City of Monroe, WA, Multi-Modal Trail: Transportation Analysis

Project Report
ENVS 373: Transportation Systems & Planning, Independent Study
Winter - Spring 2019

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WESTERN
WASHINGTON UNIVERSITY

SUSTAINABLE COMMUNITIES PARTNERSHIP

About SCP

Western's Sustainable Communities Partnership (SCP) program focuses the expertise, energy, and ideas of faculty and students upon the issues that communities face as our society transitions to a more sustainable future. SCP partners with communities each academic year, facilitating a program in which many Western courses complete community-engaged learning projects that address challenges identified by the partner.

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SCP Partner for 2018-2019: City of Monroe, WA

SCP is proud to partner with City of Monroe, Washington, during the program's third year. Four Western courses will tackle projects identified in collaboration with city staff.

Acknowledgement

The Association of Washington Cities (AWC) has provided invaluable assistance as SCP has grown and developed in its third year. AWC has provided advice on program development, and has assisted in promoting the program.

SCP is housed within Western's Office of Sustainability

PREFACE

This project was conducted by Dr. Paul Stangl's *Transportation Systems and Planning* class (ENVS 373) and two students completing senior projects at Western Washington University. With the guidance of Dr. Paul Stangl, students analyzed transportation impacts associated with the implementation of a temporary trail and various entrances in the US-2 Bypass Right-of-Way. They demonstrated considerable improvements to park accessibility for Monroe residents by measuring the number of households that could walk or bicycle to the new trail. They identified significant reductions in the time required for pedestrians and bicyclists to travel between complimentary land uses surrounding the trail area, such as residences and retail. Finally, they identified potential improvements to links with nearby parks, particularly for bicyclists.

Western Team

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TRANSPORTATION ANALYSIS OF PROPOSED ACCESS POINTS TO US-2 BYPASS TRAIL

Introduction

The City of Monroe is divided by US-2, which passes directly through the city. The area south of US-2 includes residential neighborhoods, a great deal of park space, and some retail including the old downtown. The area north of the highway contains The Evergreen State Fairgrounds, residential neighborhoods, and a considerable amount of suburban retail. There are no large parks here and few small ones. Washington State Department of Transportation (WSDOT) acquired land for a bypass to the north of the city, but it has not been developed. The City of Monroe is interested in using this land for a trail.

As part of Sustainable Communities Partnership, City of Monroe staff worked with Western Washington University (WWU) students and faculty to conduct a community outreach meeting in the fall of 2018. Feedback from that meeting indicated that residents are interested in adapting the US-2 Bypass Right-of-Way (ROW) into a pedestrian, bicycle, and equestrian trail. This study analyzes the value of different potential trail entrances and identifies improvements to adjoining pedestrian and bicycle networks to improve access to the trail. It utilizes the research and community outreach feedback acquired in the fall, in combination with best practices in transportation planning, and transportation data specific to the area of study.

Nine potential access points were identified based on suggestions from the attendees at the outreach meeting, discussions with city staff, and the WWU research team's analysis. During the fall outreach meeting, students collected feedback from the public, providing insight into where community members can find access to the trail, and where there might be high demand for access based on the ways in which people move through the city and/or congregate. The City provided insight on these high demand areas as well, and recommended that there be access points on either side of the former road located at 191st Avenue SE. The rest of the access points were identified by the transportation research team using GIS and visual analysis of the city's current layout.

City planners use various distances to plan for pedestrian access to parks, typically ranging from an eighth of a mile to half a mile.[1] Evidence suggests that the distance people will walk, and presumably, bicycle, to a park varies with park size, park amenities, and the personal characteristics of the user.[2] While research supports using both quarter-mile and half-mile pedestrian sheds for

[1] Harnik, P., & Simms, J. (2004). Parks: How far is too far. *Planning*, *70*(11), 8-11.

[2] Giles-Corti, B., Broomhall, M. H., Knuiman, M., Collins, C., Douglas, K., Ng, K., ... & Donovan, R. J. (2005). Increasing walking: how important is distance to, attractiveness, and size of public open space?. *American journal of preventive medicine*, *28*(2), 169-176.

different types of park, the larger threshold is more suitable for a trail in a low-density area such as Monroe.[3] Less is known about bicycling distances, though the Federal Transportation Authority uses a three-mile bike shed for travel to public transit.[4] Bicycling trips for recreational purposes are likely longer than those for utilitarian trips, but the three-mile standard is practical as a threshold that will encompass a sizeable portion of bicycle trips to the US-2 Bypass Trail.

Methods

The relative value of potential trail entrances were evaluated for their contribution to utilitarian travel and access to recreation. In this study, utilitarian travel includes movement between households and commercial areas or the State Fairgrounds. Areas with homogenous land uses were grouped into zones, each with a centroid, representing the core of the area. Travel between pairs of zones was measured along the shortest route distance connecting their centroids. This is similar to both traditional travel demand forecasting models and pedestrian connectivity studies relying on "route distance." Route distances between each pair of centroids were multiplied by pedestrian walking and bicycle speeds to identify travel times under current conditions, and after the addition of each potential trail entrance.

The research team also assessed improved access to recreation (parks and trails) for residents surrounding the study area. Many studies draw a half-mile buffer around a park entrance to identify the area within walking distance of a park. This does not provide an accurate depiction of park access, as residents must travel along city streets and trails that do not follow straight lines. For a more precise analysis, the research team opted to employ a "reach" measure.* Utilizing ArcGIS Pro, the team found the reach of each potential entrance for pedestrians and bicyclists traveling along the street network throughout the Monroe Urban Growth Area (see Figure 1). This was done by taking the WSDOT identified public roads and trails identified in the Monroe Comprehensive Plan and measuring the distance (in linear feet) from the entrance along the centerlines of the road network. Researchers then identified all parcels that lay within 50 feet of the road network identified to be within a half-mile to an access point. In other words, all residences with frontage directly adjoining these routes were counted as having pedestrian access to the new trail.

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[3] Donahue, R. (2011). Pedestrians and park planning: How far will people walk. *City Parks Blog*.

[4] McNeil, N., Dill, J., DeVitis, D., Doubleday, R., Duncan, A., & Weigand, L. (2017). *Manual on Pedestrian and Bicycle Connections to Transit* (No. FTA Report No. 0111). United States. Federal Transit Administration. Office of Research, Demonstration, and Innovation.

* For a definition of "reach," see: Ozbil, Ayse & Peponis, John & Stone, Brian. (2011). Understanding the link between street connectivity, land use and pedestrian flows. Urban Design International. 16. 125-141. 10.1057/udi.2011.2.

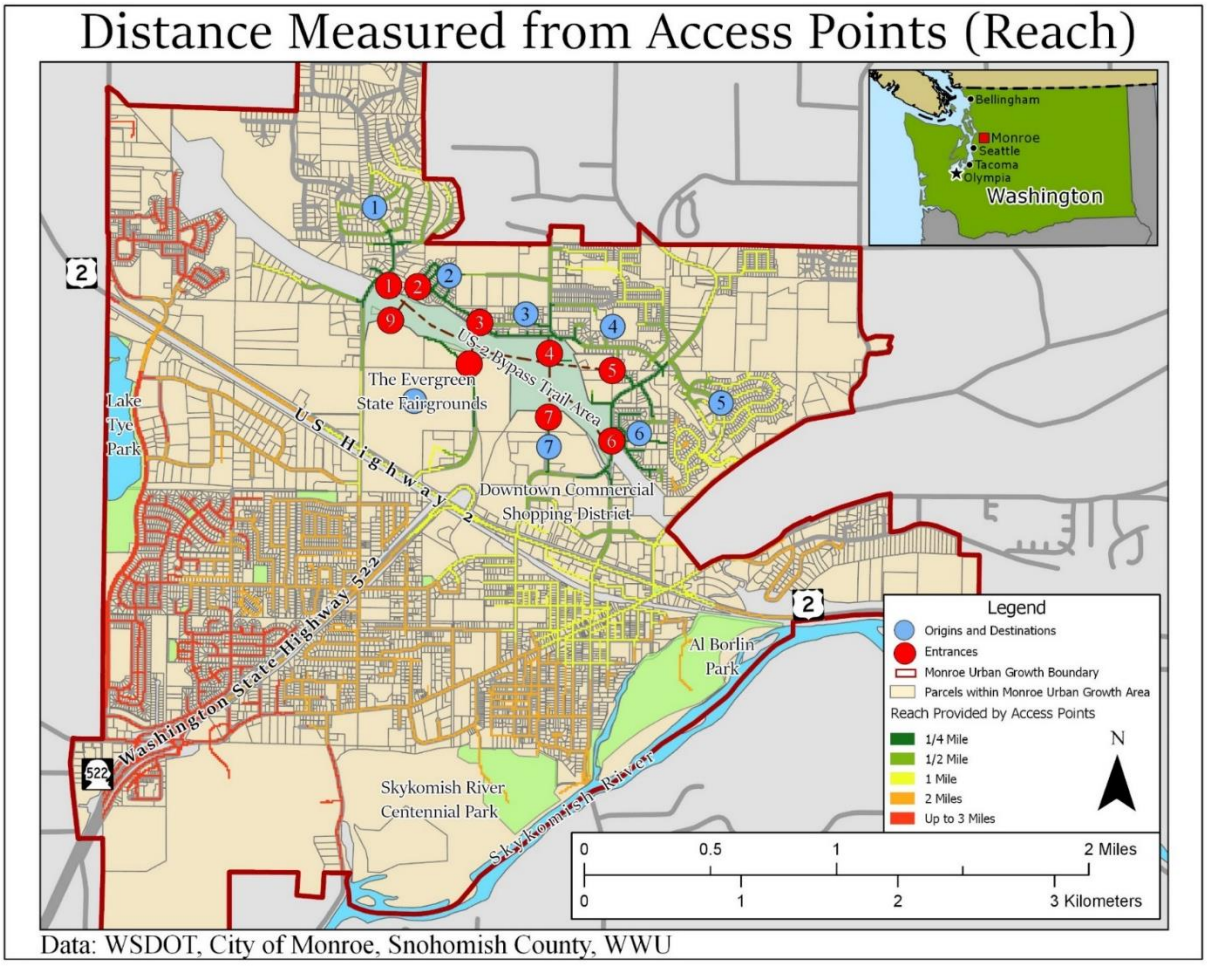

Figure 1: Preliminary view of the reach provided by each proposed Access Point.

Walking Analysis of Access Points in the Study Area

On March 1st, 2019, students from Western Washington University's Transportation Systems and Planning course (ENVS373) conducted an on-site walking audit of the current existing road networks located near the US-2 Bypass Trail Area. Specific routes that students evaluated can be found in the Appendix. Following instruction from Dr. Paul Stangl, the course instructor, 26 students walked roughly two miles of public roads in teams of 3-4 to complete a walking survey of their respective study areas. The students provided a subjective score from 1-10 on level of safety, comfort, and interest pertaining to specific street segments and intersections found within their study area.

Safety refers to the relative feeling of security or danger students felt in respect to traffic. Comfort refers to a sense of uneasiness that may occur whether one senses danger or not. Traffic racing along behind bollards might not pose danger, but could make one uncomfortable. A muddy path poses no danger at all, but can be very uncomfortable. Finally, interest was assessed based on the

appeal of the surrounding area to each student. The student observations and scores varied slightly, ranging between 1 and 3 point differences on a 10-point scale. These differences are potentially due to the diversity in backgrounds of environments within which the students came from, and their relative experiences.

Cycling Analysis of Monroe

The compact size of the City of Monroe means that throughout the Urban Growth Area of Monroe, the US-2 Bypass Trail Area is within the three-mile reach for bicyclists to access from anywhere in the city, should all nine access points be implemented. Additional bicycle infrastructure should be constructed to promote connections to the other parks throughout the city. Bicycling provides benefits to the community in the form of more activity, less congestion, and a smaller impact on the environment. Additionally, a major factor for a lack of cycling is a lack of proper bicycle infrastructure to promote safe cycling.[5] By extending current bicycle infrastructure and paved multi-use trails found throughout the city, major connections to Lake Tye Park, Skykomish River Centennial Park, and Al Borlin Park are possible. Figure 2 depicts the current bicycle infrastructure in the Monroe Comprehensive Plan in blue, yellow, and red, while the proposed additional bicycle infrastructure is highlighted in green.

[5] Handy, S. L., Xing, Y., & Buehler, T. J. (2010). Factors associated with bicycle ownership and use: a study of six small U.S. cities. Transportation, 37(6), 967–985..

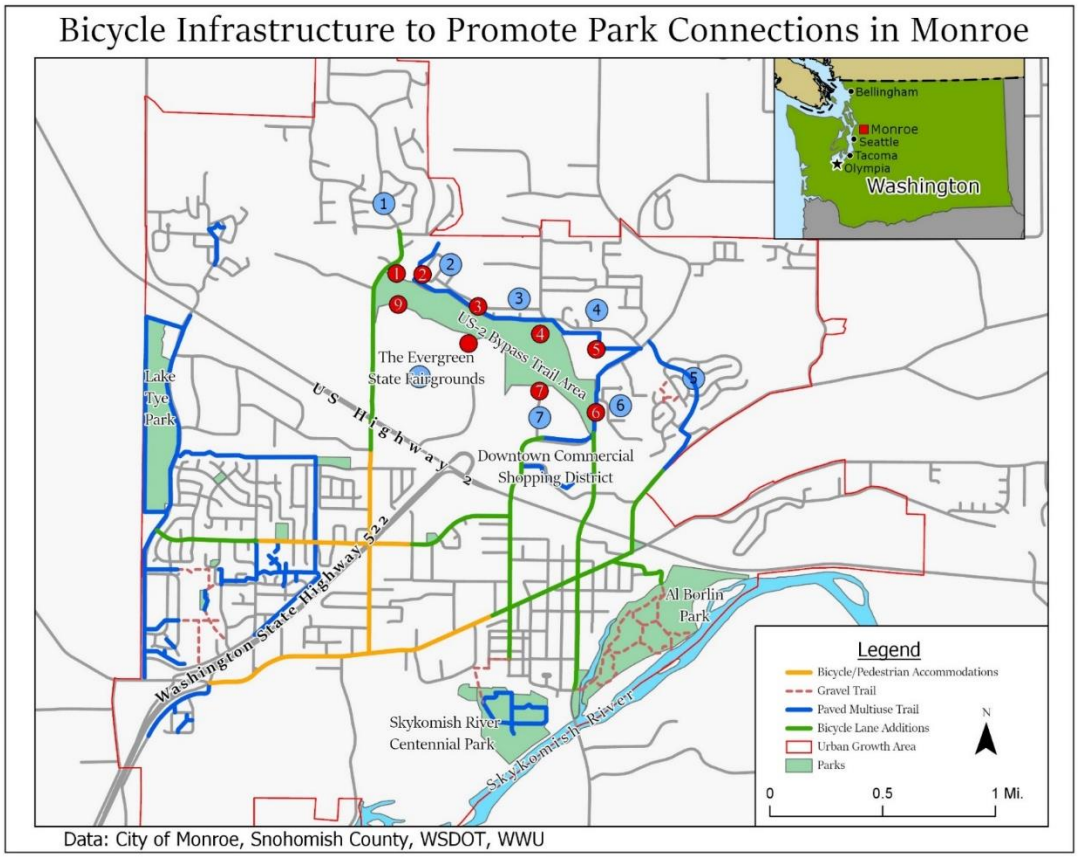

Figure 2: Bicycle additions to promote connectivity between city parks

Potential Contribution of Trail and Access Points

The transportation research team examined the extent to which the proposed trail and its potential access points could improve access to open space and access to use non-motorized transportation for utilitarian trips and recreational trips. Access to the retail shopping located to the north of US-2 is important to the City as well as the residents in the northern neighborhoods. The proposed US-2 Bypass Trail will create opportunities for residents to access those shopping opportunities or attend events at The Evergreen State Fairgrounds via foot or bicycle. Additionally, the trail will provide much need access to open space for residents north of I-5 and provide an area to practice equestrian skills. A more comprehensive analysis of the benefits of each access point is provided in the Evaluation of Potential Access Points section. The following section summarizes the potential contributions the US-2 Bypass Trail Area will have on utilitarian, recreational, pedestrian, cycling, and equestrian usage.

Utilitarian Trips

Utilitarian trips are often taken with the desire to travel from one point to another in the shortest time and distance possible. Residents will see improvements in utilitarian trips with the

implementation of all nine access points (see Figure 3). Residents located in the northern neighborhoods of Crescent Drive, north of Rainier View Road, Blueberry Lane, and the neighborhood near Tahoma Street and Summit Avenue will experience the greatest benefit. These neighborhoods will have a significantly shorter distance to travel along the trail in comparison to the current routes that require residents to travel down 179th Avenue (with little protection from traffic at some points) or down Chain Lake Road to reach the shopping area or The Evergreen State Fairgrounds. Improvements for utilitarian trips were measured in two ways: 1) reductions in travel time and distance for pedestrians and bicyclists and 2) percent of travel along a trail versus a roadway.

Utilitarian trips are far more likely to take place when the path to a location is shortened.[6] Although the walking time from northern neighborhoods to the shopping center or Fairgrounds will still be 15 minutes or more, which is beyond the travel time many people will choose for utilitarian trips, residents nearest to the trail area may consider it reasonable. For many residents, the addition of the US-2 Bypass Trail and entrances can make trips for a small item from the store a more direct route to walk than to drive. Further, driving entails traveling along a longer route, searching for parking, and then walking up to five hundred feet to the store entrance during peak travel times and shopping days. At these times, there is a special appeal to traveling by foot or bicycle on a pleasant trail through the woods, saving both aggravation and vehicle miles traveled.

[6] Greenwald, M. J., & Boarnet, M. G. (2001). The Built Environment as a Determinant of Walking Behavior: Analyzing Non-Work Pedestrian Travel in Portland, Oregon. 30.
Hoogendoorn, S. P., & Bovy, P. H. L. (2005). Pedestrian Travel Behavior Modeling. Networks and Spatial Economics, 5(2), 193–216.

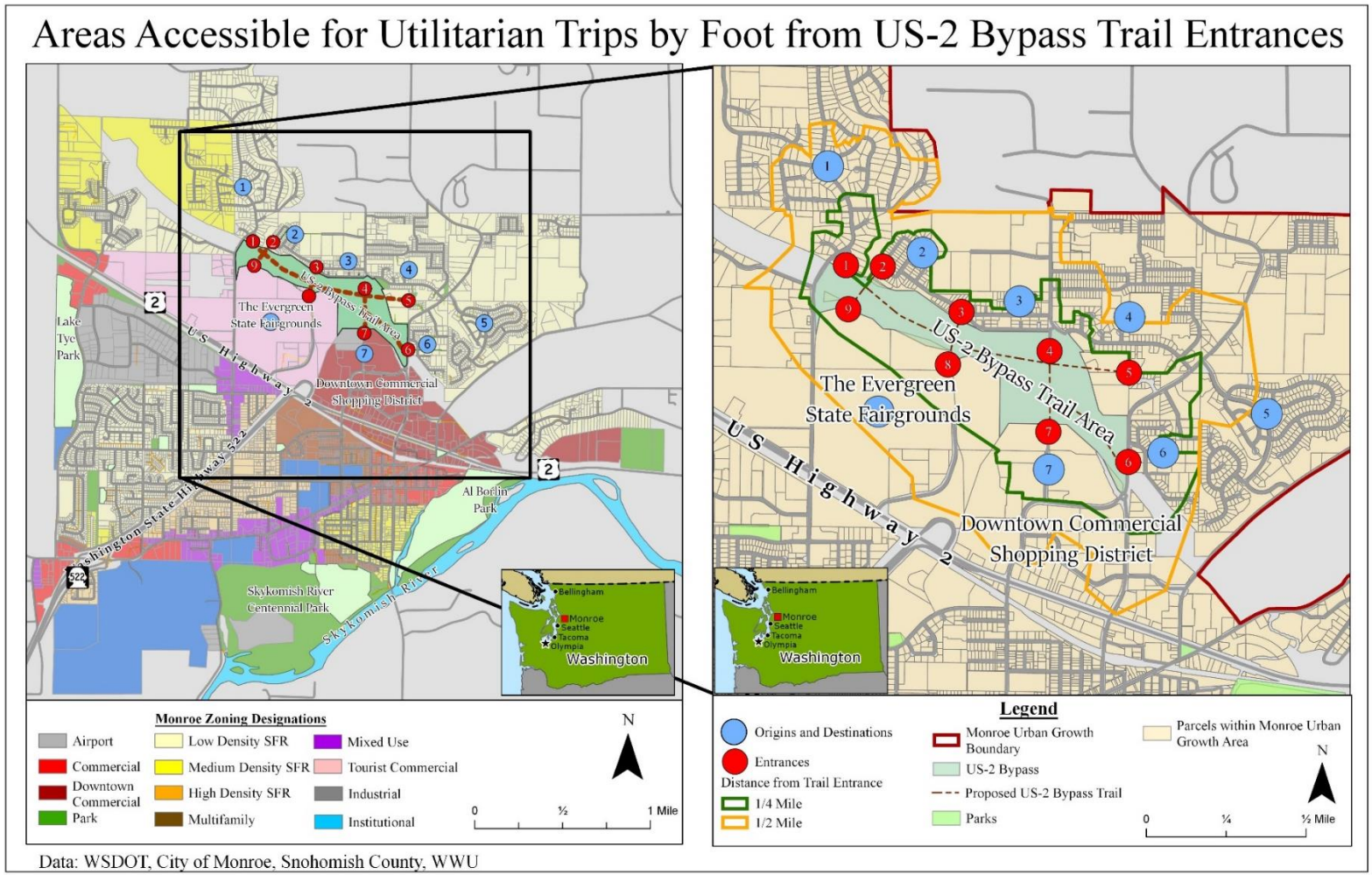

Figure 3: Areas accessible for utilitarian trips by foot

Implementing all nine access points will result in an average reduction of about 14 minutes for utilitarian trips. While this time is spread unevenly amongst the access points, it reduces the average pedestrian trip from a neighborhood to either the shopping area or the Fairgrounds. Figure 4 shows neighborhoods and nearby associated access points, or entrances, to the US-2 Bypass Trail Area. Adding all nine entrances will reduce the average time for a pedestrian trip from a neighborhood to an amenity from 36 minutes to roughly 22 minutes. The reduction is most significant for access points that are more closely connected as will be described below.

The second measure of improved pedestrian travel is the amount of travel by trail rather than alongside a roadway. The reduction in travel time shows that though there may be amenities within the immediate vicinity of a neighborhood, road networks and barriers create a situation where "near is far" and residents must travel long distances to reach amenities that are nearby in straight line distance, or "as the crow flies."[7] Measuring the amount of travel by trail is important because trails allow pedestrians to walk in a safe, comfortable environment, instead of along a busy road with little protection from motorized vehicles.[8] Trails are also much more interesting, as pedestrians and bicyclists can enjoy nature and their surroundings during their trip, rather than breathing exhaust fumes and viewing the speeding cars along a roadway. For the purposes of this study, we define a trail as a walking path that is at least 20 feet from a roadway, with greenspace occupying at least one side of the walkway.

Implementing all access points will give residents an average of 56% of the distance traveled along a trail, a 20% increase in travel by trail when compared to current conditions. The new trail will likely be more interesting, safe, and visually appealing, from a pedestrian point of view, than the existing trails located along Chain Lake Road and Rainier View Road. While both the walking paths along Chain Lake Road and Rainier View Road are considered a trail under the study's definition, they are bordered by a roadway on one side, exposing pedestrians and cyclists to nearby road traffic and occasionally are cut through by driveways and side streets. The qualitative difference between traveling along a busy roadway (such as Chain Lake Road) and traveling through a well-designed forested trail should be emphasized. Residents' enjoyment of nature adds a recreational dimension to utilitarian trips that will likely increase both their willingness to walk and the distance they are willing to walk. While existing trails on the edge of the same natural area (specifically along Chain Lake Road) provide some benefits, they are still subject to the sounds and sights of automobile traffic.

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[7] Duany, A., Plater-Zyberk, E., & Speck, J. (2001). *Suburban nation: The rise of sprawl and the decline of the American dream*. Macmillan.

[8] To measure the amount traveled by trail, researchers found the distances of existing conditions traveled by sidewalk, roadways, and trails via satellite imagery analysis. New travel along trail was measured by finding the access point researchers identified, and utilizing a preliminary draft of a trail line that runs directly through the trail area. These distances were converted to percentage traveled along a trail to identify the difference between existing conditions and improved conditions that are traveled along a trail.

Recreational Trips

The GIS analysis findings indicate that building this new trail, with all nine proposed entrances, will provide residents an opportunity to visit a large park area. Using GIS, researchers identified 865 parcels within a half-mile of an access point. This analysis was done both tabular and visually, as visual analysis results were checked against the Snohomish County Assessor's master records. The image on the left side of Figure 4 shows the associated land uses based on the Comprehensive Plan. While the parcels north and east of the trail area are zoned as single family residences, the parcels located to the south of the trail area are shopping and The Evergreen State Fairgrounds. Visual analysis as well as research into the Snohomish County Assessor data and Monroe Comprehensive Plan indicates that all 865 parcels in the residential area to the north and east are single-family residences. These 2,578 people or roughly 13.3% of the population of Monroe, will be direct beneficiaries of increased park access.[9] Currently, residents in the northern portion of the city must travel several miles and cross US-2 to access a city park other than the small playground parks found in the northern residential areas.

Cycling Use

The Bypass Trail will make the time required to drive on roads or bicycle on the trail roughly equivalent for travel from many of the neighborhoods to the shopping center. In some cases, cycling will be faster than driving, even without considering savings in parking time. GIS analysis conducted to determine the amount of additional cycling infrastructure needed indicates that if all the bicycle lane additions proposed in Figure 2 were adopted, it will add 5.54 miles of new bicycle infrastructure throughout Monroe. This will help create connections between the proposed US-2 Bypass Trail Area, Lake Tye Park, Al Borlin Park, and Skykomish River Centennial Park. The total cost to complete the cycling network is an estimated $740,000.

Equestrian Use

The US-2 Bypass Trail will also allow horses participating in equestrian events at The Evergreen State Fairgrounds to warm-up on a new equestrian trail. The implementation of equestrian-friendly facilities was suggested at the community development meeting held in the fall of 2018.

The potential benefits of implementing all nine proposed access points are significant (see Figure 4). The average pedestrian travel distance from northern neighborhoods to the Fairgrounds or commercial areas will be reduced from 1.85 miles to an average of 1.16 miles. In some cases, travel times for pedestrians will be reduced by as much as an hour, as demonstrated in the next section. This is especially dramatic for Access Points 2 and 9, which will reduce a long circuitous route by roughly three miles by creating a direct access route to the Fairgrounds. The analyses of potential

[9] Assuming that each household contains an average of 2.98 people, and the population is 19,363. U.S. Census Bureau QuickFacts: Monroe, Washington. (2019).

benefits in this section assumed that all nine potential trail access points are implemented. To better inform the trail design process, the next section provides an in-depth look at the merits of each potential access point.

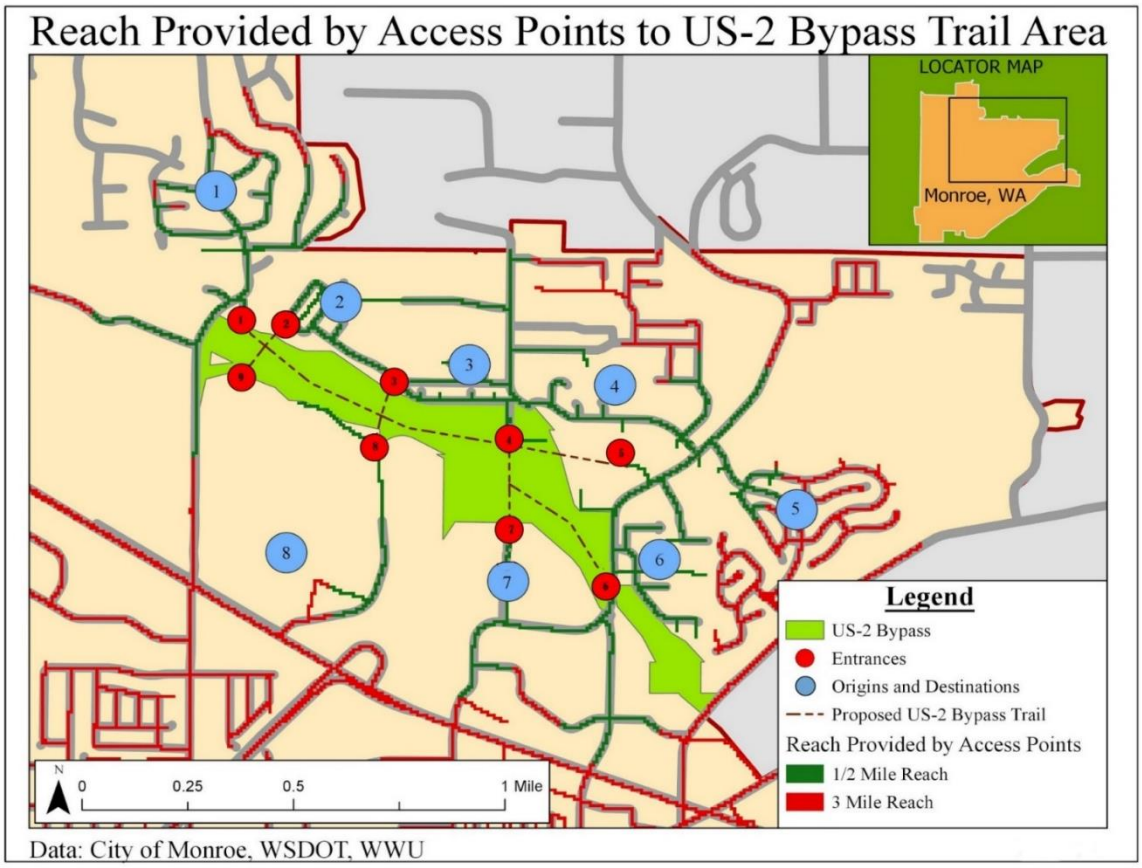


Figure 4: Neighborhoods and nearby associated access points to the US-2 Bypass Trail Area.

Evaluation of Potential Access Points

Nine potential access point locations were identified, analyzed, and evaluated for the benefits for recreational and utilitarian travel (Figure 1). This analysis was done based on public comment at the community development meeting in the fall, City recommendations, and technical analysis conducted by the transportation research team. Residents will likely travel a half-mile to access recreational areas on foot and three miles by bicycle to access recreational facilities.[10] Figure 3 shows the parcels that are accessible within a half-mile along the current road network to the proposed trail area (see yellow line). The eight blue circles on the map in Figures 1, 2, and 3 represent trip origins and destinations, and were used to measure walking, bicycling and driving distances. Blue circles one through six represent adjoining residential neighborhoods, or trip origins. Circles seven and eight represent the shopping center and The Evergreen State Fairgrounds, respectively. These are the

[10] Harnik, P., & Simms, J. (2004). Parks: How far is too far. *Planning*, *70*(11), 8-11.

destinations that residents are likely to travel to for utilitarian trips, though a small number of social visits between neighborhoods could also be expected. The pedestrian and bicycle networks in neighborhoods adjoining these access points were found to have a number of inadequacies. A series of improvements are recommended along with their estimated costs.[11,12,13]

Analysis of Potential Access Point 1

Justification for Access Point 1

This access point will provide the opportunity for a number of residents in the neighborhoods surrounding Robinhood Lane to reach a trail with a short walk or bicycle ride. The study area of Access Point #1 encompassed the neighborhoods along Robinhood Lane (see Figure 5). It is essential in this regard for a number of northwestern neighborhoods. Though entrances two and nine are nearby, neither is accessible in the current state from this area. To reach entrance two, residents must walk an additional one thousand feet along a road with no sidewalks and little shoulder. It is not possible to directly reach entrance number nine from this location. Residents must travel an extremely long, circuitous route to the north in order to access areas on the eastern side of the Fairgrounds under current conditions. However, Access Point 1 will allow residents in the Robinhood Lane neighborhoods to reach the Fairgrounds without using an automobile. The benefits for utilitarian travel are very significant. At present, residents must travel 2 miles along the roadside to get to the shopping center. With the new trail, they will only have to walk 1.4 miles along a pleasant trail and exit at Access Point 7 to reach the shopping center.

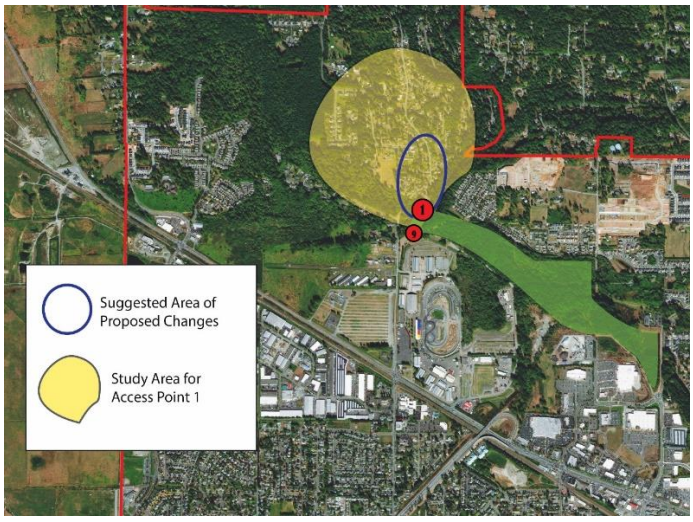


Figure 5: Access Point 1 study area and suggested area of proposed changes.

[11] Smith, P. (2014). Tompkins County Wayfinding & Interpretive Signage Plan.
[12] Bushell, M., et al. (2013). Costs for Pedestrians and Bicyclist Infrastructure Improvements: A Resource for Researchers, Engineers, Planners and the General Public.
[13] Craighead, M. (2018). A Comparison of Highway Construction Costs in the Midwest and Nationally. Midwest Economic Policy Institute.

However, Robinhood Lane is far from optimal for pedestrians in its current state as student researchers noted during their on-the-ground surveys.

Access Point 1: Walking Survey Results

Students performing a walking survey of the area found some key issues facing the Robinhood Lane neighborhoods. Among them were the lack of pedestrian infrastructure, high speeds of automobile traffic, and winding roads with a slope that limit visibility. This led to an average safety rating of 2.1 out of 10, suggesting that major improvements will be needed for pedestrian safety.

The main thoroughfare into and out of the neighborhood is Robinhood Lane. Student researchers reported that a number of the streets have fairly steep slopes. Furthermore, there are no sidewalks, bike lanes, or even a shoulder, which limits pedestrian opportunities. This is especially problematic with the presence of vehicles moving quickly through the area, specifically on Robinhood Lane.

Key Improvements to Promote Pedestrian Access (see Figures 6 and 7)

- Sidewalks throughout the neighborhood, specifically on Robinhood Lane.
- Dedicated street crossings along Robinhood Lane, to include flashing lights visible to drivers.
- Traffic calming devices to slow drivers along pedestrian routes.
- Dedicated bike lanes along Robinhood Lane.
- Signage (with adoption of access point 1) to US-2 Bypass Trail Entrance

Table 1: Access Point 1 Improvement Costs

Key Improvements	Price / Qty	Qty Needed	Total Cost
Sidewalk	$32 / linear foot	2,820 feet	$90,240.00
Bike Lane	$133,170 / mile	2,820 feet	$71,125.00
Pedestrian Hybrid Beacon	$57,680 each	1	$57,680.00
Painted Crosswalk	$2,540 each	7	$17,780.00
Speed Bump	$1,550 each	2	$3,100.00
Way-finding Signage	$1,900 each	2	$3,800.00
		TOTAL COST:	$243,725.00

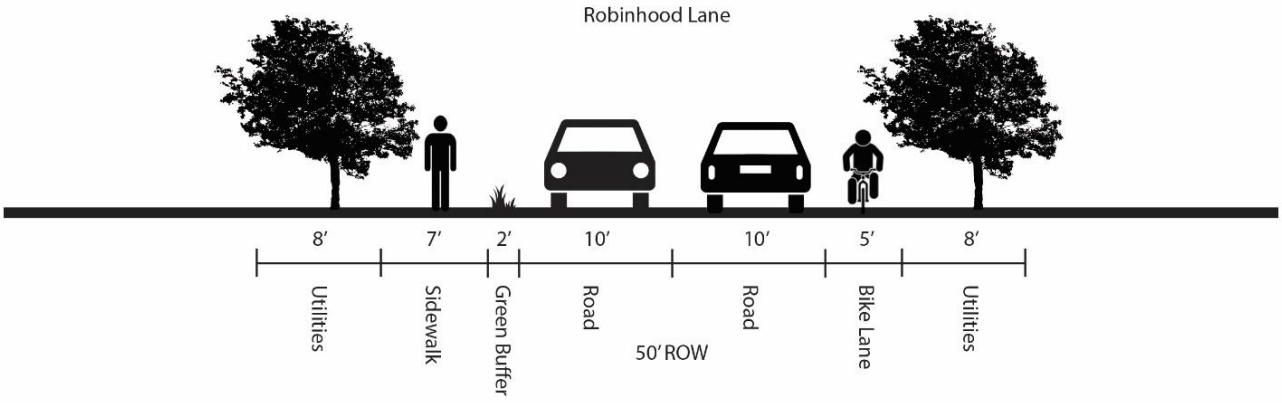


Figure 6: A depiction of the Right of Way changes recommended to promote a safer and more pedestrian and bicycle friendly environment.

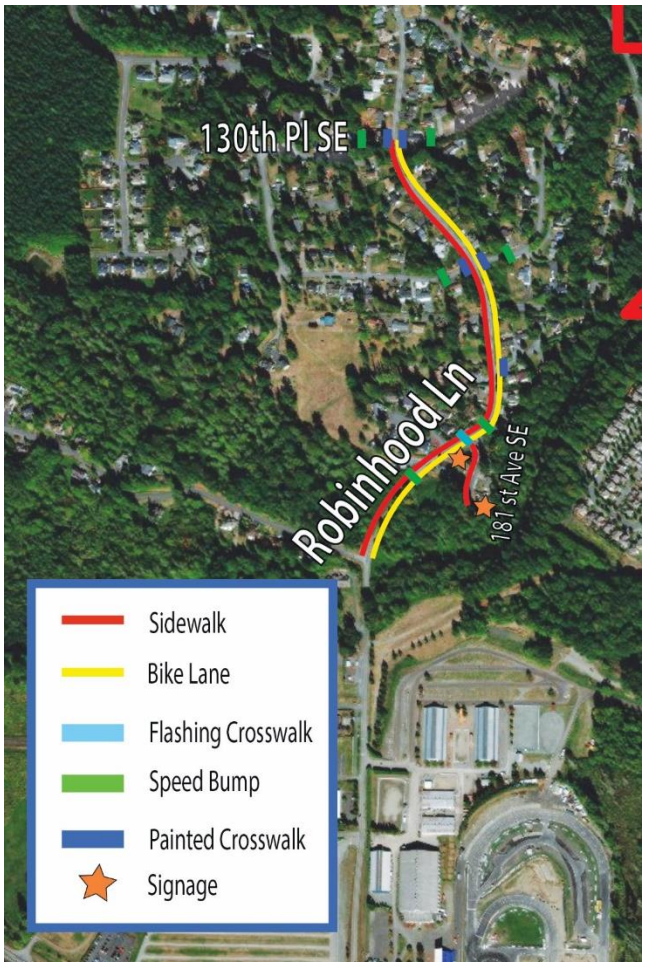


Figure 7: Key improvements to promote pedestrian access.

Analysis of Potential Access Point 2

Justification for Access Point 2

Access Point 2 provides the most direct access to the residents living in the Summit Avenue neighborhood, located to the northwest of Rainier View Road (see Figure 8). Approximately 85 households are located within a quarter-mile of the proposed access point. If pedestrian connections are added when development continues to the north and east of this neighborhood, Access Point 2 will provide the most direct entrance to the trail for a number of new residents. Another option worth exploring is the potential to extend a trail on private or public property owned by the North Crest Development Corporation. As a private trail, it would provide excellent access for residents in this subdivision. As a public trail, it could be extended north to reach multiple neighborhoods. However, there must be coordination between the City and North Crest Development Corporation.

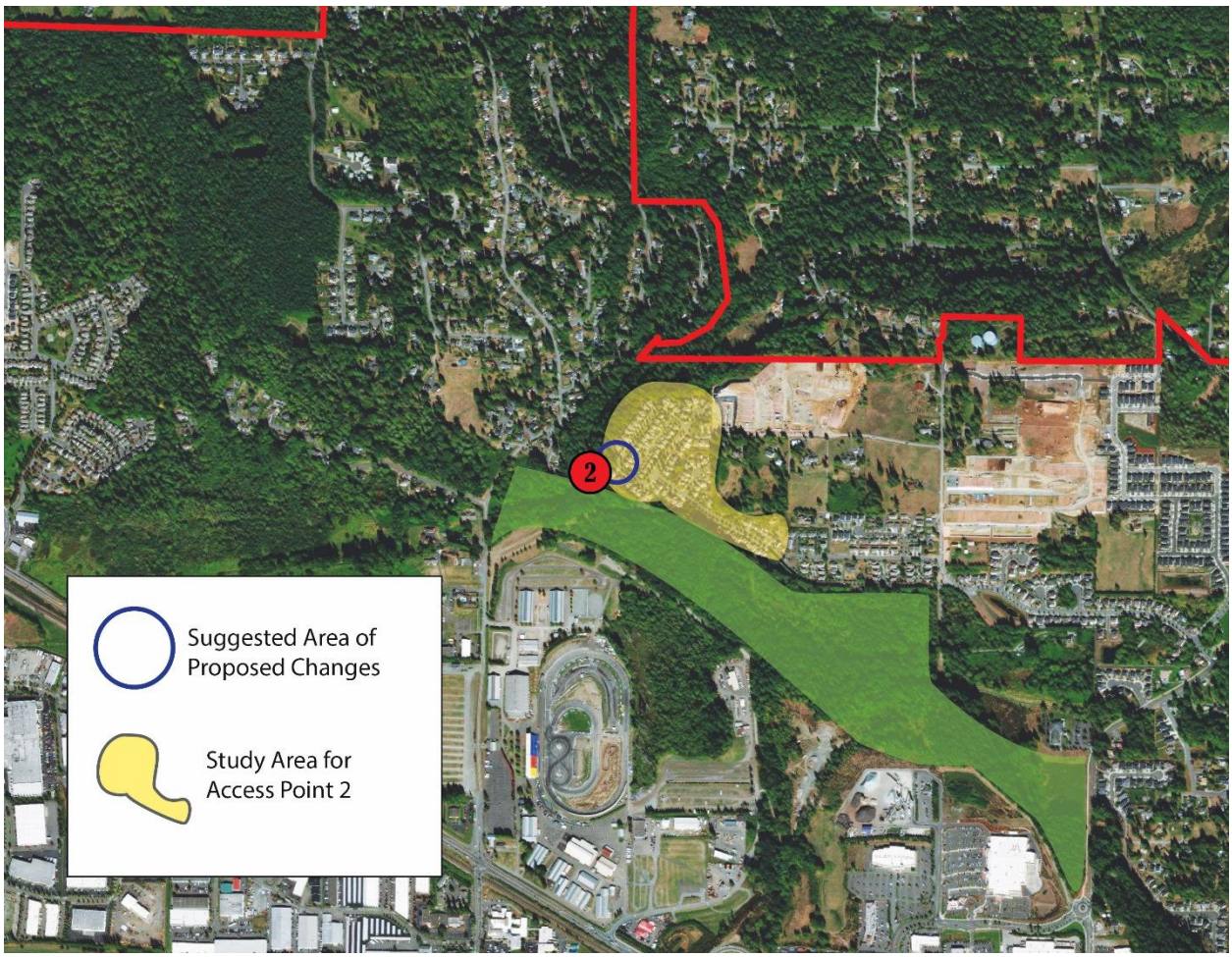


Figure 8: The study area and suggested area of proposed changes for Access Point 2.

For the residents in the Summit Avenue neighborhood, adoption of Access Point 3 or 4 will still allow them the ability to walk along the existing trail to access the shopping area. However, Access

Point 2 (in conjunction with Access Point 9) will give residents the shortest path to The Evergreen State Fairgrounds, eliminating the need for automobile use. Currently, residents live less than a half-mile from the Fairgrounds, but, if utilizing a personal vehicle, must travel 3.8 miles down Rainier View Road to Chain Lake Road, and then down US-2 to reach the parking lot. With the US-2 Bypass Trail and Access Points 2 and 9, residents in the Summit Avenue neighborhood will benefit from dramatically reduced travel distance to an average of 0.65 miles and travel time on foot reduced from 73.5 minutes to approximately 12.5 minutes.

Additionally, because Access Point 2 is best located at the convergence of Tahoma Street and Forest View Avenue, the cost for implementing Access Point 2 will likely be lower than other points of entry because of the close proximity to the current neighborhood trail and the existing roads. Pedestrian infrastructure in the area is already significantly upgraded, with sidewalks and an existing trail, requiring less pedestrian improvements. Access Point 2 can utilize the existing neighborhood trail and will likely only require signage directing residents to the trail area.

Access Point 2: Walking Survey Results

Students conducting walking surveys in the Summit Avenue neighborhood noted that the residential area was "pleasant," with ample sidewalks, buffered pedestrian space, and plenty of green space. The students rated the area 8.85 out of 10 for safety, and 8.86 out of 10 for comfort. However, the students did rank the area as 6.4 out of 10 for interest, indicating that additional features in the suburban neighborhood may add to the interest level.

Figure 9: Identification of the location for signage and infrastructure for Access Point 2.

Key Improvements to Promote Access

- Paved walkway from the neighborhood sidewalk located along Tahoma Street to the neighborhood trail.
- Signage to indicate that the US-2 Bypass Trail can be accessed.

Table 2: Access Point 2 Improvement Costs

Key Improvements	Price / Qty	Qty Needed	Total Cost
Unpaved Trail	$121,390 / mile	30 feet	$690.00
Way-finding Signage	$1,900 each	1	$1,900.00
		TOTAL COST:	$2,590.00

Analysis of Potential Access Point 3

Justification for Access Point 3

With the current rapid urban growth throughout the region, there is likely to be more development in Monroe, particularly to the north of Rainier View Road SE (see Figure 10). Access Point 3 gives park access to residents located along Rainier View Road (west of 191st Avenue), as well as the housing located along 137th Street, and future developments north of the trail area. Access Point 3 can directly link residents along Rainier View Road to the eastern side of the Fairgrounds via Access Point 8. This shorter route is significantly easier than the longer current route that requires residents to transit Rainier View Road to Chain Lake Road, and access the Fairgrounds via US-2. Implementing Access Points 3 and 8 will reduce foot travel by roughly 2 miles from 2.9 miles to 0.95 miles while increasing the percentage of travel along a trail by 16%.

In addition to providing a more direct link to The Evergreen State Fairgrounds, Access Point 3 is cost-effective as it could utilize an existing access point to the residential trail. Implementation of Access Point 3 will provide recreational access to roughly 80 households residing along Rainier View Road by utilizing the existing access path to reach the US-2 Bypass Trail Area.

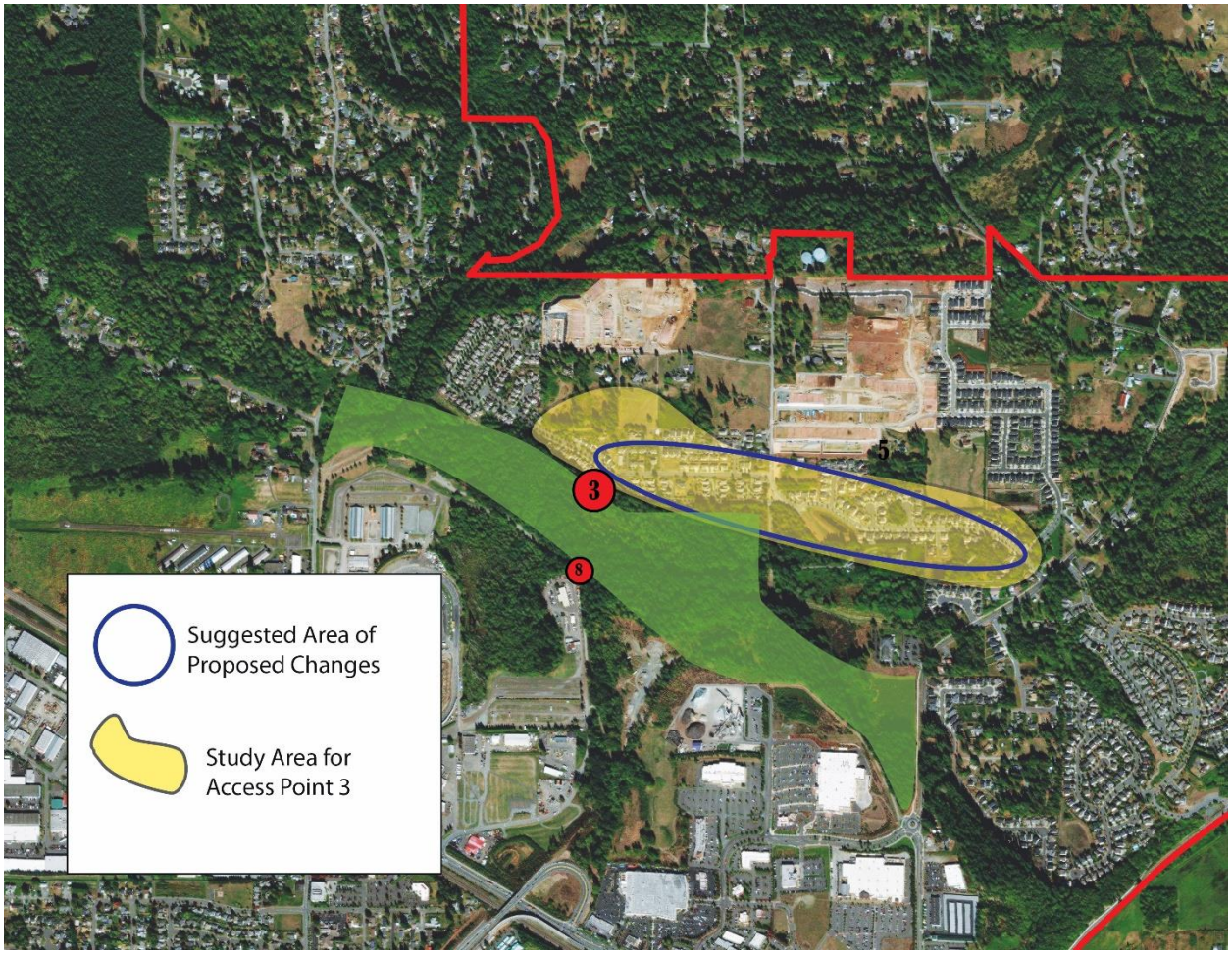


Figure 10: Rainier View Road area. Rainier View Road will provide access to Access Points 2, 3, 4, and 5.

Access Point 3: Walking Survey Results

Access Point 3 will primarily serve Rainier View Road and 137th Street. As such, the pedestrian infrastructure in place is the same as Access Point 2. Student researchers noted that the surrounding residential area has adequately buffered sidewalks along Rainier View Road., the main corridor along Access Point 3.

Key Improvements to Promote Access:

- Signage at the current access lane to the Trail Area.
- Traffic calming measures, such as speed bumps and painted sidewalks, along Rainier View Road will ensure that drivers are mindful of the potential for pedestrians to cross Rainier View Road (see Figure 11).

Figure 11: Traffic calming recommendations for safe pedestrian travel along Rainier View Road. These improvements will slow traffic as more pedestrians will be present in the area.

Table 3: Access Point 3 Improvement Costs			
Key Improvements	Price / Qty	Qty Needed	Total Cost
Painted Crosswalk	$770 each	5	$3,850.00
Speed Bump	$1,550 each	6	$9,300.00
Way-finding Signage	$1,900 each	3	$5,700.00
		TOTAL COST:	$18,850.00

Analysis of Potential Access Point 4

Justification for Access Point 4

This point was recommended by the City of Monroe because of the improbability of reestablishing 191st Avenue SE as a thoroughfare to the shopping area due to the US-2 Bypass right of way (see Figure 12). Access Point 4 will provide residents with the most direct route to the shopping area from the neighborhoods directly north of the trail area. Access Points 4 and 7 will create the fastest and most direct walking route to the shopping center for those living north of the park area. The new trail cuts travel distance from 1.4 miles to 0.8 miles while adding 11% more distance traveled by trail along a safe, forested route.

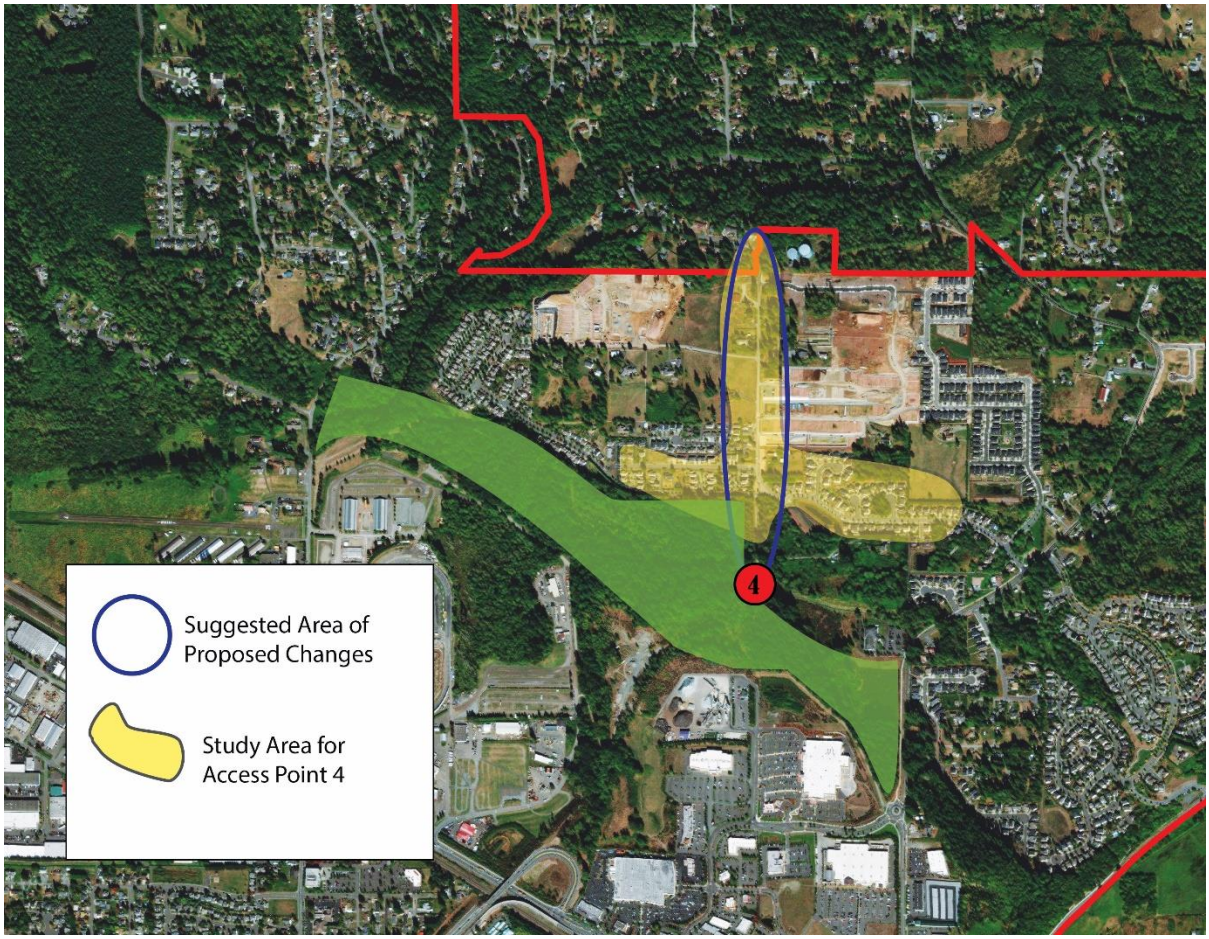


Figure 12: The study area for Access Point 4 surrounds 191st Avenue SE.

Like Access Points 2, 3, and 5, Access Point 4 has the ability to make use of existing infrastructure. Currently, 191st Avenue SE runs downhill from Rainier View Road to the US-2 Bypass Trail Area. Public vehicular access is restricted at the bottom of 191st along the northern edge of the trail area, while the road no longer exits near Access Point 7. While existing infrastructure provides a north/south connection along 191st Avenue, there is opportunity for additional trail or street connections running north and south as future development spreads to the north.

Access Point 4: Walking Survey Results

Students ranked 191st Avenue SE and El Bella Paseo (the two roads that lead directly to Access Point 4) as a 5.83 out of 10 for safety. Students' low safety ranking was due to incomplete sidewalks along 191st Avenue SE and El Bella Paseo, particularly south of Rainier View Road, and north of 134th Street leading to El Bella Paseo.

Additionally, students pointed out that at 191st Avenue and Rainier View Road there is a potential "blind corner" for pedestrians looking to cross the road and access the trail area from the neighborhoods located north of Rainier View Road.

Key Improvements to Promote Access

- Sidewalks completely along 191st Avenue SE and leading up El Bella Paseo Road.
- Completion of current sidewalks located along 191st Avenue SE.
- Implementation of Access Point 7 in conjunction with Access Point 4.

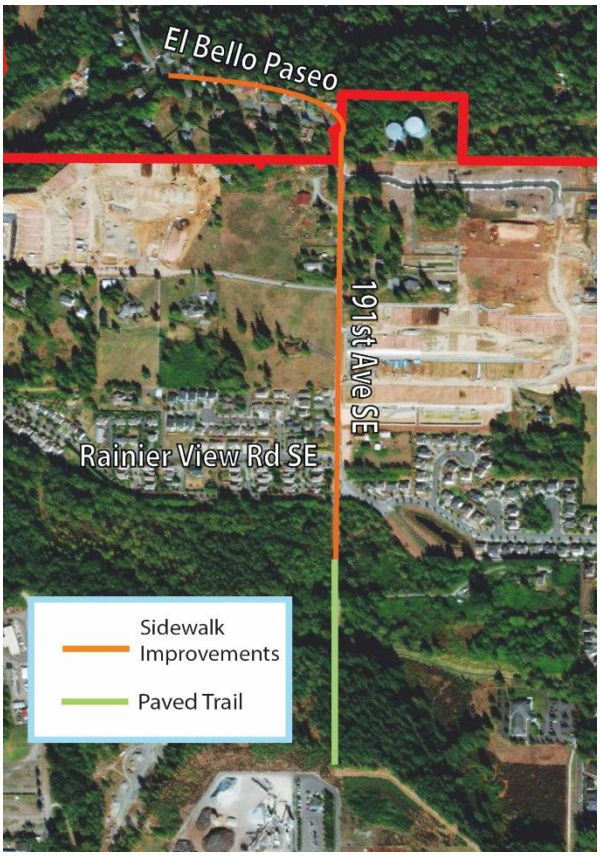


Figure 13: The major recommendations for Access Point 4 are focused on developing better sidewalks along 191st Avenue SE.

Table 4: Access Point 4 Improvement Costs			
Key Improvements	Price / Qty	Qty Needed	Total Cost
Sidewalk	$32 / linear foot	2,144 feet	$68,608.00
Paved Trail	$481,140 / mile	1,893 feet	$172,500.00
		TOTAL COST:	$241,108.00

Analysis of Potential Access Point 5

Justification for Access Point 5

Access Point 5 provides beneficial access to the Country Crescent neighborhood and the Eaglemont development along 199th Avenue SE (see Figure 14). Currently, only Rainier View Park, a small neighborhood playground, is within walking distance. Access Point 5 will bring a large recreational area within a half-mile walk of many living within these neighborhoods.

Residents traveling from Country Crescent to the Fairgrounds on foot will see their walking distance cut by almost half-a-mile, while the length of travel by trail increases from 21% to 62%. This means a much safer and more pleasurable route for recreational and utilitarian purposes.

Access Point 5 is located along an established trail, and will be another cost effective entrance. In addition, the access point could utilize the existing residential trail that winds around the private property lines of residents in the area, mitigating the need for easements or costly acquisitions of land to get local resident access to the Bypass Trail. Finally, Access Point 5 will reduce the amount of time pedestrians travel along Chain Lake Road, a major thoroughfare in the northern portion of Monroe.

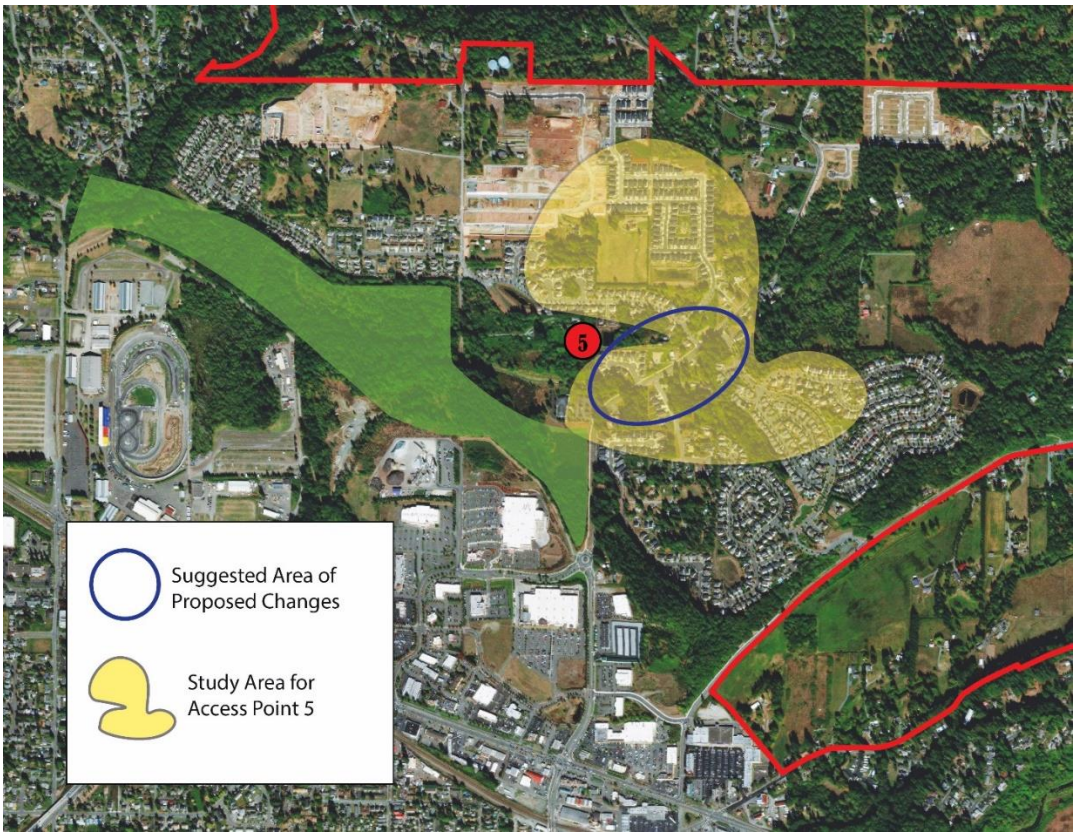


Figure 14: Study area around Access Point 5. The intersection between Chain Lake Road and Rainier View Road. Access Point 5 is located off of the current trail that runs along Rainier View Road.

Access Point 5: Walking Survey Results

Two separate student teams interacted with Chain Lake Road and Rainier View Road. One team transited down Rainier View Road toward Chain Lake Road while the other team had to cross Chain Lake Road at Country Crescent Boulevard. The team that traveled down Rainier View Road to get to Chain Lake Road noticed a crosswalk across Chain Lake Road to well-paved sidewalks located along Rainier View Road. The team that crossed Chain Lake Road at Country Crescent Boulevard noticed a lack of sidewalks north of the Country Crescent neighborhood along Chain Lake Road. Some of the student researchers felt uneasy crossing Chain Lake Road as there was fast traffic. The group that did not traverse Chain Lake Road had an average safety score for this crossing of 7.3 out of 10. The group that actually crossed the road scored the same crossing as a 2 out of 10.

Key Improvements to Promote Access (see Figure 15)

- Flashing Crosswalk at Chain Lake Road and Rainier View Road.
- Traffic calming measures to reduce high speed traffic at crossings.
- Signage at the current trail entrance promoting access to US-2 Bypass Trail.

Figure 15: Access Point 5 pedestrian improvement recommendations are centered on the Chain Lake Road and Rainier View Road intersection to promote safe crossing and entry to the US-2 Bypass Trail Area.

Table 5: Access Point 5 Improvement Costs			
Key Improvements	Price / Qty	Qty Needed	Total Cost
Flashing Crosswalk	$57,680 each	1	$57,680.00
Speedbump	$1,550 each	3	$4,650.00
Way-finding Signage	$1,900 each	2	$3,800.00
		TOTAL COST:	$66,130.00

Analysis of Potential Access Point 6

Justification for Access Point 6

This access point, located at the roundabout on Chain Lake Road, provides increased recreational opportunities for the neighborhoods adjacent to Mountain Ridge Road, with a potential added benefit to the residents located in the southwestern sector of the Country Crescent Neighborhood. Residents in the Country Crescent Neighborhood may be able to travel along an informal trail just west of Autumns Avenue to 146th Street to travel to Access Point 6.

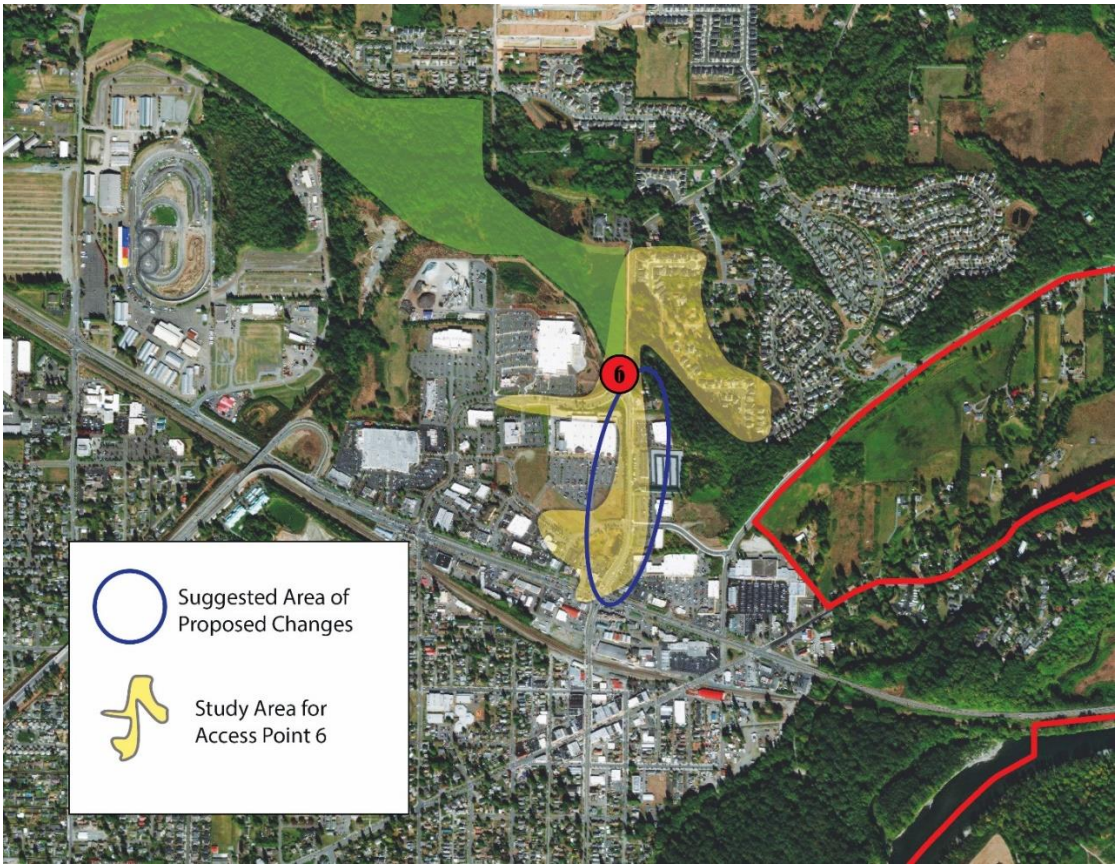


Figure 16: The Chain Lake Road roundabout and shopping area located around the Walmart and Galaxy movie-theater are the focus for Access Point 6.

Existing road conditions provide faster access to the shopping area for the residents in the vicinity of Mountain Ridge Road. The trail and Access Point 6 will provide a minimal reduction in travel distance to the Fairgrounds, decreasing the distance by only 0.2 miles. However, the distance traveled by trail to the Fairgrounds will be increased from 0% to 69%. This increase in travel by trail will promote a safer route, as residents looking to walk to the Fairgrounds from Mountain Ridge Road must currently travel down Chain Lake Road, and eventually walk along US-2, a major arterial and a highway, respectively.

Access Point 6 will also provide access to the informal BMX park located adjacent to the Chain Lake Road roundabout. This will likely promote the use of the US-2 Bypass Trail Area for cyclists as well. Because cyclists may opt to use Access Point 6 as a major entry point, increased bicycle infrastructure should be considered. This will also give the ability to create a cycling connection between the US-2 Bypass Trail Area and other parks located in the southern part of the city.

Access Point 6: Walking Survey Results

During the walking survey, students noted that Chain Lake Road has good crosswalks and signage around the roundabout to create a safe travel space. However, the students felt there was an opportunity for a more inviting surrounding area. The roundabout at Chain Lake Road is a node in the automotive network, not a community focal point. Access Point 6 could be more balanced by becoming more pedestrian-friendly and a focal point for the trail with an inviting entrance.

Key Improvements to Promote Access (see Figure 17)

- Bicycle lanes along Chain Lake Road and North Kelsey Street to connect to the Access Point.
- Flashing lights near the roundabout to further promote pedestrian safety.
- Access Point 6 may be an ideal location to create a "Main Entrance" to the trail area. Creating a "Main Entrance" at Access Point 6 can make the roundabout area more visually appealing and inviting to pedestrians.

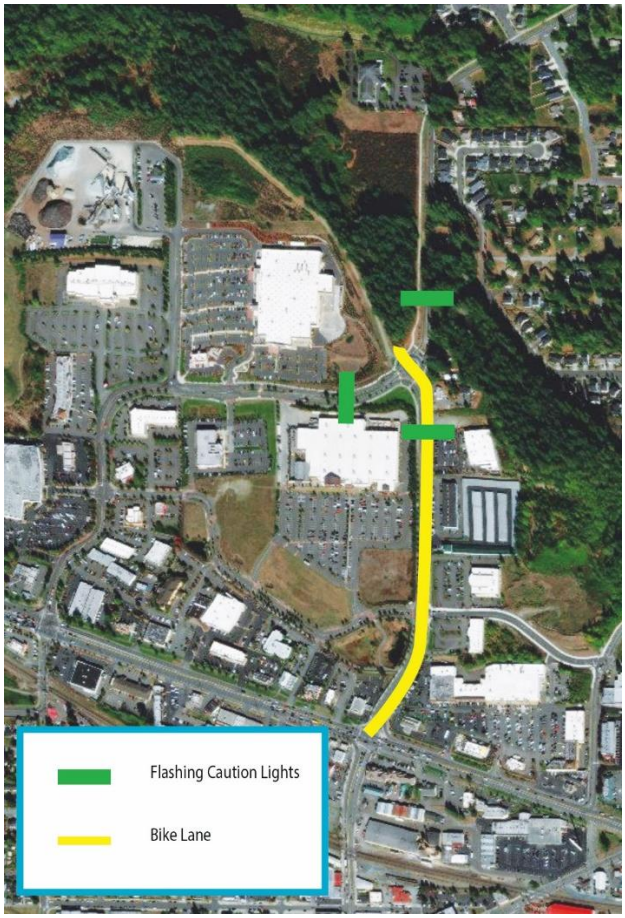


Figure 17: The pedestrian facilities around Access Point 6 are appealing and adequate. However, because of the existing BMX area and the potential to create a connection to the south with other parks, additional cycling lanes can promote cycling.

Table 6: Access Point 6 Improvement Costs			
Key Improvements	Price / Qty	Qty Needed	Total Cost
Flashing Beacon	$10,010 each	3	$30,030.00
Painted Bike Lane	$133,170 / mile	1,770 feet	$44,642.00
		TOTAL COST:	$74,672.00

Analysis of Potential Access Point 7

Justification for Access Point 7

Access Point 7 is critical to providing a connection for the residents in up to 300 homes within a half-mile to access the trail area for recreation or short trips to the shopping center (see Figure 18). A utilitarian trip from any neighborhood along Rainier View Road is significantly closer because of the ability to access the trail if Access Points 4 and 7 are adopted. This is essential for the utilitarian

purposes of this bypass trail, as it greatly shortens the distance traveled from the neighborhood adjacent to Rainier View Road to the shopping area from 1.4 miles to slightly more than ¾ of-a-mile. Those unable to drive, especially children and teenagers, may find this opportunity to walk to a movie theater and restaurants a great asset.

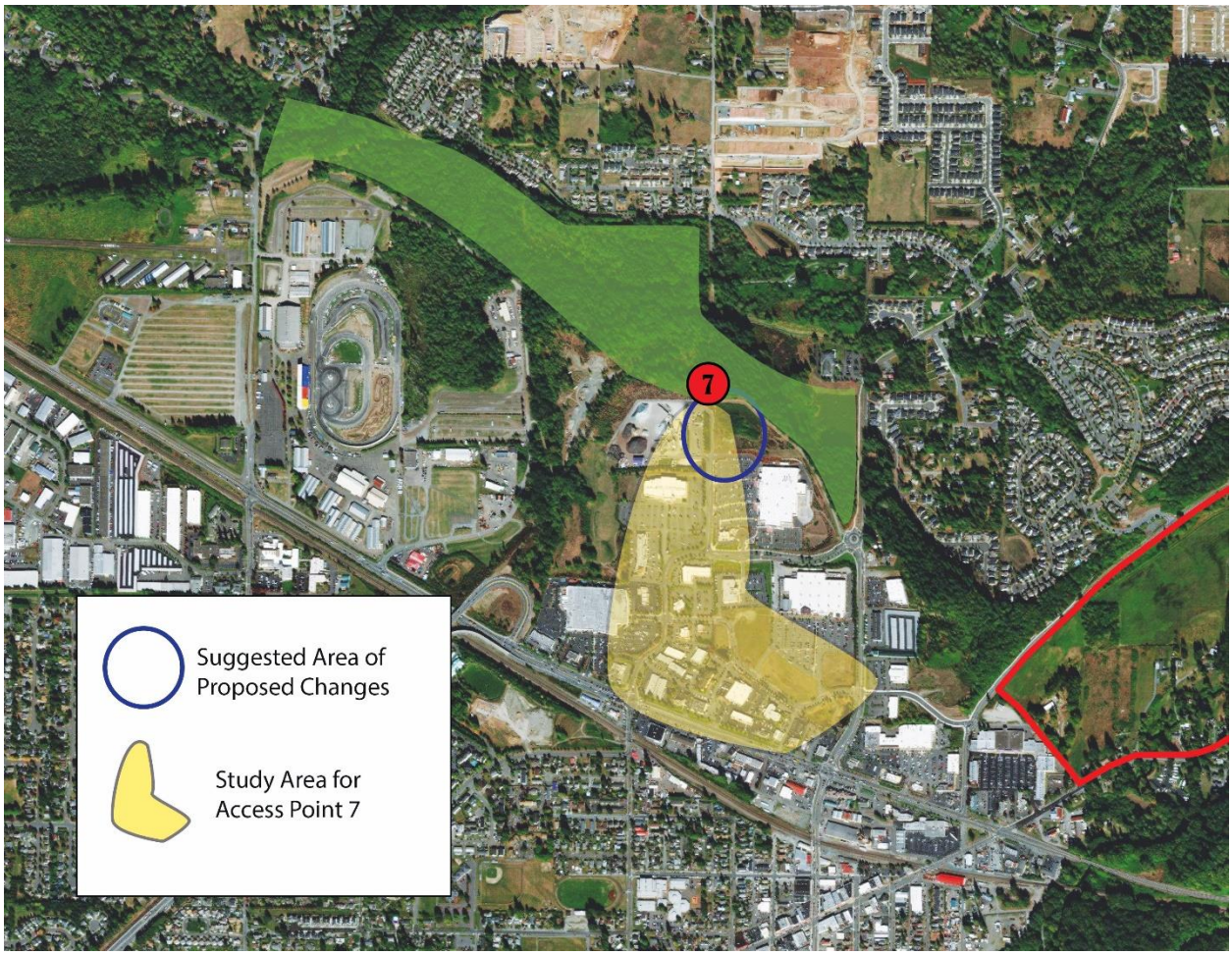


Figure 18: The Access Point 7 study area focused around the shopping area and connection with US-2 Bypass Trail Area.

A large amount of landscaping will be required due to the steep slope at the end of Galaxy Way entering the US-2 Bypass Trail Area. Switchbacks or grading may be required to promote cycling and create an ADA (Americans with Disabilities Act) appropriate path (see Figure 19).

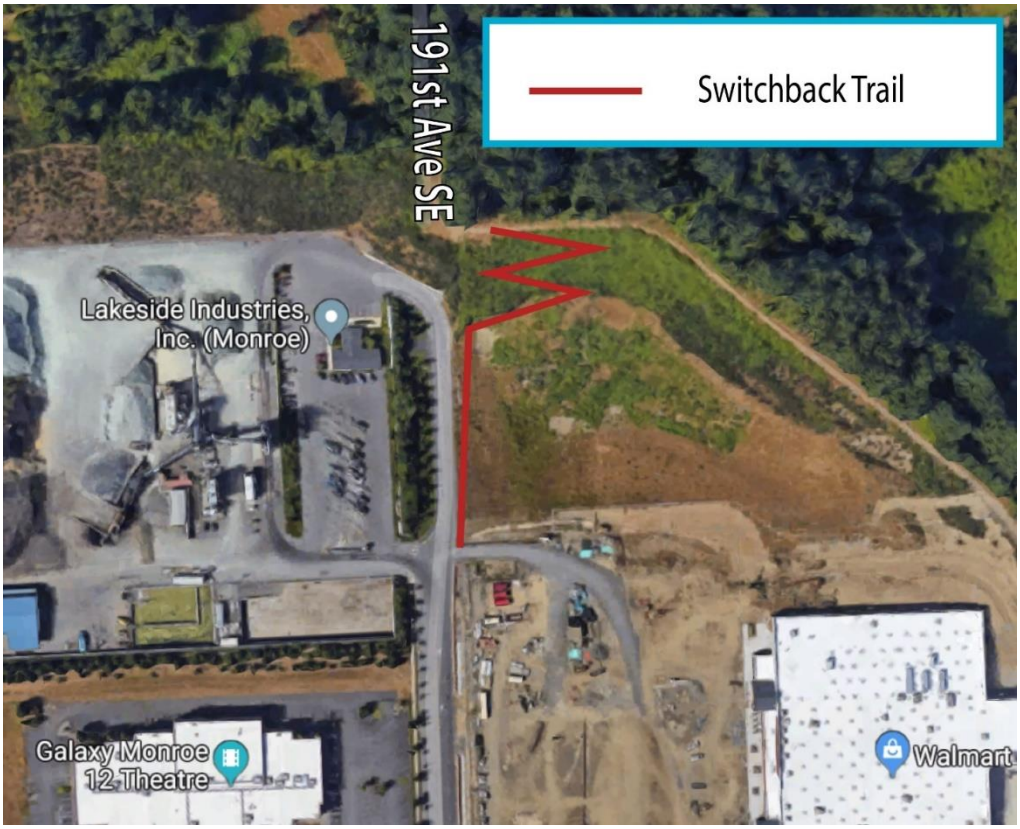


Figure 19: Access Point 7 will likely require a trail switchback network to connect the trail area to Galaxy Way. This will provide greater access to the shopping area for residents in northern Monroe.

Access Point 7: Walking Survey Results

Students traveling along Galaxy Way and North Kelsey Street noted that there were large sidewalks with nearby shops. However, they also lamented the large parking lots as space that could be better used if more stores were available to access via foot along the sidewalks. There is a potential to place liner stores along the Northern end of Galaxy Way, converting it to a pedestrian-friendly urban village.

Key Improvements to Promote Access

- Switchback pathway from the now-defunct 191st Avenue in the US-2 Bypass Trail Area to Galaxy Way.
- Alternative option: Stairs down the southern slope of the US-2 Bypass Trail area to access Galaxy Way.
- Additional shopping opportunities may be available by reducing the parking requirements in the Downtown Commercial Zoning area and creating a line of shops in the current parking lots of Walmart and the movie theater along Galaxy Way.

Table 7: Access Point 7 Improvement Costs			
Key Improvements	Price / Qty	Qty Needed	Total Cost
Paved Trail	$481,140 / mile	1,050 feet	$95,681.00
		TOTAL COST	$95,681.00

Analysis of Potential Access Point 8

Justification for Access Point 8

Access Point 8 benefits families living in more than 450 households located in the neighborhoods north of Rainier View Road or east of Chain Lake Road within a half-mile of proposed Access Points 2, 3, 4, and 5. Residents interested in destinations on the eastern half of the Fairgrounds[14] could enter the Fairgrounds through the orange and blue gates for a short route to a range of exhibits, the food midway, and most important for families, Kiddieland. Access Point 8 will greatly cut the distance traveled between the northern Monroe neighborhoods along Rainier View Road, particularly those who enter the trail area at Access Point 3, by about two miles from 2.9 miles to 0.95 miles. Along with this two-mile reduction in travel distance to the eastern side of the Fairgrounds, there would also be an increase in the percent traveled by trail from 31% to 47%.

Access Points 8 and 9 provide direct access to The Evergreen State Fairgrounds. Currently, residents in Monroe who wish to visit the Fairgrounds must travel along US-2 to get to the main gate. Portions of US-2, particularly near the Fairgrounds, have no sidewalks and place pedestrians in a dangerous predicament as speeding traffic is feet away from the shoulder that must be traveled along to access 179th Avenue to get to the main gate. Furthermore, 179th Avenue does not have sidewalks for pedestrians either, making travel a potential danger for pedestrians. While the area around the Fairgrounds are not within Monroe city limits, there is an opportunity for collaboration between the City, Snohomish County, and WSDOT to promote a safer travel path to the Fairgrounds via the US-2 Bypass Trail Area.

[14] Travel distances from all neighborhoods to the Fairgrounds were measured to blue point 8. This provides a general picture of the impact of different access points, but does not account for the various destinations within the Fairgrounds.

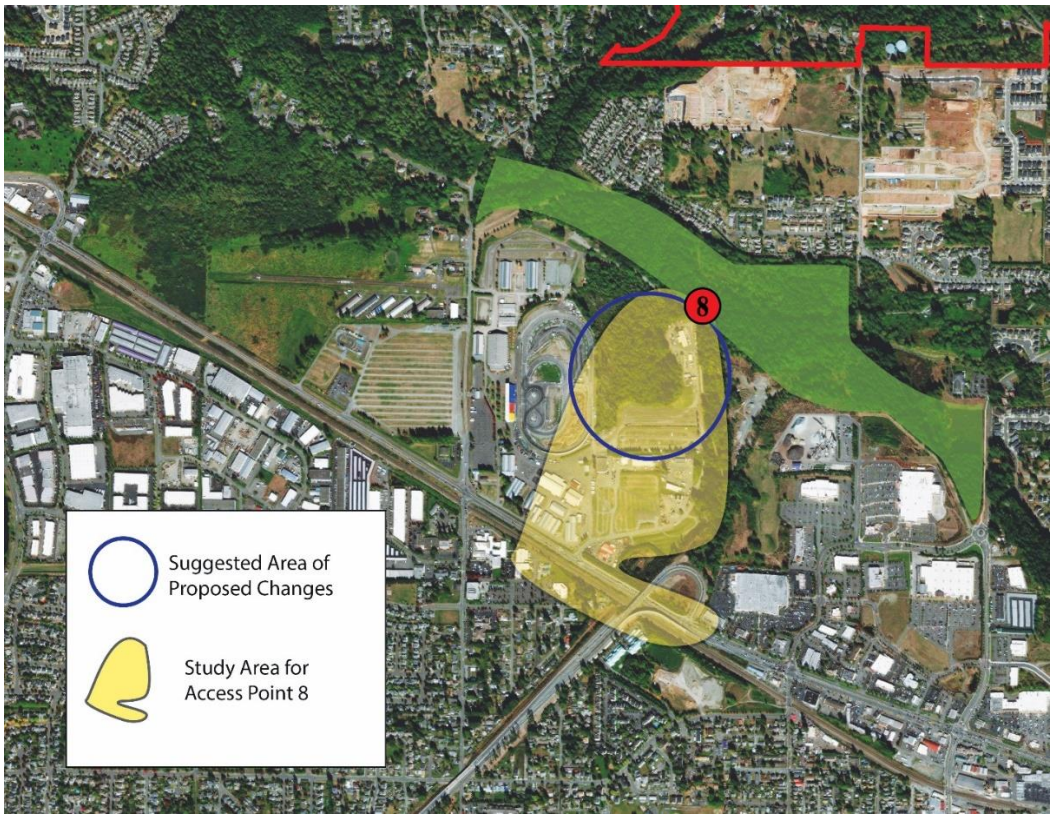


Figure 20: Access Point 8 and the study area surrounding it are focused primarily on the eastern portion of the Evergreen State Fairgrounds.

Access Point 8: Walking Survey Results

Students found the area behind the Fairgrounds to be safe and interesting, rating it as 8.6 for safety, 8 for comfort, and a 9.3 for interest. While the students found the trail behind the Evergreen State Fairgrounds to be interesting, comfortable, and safe, they did note that during the inclement weather they had to deal with a muddy travel route.

Key Improvements to Promote Access

- A trail from Access Point 8 to the northeastern side of the Fairgrounds that transits through Snohomish County land to The Evergreen State Fairgrounds as depicted in Figure 20.
- Alternate route recommendations: Sidewalks or a trail that drains well along Cascade View Drive and behind the Fairgrounds to keep residents clean during inclement weather.

Figure 21: Key improvements to Access Point 8 include a trail that transits through land that borders the eastern portion of The Evergreen State Fairgrounds (owned by Snohomish County) and the US-2 Bypass Trail Area.

Table 8: Access Point 8 Improvement Costs			
Key Improvements	Price / Qty	Qty Needed	Total Cost
Unpaved Trail	$121,390 / mile	1,533 feet	$33,244.00
Signage	$1,900 each	1	$1,900.00
		TOTAL COST	$35,144.00

Analysis of Potential Access Point 9

Justification for Access Point 9

Access Point 9 is ideal for residents who want to travel to the main gate of the Fairgrounds (see Figure 22). It provides a direct route across the greenway for residents in the Robinhood Lane and Tahoma Street neighborhoods through Access Points 1 and 2. This entrance provides the most direct route for all residents seeking to visit the equestrian exhibits and carnival area. For residents traveling from the Tahoma Street neighborhood, Access Points 2 and 9 dramatically reduce travel

distance and time. Under current conditions, residents must travel a circuitous route of 3.8 miles, or about 73.5 minutes to reach The Evergreen State Fairgrounds by foot. With the implementation of Access Points 2 and 9, the distance traveled will be reduced to about 0.65 miles, and about a 12.5-minute walk time. This will make a trip from Tahoma Street to The Evergreen State Fairgrounds much easier to walk than to drive. Improvements should be made to increase pedestrian and cyclist safety for residents who reside south of US-2 and want to travel to access the US-2 Bypass Trail Area. Additionally, any further development west of 179th Avenue will likely increase the demand for pedestrian usage of the trail area as well.

Access Point 9 gives horse enthusiasts the ability to access the trail for equestrian travel or warm-up prior to events at The Evergreen State Fairgrounds, an idea that appealed to residents during the fall, 2018, community meeting on the trail system.

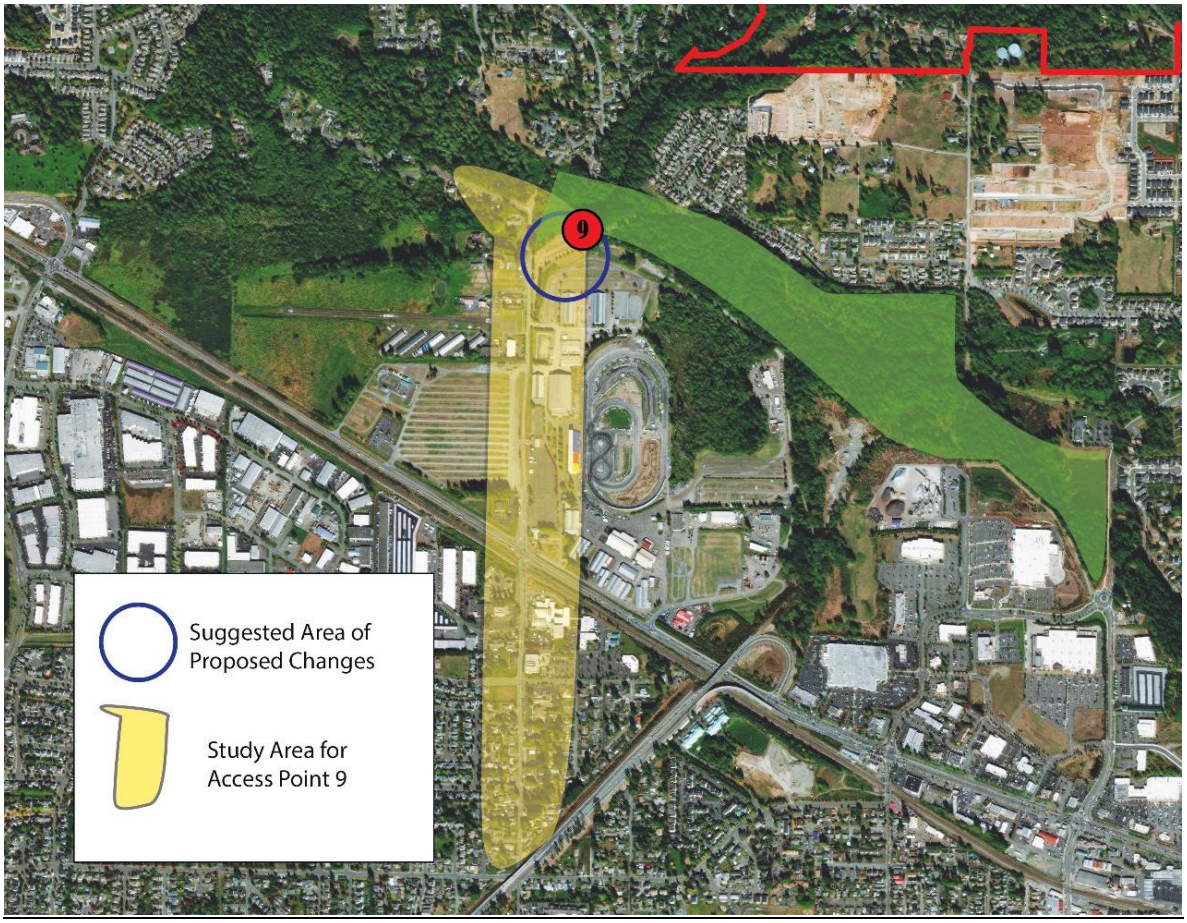


Figure 22: The area surrounding Access Point 9 is primarily located in the Robinhood Lane neighborhood and the northern portion of The Evergreen State Fairgrounds.

Access Point 9: Walking Survey Results

Students found the roadways surrounding the Fairground main entrance to be dangerous for pedestrians. Among the issues that were identified was a lack of sidewalks and a narrow bridge crossing along 179th Avenue from US-2 to the entrance, and a lack of sidewalks along US-2 adjacent to the Fairgrounds. Safety, comfort, and interest along 179th Avenue were ranked as the lowest for all three categories for any street within the study area. Students ranked 179th Avenue as 1 out of 10 for safety, 1 out of 10 for comfort, and 2 out of 10 for interest. Additionally, due to the lack of safe sidewalks and the presence of high-speed traffic, the surveyors did not attempt to walk along US-2 between 179th Avenue and the WA-522 Interchange.

Key Improvements to Promote Access

- Widening the right of way to accommodate a new sidewalk and bicycle lane for pedestrian and cycling connectivity.
- The inclusion of a pathway that is safe for equestrian activities will ensure that residents of Monroe who want to use the trail for horseback riding is essential at Access Point 9, as it will become the main access point for equestrian use.
- The implementation of Access Points 1 and 2 will provide a safe alternative for residents looking to walk to the Fairgrounds. Without implementation of all three access points, residents in Monroe must travel along unsafe pedestrian paths to walk to the Fairgrounds.

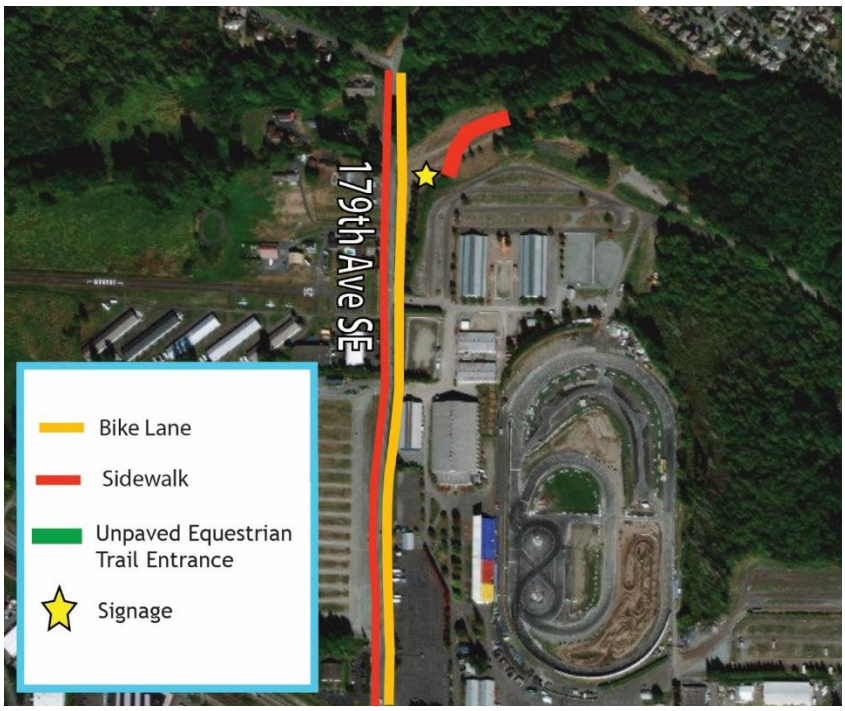


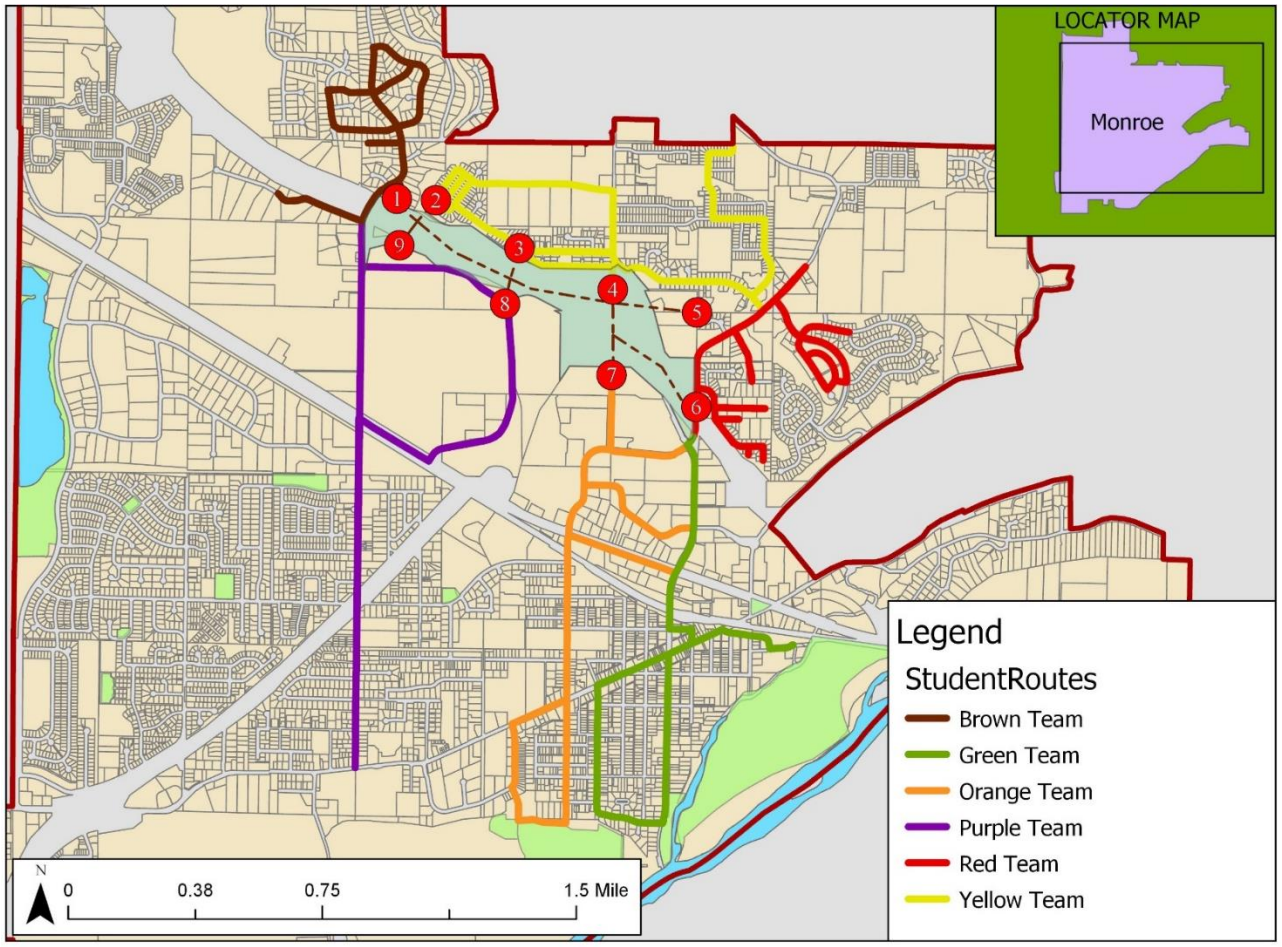
Figure 23: Key improvements to the area surrounding Access Point 9 include an equestrian-friendly trail entrance and the implementation of Access Points 1 and 2.

Table 9: Access Point 9 Improvement Costs			
Key Improvements	Price / Qty	Qty Needed	Total Cost
Lane Widening	$82,594 / mile	0.69 miles	$56,989
Unpaved Trail	$121,390 / mile	541 feet	$12,438.00
Sidewalk	$32 / linear foot	3,650 feet	$116,800
Bike Lane	$133,170 / mile	0.69 miles	$91,887
Signage	$1,900 each	1	$1,900.00
		TOTAL COST	$280,014.00

Conclusion

Currently, residents to the north and east of the project site have limited access to parks and trails. The implementation of multiple entrances to the US-2 Bypass Trail area will greatly increase park access for these residents, similar to levels found in the southern portion of the city. There are currently three large parks in the southern portion of Monroe, and the new trail will provide one in the northern portion of the city. Extending the bicycle infrastructure to connect the three parks in the south with the new US-2 Bypass Trail can create a larger trail system with connections for residents throughout the city. The new trail will also have the added benefit of expedient, non-motorized travel to shopping, retail, and the movie theaters for residents of all ages. Currently, the distance and time required to travel to shopping, recreation, and community events often requires a vehicle trip.

Appendix



Data: City of Monroe, WSDOT, WWU