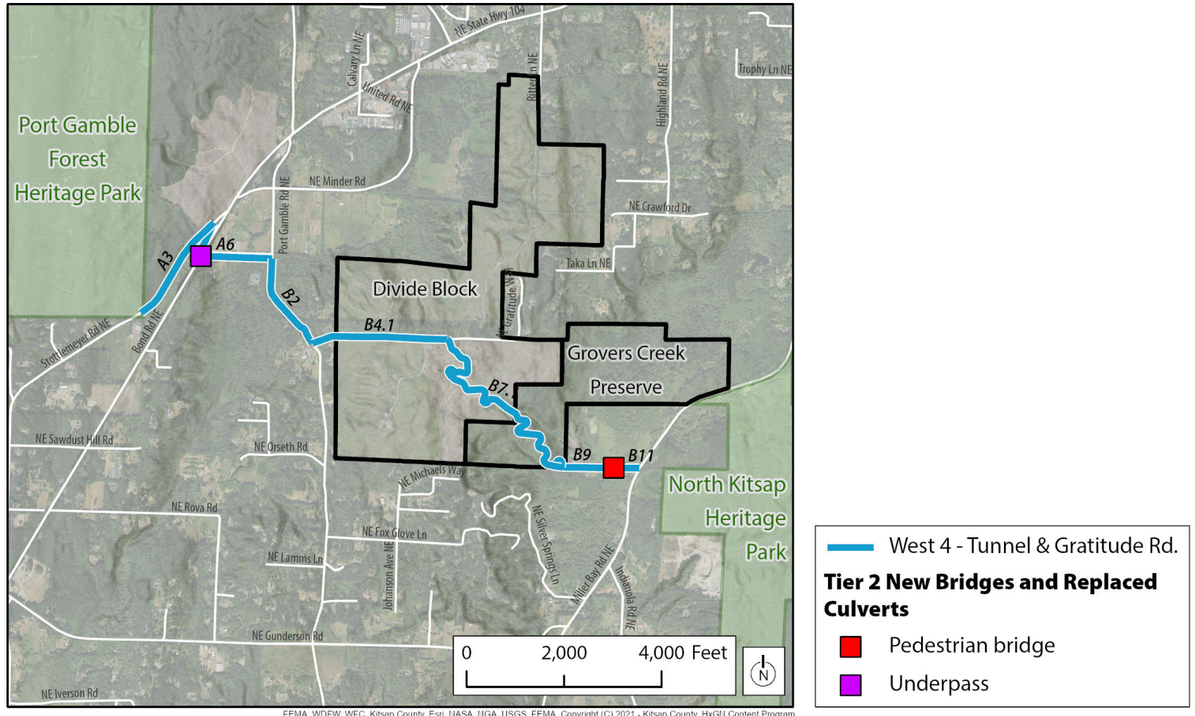



Figure 44: Mini-Alignment West 4

| TIER 2 RATINGS | | | |
|---|---|---|---|
| **Criteria Name** | | | |
| Category 1 - Connections | | T2 Avg Rating | Adjusted |
| 1.1 | Access to communities | 2.54 | 2.54 |
| 1.2 | Access to parks and open space | 2.44 | 3.00 |
| 1.3 | Consistency with County plans | 2.54 | 2.75 |
| 1.4 | Places of interest | 2.44 | 2.44 |
| **Category Average** | | **2.49** | **2.68** |
| Category 2 - Environmental | | T2 Avg Rating | Adjusted |
| 2.1 | Wetlands | 2.62 | 2.62 |
| 2.2 | Wetland buffers | 2.09 | 2.09 |
| 2.3 | Streams | 2.15 | 2.15 |
| 2.4 | Stream buffers | 2.44 | 2.44 |
| 2.5 | Mitigation needs and opportunities | 2.28 | 2.28 |
| 2.6 | Restoration potential | 1.75 | 1.75 |
| **Category Average** | | **2.22** | **2.22** |
| Category 3 - Health & Safety | | T2 Avg Rating | Adjusted |
| 3.1 | User health | 2.35 | 2.35 |
| 3.2 | User safety - Conflicts at driveways | 2.39 | 2.39 |
| **Category Average** | | **2.37** | **2.37** |
| Category 4 - User Experience | | T2 Avg Rating | Adjusted |
| 4.1 | Difficulty | 2.10 | 2.10 |
| 4.2 | Meeting ADA criteria- built | 2.65 | 2.65 |
| 4.3 | Quality of the outdoor experience | 2.43 | 2.43 |
| **Category Average** | | **2.39** | **2.39** |
| Category 5 - Project Delivery | | T2 Avg Rating | Adjusted |
| 5.1 | Capital costs | 2.42 | 2.00 |
| 5.2 | Rights of Way and easements | 2.45 | 2.45 |
| 5.3 | Maintenance costs | 1.99 | 1.99 |
| **Category Average** | | **2.29** | **2.14** |
| **Total of Averages** | | **11.76** | **11.81** |

Table 6: Mini-Alignment West 4

| | | | | |
|---|---|---|---|---|
| **Mini-Alignment** | **West 2 - Divide Block Option (Tunnel)** | | | |
| **Zone** | West | | | |
| **Segments** | A3, A6, B3.1, B7.1, B9, and B11 | | | |
| **Length (miles)** | 3.28 | | | |
| **Opportunities** | • Existing easement already established, connecting the NW corner of the Divide Block (through the Hogg or former Speed property) to Port Gamble Road.<br>• Flexibility of path design exists within the Divide Block and on GPC parcels since much of the land is undeveloped open space and much of the Divide Block was recently cleared of trees. Accessibility can be addressed adequately per initial conceptual designs.<br>• Private entities (including Rayonier and GPC) own most parcels in this zone and value accessibility to paths, open space, and nature.<br>• User experience was generally rated high.<br>• Consistent with past planning efforts and adopted plans. | | | |
| **Constraints** | • The cost of a tunnel under Bond Road could be prohibitive. Design of the tunnel needs further development to improve potential issues with user experience.<br>• At the east side of this zone, the path would require a boardwalk along Orseth Road and bridge across Grover's Creek due to the narrow width of the existing vehicle bridge. Orseth Road is currently used for industrial purposes associated with the topsoil facility northwest of the road.<br>• Significant elevation changes within route impact user experience. | | | |
| **Environmental Assessment Summary** | *Buffer Impact (acres)* | 2.19 | *No. Stream Crossings* | 5 |
| | *Wetland Impact (acres)* | 0.59 | *Stream Buffer Impact (linear feet* | 1,300 |

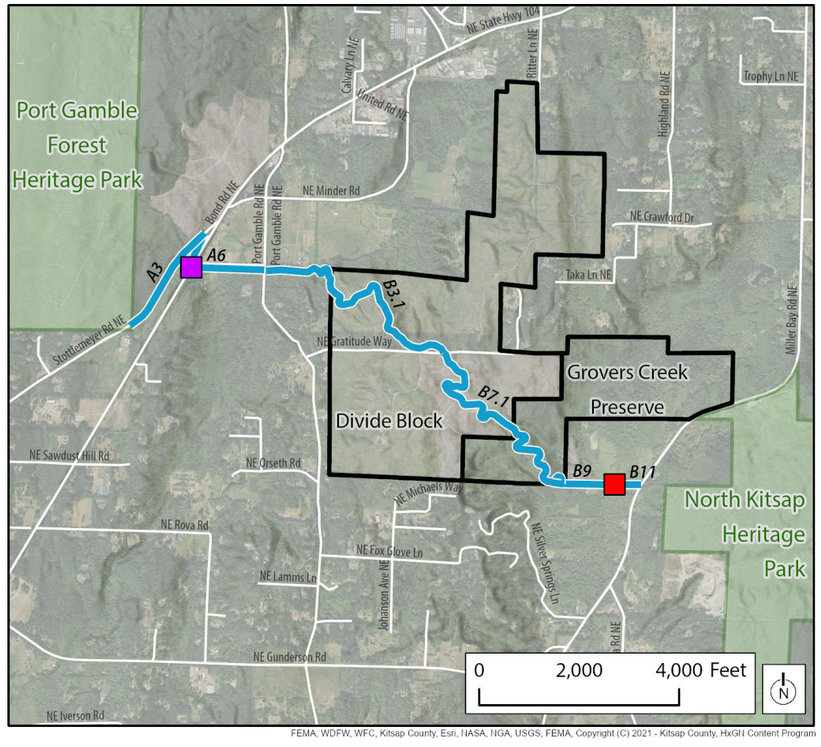




Figure 45: Mini-Alignment West 2

| TIER 2 RATINGS | | | |
|---|---|---|---|
| **Criteria Name** | | | |
| Category 1 - Connections | | T2 Avg Rating | Adjusted |
| 1.1 | Access to communities | 2.55 | 2.55 |
| 1.2 | Access to parks and open space | 2.59 | 3.00 |
| 1.3 | Consistency with County plans | 2.55 | 2.75 |
| 1.4 | Places of interest | 2.59 | 2.59 |
| **Category Average** | | **2.57** | **2.72** |
| Category 2 - Environmental | | T2 Avg Rating | Adjusted |
| 2.1 | Wetlands | 2.28 | 2.28 |
| 2.2 | Wetland buffers | 1.59 | 1.59 |
| 2.3 | Streams | 2.41 | 2.41 |
| 2.4 | Stream buffers | 2.10 | 2.10 |
| 2.5 | Mitigation needs and opportunities | 1.96 | 1.96 |
| 2.6 | Restoration potential | 2.43 | 2.43 |
| **Category Average** | | **2.13** | **2.13** |
| Category 3 - Health & Safety | | T2 Avg Rating | Adjusted |
| 3.1 | User health | 2.70 | 2.70 |
| 3.2 | User safety - Conflicts at driveways | 3.00 | 3.00 |
| **Category Average** | | **2.85** | **2.85** |
| Category 4 - User Experience | | T2 Avg Rating | Adjusted |
| 4.1 | Difficulty | 2.45 | 2.45 |
| 4.2 | Meeting ADA criteria- built | 2.66 | 2.66 |
| 4.3 | Quality of the outdoor experience | 2.77 | 2.77 |
| **Category Average** | | **2.63** | **2.63** |
| Category 5 - Project Delivery | | T2 Avg Rating | Adjusted |
| 5.1 | Capital costs | 2.21 | 2.00 |
| 5.2 | Rights of Way and easements | 2.78 | 2.78 |
| 5.3 | Maintenance costs | 1.99 | 1.99 |
| **Category Average** | | **2.33** | **2.26** |
| **Total of Averages** | | **12.50** | **12.58** |

Table 7: Mini-Alignment West 2

| | | | | |
|---|---|---|---|---|
| **Mini-Alignment** | **West 5 - Divide Block Option (No Tunnel)** | | | |
| **Zone** | West | | | |
| **Segments** | A3, A4, A5, B3.1, B7.1, B9, and B11 | | | |
| **Length (miles)** | 3.58 | | | |
| **Opportunities** | • Existing easement already established, connecting the NW corner of the Divide Block (through the Hogg or former Speed property) to Port Gamble Road.<br>• Flexibility of path design exists within the Divide Block and on GPC parcels since much of the land is undeveloped open space and much of the Divide Block was recently cleared of trees. Accessibility can be addressed adequately per initial conceptual designs.<br>• Private entities (including Rayonier and GPC) own most parcels in this zone and value accessibility to paths, open space, and nature.<br>• User experience was generally rated high.<br>• Consistent with past planning efforts and adopted plans. | | | |
| **Constraints** | • At-grade crossing at the intersection would be less expensive than a tunnel (see West 5) but also less safe for users as the risk of pedestrian/vehicle conflicts increases due to high speed and volumes on Bond Road.<br>• At the east side of this zone, the path would require a boardwalk along Orseth Road and bridge across Grover's Creek due to the narrow width of the existing vehicle bridge. Orseth Road is currently used for industrial purposes associated with the topsoil facility northwest of the road.<br>• Significant elevation changes within route impact user experience. | | | |
| **Environmental Assessment Summary** | *Buffer Impact (acres)* | 2.55 | *No. Stream Crossings* | 5 |
| | *Wetland Impact (acres)* | 0.56 | *Stream Buffer Impact (linear feet* | 1,300 |

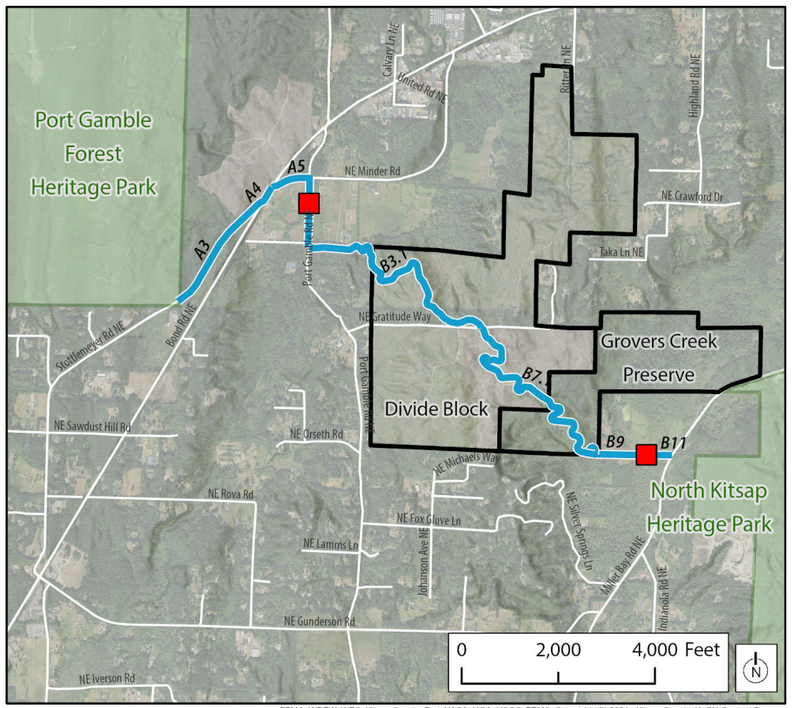



Figure 46: Mini-Alignment West 5

| TIER 2 RATINGS | | | |
|---|---|---|---|
| **Criteria Name** | | | |
| Category 1 - Connections | | T2 Avg Rating | Adjusted |
| 1.1 | Access to communities | 2.60 | 2.60 |
| 1.2 | Access to parks and open space | 2.50 | 3.00 |
| 1.3 | Consistency with County plans | 2.60 | 2.75 |
| 1.4 | Places of interest | 2.41 | 2.41 |
| **Category Average** | | **2.53** | **2.69** |
| Category 2 - Environmental | | T2 Avg Rating | Adjusted |
| 2.1 | Wetlands | 2.34 | 2.34 |
| 2.2 | Wetland buffers | 1.59 | 1.59 |
| 2.3 | Streams | 2.42 | 2.42 |
| 2.4 | Stream buffers | 2.13 | 2.13 |
| 2.5 | Mitigation needs and opportunities | 2.00 | 2.00 |
| 2.6 | Restoration potential | 2.27 | 2.27 |
| **Category Average** | | **2.13** | **2.13** |
| Category 3 - Health & Safety | | T2 Avg Rating | Adjusted |
| 3.1 | User health | 2.62 | 2.62 |
| 3.2 | User safety - Conflicts at driveways | 2.64 | 2.64 |
| **Category Average** | | **2.63** | **2.63** |
| Category 4 - User Experience | | T2 Avg Rating | Adjusted |
| 4.1 | Difficulty | 2.33 | 2.33 |
| 4.2 | Meeting ADA criteria- built | 2.70 | 2.70 |
| 4.3 | Quality of the outdoor experience | 2.50 | 2.50 |
| **Category Average** | | **2.51** | **2.51** |
| Category 5 - Project Delivery | | T2 Avg Rating | Adjusted |
| 5.1 | Capital costs | 2.37 | 2.37 |
| 5.2 | Rights of Way and easements | 2.90 | 2.90 |
| 5.3 | Maintenance costs | 2.09 | 2.09 |
| **Category Average** | | **2.60** | **2.46** |
| **Total of Averages** | | **12.40** | **12.41** |

Table 8: Mini-Alignment West 5

| | | | | |
|---|---|---|---|---|
| **Mini-Alignment** | **Central 1 - Road Option** | | | |
| **Zone** | Central | | | |
| **Segments** | B13, B14, and C3 | | | |
| **Length (miles)** | 2.33 | | | |
| **Opportunities** | • Direct connection between the parking lot at NKHP and West Kingston Road and potential connections north to Four Corners.<br>• Connects to two schools. | | | |
| **Constraints** | • Considerable number of critical areas and buffers.<br>• New bridge required over Grover's Creek on the east side of Miller Bay Road. A boardwalk is not feasible in this situation due to the creek's location within a steep ravine next to the road.<br>• Meets ADA by following roadway grades, but still has steep sections that increase difficulty and reduce quality of outdoor experience for users, particularly along a busy road.<br>• User health and safety is a concern due to its proximity to the road.<br>• The east side of the road was identified as the best side for a path based on topography, land ownership, critical areas, and the results of previous studies. The path would require more ROW than currently exists to meet separated path standards requiring acquisition of easements from several properties.<br>• Does not provide access within the park. | | | |
| **Environmental Assessment Summary** | *Buffer Impact (acres)* | 1.91 | *No. Stream Crossings* | 3 |
| | *Wetland Impact (acres)* | 0.20 | *Stream Buffer Impact (linear feet* | 900 |

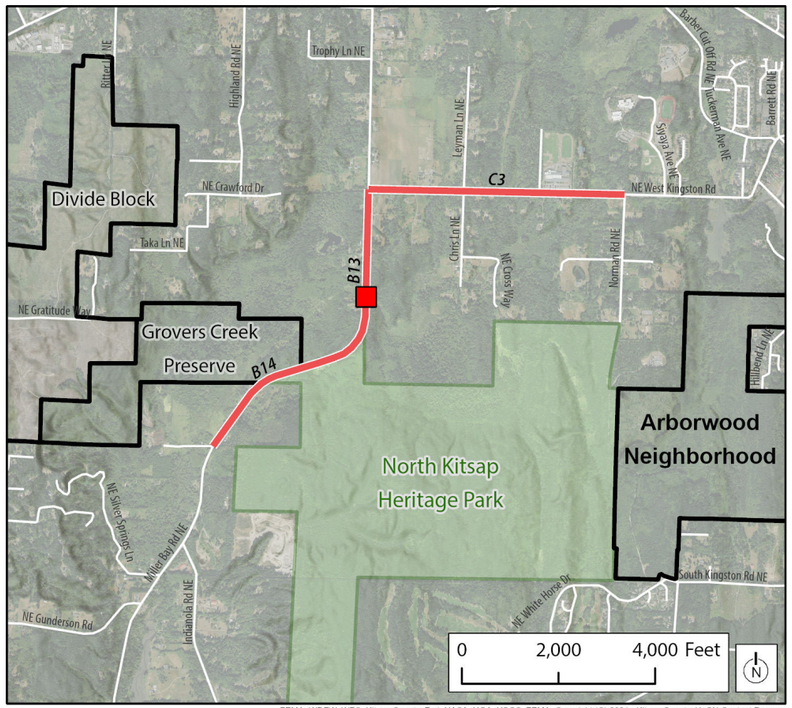



Figure 47: Mini-Alignment Central 1

| TIER 2 RATINGS | | | |
|---|---|---|---|
| **Criteria Name** | | | |
| Category 1 - Connections | | T2 Avg Rating | Adjusted |
| 1.1 | Access to communities | 2.43 | 2.43 |
| 1.2 | Access to parks and open space | 2.00 | 1.50 |
| 1.3 | Consistency with County plans | 2.43 | 2.00 |
| 1.4 | Places of interest | 1.57 | 1.57 |
| **Category Average** | | **2.11** | **1.88** |
| Category 2 - Environmental | | T2 Avg Rating | Adjusted |
| 2.1 | Wetlands | 2.01 | 2.01 |
| 2.2 | Wetland buffers | 1.55 | 1.55 |
| 2.3 | Streams | 2.07 | 2.07 |
| 2.4 | Stream buffers | 1.90 | 1.90 |
| 2.5 | Mitigation needs and opportunities | 1.81 | 1.81 |
| 2.6 | Restoration potential | 1.35 | 1.35 |
| **Category Average** | | **1.78** | **1.78** |
| Category 3 - Health & Safety | | T2 Avg Rating | Adjusted |
| 3.1 | User health | 1.00 | 1.00 |
| 3.2 | User safety - Conflicts at driveways | 1.81 | 1.81 |
| **Category Average** | | **1.40** | **1.40** |
| Category 4 - User Experience | | T2 Avg Rating | Adjusted |
| 4.1 | Difficulty | 2.67 | 2.67 |
| 4.2 | Meeting ADA criteria- built | 3.00 | 3.00 |
| 4.3 | Quality of the outdoor experience | 1.24 | 1.24 |
| **Category Average** | | **2.30** | **2.30** |
| Category 5 - Project Delivery | | T2 Avg Rating | Adjusted |
| 5.1 | Capital costs | 1.33 | 1.33 |
| 5.2 | Rights of Way and easements | 2.00 | 2.00 |
| 5.3 | Maintenance costs | 2.17 | 2.17 |
| **Category Average** | | **1.83** | **1.83** |
| **Total of Averages** | | **9.43** | **9.19** |

Table 9: Mini-Alignment Central 1

| | | | | |
|---|---|---|---|---|
| **Mini-Alignment** | **Central 2 - NKHP Spine Option** | | | |
| **Zone** | Central | | | |
| **Segments** | B14, C14, C16.1 OR C22.1, C18, C21.1, C25, C29, and C30 | | | |
| **Length (miles)** | 3.40 | | | |
| **Opportunities** | • High health and safety and user experience ratings.<br>• Much of the proposed path would utilize existing logging roads, minimizing disturbance.<br>• Conceptual designs highlight that slopes could be reduced to reduce difficulty, improve accessibility, and decrease the impact on existing critical areas and their buffers.<br>• Segments on the top of the ridge, along the existing Spine path within NKHP, are relatively flat.<br>• Two path options could connect the upper area of the park to the parking lot on Miller Bay Road on the west side of the park.<br>• Provides multiple connections to other paths and trailheads/parking at NKHP, the White Horse community, and the Arborwood neighborhood. | | | |
| **Constraints** | • Considerably longer than the other two mini-alignments in the Central Zone.<br>• Impact to stream and wetland buffers would occur although mitigated through realignment and restoration.<br>• C16.1 and C22.1 could provide better connection between the park the parking lot or to a future path but require the acquisition of undeveloped, privately owned parcels.<br>• Steeper sections of path would be required due to the ridge within NKHP.<br>• Uncertainty regarding whether a shared-use path would be approved by RCO based on conditions of the grant funding used to acquire the park. See Section 7.1, Segment C14 discussion regarding this issue and the mechanisms that RCO provided for potential approval.<br>• Costs for implementation and maintenance would be higher due to the longer length and topography of the path.<br>• Crossing of the Beaver Pond on the east side of the park, utilizing the existing berm and new boardwalks, is more complicated. | | | |
| **Environmental Assessment Summary** | *Buffer Impact (acres)* | 1.77 | *No. Stream Crossings* | 3 |
| | *Wetland Impact (acres)* | 0.50 | *Stream Buffer Impact (linear feet* | 700 |

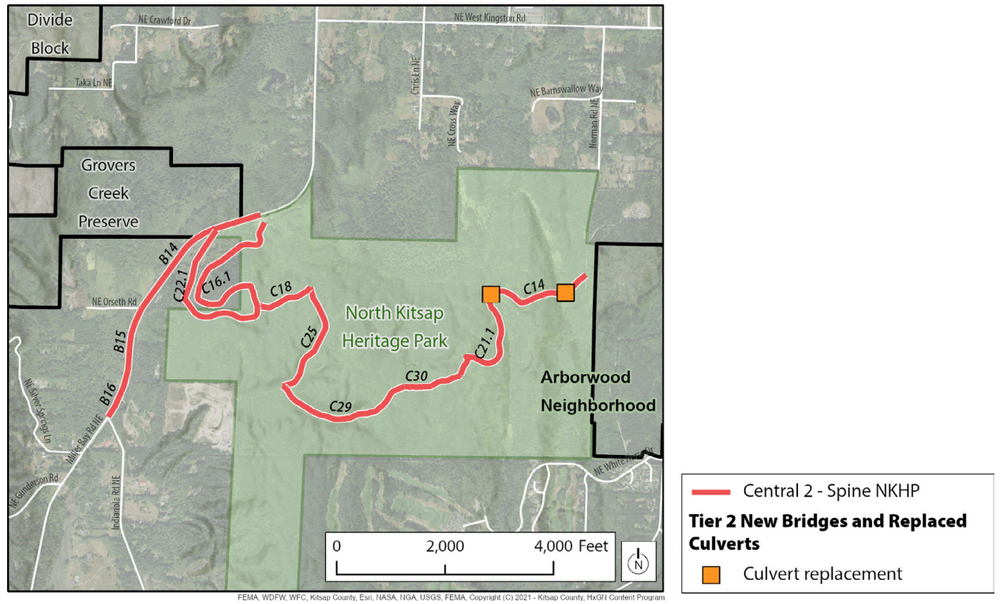




Figure 48: Mini-Alignment Central 2

| TIER 2 RATINGS | | | |
|---|---|---|---|
| **Criteria Name** | | | |
| Category 1 - Connections | | T2 Avg Rating | Adjusted |
| 1.1 | Access to communities | 2.00 | 2.00 |
| 1.2 | Access to parks and open space | 3.00 | 3.00 |
| 1.3 | Consistency with County plans | 2.84 | 2.75 |
| 1.4 | Places of interest | 2.84 | 2.84 |
| **Category Average** | | **2.67** | **2.65** |
| Category 2 - Environmental | | T2 Avg Rating | Adjusted |
| 2.1 | Wetlands | 2.75 | 2.75 |
| 2.2 | Wetland buffers | 1.74 | 1.74 |
| 2.3 | Streams | 2.70 | 2.70 |
| 2.4 | Stream buffers | 1.28 | 1.28 |
| 2.5 | Mitigation needs and opportunities | 2.33 | 2.33 |
| 2.6 | Restoration potential | 1.88 | 1.88 |
| **Category Average** | | **2.12** | **2.12** |
| Category 3 - Health & Safety | | T2 Avg Rating | Adjusted |
| 3.1 | User health | 2.68 | 2.68 |
| 3.2 | User safety - Conflicts at driveways | 3.00 | 3.00 |
| **Category Average** | | **2.84** | **2.84** |
| Category 4 - User Experience | | T2 Avg Rating | Adjusted |
| 4.1 | Difficulty | 2.26 | 2.26 |
| 4.2 | Meeting ADA criteria- built | 2.46 | 2.46 |
| 4.3 | Quality of the outdoor experience | 2.84 | 2.84 |
| **Category Average** | | **2.52** | **2.52** |
| Category 5 - Project Delivery | | T2 Avg Rating | Adjusted |
| 5.1 | Capital costs | 1.16 | 1.16 |
| 5.2 | Rights of Way and easements | 2.30 | 2.00 |
| 5.3 | Maintenance costs | 2.00 | 2.00 |
| **Category Average** | | **1.82** | **1.72** |
| **Total of Averages** | | **11.96** | **11.84** |

Table 10: Mini-Alignment Central 2

| | | | | |
|---|---|---|---|---|
| **Mini-Alignment** | **Central 3 - NKHP North Option** | | | |
| **Zone** | Central | | | |
| **Segments** | B14, C11, C12, C13.2, and C14 | | | |
| **Length (miles)** | 1.89 | | | |
| **Opportunities** | • Shortest length in the Central Zone.<br>• High health and safety and user experience ratings were also high due to its location within the park.<br>• Best accessibility due to flat topography.<br>• Most direct route through the park provides access within the park and maintains most of the existing soft path system.<br>• Direct connection to the parking lot on the west side of the park at Miller Bay Road.<br>• Provides multiple connections to other paths and trailheads/parking at NKHP, the White Horse community, and the Arborwood neighborhood. | | | |
| **Constraints** | • Impacts to stream and wetland buffers, some of which could be mitigated through realignment (primarily Segment 13.2).<br>• Most of this mini-alignment (Segment C13.2) was once a logging road that has grown over and not been maintained as a path. Geotechnical investigation indicated that this segment of path could be moved up slope and out of the wetlands to the outer 25% of the buffer, which has much less impact and different mitigation requirements.<br>• Uncertainty regarding whether a shared-use path would be approved by RCO based on conditions of the grant funding used to acquire the park. See Section 1.1, Segment C14 discussion regarding this issue and the mechanisms that RCO provided for potential approval.<br>• Crossing of the Beaver Pond on the east side of the park, using the existing berm and new boardwalks, is more complicated. | | | |
| **Environmental Assessment Summary** | *Buffer Impact (acres)* | 3.03 | *No. Stream Crossings* | 6 |
| | *Wetland Impact (acres)* | 0.20 | *Stream Buffer Impact (linear feet* | 1,500 |

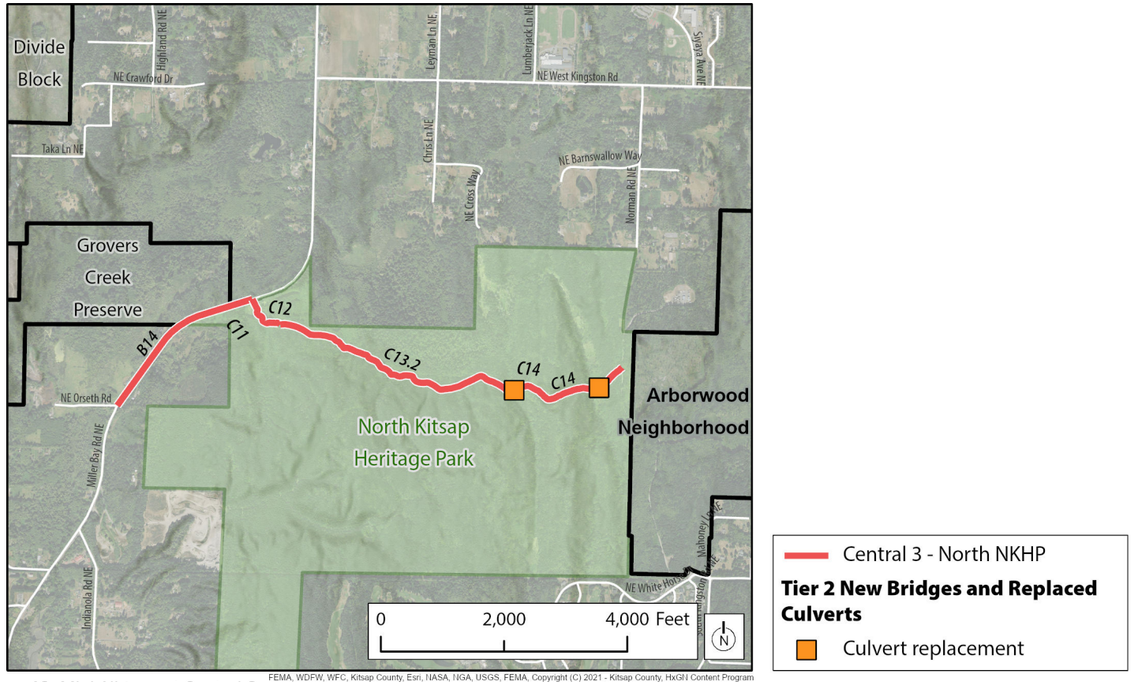



Figure 49: Mini-Alignment Central 3

| TIER 2 RATINGS | | | |
|---|---|---|---|
| **Criteria Name** | | | |
| Category 1 - Connections | | T2 Avg Rating | Adjusted |
| 1.1 | Access to communities | 2.19 | 2.19 |
| 1.2 | Access to parks and open space | 2.75 | 3.00 |
| 1.3 | Consistency with County plans | 2.75 | 2.75 |
| 1.4 | Places of interest | 2.75 | 2.75 |
| **Category Average** | | **2.61** | **2.67** |
| Category 2 - Environmental | | T2 Avg Rating | Adjusted |
| 2.1 | Wetlands | 2.10 | 2.10 |
| 2.2 | Wetland buffers | 1.25 | 1.25 |
| 2.3 | Streams | 2.30 | 2.30 |
| 2.4 | Stream buffers | 0.95 | 0.95 |
| 2.5 | Mitigation needs and opportunities | 2.05 | 2.05 |
| 2.6 | Restoration potential | 1.66 | 1.66 |
| **Category Average** | | **1.72** | **1.72** |
| Category 3 - Health & Safety | | T2 Avg Rating | Adjusted |
| 3.1 | User health | 2.49 | 2.68 |
| 3.2 | User safety - Conflicts at driveways | 3.00 | 3.00 |
| **Category Average** | | **2.75** | **2.84** |
| Category 4 - User Experience | | T2 Avg Rating | Adjusted |
| 4.1 | Difficulty | 2.63 | 2.75 |
| 4.2 | Meeting ADA criteria- built | 2.63 | 2.63 |
| 4.3 | Quality of the outdoor experience | 2.56 | 2.56 |
| **Category Average** | | **2.61** | **2.65** |
| Category 5 - Project Delivery | | T2 Avg Rating | Adjusted |
| 5.1 | Capital costs | 1.25 | 1.25 |
| 5.2 | Rights of Way and easements | 2.37 | 2.37 |
| 5.3 | Maintenance costs | 2.00 | 2.00 |
| **Category Average** | | **1.88** | **1.88** |
| **Total of Averages** | | **11.55** | **11.75** |

Table 11: Mini-Alignment Central 3

| | | | | |
|---|---|---|---|---|
| **Mini-Alignment** | **East 1 - Road Option** | | | |
| **Zone** | East | | | |
| **Segments** | C4 and C5 | | | |
| **Length (miles)** | 1.29 | | | |
| **Opportunities** | • This mini-alignment could be considered if a path along Norman Road, which accesses the east side of NKHP, were to be considered as an alternate to mini-alignment #2. | | | |
| **Constraints** | • Only viable as part of a larger full alignment in combination with the Central Zone road option, which has the lowest rating in that zone. The ROW and adjacent parcels along this mini-alignment, most of which are developed, restrict the ability to implement a separate shared-use path along West Kingston Road. STO would be an urban roadway design with a sidewalk on north side and bike lanes.<br>• User health and safety is a concern due to its proximity to the road and the number of driveways that are crossed. There currently is no separation between bicycles and vehicles. | | | |
| **Environmental Assessment Summary** | *Buffer Impact (acres)* | 0.00 | *No. Stream Crossings* | 0 |
| | *Wetland Impact (acres)* | 0.00 | *Stream Buffer Impact (linear feet* | 0 |

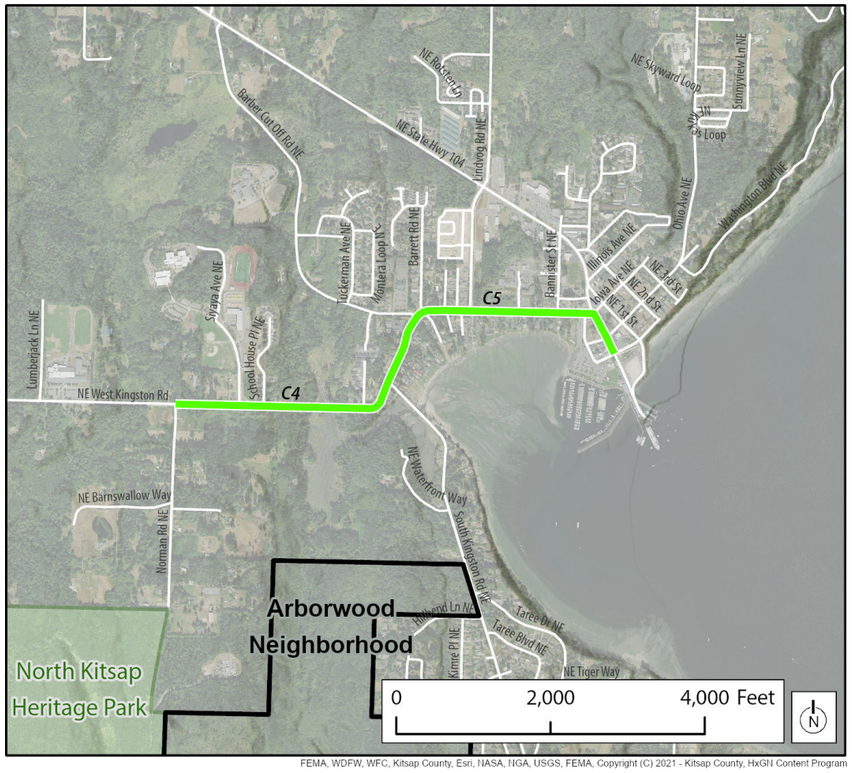



Figure 50: Mini-Alignment East 1

| TIER 2 RATINGS | | | |
|---|---|---|---|
| **Criteria Name** | | | |
| Category 1 - Connections | | T2 Avg Rating | Adjusted |
| 1.1 | Access to communities | 3.00 | 3.00 |
| 1.2 | Access to parks and open space | 2.00 | 1.50 |
| 1.3 | Consistency with County plans | 3.00 | 2.00 |
| 1.4 | Places of interest | 2.56 | 2.56 |
| **Category Average** | | **2.64** | **2.27** |
| Category 2 - Environmental | | T2 Avg Rating | Adjusted |
| 2.1 | Wetlands | 3.00 | 3.00 |
| 2.2 | Wetland buffers | 3.00 | 3.00 |
| 2.3 | Streams | 3.00 | 3.00 |
| 2.4 | Stream buffers | 3.00 | 3.00 |
| 2.5 | Mitigation needs and opportunities | 3.00 | 3.00 |
| 2.6 | Restoration potential | 1.00 | 1.00 |
| **Category Average** | | **2.67** | **2.67** |
| Category 3 - Health & Safety | | T2 Avg Rating | Adjusted |
| 3.1 | User health | 1.00 | 1.00 |
| 3.2 | User safety - Conflicts at driveways | 1.00 | 1.50 |
| **Category Average** | | **1.00** | **1.25** |
| Category 4 - User Experience | | T2 Avg Rating | Adjusted |
| 4.1 | Difficulty | 2.12 | 2.12 |
| 4.2 | Meeting ADA criteria- built | 3.00 | 3.00 |
| 4.3 | Quality of the outdoor experience | 1.00 | 1.00 |
| **Category Average** | | **2.04** | **2.04** |
| Category 5 - Project Delivery | | T2 Avg Rating | Adjusted |
| 5.1 | Capital costs | 2.56 | 2.56 |
| 5.2 | Rights of Way and easements | 2.56 | 2.56 |
| 5.3 | Maintenance costs | 2.00 | 2.00 |
| **Category Average** | | **2.37** | **2.37** |
| **Total of Averages** | | **10.72** | **10.60** |

Table 12: Mini-Alignment East 1

| | | | | |
|---|---|---|---|---|
| **Mini-Alignment** | **East 2 - Norman Road Alternate Option** | | | |
| **Zone** | East | | | |
| **Segments** | C4, C5, C7, and C9 | | | |
| **Length (miles)** | 2.77 | | | |
| **Opportunities** | • The portion of Segment C4 that is west of Segment C7 is not considered when analyzing this mini-alignment (sub-alignment).<br>• Shortest mini-alignment in the East Zone which connects to the park.<br>• Limited parcel ownership including County-owned property with the Kingston Wastewater Treatment Plant.<br>• Connects to the east side of NKHP, the north and west sides of the Arborwood neighborhood, and schools on the north side of West Kingston Road.<br>• Environmental criteria ratings are generally good except for restoration potential. There are fewer wetlands, streams, and their buffers along this mini-alignment that could potentially be impacted.<br>• While not rated as high for health and safety or user experience compared to paths within parks and open spaces, it does rate higher for these categories than roadside options. | | | |
| **Constraints** | • The mini-alignment relies on acquisition or easement within a privately owned parcel.<br>• More detailed design of Segment C7 within the private parcel has not occurred to determine if the alignment of the path could avoid critical areas while meeting accessibility standards.<br>• Road crossing of West Kingston Road. | | | |
| **Environmental Assessment Summary** | *Buffer Impact (acres)* | 0.00 | *No. Stream Crossings* | 0 |
| | *Wetland Impact (acres)* | 0.00 | *Stream Buffer Impact (linear feet* | 0 |

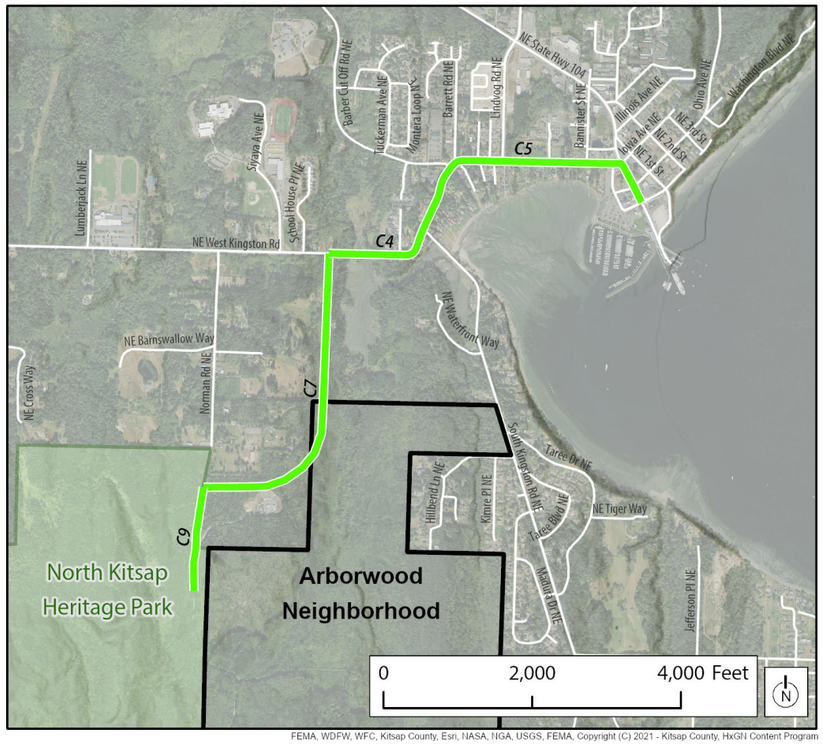



Figure 51: Mini-Alignment East 2

| TIER 2 RATINGS | | | |
|---|---|---|---|
| **Criteria Name** | | | |
| Category 1 - Connections | | T2 Avg Rating | Adjusted |
| 1.1 | Access to communities | 2.54 | 2.54 |
| 1.2 | Access to parks and open space | 2.46 | 2.46 |
| 1.3 | Consistency with County plans | 3.00 | 2.75 |
| 1.4 | Places of interest | 2.30 | 2.30 |
| **Category Average** | | **2.58** | **2.51** |
| Category 2 - Environmental | | T2 Avg Rating | Adjusted |
| 2.1 | Wetlands | 2.88 | 2.88 |
| 2.2 | Wetland buffers | 2.39 | 2.39 |
| 2.3 | Streams | 3.00 | 3.00 |
| 2.4 | Stream buffers | 3.00 | 3.00 |
| 2.5 | Mitigation needs and opportunities | 2.57 | 2.57 |
| 2.6 | Restoration potential | 1.03 | 1.03 |
| **Category Average** | | **2.48** | **2.48** |
| Category 3 - Health & Safety | | T2 Avg Rating | Adjusted |
| 3.1 | User health | 1.92 | 2.25 |
| 3.2 | User safety - Conflicts at driveways | 1.92 | 1.92 |
| **Category Average** | | **1.92** | **2.08** |
| Category 4 - User Experience | | T2 Avg Rating | Adjusted |
| 4.1 | Difficulty | 2.07 | 2.50 |
| 4.2 | Meeting ADA criteria- built | 2.65 | 2.75 |
| 4.3 | Quality of the outdoor experience | 1.81 | 2.50 |
| **Category Average** | | **2.18** | **2.58** |
| Category 5 - Project Delivery | | T2 Avg Rating | Adjusted |
| 5.1 | Capital costs | 2.07 | 2.07 |
| 5.2 | Rights of Way and easements | 2.42 | 2.25 |
| 5.3 | Maintenance costs | 2.00 | 2.00 |
| **Category Average** | | **2.16** | **2.11** |
| **Total of Averages** | | **11.31** | **11.76** |

Table 13: Mini-Alignment East 2

| | | | | |
|---|---|---|---|---|
| **Mini-Alignment** | **East 3 - South Kingston Road and Arborwood Option** | | | |
| **Zone** | East | | | |
| **Segments** | C5, C8, C10, and C15 | | | |
| **Length (miles)** | 2.95 | | | |
| **Opportunities** | • Longest mini-alignment in the East Zone; a significant portion of that distance is being constructed by the developer of the Arborwood neighborhood, at no cost to the County.<br>• The cost of a new bridge over the estuary is likely offset by cost savings associated with Arborwood neighborhood. | | | |
| **Constraints** | • Requires a new bridge, at significant cost, over the inlet connecting the estuary and wetlands with Appletree Cove. The current vehicle bridge is not wide enough to add a separated shared-use path.<br>• User health and safety is a concern due to the path's proximity to the road and the number of driveways that the path would cross, along South Kingston Way.<br>• The path would require more ROW than currently exists to meet separated path standards resulting in the need for acquisition of easements from several properties along South Kinston Road.<br>• This route is not as direct a connection (compared to mini-alignment #2) between the town of Kingston and NKHP, and it does not connect as directly to the schools north of West Kingston Road. This is reflected in lower connectivity ratings. | | | |
| **Environmental Assessment Summary** | *Buffer Impact (acres)* | 1.18 | *No. Stream Crossings* | 1 |
| | *Wetland Impact (acres)* | 0.60 | *Stream Buffer Impact (linear feet* | 300 |

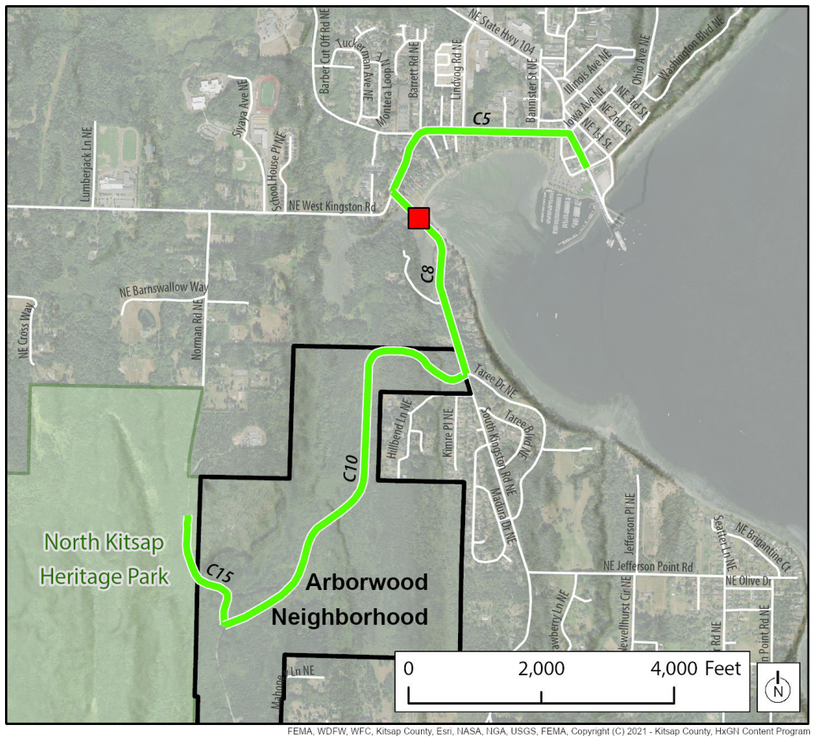



Figure 52: Mini-Alignment East 3

| TIER 2 RATINGS | | | |
|---|---|---|---|
| **Criteria Name** | | | |
| Category 1 - Connections | | T2 Avg Rating | Adjusted |
| 1.1 | Access to communities | 2.11 | 2.50 |
| 1.2 | Access to parks and open space | 2.15 | 2.50 |
| 1.3 | Consistency with County plans | 2.38 | 2.38 |
| 1.4 | Places of interest | 2.11 | 2.11 |
| **Category Average** | | **2.19** | **2.37** |
| Category 2 - Environmental | | T2 Avg Rating | Adjusted |
| 2.1 | Wetlands | 2.53 | 2.53 |
| 2.2 | Wetland buffers | 2.26 | 2.26 |
| 2.3 | Streams | 2.65 | 2.65 |
| 2.4 | Stream buffers | 2.76 | 2.76 |
| 2.5 | Mitigation needs and opportunities | 2.44 | 2.44 |
| 2.6 | Restoration potential | 1.00 | 1.00 |
| **Category Average** | | **2.27** | **2.27** |
| Category 3 - Health & Safety | | T2 Avg Rating | Adjusted |
| 3.1 | User health | 1.81 | 2.00 |
| 3.2 | User safety - Conflicts at driveways | 1.81 | 1.81 |
| **Category Average** | | **1.81** | **1.90** |
| Category 4 - User Experience | | T2 Avg Rating | Adjusted |
| 4.1 | Difficulty | 2.11 | 2.25 |
| 4.2 | Meeting ADA criteria- built | 3.00 | 3.00 |
| 4.3 | Quality of the outdoor experience | 1.15 | 1.15 |
| **Category Average** | | **2.09** | **2.13** |
| Category 5 - Project Delivery | | T2 Avg Rating | Adjusted |
| 5.1 | Capital costs | 2.53 | 2.25 |
| 5.2 | Rights of Way and easements | 2.38 | 2.00 |
| 5.3 | Maintenance costs | 1.76 | 1.76 |
| **Category Average** | | **2.22** | **2.00** |
| **Total of Averages** | | **10.58** | **10.69** |

Table 14: Mini-Alignment East 3

## 8.2 The Preferred Alignment

Selection of a preferred mini-alignment in each zone was a multi-step process involving public outreach and discussions amongst the consultant team, County, and Working Group members. Steps in the selection process included the following:

- Assessing the overall criteria scores, both original and "adjusted" (Appendix E)
- Comparing ratings for the criteria category average for the 11 mini-alignments
- Comparing ratings for the individual criteria average for the 11 mini-alignments
- Listing the opportunities and issues with each mini-alignment (refer to Section 8.1)
- Discussing the ratings (at all scales) and the constraints and opportunities with all team members
- Written and verbal feedback from Working Group members on preferred mini-alignments and responses to the issues and opportunities associated with each

This process resulted in the selection of preferred and alternative mini-alignments, as shown in Figure 53.

When the preferred mini-alignments in each zone are combined, the result is a 7.93-mile continuous connection from Kingston to PGFHP through NKHP and the Divide Block. The preferred mini-alignment in each zone includes the following:

*West Zone*

Mini-alignment #2: From west to east, the preferred route is 3.28 miles from PGFHP, along the north side of Stottlemeyer Road, under Bond Road via a tunnel, along Stevens Uhler Road, through the Hogg (formerly Speed) property easement, up through the northwest portion of the Divide Block to the top of the ridge, down the southeast portion of the Divide Block, through GPC-owned land to Orseth Road, and over Grover's Creek to Miller Bay Road. This route takes advantage of opportunities within the Divide Block that provide an accessible, safe, healthy, and direct route, and the best user experience, all while avoiding critical areas to the greatest extent possible.

*Central Zone*

Mini-alignment #3: From west to east, the preferred route is 1.89 miles from Orseth Road, crossing Miller Bay Road and following it along its east side to the parking lot on the west side of NKHP, turning east through the northern portion of NKHP (segment 13.2), and over Beaver Pond to the east side of the park at the County road that accesses the wastewater treatment plant. While the northern route through the park is through sensitive wetland buffer, the path could be placed within the outer 25% of the buffer to reduce impacts and mitigation requirements. This route is the shortest, most direct, and most accessible (compared to the steeper Spine mini-alignment #2, which requires a steep climb up and down the central ridge in the park). It also locates a high-use regional path at the northern edge of the park. It provides for a safe, healthy, and interesting route through natural areas that will enhance the user experience.

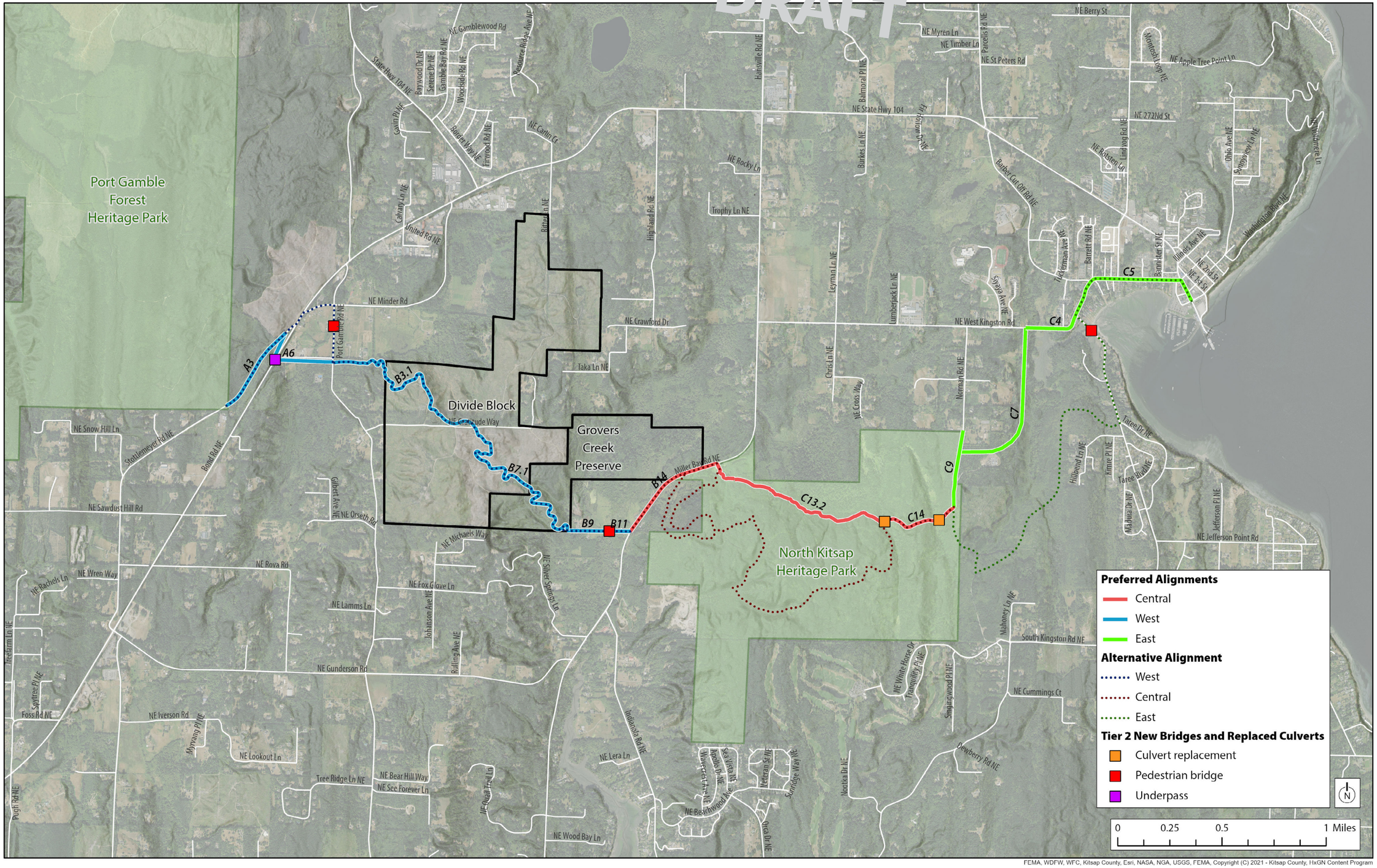



Figure 53: Preferred and Alternative Alignments

*East Zone*

Mini-alignment #2: From west to east, the preferred route is 2.77 miles from the County road that accesses the wastewater treatment plant, northwest to the treatment plant, then north through a private parcel to West Kingston Road. At this point, the path would utilize existing infrastructure in place, including sidewalks and a bike lane, for users to access downtown Kingston and the ferry. This route is the most direct between West Kingston Road and NKHP. It provides for a safe, healthy, and interesting route through natural areas that will enhance the user experience. While it does rely on the acquisition of an easement on a private parcel, it has fewer property issues than the other mini-alignments in the East Zone.

### 8.3 Alternative Alignments

Alternative segments were identified for each mini-alignment and within each zone in the event that a significant issue arises with the preferred alignment. This high-level planning study did not include predesign or engineering, and it will take time for the path to be prioritized, funded, designed, and implemented. As time passes, there may be new information or changes along the preferred alignment (such as land ownership, funding, partnerships, and community priorities) that require alternatives to be considered. See Figure 54.

*West Zone*

An alternative in this zone could be considered if further studies or funding availability determine that a tunnel under Bond Road is infeasible. In this case, mini-alignment #5 would be the alternative to mini-alignment #2. The primary difference is that the mini-alignment #5 alternatives crosses Bond Road at grade, at a signaled intersection. This is indicated by the dotted line in Figure 54. While less expensive, this alternative was rated lower due to safety concerns associated with an at-grade crossing for a regional path.

*Central Zone*

The Spine path (mini-alignment #2) could be an alternative to the North route (mini-alignment #3) through NKHP should the latter be deemed infeasible during future design and engineering efforts. The Miller Bay Road option (mini-alignment #1) has safety, accessibility, user experience, and cost issues. Per the analysis and results of this study, a connecting route though NKHP is necessary to provide the most optimal and viable regional, shared-use path across the North Kitsap Peninsula in a way that appropriately balances the needs and values of the community with regard to accessibility, user experience, and critical area protection.

*East Zone*

The route through Arborwood (mini-alignment #3) could be an alternative to the preferred mini-alignment in this zone. While less direct and containing ROW issues, the path within the Arborwood neighborhood will be built by the developer to federal shared-use standards. This alternative route also provides good connections to the east side of NKHP.

# 9. PHASING STRATEGIES AND COSTS

## 9.1 Phasing of the Preferred Alternative

Due to the length of the preferred alignment (7.93 miles) and typical grant funds available for the project, it is likely that the path would be designed, engineered, permitted, and constructed in phases. As such, sections of the preferred alignment have been identified with logical termini (meaning they connect accessible points of interest, such as parks, trailheads, or parking lots) and independent utility (meaning they can function as independent path sections until others are connected to them). The following list identifies a preliminary phasing sequence, which is also displayed graphically in Figure 54.

Phase 1: East Zone segment C9 from the trailhead at the south end of Norman Road, along the existing road to the east entrance of NKHP, and beyond (utilizing segment C15) to the Arborwood neighborhood. This provides an interim connection between West Kingston Road and Arborwood next to the park. This segment provides logical termini between the trailhead, east entrance of NKHP, and Arborwood utilizing gravel roads used only by park and wastewater treatment facility staff. The shared-use path would not need to be separated from these low-use County-only roads but could utilize the roads themselves, if paved.

Phase 2: Central Zone segment C14 across Beaver Pond in NKHP. This would allow users access from Kingston, utilizing the path completed in Phase 1, to and over Beaver Pond. This short segment was identified as a separate phase due to the complexity and likely crossing of Beaver Pond utilizing the existing berm and new boardwalk sections. This phase would provide better accessibility to a very interesting and educational area of NKHP.

Phase 3: Central Zone segment C13.2 across the north section of NKHP would complete the connection across the park east to west, with the termini being the existing parking lot along Miller Bay Road. This would allow users access from Kingston, utilizing the path completed in Phases 1 and 2, to and through the park to Miller Bay Road.

Phase 4: East Zone segment C7 runs from West Kingston Road to segment C9, which will have been completed in Phase 1. This segment runs south through the private parcel to the County Wastewater Treatment Plant to the existing road, providing access to the east entrance of NKHP. This segment provides two logical termini between existing bike lanes and sidewalks on West Kingston Road and the park. It would allow access for users between the town and the park as well as residents of the Arborwood neighborhood to access town to the north.

Phase 5: A short segment of path along Miller Bay Road (B14) connecting the NKHP path and trailhead at the parking lot on the west side of the park to Orseth Road. This short segment was identified as a separate phase due to the complexity due to roadside topography and critical areas. This segment would provide a safe connection to unimproved paths in GPC parcels and would allow users to access the Divide Block from Kingston via paths developed in previous phases.

Phase 6: West Zone segment B9 from Miller Bay Road west along Orseth Road (and over Grover's Creek). This would provide a connection from NKHP on the east side of Miller Bay Road (via a short path link along the road realized in Phase 5) to a large open space and paths to the west-GPC land and the Divide Block. This short segment was identified as a separate phase due to the complexity of crossing Grover's Creek, which would require a separate pedestrian bridge and roadside boardwalk sections over existing wetlands. As an interim, or even long-term solution, the shared-use path may not need to be separated from the existing road

and bridge if existing land uses change along Orseth Road and a nonstandard shared-use path is allowed over the existing bridge.

Phase 7: West Zone segment B7.1 from the end of Orseth Road, which will ascend into the Divide Block to its peak near Gratitude Way. Logical termini include the parking lot at NKHP on the east side of this phase (connected by Phases 5 and 6) and Gratitude Way on the Divide Block. Depending on the future ownership and development (or lack thereof) of the Divide Block, it is reasonable to think a small parking lot and trailhead could be created at the top of the ridge at the end of Gratitude Way.

Phase 8: West Zone segments including B3.1 from the top of the Divide Block to Port Gamble Road to the west through the Hogg (formerly Speed) property easement. At this point, the feasibility of a tunnel under Bond Road (A6) or an at-grade signaled crossing (A5 and A7) will have been determined, and the implementation of that effort scheduled as part of Phase 9. This will provide logical termini between the Divide Block and PGFHP.

Phase 9: West Zone segment A6 (tunnel crossing) or A5 and A7 (signal crossing) would connect the path from the Divide Block to PGFHP. On the west side of Bond Road segment A3 would connect the Park to Bond Road, completing the connection all the way from Kingston.

### 9.2 General Cost Considerations

The project will be implemented over a 20-30 year timeframe, with a significant portion of the necessary funding obtained through grants. Tables 15 and 16 in this section provide a cost range for each project phase.

Project costs assume a 2024 base year, and inflation projections are currently projected for 3- 5% per year thereafter. Base year costs were developed through linear foot comparisons with regional projects of similar complexity and terrain, with unusual or high-cost items removed from the regional estimates before applying it to this project. Add-ins, including culvert replacements, pedestrian bridges, intersection crossings, and underpasses, were then estimated and added to the base cost for each project phase.

The estimates include right of way costs, design and permitting as a factor of construction costs, mitigation, and construction management. See Appendix F for a detailed breakdown.

Some final notes regarding Phases 6 and 9:

Phase 6: Orseth Road Alignment. This project currently presumes a separated facility from the roadway along a boardwalk within a wetland. Because of the significant cost of this type of work, future designers may consider a shared roadway facility, provided that the large vehicular activity associated with adjoining land use is addressed.

Phase 9: Bond Road Undercrossing, Port Gamble Road to PGFHP. At the time of this report, regional development partners were exploring a roundabout and other improvements at the intersection of Bond and Minder Roads. These future developments may influence the type of highway crossing in this location.

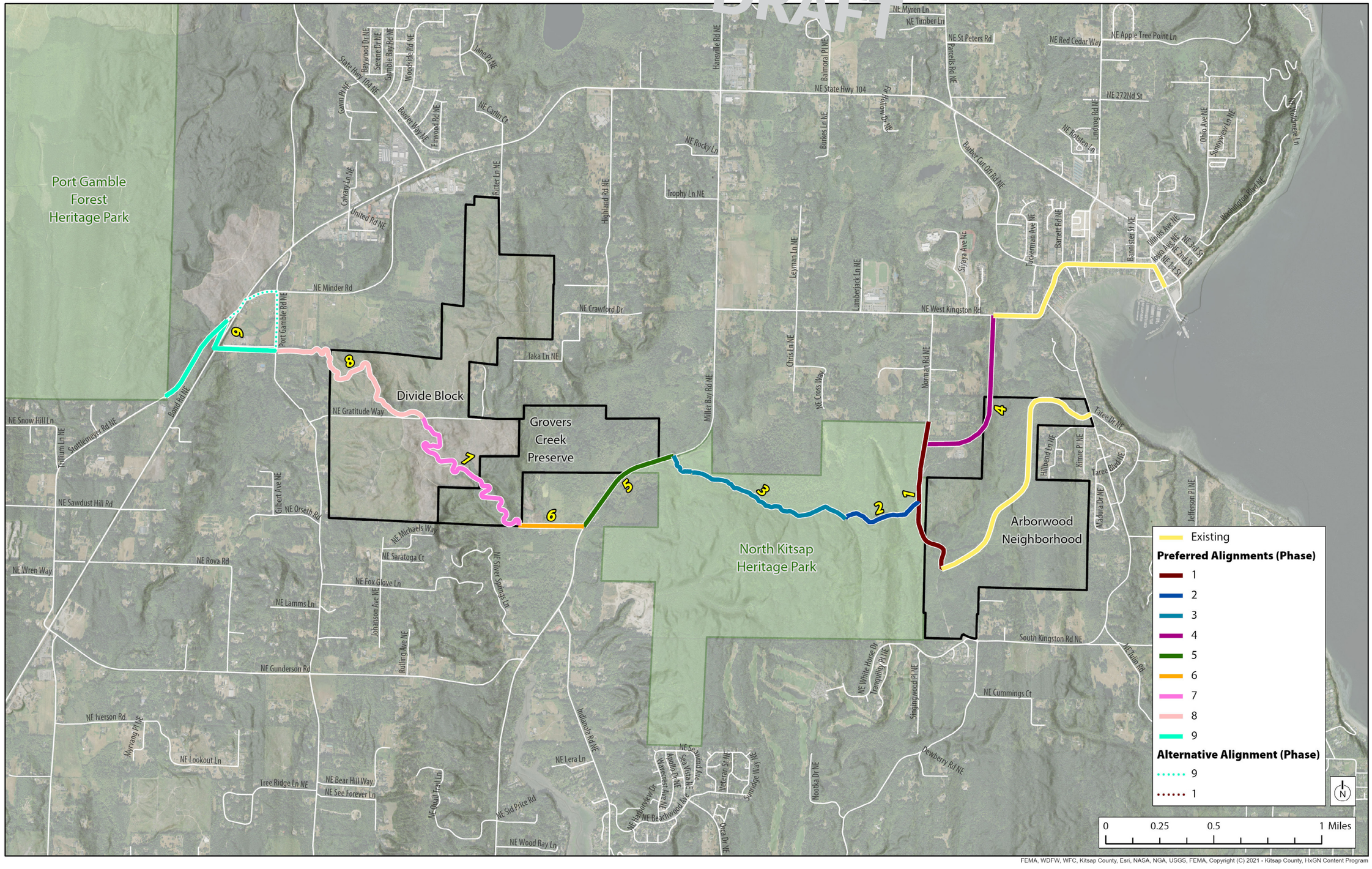



Figure 54: Phasing of the Preferred Alternative

Table 15: Cost Breakdown by Phase

| PHASE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| CONSTRUCTION COST (INCL CONTINGENCY)[4] | $1,945,716 | $2,938,033 | $5,601,162 | $8,298,508 | $3,041,638 | $8,785,396 | $4,200,873 | $6,196,026 | $8,621,466 |
| RW ACQUISITION | | | | $87,000 | $96,000 | $77,000 | $42,000 | | $187,000 |
| DESIGN AND PERMITTING[1] | $389,143 | $934,379 | $1,680,348 | $2,074,627 | $760,410 | $2,635,619 | $1,050,218 | $1,239,205 | $2,586,440 |
| MITIGATION[3] | $0 | $455,000 | $1,171,000 | $399,000 | $219,000 | $581,000 | $294,000 | $493,000 | $249,000 |
| CONSTRUCTION MANAGEMENT[2] | $292,000 | $401,000 | $841,000 | $1,245,000 | $457,000 | $1,318,000 | $631,000 | $930,000 | $1,294,000 |
| **PROJECT TOTAL** | **$2,626,859** | **$4,460,032** | **$9,293,510** | **$12,104,135** | **$4,574,048** | **$13,397,015** | **$6,218,091** | **$8,858,231** | **$12,937,906** |
| **RANGE (LOW, ROUNDED TO 10,000)** | **$2,630,000** | **$4,470,000** | **$9,300,000** | **$12,110,000** | **$4,580,000** | **$13,400,000** | **$6,220,000** | **$8,860,000** | **$12,940,000** |
| **RANGE (HIGH = LOW X 1.2)** | **$3,156,000** | **$5,364,000** | **$11,160,000** | **$14,532,000** | **$5,496,000** | **$16,080,000** | **$7,464,000** | **$10,632,000** | **$15,528,000** |

1 Design and permitting: LOW RISK/COMPLEXITY 15-25% MEDIUM RISK/COMPLEXITY 20-30% HIGH RISK/COMPLEXITY 25-35%

2 Construction management: cap at 15% of construction costs

3 See Appendix C

4 See Appendix F

Table 16: Project Costs by Phase

| PROJECT PHASE | PROJECT TOTAL ($M - LOW) | PROJECT TOTAL ($M - HIGH) |
|---|---|---|
| Phase 1 - Norman Road to Arborwood Connector | $2.63 | $3.16 |
| Phase 2 - East NKHP - across Beaver Pond | $4.47 | $5.36 |
| Phase 3 - NKHP - through Park | $9.30 | $11.16 |
| Phase 4 - West Kingston to end of Norman Road | $12.11 | $14.53 |
| Phase 5 - Miller Bay Road, from NKHP Parking Lot to Orseth Road | $4.58 | $5.50 |
| Phase 6 - Orseth Road Alignment | $13.40 | $16.08 |
| Phase 7 - Grovers Creek Preserve, Orseth Road to Gratitude Way | $6.22 | $7.46 |
| Phase 8 - Divide Block, Gratitude Way to Port Gamble Road | $8.86 | $10.63 |
| Phase 9 - Bond Road Undercrossing, Port Gamble Rd to PGFHP | $12.94 | $15.53 |

**Notes**

Anticipated Inflation Rate: 3-5%

Base Year: 2024

# 10. NEXT STEPS

This study will inform Kitsap County Public Works prioritization of path projects in the development of the County's Six-Year TIP and Annual Construction Program. During this process, the Board of County Commissioners conducts formal public hearings, and the public can provide input and suggestions for projects. An evaluation system is used for the selection of transportation projects for funding in the County's TIP. Projects placed into the process are scored and ranked using objective criteria. These criteria include safety and/or capacity needs, structural condition, availability of funding, and timing of the funding, especially for State and Federally funded programs.

Figure 55: Struck Environmental. June 2022. Segment C14 at Beaver Pond, a beaver exclusion structure and debris pile.


Figure 56: Struck Environmental. June 2022. Trail marker in NKHP in segment C21 at the intersection of the Spine Line and White Horse trails.

# REFERENCES

American Association of State Highway and Transportation Officials (AASHTO). 2012. AASHTO Guide for the Development of Bicycle Facilities.

Architectural and Transportation Barriers Compliance Board. 2023. Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way

FHWA (Federal Highway Administration). 2006. Evaluation of Safety, Design, and Operation of Shared-use Paths.

FHWA. 2016. Small Town and Rural Multimodal Networks.

North Kitsap Trails Association. 2011. North Kitsap String of Pearls Trail Plan.

WSDOT (Washington Department of Transportation). 2023. Design Manual, Shared Use Paths 1515.02(2)(a), pg. 1515-3. October.

# APPENDIX A

PUBLIC COMMENTS

# APPENDIX B

TIER 2 SEGMENT REFINEMENTS

# APPENDIX C

CRITERIA AND RATINGS BY SEGMENT

# APPENDIX D

SEGMENT LENGTHS AND COSTS
BY SECTION

# APPENDIX E

CRITERIA AND RATINGS
BY MINI-ALIGNMENT

# APPENDIX F

PROJECT COSTS

# APPENDIX G

OPEN HOUSE FAQ AND PRESENTATION